Review

Evaluating education quality in terms of ISO9000 standards

Cheng Fengchun[1], Linda R. Vogel[2] and Zheng Zhaoyu[1]

[1]Beijing Normal University, Beijing 100875, China.
[2]University of Northern Colorado, U.S.A.

While nations measure the quality of educational systems by different standards, many nations, such as China, have adopted the ISO9000 quality standards to assess the quality of schools. This article explores the various elements of the ISO 9000 standards and how each element relates to the various groups that are consumers or stakeholders in the educational process. The authors then develop a model to explain the relationship of the expectations of stakeholder groups to measures of quality for educational inputs, processes, and outputs. Emphasizing the differences between business and educational systems, a balance of promissory and satisfaction standards based on the ISO9000 standards is suggested in order to appropriately and effectively assess educational quality.

Key words: Education, quality; standards, ISO9000 series, customer satisfaction.

INTRODUCTION

Education quality, which we shall discuss further and suggest revisions, has been one of central theoretic problems in the field of educational theory for a long time. Moreover, with the proliferation of educational options and the emphasis on global competitiveness, education quality has become a central societal issue in the past several years. However, regarding what education quality is and what standards can be used to evaluate it, opinions differ greatly (Husen, 1997; Yongtao and Qingyong, 2003; Minn, 2000; Quanlin, 2000).

ISO9000, which offers organizations and industries regardless of type, size and product provided with a scientific quality assurance system and quality analysis tool which helps in analyzing and improving quality of products and services, is undoubtedly one of the greatest achievements of quality management theory and practice in present times. Countries all over the world have adopted and implemented IS9000 as national standards to analyze and improve products and manage the production process. In 1992, China also adopted ISO9000 as its national standard across industries, including education. The article will discuss the application of ISO9000 as it relates to education quality (State Quality Supervision Bureau, 2001), highlighting the differences between products and services in business and educational organizations and examining how educational quality standards can be developed to address the expectations of each education stakeholder group.

Quality is defined in ISO9000 as the "degree to which a set of inherent characteristics (3.5.1) fulfills requirements (3.1.2). Requirement refers to "need or expectation that is stated, generally implied or obligatory" (Jisheng, 2002, p.

*Corresponding author E-mail: cfc1963@sina.cn, linda.vogel@unco.edu. Tel: 86-13501162711.

8). It is obvious that products or services themselves cannot be designated as quality; instead, quality is the degree to which a set of inherent characteristics fulfills requirements. Consequently, an "inherent characteristic (3.5.1) of a product (3.4.2), process (3.4.1) or system (3.2.1) related to a requirement (3.1.2)" determines a "quality characteristic" in ISO9000 (Jisheng, 2002, p. 11).

In accordance with terms defined in ISO9000, we define inherent educational characteristics of schooling related to the requirements of the customers as educational quality characteristics. In light of ISO 9000, education itself cannot be designated as quality; instead, education quality is the degree to which a set of inherent educational characteristics (3.5.1) fulfill the requirements of education consumers. Therefore, the crux of defining education quality lies in establishing the needs or requirements of education consumers. These needs or requirements of the education consumers thus become the characteristics by which education quality can be defined and measured, guiding education improvement efforts. After a discussion of quality characteristics associated with educational services as compared to other enterprise products, a model is presented to explain the expectations of various educational stakeholders or consumers which leads to the recommendation of the development of both promissory and satisfaction standards for education in order to address the multiple and complex facets of true educational quality.

Manifestations of education quality characteristics

The activities of social organizations can be divided into two types: the production of tangible products and the production of a service or information. The qualities of these different products are manifested in varied forms which merit individual discussion. First, service organizations provide customers with services directly which creates a close, interwoven personal relationship between the service supplier and customers which cannot be separated. The interrelation between them is also a component of the service provided. This differs from the production of tangible products where producers and customers may never personally interact and establish relationships. Second, the timeliness of service provision is an element of the service being provided. Third, service cannot be repaired as can tangible products so service requires higher quality, i.e. meeting the needs or require-ments of the consumer. It must be correct the first time, because the consumer may not allow a second opportunity for services to be provided if they are unsatisfied with the initial service. Nevertheless, no one can always be flawless. It is unavoidable for people to make mistakes and this means that service is often beset with more difficulties. Fourth, the process of providing a service is as important as or sometimes inseparable

from the results. With regards to the production of a tangible product, quality is manifested or contained in the product. Service, however, is a provision process in which quality is embodied in the process. The "what" and the "how" of the service are often synonymous.

