

Validity and Reliability of Total Quality Management Questionnaire in Greek Primary Education Settings

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Abstract

Purpose - The purpose of the study was to develop a reliable measurement tool for the evaluation of TQM application in Greek education settings and to examine the factors that determine quality of education.

Research design, data, and methodology - A questionnaire commencing from the questions included in the Application Guide of Common Assessment Framework was used for research purposes. Each item was scored on a 5point Likert scale - to a sample of 112 educators (55 men, 57 women), all teachers working in public primary education schools. Factor analysis resulted in a questionnaire of 43 items consisting of five factors, teacher satisfaction, school management and operation, motivation, effectiveness of public school leadership and finance management.

Results - Results revealed a positive correlation among all factors. Reliability results using Cronbach's α was high ($\alpha=.961$) for all factors of the questionnaire ranging from $\alpha=.930$ (for motivation) to $\alpha=.797$ (for financial management). Additionally, ICC procedure revealed high values for the above mentioned factors.

Conclusions - The study resulted in the construction of a reliable questionnaire focused exclusively on TQM that can be used in future studies using larger samples in different areas so as to draw useful conclusions regarding TQM application in Greek education settings and further identify the factors determining quality in education.

Keywords: Total Quality Management, Teachers, Kalampka Area, Primary Education, Primary School Students.

JEL Classifications: I20, I21, I29

1. Introduction

Total Quality Management (TQM), as formulated by Deming in the early 20th century, has been extensively studied, developed, and applied with some variations to several countries so far during the last few decades. Its objective of customer service management in business section constitutes a broad concept, including many sectors and services (Neely, Gregory, & Platts, 1995), such as the effort toward success, implementation and most optimized result (Kollberg et al., 2005) as the main forces affecting the future of quality services provided (American Society for Quality, 1999).

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2. Literature Review

The discussion of TQM transition from business to education has been initiated during the 70s by international organizations such as U.N.E.S.C.O. and, in particular, in countries mainly U.S.A., Great Britain, and France, gradually attracting the interests of numerous educational officers (Bonser, 1992; Brigham, 1993; De Cosmo et al., 1991; Ewell, 1993; Heverly, 1994; Heverly & Comesky, 1992; Rhodes, 1992; Sherr & Lozier, 1991; Tribus, 1994) and teaching staff (Bostingl, 1992; Byrnes, 1992; Murgatroyd & Morgan, 1993; Morgan & Murgatroyd, 1994; Saylor, 1992). In an attempt to reinforce the humanistic character of education through the exploitation of positive management elements (Morgan & Murgatroyd, 1994), TQM has first been applied to school settings and been extended its use to the actual class conditions as a criterion of educational quality, joy, and pleasure that learning offers to all students (Tribus, 1993).

Early applications of TQM in education in Great Britain and North America have related to empower the user-student and to create consciousness of the user-supplier responsibility (Murgatroyd & Morgan, 1993). Although there are no data available to show exactly how many schools and colleges have officially adopted the TQM policy in several countries, it is a fact that the majority of educational organizations accepted TQM philosophy for the same reasons business corporations attempted to apply quality programs. Nowadays, modern education of all developed countries under the context of the new digital school reality, transform their operation so as to correspond to the requirements of a qualitatively upgraded services through the participation of all school associates, that is, students, teachers, parents, and local education authorities.

The Hellenic As a continuation of this effort to update Greek education, the Directorate of Quality and Efficiency proceeded with the development of evaluation instruments derived from the Application Guide of Common Assessment Framework (2007). Consequently, a total number of 195 questions included in the application guide have been evaluated through a self-assessment model according to 9 general criteria set by the European Foundation for Quality Management for the insurance of public quality and nonprofit organizations.

Nowadays, the issue of TQM implementation in Greek educational settings is more important than ever despite the gap observed between TQM theory and its real application, and educational tools serving this purpose should be developed. Nevertheless, a review of the literature seems that no relative research has been administered to explore this issue. Furthermore, neither has a factor analysis been ever conducted regarding the 195 questions included in the application Guide of Common Assessment Framework (Ministry of Internal Affairs, Public Administration and

Decentralization, 2007) in an attempt to formulate a new and more flexible measurement tool that could be used to evaluate TQM application in Greek educational settings.

