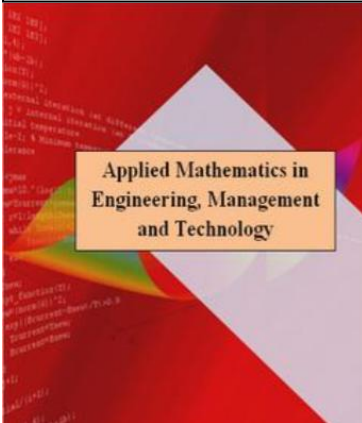


## Presenting a model for the establishment of total quality management in girl public high school in Tehran

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### Abstract

Total quality management is a kind of management culture that becomes a tool for the exploitation and utilization of all human resources, finance, technology, etc. in a country after being institutionalized in educational organizations. Hence, the present investigation was aimed to present a model for the establishment of total quality management in girl public high school in Tehran in the academic year of 2012-2013. The present investigation was practical in terms of objectives, descriptive-survey in terms of nature and a quantitative one. The population consisted of 364 managers and 7241 teachers in which 384 individuals were chosen using simple random sampling method and according to Kerjcy and Morgan table. The research tool was a researcher made questionnaire, which the experts approved its validity and its reliability was calculated by Cronbach's alpha coefficient (0.82) and approved. In order to test the research hypotheses and fit the designed tool, structural equation modelling and

LISREL software were used experimentally. The results demonstrated that the components of commitment, customer-focus (customer satisfaction), partnership and cooperation, continuous education and improvement and the dimension of realism affect the establishment of total quality management in schools.

Keywords: total quality management, continuous improvement, schools, education, customer-focus

### Introduction

Education system, as the most significant investment in human resources, nowadays is responsible for prosperity in the society. The society allocated a significant part of the budget of every country to itself. According to the importance and role of education in the economical, social, cultural and political dimensions of a society, it is necessary to conduct serious and fundamental measures in order to improve the quality of education systems and prevent loss of human and financial capital (Courtney, 2008).

Education in a systematic system can play an important role in transferring knowledge and skill in any society and country. Education can be based on national needs and the promotion of culture and knowledge of modern management when a management system considering customer-focus and quality-oriented approach is developed. In this respect, educational management system and structure are under consideration of the quality management system. Education systems such as schools are as a bridge between producers of knowledge, and scholars demand serious changes in order to responses to social, political, economic and cultural changes. Total quality management is a method to bring this evolution to the education (Lawrence, 2006). In fact, TQM is to manage an organization that is based on the quality and involvement of all the members and its objective is to achieve long-term success through customer satisfaction and meeting the interests of all stakeholders (Vouzaz and Psychogios, 2007).

This paradigm came into the education literature from the industrial sector and its findings can help the organization in solving crises and educational issues. As it is obvious, if we use students instead of customers in the mentioned definitions, we can achieve the definition of TQM in schools, because as we said before, customer can be referred to students who use services in schools. Customers, education system stockholders and students' status are mentioned in figure 1.