Fifth, service is usually offered to customers by staff or ground-level employees in basic units, rather than by management. Typically, there exists a distance between mid-level and top-level managers of the organization and the customers; administrators and customers may rarely interact. Hence, service organizations must find ways to inspire employees who actually deliver services to offer customers the best possible service on an on-going basis. Compared to tangible products, the needs or requirements of consumers regarding intangible services are harder to definite or measure. For customers, interpersonal attributes or the "soft index" of satisfaction is very important, such as carefulness, manners, kind-ness, concern, etc., which positively impact customers' perception of a service. This positive perception is doubly important because, unlike tangible products that can be displayed to potential consumers, service providers grow their customer base through reputation. A positive experience of one customer increases the likelihood that the customer will recommend the service to others. Establishing and maintaining a positive image and reputation takes time and can always be impacted by human error, as mentioned above (Cheng and Hong, 2000, pp. 164-168).

Service quality is more difficult to define, establish, and maintain for all of the foregoing reasons and arguably requires more effort. The quality characteristics of services have to be manifested in every aspect, from input to procedure and the final output. Comparatively, the quality characteristics of tangible products are contained to the characteristics of the final output or result and customer satisfaction with that finite output or product.

Education can be considered as a service provided rather than the production of a finite product if the criteria for production are based on (1) specialized and controlled supply of raw materials or inputs, (2) the processing of raw materials in a standardized manner, and (3) products meeting predetermined, uniform specifications. Education, however, cannot select its customers who are the raw materials or inputs in the educational process. Further-more, education cannot "change" or process the raw materials of students in a standardized format and hope to attain any uniformity of outcomes, given the differing needs and attributes of each individual. While the learning goal might be similar for each student, specific goals and processes to achieve those goals vary for each individual (Sallis, 1993, p. 29).

Many people consider educational organizations to be the same as business organizations, comparing the use of resources, product production, external customer

satisfaction, and promoting learner success in both the present and future. Compared to general production and management industries, we usually apply different words to describe education related issues and activities regarding the products of educational organizations and how those products are judged by society (Kaufman and Zahn, 1993, p. 23). Actually, education is viewed as a production activity inferred from the above view. While newly enrolled students are looked upon as "semi-finished products," graduates who are cultivated in educational institutions are "end products." As a matter of fact, service and productiveness characteristics co-exist in education. Opinions vary among different stakeholder or customer groups. Customer groups include the following: governments, society, parents, and youngsters. Between and among these groups, opinions are diverse on education, so are each customer group's requirements from the educational process. Characteristics of education also differ among school systems and individual schools with each manifesting educational quality differently, as well.

As described in ISO9000, the term "customer" refers to organizations or individuals who receive products, either internally or externally. In reality, customers specifically refer to the consumer, shopper, final user, retail dealer, beneficial owner, purchaser, employee, and shareholder (State Quality Supervision Bureau, 2001, p. 10). Compared with the customers of production and services in industrial and commercial enterprises, educations customers are much more complicated. For business enterprises, customers are explicit and persistent, while for schools, in the instant when education starts, direct customers are receivers—students and education providers are undoubtedly schools and teachers. Nevertheless, the ultimate customers do not only consist of students, parents, employing units, governments, and society, but schools of higher or lower levels are also included. Demands of different customers vary accordingly. The relationships between different customers and schools are different as well. We can make further divide education customers into three ranks. The first rank, also named basic or direct customers, refers to students; the second rank refers to parents, education administrative departments, schools of higher levels and employing units; and the third rank includes the labor market, government, country, and society in general. Although students are direct customers, they do not directly contribute monetarily. Educational appropriations are offered by the second and third rank customers. Thus, when we consider the students' requirements, we should also take the requirements of the second and third rank customers into consideration.

To students, education is a special kind of service. Education is a series of services offered by teachers, and educational facilities. According to the American education psychologist R. M. Garnie, education is "an enterprise whose aim is to help people study" (Garnie et al., 1999, p. 3). Although good educational inputs can lead to good educational experiences, good inputs and good procedures can lead to good educational outputs. From the perspective of meeting students' learning needs, good inputs and procedures are equally important. As a service offered to students, education quality should be understood as a degree to which QCE input, procedure, and output satisfy the learning needs of students. To students, education quality must be reflected through the whole education process, that is, education input, procedure, and output, as shown in Table 1.