Provision of continuous improvement of educational services for the most benefit of the students, parents, and teachers requires first to evaluate current situation through the creation and use of a reliable measurement tool that will lay the foundations for better organization, evaluation and redefinition of TQM objectives based on the actual conditions of Greek educational reality. Therefore, the purpose of this research was to develop a reliable measurement tool for the evaluation of TQM application in Greek education settings, commencing from the questions included in the Application Guide of Common Assessment Framework and to examine the factors that determine quality of education.

3. Methodology

3.1. Sample

The sample consisted of 112 participants (55 men, Mean Age = 46.02, SD = 8.41 and 57 women, Mean Age = 41.90, SD = 8.16), all teachers working in primary schools of Kalampaka educational region (<Table 1>). An official permission and approval was first provided by the Ministry of Education and the Pedagogical Institute (Φ15/295/21962/Γ 1) prior to the initiation of the research (see <Table 1>).

<Table 1> Average values (M) and standard deviations (SD) age of teachers (n = 112).

Participant's gender	M	SD	N
Mean	46.02	8.41	55
Women	41.90	8.16	57

3.2. Instrument

A questionnaire of 55 items was administered. Each item was scored on a 5-point Likert Scale, that is, from strongly disagree (1) to strongly agree (5) according to each statement and from very disappointed (1) to very satisfied (5), for items related to teacher satisfaction. Factor analysis resulted in a questionnaire of 43 items consisting of the following five factors explaining the 59.2% of total variance:

- Teacher satisfaction.
- School Management and operation in administrative, educational and collaborative level.
- Motivation to develop teaching skills.
- Effectiveness of public school leadership.
- Finance management.

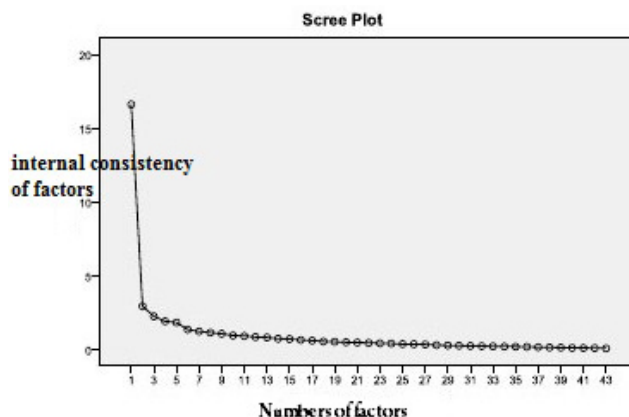
3.3. Process

First, the researcher with the assistance of 2 specialists selected fifty-five (55) items relevant to research purpose from a total number of 195 questions included in the application Guide of the Common Assessment Framework (2007). Next, the questions were given to two independent research experts to check content validity (Schmitt & Landy, 1993). The questionnaire has then been administered to 4 teachers (2 males and 2 females) who have been asked to complete and report their observations with regards to relative issues which emerge in completing and understanding. This process led to the removal of 12 questions with the final version of the questionnaire consisted of 43 items as administered for completion to research participants in primary schools (see Appendix A).

The study was approved by the University Review Board and informed consent was received from all participants' prior program initiation. All participants received confirmation that the questionnaire was anonymous and confidential and that their participation in research was voluntary. Total time to fill in the questionnaire ranged from 10 to 15 minutes depending on each case.

3.4. Statistical Analysis

Statistical analysis included the use of the Statistical Package for Social Sciences (SPSS 15, Chicago, IL, USA) and included factor analysis of the questionnaire, correlation analysis (Pearson *r*) among variables and Cronbach's α reliability analysis, and ICC to assess internal consistency of factors.



<Figure 1> Scree Plot of Factor Analysis.

4. Results

4.1. Factor Analysis

Exploratory factor analysis with principal factors extraction method (with varimax rotation) was used to examine validity. The Scree-plot advocated the retention of five factors with eigenvalues greater than one (see <Figure 1>). Questions with a load greater than .40 were considered to charge in a particular factor (Bortz, 1993). The five factors emerged, explaining the 59.16% of total variance (KMO = .88, Bartlett's Test of Sphericity = 3375.60, $p < .001$) (see <Table 2>).