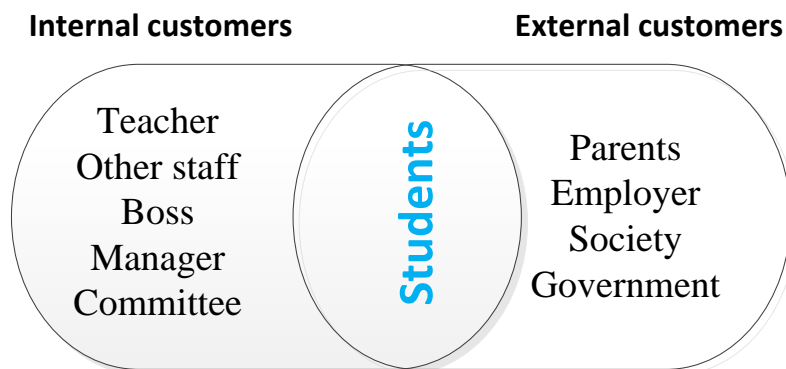


Figure 1. Customers, education system stockholders and students' status

Some of the renowned researchers in the field of TQM such as Bayernz, Bastingel, Mugart roid and Tribass Niz believe that TQM is a philosophy of continuous improvement that can provide a set of practical tools and techniques in order to meet the needs, wants and expectations of current and future educational institution. Considering that, organizations and educational units are the main and determinant factors of preparation and supply of human resources for other manufacturing and service organizations in the community, need to study and implement the principles of total quality management in education is felt more than ever. At the present moment, it is the most important topics in education centers in the united state, Britain and Canada, and they employed standard methods for the implementation of tests and curriculums and associated trainings through this way (Predergast, 2001).

Many principles have been presented for total quality management that any organization should choose a set of principles according to its activity and organizational environment. Some of the most important dimensions are mentioned in table 1.

**Table 1. principles of TQM**

Researcher, year	Dimensions	Resource
Deming (1986)	1) Creation of a sustainable determination and will for continuous improvement of products and services by planning, 2) Acceptance and employment of new philosophy by the senior management and employees, 3) Ending the product inspection and the replacement of quality creation in the process, 4) Purchasing items and raw materials from a resource without considering the principle of only low price, 5) Considering continuous improvement and optimization of processes in order to reduce waste continuously, 6) Establishment of job training for employees and managers, 7) Establishment of novel leadership styles, 8) Eliminating fear from the organization, 9) Eliminating distances and obstacles between different sectors, 10) Refraining from chanting, preaching, and goal setting for employees, 11) Eliminating quantitative goals for employees and managers, 12) Eliminating obstacles that prevent the employees from sense of proud of their job, 13) Encouraging the employees to improve their knowledge and culture and promoting the culture of self-learning and self-improvement 14) commitment to quality and efficiency and changes.	(Kazemi and Hushyar, 2009)
Saraf et al. (1989)	1) Senior management leadership, 2) Role of quality sector, 3) Education, 4) Product design, 5) Supplier quality management, 6) Process management, 7) reporting quality data, 8) employees relationship	(Saraph, Benson and Schroeder, 1989)
Flynn et al. (1994)	1) Supporting of senior management, 2) Employees management, 3) Quality information, 4) Involvement of suppliers, 5) Product design,	(Flynn, Schroeder and

	6) Process management, 7) Involvement of customers	Sakakibara, 1994)
Zeitz et al. (1997)	1) Supporting of managers, 2) Using data and information, 3) Supplier's relations, 4) Improvement of employees, 5) Emphasizing on customers, 6) Supervision	(Zeitz, Johannesson and Ritchie, 1997)
Rajabbeigi and Salim (1995)	1) Commitment, 2) Customer-focus (customer satisfaction), 3) Realism, 4) Involvement and cooperation, 5) Continuous education and improvement	(Rajabbeigi and Salim, 1995)
Tamimi, 1994	1) Commitment of senior managers, 2) Supervision leadership, 3) Training of employees, 4) Operational communication for quality improvement, 5) Supply management, 6) Quality training, 7) Innovation in products/services, 8) Providing insurance for employees	(Tamimi, 1994)
Joseph et al. (1999)	1) Organizational commitment, 2) Human resource management, 3) Involvement of supplier, 4) Quality policy, 5) Role of quality sector, 6) Information systems of quality, 7) Using technology, 8) Operational procedures, 9) Training	(Joseph, Rajendran and Kamalanabhan, 1999)
Motwani, 2001	1) Commitment of senior managers, 2) Evaluation of quality and patterning, 3) Process management, 4) Product design, 5) Employees training and empowerment, 6) Supplier quality management	(Motwani, 2001)

According to the quantitative increase in the number of students and lack of facilities and quality resources in education, and since establishment of TQM in educational systems through employing scientific approaches in the development of learning-teaching process helps with the continuous improvement of processes and increase in the quality of education, studying the role of TQM in Iran's education is very important.