Parents are concerned about the education output and their children's school performance and grades. They hold high hopes for their children, wanting them to succeed in examinations, enter schools of higher levels, and continuously advance through the educational system. Nevertheless, parents are also concerned about how their children are treated in schools. They all wish their children to be treated fairly and justly at school, in classrooms, and in the pedagogical process. The teaching staff is expected to be kind and patient. To parents, education has the characteristics of both production and service, with the latter process perhaps more obvious. Therefore, education quality can be defined as the degree to which the characteristics of educational input, educational process, and educational output fulfill the parents' requirements. To parents, education quality is reflected through the whole process of education, that is, education input, process, and output, as shown in Table 1.

What the government and education administration departments are concerned with is the products supplied by school—graduates. They wish the students to be qualified citizens and pillars of the society with the knowledge and moral character to promote the social, economic, and cultural development of a nation. As the government undertakes the duty of providing education for its citizens, including assuring that students are treated fairly, the government is also concerned about the educational process, as well. This can be seen from the government's educational norms, principles, policies, and laws. In a sense, educational inputs are part of the government's duty. It usually does not raise any requirements regarding educational inputs (except in the case of some private schools). From the perspective of the government, education has the characteristics of both productiveness and service, but the former one is more obvious concern for government. To governments, education quality can be defined as a degree to which the characteristics of education process and output satisfy the government's requirements. Education quality is mainly manifested in two aspects, that is, education process and output.

Schools have a much more complicated relationship with society than with students, parents, government, and

Table 1. Customer concerns regarding the educational process.

Customers / System element	Students	Parents	Government	Schools of higher levels or employers
Education Input	◎	◎		
Education Procedure	◎	◎	◎	
Education Output	◎	◎	◎	◎

◎means strong concern, no ◎ means weak or no concern.

administrative units individually in that society is complex and multilayered. We define society as consisting of the politics, economy, culture, and technological or scientific infrastructure related to a specific social system, essentially the whole social background of a county. Seen from this macro level, society demands and expects schools to accomplish multiple goals: promoting economic development, fostering social culture, and safeguarding social stability. Compared with the macro-social background, schools have a closer relationship with local communities. Schools depend upon community support and enrich communities with their services. Communities expect schools to provide a high quality education and educational reputation, work with communities, and assist in solving children's educational problems, as well as preventing unacceptable social behavior that might lead to criminal behavior. There is also the individual level of concern regarding the educational process. Society consists of individuals, including individual citizens and institutions or enterprises. Their demands and expectations towards education vary. These demands are always numerous and complicated and even contradictory sometimes.

Among these three levels of "society," the requirements of the macro-society, communities, and individuals are often channeled through the government and reflected in governmental policies. The individual level of society is very complicated, and individuals may appear as parents or students, while individual organizations may appear as employing units or schools of lower or higher levels. Schools can treat them separately as students, parents, employers, and schools of higher or lower levels or as potential students, parents, employing units, and schools of lower or higher levels. Since the government, students, and parents have been considered as independent customers, schools should also care about societal customers, which includes those employing units and schools of higher levels. Educational output, which is the main concern of employing units and schools of higher levels, are the educated students. In these customers' opinion, education is a producing procedure, in which qualified products, i.e. the graduates, are produced through a series of linked processes. These processes include educational input, process, and output, among

which the output—graduates--are the most important. Poor educational inputs and processes will influence output. Compared with output, input and process are a means rather than aim. For employing units and schools of higher levels, the quality of education students receive is a critical concern. From their perspective, education quality is the degree to which educational output characteristics satisfy customers. We can infer from the above analysis that different customers are concerned about different educational elements. To different customers, requirements of educational characteristics are different and different elements are viewed as reflecting a quality education.

According to the authors, there are mainly two things to consider when grasping education quality. Firstly, it is to treat education roughly as a service, reflecting quality throughout the whole educational process. The reasons are as follows:

(1) Among all the education customers, students and their parents are the most important external customers and considered education as a service.

(2) Production in educational systems is quite different from that in factories. What is produced in the factory are lifeless, "semi-finished products," while schools are faced with conscious, active, and unique students. Schools "model" the students in that the schools attempt to shape students directly and also in that the students shape themselves in response to the experiences and contexts offered by the schools. The former modeling needs to consider students' characteristics of both mind and body, while the latter can be achieved through educational "service." That is to say, the education "producing" process has service characteristics.

(3) Viewing the whole education process, educational "service" quality includes the quality of education in the entire process, covering educational "production" which emphasized the whole course. Second, based on a concrete understanding of education activities and an overall grasp of the educational process, we should work to change the perspective of concern among specific customers purposely. For students and parents, educa-tion should be considered from the perspective of service so as to meet their quality requirements, while for the

governments, society school of higher levels, and employing units, concerns should be put more on education productiveness.