<Table 2> Loading of factors using principal factors extraction method with varimax rotation

Factors	F1	F2	F3	F4	F5	M	SD
F1 Teacher satisfaction							
20. I think that parents with an overview of the public school are:	.563					3.00	.900
22. Parents of public school as their access to the structures of the school are:	.462					3.09	.722
23. The parents of public school to programs and services of the school are:	.735					3.08	.840
24. I think the approach of the citizen-parent from the school is so good that enhances the overall image of the school.	.710					3.04	.900
25. I think the approach of the citizen-parent from the school is so good that encourages participation.	.619					3.13	.871
26. I think the approach of the citizen-parent from the school promotes the effectiveness of programs and services.	.566					3.03	.875
27. ...the image of the public school	.585					2.78	.908
28. ...the performance of public school	.699					2.96	.986
29. ...relations of the public school with society and citizens	.544					3.21	.969
30. ... the extent of my participation in the operation of public school	.461					3.54	.848
31. ... management and management systems	.449					2.91	.926
41. I think that public schools work effectively to achieve their objectives.	.695					2.98	2.98

Factors	F1	F2	F3	F4	F5	M	SD
F2 School management							
5. ... collects information relevant to current and future needs of fellow-members		.777				2.69	.940
6. ... plans and develops the strategy and planning		.708				3.19	.899
7. ... implement the strategy and planning		.610				3.10	.968
8. ... administrate and improve its educational potential		.612				2.98	.977
9. ... use the skills of teachers by harmonizing people and groups		.564				2.92	.969
10. ... encourage the dialogue between educational and administrative staff		.624				2.99	.963
11. ... develop partnerships with other public institutions		.696				3.13	.865
12. ... develops partnerships with parents / citizens		.469				3.18	.681
18. ... provides services and develops programs involving parents / citizens		.500				3.02	.890
19. ... adopt innovative ideas leading to the modernization of procedures		.588				2.83	.939
F3 Motivation							
35. ... to satisfying			.753			3.42	.955
36. ... to performing			.824			3.55	.948
37. ... to developing skills			.802			3.37	.986
38. ... to motivating			.833			3.47	.977
39. ... to participating			.817			3.57	.927
40. ... in the cultivation of students' social responsibility			.650			3.58	.926
41. ... in developing environmental awareness among students			.698			3.78	.744
F4 Effectiveness of leadership							
1. in terms of school's mission and values				.516		3.29	.983
2. in terms of developing and implementing a system of school administration				.598		3.21	.864
3. To support employees and motivate them to act as role models				.679		2.88	.950
4. ... managing relationships with politicians and other influential groups				.582		2.79	.922
15. ... effectively manage the technology				.597		3.11	.924
32. ... working conditions in public school				.410		3.00	.968
33. ... career opportunities provided by the public school				.502		2.69	.930
34. ... the opportunities given for developing my skills				.612		2.83	.967
43. I think the function of public school leads to the correct execution of the financial management of the school budget.				.535		3.14	.919
F5 Financial management							
13. ... adequately manage the distribution of knowledge					.427	3.18	.851
14. ... responsibly manage the financial affairs					.779	3.48	.920
16. ... preserves and manages its buildings and assets					.612	3.59	.812
17. ... simplifies and efficiently manages the procedures by which it operates					.633	3.26	.836
21. The parents of public school in their participation in the activities of the school are					.480	3.10	.722
Eigenvalues of factors	8.90	3.25	2.50	2.19	1.80	20.19	
Explanation of the variance in %	26.19	9.57	7.36	6.44	5.28	59.16	

4.2. Correlation and Internal Consistency of Factors

Cronbach's α analysis revealed high internal consistency of the questionnaire (Cronbach's $\alpha = .961$) and items expressing each factor. In addition, ICC statistical analysis

established reliability of items. Pearson's r analysis revealed a positive correlation between teacher satisfaction and school management $r = .688$ ($p < .001$) and between motivation and effectiveness $r = .508$ ($p < .001$) (see <Table 3>).