According to the present investigation was conducted in the schools, which is a service organization. Rajabbeigi and Salim's sextuplet principles (1995) including commitment, customer-focus, employee involvement, training, continuous improvement and realism were used as the dimensions of total quality management. Generally, we aim to present a model for the establishment of total quality management in girl public high school in Tehran. Therefore, the conceptual model of the research is figured in the following.

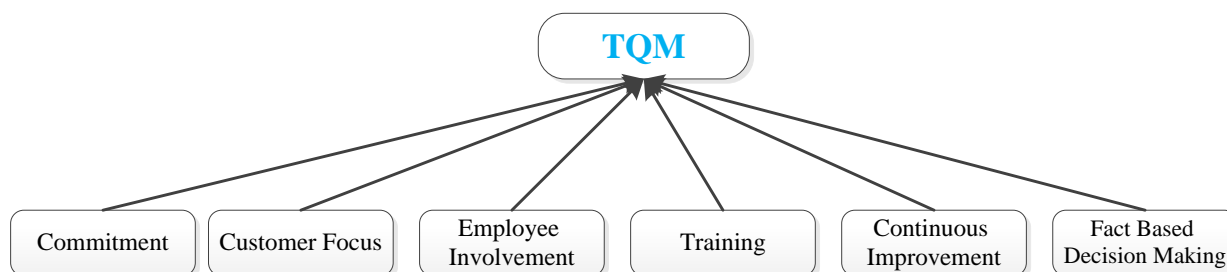


Figure 2. Conceptual model of the research

Based on the model, the research hypotheses are mentioned in the following.

- 1- Commitment affects the establishment of TQM in girl public high school in Tehran.
- 2- Customer-focus affects the establishment of TQM in girl public high school in Tehran.
- 3- Involvement and cooperation affects the establishment of TQM in girl public high school in Tehran.
- 4- Training affects the establishment of TQM in girl public high school in Tehran.
- 5- Continuous improvement affects the establishment of TQM in girl public high school in Tehran.
- 6- Realism affects the establishment of TQM in girl public high school in Tehran.

## Methodology

In fact, several indices are used to measure fitting models, but three to five indices are usually adequate to confirm the model.

1- *Chi square statistic* ( $\chi^2$ ): The value of chi square and degree of freedom in the present investigation were 110.88 and 51, respectively and the ration is less than three, which shows the adequacy of the model.

2- *Root Mean Square Error of Approximation (RMSEA)*: generally, while the value of this statistic is less than 0.05, the model is well fitted. While the value is between 0.05 and 0.08, between 0.08 and 0.1, and more than 0.1 the fitting is good, acceptable and not good, respectively. For the mentioned model, the RMSEA is equal to 0.055, so it has a good fitting.

3- *Absolute Fit Indices*: these indices are Goodness of Fit Index (DFI) and Adjusted Goodness of Fit Index (ADFI). The value of these two indices should be between 0 and 1, and the fitting is acceptable when they are more than 0.9. GIF is usually suggested for absolute fitting. It is equal to 0.91 in the present investigation, which shows that the model fitting is acceptable.

4- *Indices of relative fitness*: these indicators show that how much the fitting of the model is appropriate with respect to the baseline model, which is in fact an independent model. The calculated NFI for the present investigation was equal to 0.92, which shows that the model is well fitted.

In working with the LISREL software, any of the calculated indices are not lonely reasons for the fitting or lack of fitting of the model, but they should be analyzed together. The mentioned results are presented in table 2. The adequate value of these coefficients shows that the model fitting is acceptable.

Table 2. Fitting measures

Fitting measure	Optimal level	Abbreviations	Calculated value
Chi square to degree of freedom	$\chi^2 / df < 3$	$\chi^2 / df$	2.174
Root Mean Square Error of Approximation	Less than 0.08	RMSEA	0.055
Comparative of Fit Indices	Close to 1	CFI	0.97
Goodness of Fit Indices		GFI	0.91
NFI		NFI	0.92
Adjusted Goodness of Fit Index		AGFI	0.83

$$\chi^2=110.88 \text{ and } Df=51$$

### Structural validity analysis using confirmatory factor analysis

According to the results of factor analysis, it could be said that which index plays an important role in the measurement of the research constructs and which does not. The factor loadings related to each of the dimensions are mentioned in table 3.