The detailed contents of EQC

Service and tangible products have different contents of quality characteristics. Service quality characteristics include approximately six aspects. (1) The characteristic of function, which reflects the efficacy and usefulness of certain services. (2) The characteristic of economy, which reflects the reasonable degree of the expense that the customers should pay for different services. (3) The characteristic of safety, which reflects the capability of assuring customers' lives, health, and morality or goods are not damaged. (4) The characteristic of time, which reflects the ability to satisfy the customer in a timely manner, which includes being prompt, punctual, and efficient. (5) The characteristic of comfort, which reflects the degree of comfort during the service, after meeting the demands of function, economy, safety, and time. (6) The characteristic of civilization, which reflects the degree to which the moral requirements of customers are satisfied during service (Rui, 1995, p. 51).

The quality characteristics of tangible products also have six aspects. (1) The characteristic of function, which reflects the products' functions established by customers and society, including use and appearance. (2) The characteristic of credibility, which reflects the degree to which the products can be used claimed and other influencing elements---reliability, repairing, and guarantee for repairing. (3) The characteristic of safety, which reflects the products' capability of assuring no damage or death, loss of characteristics, and pollution during utilization. (4) The characteristic of adaptation, which reflects the products' capability of adapting to the changing of environments. (5) The characteristic of economy, which reflects products' reasonable life cycle expense. (6) The characteristic of time, which reflects the capability of satisfying customers' requirements on date of delivery and satisfying customers' changing requirements with the changing of time (Rui, 1995, pp. 50-51).

Comparing the characteristics of service quality and production quality, we find several things exactly the same, i.e. the characteristic of economy, safety, time; and something similar in the function of service and the function and adaptation of tangible products. There is, however, a difference in the importance placed on each quality characteristic.

Based on these analyses of education characteristics, we should combine the characteristics of productiveness and service of education together, and lay emphasis on the service property. So we can sum up the concrete intensions of education quality to the following seven aspects: the characteristics of function, comfort, time, safety, economy, civilization and trustfulness.

(1) The characteristic of function refers to the function and utilization of education and its results, e.g., education promotes students' knowledge level and ability, enables them to attend schools of higher levels, brings a country's and government's educational aim into reality, provides the students with knowledge, skills, and character to be qualified professionals and functioning citizens in society, helps parents to care for and educate children, makes the graduates competent to obtain jobs at employing units. This characteristic of function is the most fundamental to educational quality.

(2) The characteristic of civilization refers to the school's ability to satisfy the customers' needs regarding moral character and the pursuit of positive social engagement that contributes to and upholds the fabric of society. Educational organizations and employees should coordinate their words and deeds with civilized criterion, have a definitive vision of how schools should be run, and shall advocate advanced cultural knowledge and skills, including moral character. This characteristic of civilization is quite important to education quality.

(3) The characteristic of comfort refers to the degree to which the customers feel comfort when in contact with schools. Besides the requirement for the characteristic of good function, the customers also wish to be comfort and happy when contacting with staffs, facilities, and engaging in the learning process. Students and parents want no sense of anxiousness, to be treated fairly and justly, and even to get moral enjoyment. These would be assured by the characteristic of comfort in education.

(4) The characteristic of timeliness refers to education's ability to satisfy the customers in time, which includes three aspects, i.e., to be prompt, punctual, and time-saving or efficient. Promptness means that customers are not kept waiting for very long, students who encounter difficulties are helped as soon as possible, and parents receive quick responses to their inquiries. Punctuality means that schools and associated events, meetings, and activities begin at the scheduled time. Time-saving can also be explained as efficient so that the educational process is accomplished within the proscribed time limits.

(5) The characteristic of security refers to schools' ability to ensure students' health and safety. This characteristic's emphasis lies in assuring educational facilities and interactions are safe and reliable. The schools' should often check and repair facilities to prevent against possible safety risks from developing. The environment of teaching and learning should be clean and also promote mental and emotional well-being throughout the interactions of students and adults.

(6) The characteristic of economy means that education expenses should be reasonable. Education and teaching funds invested by the government should be applied reasonably, and the tuition and/or fees collected should

Table 2. The order of importance of education quality characteristics.