<Table 3> Internal Consistency and Correlation of Factors

Factors	1	2	3	4	α	ICC ¹
1. Teacher Satisfaction	-	-	-	-	.920	.490
2. School management	.688**	-	-	-	.898	.467
3. Motivation	.642**	.536**	-	-	.935	.673
4. Effectiveness of leadership	.668**	.652**	.508**	-	.848	.411
5. Financial Management	.640**	.577**	.527**	.575**	.797	.440

** $p < .001$, ICC: Intra-class Correlation Coefficient

5. Discussion – Conclusions

The main purpose of this study was to evaluate the psychometric properties of the Greek version of Total Quality Management Questionnaire (TQM-Q-GR). Results revealed that the validation of TQM-Q-GR was conducted successfully, carefully following the specific procedures described in published guidelines (Schmitt & Landy, 1993). The present study involved teachers from different administration positions so as to conduct reliability testing. The questionnaire exhibited a very good to high reliability since ICC and Cronbach's α analysis ranged from $\alpha = .797$ to $\alpha = .935$, showing that it is a valid and reliable assessment tool to apply in Greek education settings.

The results showed that satisfaction of primary school teachers regarding their current working environment is directly dependent on motivation provided by school administration to develop their skills as well as their perception about the effectiveness of school management and operation at all levels. The results agree with Imai's assertion (1986) that school administration should first start with how to motivate and transmit to teachers a force of constant improvement through the processes of planning, communication, participation and facilitation of school programs.

Hence, it is vital to recognize and define quality criteria for curricula, research, production of educational material, scientific support, and teaching so as to avoid continuation of a deep - rooted detrimental situation that causes concern to novice teachers and also to provide continuous education and training to experienced teachers who are not necessarily familiar with modern TQM approaches in education settings. According to Scholtes (1998), the inability to understand TQM by everyone involved in the education process can be interpreted as the result of individual failure for monitoring the events, with teachers seeing the symptoms and not the deep causes of the problem without understanding that a mediation in a "part" of the school environment can cause damage to another "part" at different times.

It seems that the distribution of power and responsibility at management level remains the bureaucratic organization that relies on known administrative authority of the Fayol (1949) "cascade", according to which the power comes from

the person in charge of the national education construct, that is, the Minister of Education and ends up to the leader of the school, that is, the school director. With regard to the Greek administrative system in education, there is a shortage of formal evidence showing that maximum school benefit is based on the utilization of existing human resources.

However, findings did show that teachers seem to lack motivation when few material resources are available, school administration seems inflexible, complicated, and inefficient and there is no extra rewarding wage for extra hours of work in Greece nowadays. The fact that there is also no sanction in case of failure maintains and worsens a pathogenic condition that rules out even the outdated 'classical' approach, let alone TQM.

According to Saitis (2005), to achieve TQM requires a minimum effort that must be done to renovate the current educational situation and to attempt an evaluation of the existing administrative system under a new qualitative view. The majority of educational community nowadays supports less the type of manager as an administrator who focuses on compliance and administrative arrangements and seeks more the type of manager who focuses on creating a good climate, developing interpersonal relationships, and satisfying individual needs of teaching staff. Motivation of human resources depends on the leadership development of any organization or business, since leadership as the typical organizational characteristic identifies the "element" (what is) and the "becoming" of the organization. Unfortunately, decisions regarding the organization and operation of schools are taken only by the Ministry of Education, without taking into account the recommendations of local education communities (Typas, 1999).

Surely, this study appears to be the first of its kind in Greece, so it is limited by its exploratory nature. The major limitation of research concerns the small sample of primary school teachers surveyed from suburban areas; thus, generalization of results cannot be made. The strong point of this study includes the construction of a reliable questionnaire focused exclusively on TQM that can be used in future studies using larger samples in different areas and education levels so as to draw useful conclusions regarding TQM application in Greek education settings.

Quality in education can be achieved only when its importance and use on both personal and working level are comprehensible. The notion of continuous self-improvement must become a philosophy and attitude in life, creating progressive, reflective, spiritually free citizens who can face the socioeconomic challenges of each era. Continuous improvement is important in a society that is constantly evolving, so as to create a change for the better and modernize the administrative education system through the TQM application and an equal distribution of authority between government educational policies and local education communities.

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