Table 3. factor loadings

Priority	result	sig	t-statistic	Factor Loadings	observed variable	Hidden variable
3	significant	0.01>	fix	0.71	Participation in activities related to quality improvement.	Q1A
2	significant	0.01>	9.22	0.74	Comprehensive understanding of quality enhancement processes	Q2A
4	significant	0.01>	8.80	0.70	Awareness of the benefits of change and implementation of new projects and losses from its non-performance	Q3A
1	significant	0.01>	8.84	0.88	Commitment to changes related to correction in procedures and preventing errors	Q4A

4	significant	0.01>	fix	0.90	Use a variety of effective methods for getting feedback from clients	Q5A	Customer Focus
2	significant	0.01>	9.93	0.93	Welcoming clients' new idea	Q6A	
3	significant	0.01>	7.58	0.92	Conducting survey of clients and promote it continuously	Q7A	
1	significant	0.01>	8.83	0.95	Reviewing and considering opinions, expectations and demands of clients to improve processes	Q8A	
2	significant	0.01>	fix	0.79	Existence of spirit of partnership and teamwork	Q9A	Employee Involvement
3	significant	0.01>	9.71	0.74	Doing activities with teams and workgroups	Q10A	
1	significant	0.01>	6.43	0.80	Using consultative and participative management styles	Q11A	
4	significant	0.01>	8.78	0.70	Considering suggestion system	Q12A	
2	significant	0.01>	fix	0.74	Necessity to provide necessary trainings for managers and employees	Q13A	Training
4	significant	0.01>	8.65	0.65	Being pre-determined of educational goals	Q14A	
3	significant	0.01>	6.83	0.70	Annual evaluation of educational programs	Q15A	
1	significant	0.01>	8.24	0.89	Paying attention to the empowerment of managers and employees	Q16A	
1	significant	0.01>	fix	0.90	Setting goals for continuous improvement activities	Q17A	Continuous Improvement
2	significant	0.01>	7.99	0.82	Continuous implementation of activities related to process improvement and improvement of the quality	Q18A	
3	significant	0.01>	7.11	0.79	Annual evaluation of programs and activities	Q19A	
4	significant	0.01>	7.70	0.63	Modification of expensive and time consuming activities	Q20A	
1	significant	0.01>	fix	0.86	Making decisions based on data collection	Q21A	Fact Based Decision Making
3	significant	0.01>	9.11	0.65	Paying attention to the problems and identifying its roots and causes	Q22A	
4	significant	0.01>	7.09	0.63	Employing methods of decision-making from the bottom to up	Q23A	
2	significant	0.01>	8.63	0.77	Using appropriate methods to improve and promote processes	Q24A	

\*\* All factor loadings are at 99% confidence level

According to the results, it could be said that all of the indices have significant weight for all dimensions and have significant factor loadings at 99 percent confident level (t-statistic is out the interval (-2.58, +2.58). It is also possible to rank and prioritize the factors affecting TQM system in girl public high school in Tehran. Structural equation modelling in the state of standard coefficient estimation is presented in figure 3.

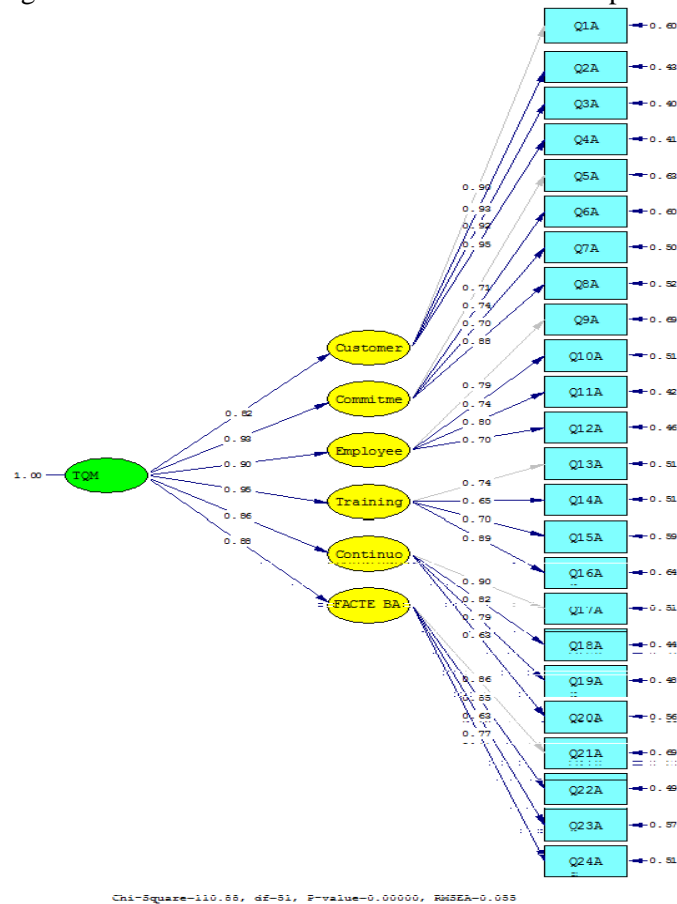


Figure 3. The research model in the state of standard coefficients estimation

All variables are converted into two categories of hidden and observed. The observed variables (rectangular) are measured directly by the researcher, while hidden variables (elliptic) are derived based on the relationships or correlations between the measured variables. The hidden variables indicates a set of theoretical structures such as abstract concepts that are not directly observable and are made and observed by other observed variables. Hidden variables in turn are divided to endogenous or downstream variables, and exogenous or upstream variables. Each variable could be an endogenous or exogenous variable in a structural equation modeling. Endogenous variable is a variable that is affected by the other variables in the model. Exogenous variables, on the other hand, are not only effected by other variables in the model but also effect on the other variables. The variable of the attitude of high school students is exogenous in the present study. Numbers and coefficients are divided into two categories in this figure. The first category is the first-order measured equations that are the relationship between the exogenous and endogenous variables. These equations are named factor loading. The second category is the structural equations, which are the relationship between the exogenous and exogenous variables and are used for the hypothesis test. These coefficients are called path coefficients. According to the model, factors loading and path coefficients can be estimated in the state of coefficient estimation. Based on the factors loading, the index that has the highest factor loading has grater contribution in the measurement of the variable and the index that has lesser loading factor has smaller contribution in the measurement of the structure (Hooman, 2009).

Figure 4 shows the research model in the case of meaningful coefficients (t-value). This figure tests all of the measurement equations (factors loading) and path coefficients using t-statistic.

According to this model, factor loading and path coefficient are meaningful at 95 percent confidence level if the t-statistic is outside the interval (-1.96,+1.96) and are not meaningful if it is inside this interval. While the t-statistic is outside the interval (-2.58, +2.58), the loading factor and path coefficient are meaningful at 99

percent confidence level. The factor loading and path coefficient are all meaningful at 99 percent confidence level according to the results obtained from the t-test and plays a significant role in the measurement of their constructs.

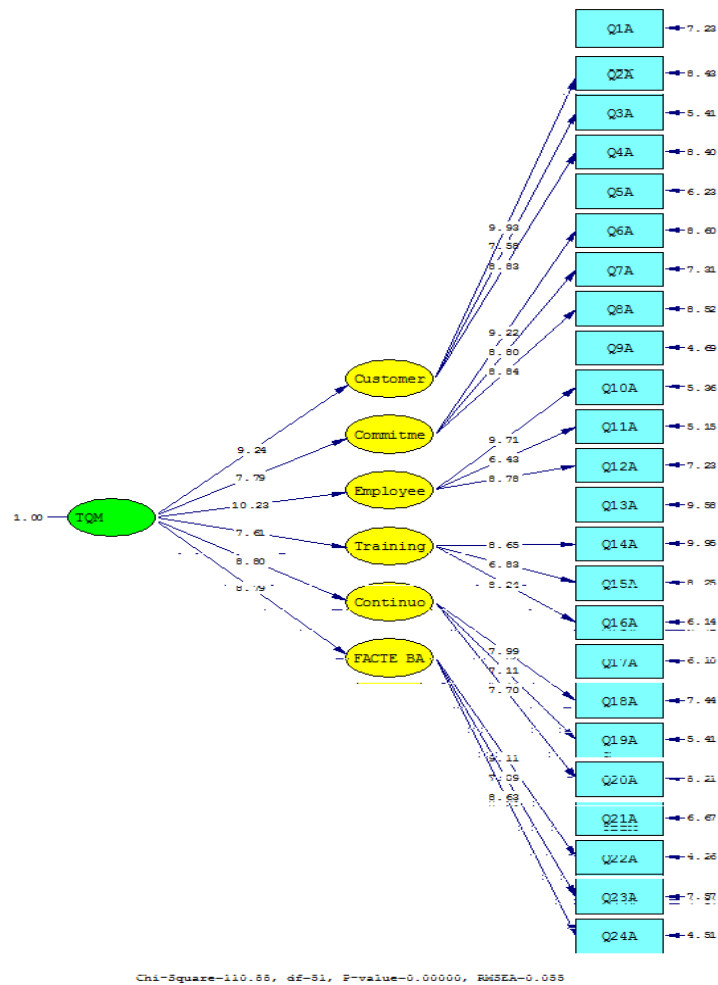


Figure 4. The research model in the case of meaningful coefficients (t-value)

Another kind of the Hidden variables in Structural Equation Modeling is of kind of direct effect. Direct effect, which is a component of Structural Equation Modelling, shows a directional relationship between two variables. These types of relationships are usually assessed by on ANOVA analysis. This type of effect in fact reflects the assumed linear causal effect of one variable on another. Each direct effect, in a modeling, determines and expresses a relationship between a dependent variable and an independent variable. Although an independent variable could be a dependent variable in another direct effect, and vice versa (Hooman, 2009). Path coefficient, t-statistic and the result of research the hypotheses is presented in table 4.

Table 4. path coefficient, t-statistic and the result of research hypothesis

Research hypothesis	Sig	t-statistic	Path coefficient	result
Customer Focus → TQM	0.01>	9.24	0.82	approved
Commitment → TQM	0.01>	7.79	0.98	approved
Employee Involvement → TQM	0.01>	10.23	0.90	approved
Training → TQM	0.01>	7.61	0.96	approved
Continuous Improvement → TQM	0.01>	8.80	0.86	approved
Fact Based Decision Making → TQM	0.01>	8.79	0.88	approved

According to the results, since t-statistics in hypotheses 1 to 6 were out the interval (-2.58, +2.58), they are confirmed at 99% confident level. According to the positive standard coefficient, it could be said that the types of relationships between variables were direct and in the same direction.

## Conclusion

Total Quality Management (TQM) is a kind of management culture that becomes a tool for the exploitation and utilization of all human resources, finance, technology, etc. in a country after being institutionalized in educational organizations. TQM is fundamentally aimed to provide appropriate structures for the exploitation of experience, talent, intellectual capacity and physical resources of educational organizations, and help the organization management automatically in order to utilize the existing power and inherent capabilities of educational agencies. The mission of the management of educational organization is to benefit from the potential of employees. This is done through total quality management system easily, and all educational agencies are responsible for quality, teaching and learning instead of one individual or unit, so all the individuals are involved in the work and the abilities of the employees are used at different levels. TQM employs the employees' ability in all activities and processes, and penetrates contribution to the depth of an organization tangibly and operationally.

Despite being common in all fields, realization of employing TQM is more prevalent in companies and some service organizations, and there is less conducted investigations about the implementation of TQM in some fields such as education, researches, or consultation. Therefore, according to the comprehensiveness of concepts and objectives of TQM in the necessity to achieve high quality, the present investigation was aimed to extend this excellence system to other educational systems in order to achieve acceptable results through using the employed qualitative models, combining it with effective measures in improving the learning process and testing it in female high school in Tehran. Hence, effective dimensions on the establishment of TQM are presented in six dimensions and hypotheses.

Based on the findings, the hypotheses could be interpreted and explained as the following.

It was demonstrated in the first hypothesis that the dimension of commitment affects the establishment of TQM in girl public high school in Tehran.

In TQM, all the employees should take part in improving quality. Improvement is not possible without collective participation. Every body should realize the advantages and necessities of improvement. However, senior managers should be committed to changes and quality improvement before the employees. Since management helps the organization's attempts and makes them happen with the support of TQM, commitment of senior management is necessary. Commitment in teachers should be created after creating commitment in managers. It is obvious that teachers' role is more important, because they are directly involved in learning-teaching processes and communicate with the students directly.

Recommendations:

- Managers and teachers should be involved in activities related to quality improvement.
- Managers and teachers should be committed to changes that are conducted in order to correct the procedure and avoid errors.
- Managers and teachers should have continuous and obvious support in the establishment of methods and activities related to TQM.
- Managers and teachers should have comprehensive understanding of quality improvement. This can be done through reading and observing, and visiting successful activities and experiences of other managers. They should recognize appropriate programs and patterns, and implement them with respect to the condition of their school after comprehensive evaluation and investigation.

It was demonstrated in the second hypothesis that the dimension of customer focus affects the establishment of TQM in girl public high school in Tehran. Manufacturing and service organizations nowadays consider the level of customer satisfaction as an important criterion for measuring the quality of their work, and this is an increasing trend, as about 30% of the total points in Malcolm Baldrige National Quality Award is assigned to customer satisfaction. Organizations, whether service or manufacturing, deal with customers and must get their consent. Primarily, students are the customer in education systems such as schools, and parents and even society are in the next levels, which survey should be conducted of them in addition to being familiar to them in order to fulfill their opinions. It is better to change the standards and criteria based on their needs and concerns.



**Recommendation:**

- Managers and teachers should welcome customers' new and novel opinions.
- Managers and teachers should investigate customers' opinions, expectations and needs in order to promote the process.
- School administrators should consider customers' opinions in organizational planning.
- Managers and teachers should utilize different and effective methods in order to get feedback from customers.
- Paying serious attention to the educational needs of students in school such as library, prayer room, scientific workshops, laboratory, appropriate playground and sport facilities.
- Developing and strengthening of good human relationships among staff, students, and parents through compassionate guidance and leadership of the manager as the main director in the school.
- Managers and teachers should conduct survey of students constantly and promote it gradually.

It was demonstrated in the third hypothesis that the dimension of realism affects the establishment of TQM in girl public high school in Tehran. Decisions should be based on realities that obtain through collecting information and statistics. Therefore, this kind of approach to management is called pragmatic management. Results-oriented management only depends on results and does not pay attention to the procedures. Hence, quality of work, cost of doing and improvement of procedures are not paid attention. Eventually, short-term visions are replaced with long-term insight. In TQM, special attention is given to the problems, they are analyzed thoroughly and solutions are provided by employees involvement. This kind of management does not pay attention to immediate solutions that are superficial and based on speculation. Hence, necessary tools are utilized in order to collect data and analyze them, continuation of solutions, conclusion of solutions, and implementation of newly designed procedures. This tool is simple and can be explained to all employees, and they can employ it easily. The important point in Total Quality Management is that it is agree with any quantitative goal setting, because there would be any possibility for planning. This kind of management is invalid without providing reasonable and logical method for implementation. Therefore, we should be cautious about both the results and method of implementation and quality improvement.

**Recommendations:**

- Managers should make their decision based on realities they obtain through information and statistics collection.
- Managers and teachers should pay special attention to problems and they should be analyzed thoroughly.
- Managers and teachers should specify the school's problems and category them based on priorities using proper tools.
- Identification of all major, supportive and managerial processes in schools, and goal setting and measuring them
- Managers and teachers should use proper and useful methods in order to improve the processes.
- In order to utilize TQM in educational systems, decision-making should be from bottom to the top, and the managers and teachers do not make their own decisions. Because, the teachers are close to the students, deal with them and know their problems and demands better.
- Providing quality in schools demands pre-specified objectives that should be in line with the objectives of the ministry of education. The objectives of the ministry of the education are very general and managers should look at them based on courses and generally, and determine the specific objectives and the details.

It was demonstrated in the fourth hypothesis that the dimension of cooperation and involvement affects the establishment of TQM in girl public high school in Tehran. Based on Padhi (2008), team working is of factors of TQM in order to succeed in business. Team working leads to better solution to the problems and issues. Team making can be done best in TQM, and involvement and cooperation of the employees can be of the ways of suggestions system.

**Recommendations:**

- The school administrator should choose their leadership style based on participation in addition to paying serious attention to the management of human relations in school administration in order to penetrate into the heart and soul of the staff and students.
- Managers should appreciate the employees' opinions, and encourage their opinions, ideas and interesting suggestions.
- School administrations should reward the teachers and employees for their good behavior. This leads to increase in their positive results. The administrator should also reward for novel and highlighted activities,

applicable creativity, work simplification, work quality, teamwork and effective behaviors. This reward could be either spiritual or financial.

- Instructing and guiding teachers towards innovative teaching, utilizing cooperative learning by the students themselves and using teaching methods such as brainstorming in order to empower the students.
- Managers and teachers should pay special attention to schools' suggestion System.
- Managers and teachers should employ teams and workgroups in carrying out activities and strengthen the spirit of partnership and teamwork in schools, which the culture of teamwork can be transferred to the students by it.
- Enhance the quality of teachers' council meetings by raising scientific and practical issues and developing workshops.

It was demonstrated in the fifth hypothesis that the dimension of training affects the establishment of TQM in girl public high school in Tehran. In fact, total quality starts with trainings and ends to training. Training and retraining should include every body: managers, employees and teachers. The general objectives of training consisted of familiarity of people with their duties and responsibilities, greater understanding of the customers (students) and familiarity of people with their needs, promotion of individuals' knowledge level, familiarity of people with new tools came from technology, familiarity of people with the concepts of TQM and continuous learning of these concepts to them and Skill acquisition of school staff in using statistical tools of TQM. Since teachers are responsible for their students, they should be up to date and attend in in-service training. Moreover, education system should pay special attention to empowerment of managers and teachers. Empowerment means generation of enthusiasm in people for their own job or duty. It also means to use our internal motivation in order to do a job (Waten et al., 2002). Empowerment or enabling provides potential capacities for utilization of human potential source that is used rarely.

Recommendations:

- Managers and teachers should welcome training programs in schools.
- Presenting necessary trainings should be under special attention in schools.
- Empowerment of managers should be under special attention in schools.
- Empowerment of employees should be under special attention in schools.
- Educational objectives should be pre-specified and pre-determined.
- Identification of responsibilities and authority for all employees

It was demonstrated in the sixth hypothesis that the dimension of continuous improvement affects the establishment of TQM in girl public high school in Tehran. Continuous improvement is of important features in Total Quality Management so that it is sometimes synonymous with continuous and ongoing improvement of processes of an organization. TQM is known as a travel and not a destination. The management should take charge of the guidance and support of a TQM program with knowledge of this point and never deem it as a accomplished assignment.

Recommendations:

- Managers and teachers should attend in in-service trainings continuously.
- Educational programs should be evaluated annually.
- Managers and teachers should set some objectives accordance with the constant improvement of activities.
- Activities and efforts related to the improvement of processes and quality should be carried out continuously.
- Executive programs should be considered in order to achieve continuous improvement in school activities with the aim of institutionalizing it.
- Managers should always identify activities that cause high costs and time and reform them.

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