Quality Characteristics / Education process	Function	Civilization	Comfort	Time	Safety	Economy	Trustfulness
Education Input	◎	◎			◎		◎
Education Procedure	◎	◎	◎	◎	◎	◎	
Education Result	◎						◎

◎ means the requirement of relevant characteristics

be reasonable. The expenditures of schools should have a clear budget and final accounts which is transparent in that it can be viewed by other stakeholders. Economy also implies the effective use of human resources.
(7) The characteristic of trustfulness refers to schools' ability to make customers feel that everything in the educational process is done for the benefit of the students, families, community, and society. The students trained by schools should behave in accord with social requirements and national regulations. School educational activities should be conducted with honesty and transparency so people view schools and educators as reliable and acting with the best of intentions. The schools must not conceal any of their problems or issue any false information to parents and society.

The order of importance for education quality characteristics

We cannot simply say which education quality characteristics are more important. Three dimensions should be considered to decide the order of importance of education quality characteristics. These include the customer dimension, whole process of education dimension (input, process, output), and quality property dimension.

We have learned from the analysis above that, to students, the quality characteristics of education input, whole process of education,and education results are all necessary. To parents, the education input, whole process of education, and education output are all necessary. To the government, the whole process of education and education output are necessary, but education output is more important. To schools of higher levels and employers, educational result or outputs are the most important (Table 1)

From the perspective of the whole education process, the characteristics of function, civilization, safety, and trustfulness are the important aspects of education input. The characteristics of function, civilization, comfort, time, safety, and economy are necessary to education process, but the most important characteristics are function and trustfulness (Table 2).

Based on the two points discussed above, the different orders of importance of education quality characteristics can be conceptualized as follows:

-To students, the education characteristics of function, civilization, comfort, time, safety, economy, and trustfulness are all necessary.
-To parents, the education characteristics of function, civilization, comfort, time, safety, economy, and trustfulness are all necessary, while comparatively function, safety and economy are more important.
-To schools of higher levels and employing units function, safety, economy, and trustfulness are most important (Table 3).

Promise + satisfaction: Promissory standard and customers' satisfactory standard

According to ISO9000, whether the education quality is high or not depends on customers' satisfaction. However, customers' satisfaction can be reflected only after the education has been provided. We need to know how to provide quality education before we begin with education inputs. The standards of education quality include two aspects: promissory standards and customers' satisfactory standards. Promissory standards have the characteristic of being promised before hand. It may be formulated by government (education administrative departments) or educational experts according to the demands of different customers and universally accepted within a certain scope. Schools accept and make promises to customers about providing education to a certain standard. Promissory standards may also be constructed by certain customers (students, parents, governments, schools of higher levels, and communities) according to the needs of each group and the ability of the schools. The former would mainly be the local standards or national standards while the latter is usually the combination of both. For example, some schools can accept national and local education quality standards while also making promises to abide by some quality standards with distinguishing features dictated by the

Table 3. Matching of education quality characteristics.

Customers Education Quality Characteristics		Students	Parents	Government	Employers or schools of higher levels
Education Input	Function	◎	◎		
	Civilization	◎	◎		
	Safety	◎	◎		
	Trustfulness	◎	◎		
Education Process	Function	◎	◎		
	Civilization	◎	◎		
	Comfort	◎	◎		
	Time	◎	◎		
	Safety	◎	◎	◎	
	Economy	◎	◎	◎	
Education Output	Function	◎	◎	◎	◎
	Trustfulness	◎	◎	◎	◎

◎ means the requirement of this characteristic.

specific customer population.

Education quality promissory standards usually require education to be specialized, adapted with certain aims and norms, and without any defects (or within the permitted scope). The customers' satisfactory standard requires schools to make customers satisfied and pleased or even going beyond customers' expectation. These two standards have different properties and usages. First, promissory standards pertain to all customers as they are formulated on the basis of different customers' demands. The aim of these standards is to satisfy most of the customers. Customers' satisfaction standards seek to satisfy each customer, individually. Second, promissory standards have a defined scope with definite intentions and extensions. Schools can achieve promissory quality by adhering to these predefined means and methods of educating students. Customer satisfaction standards are open, however, because different customers have different reasons to be satisfied; there is no unified means to satisfying all of the customers. Third, promissory standards are set while satisfactory standards change according to current contexts that impact customer needs. The idea of promissory standards is to achieve success by generally accepted and established means, while the idea of satisfaction standards are to satisfy customers by understanding and responding to their demands in current and changing contexts. Finally, promissory standards are made before hand while satisfactory standards are created and revised on a continual basis. The significance of promissory

standards of education quality lies in that it can offer prior guidance to schools, teachers, and customers, and at the same time provide students, parents, government, community, employers or schools of higher levels with a criteria by which to judge schools, the educational process, and teaching quality and to select schools or graduates. The significance of satisfactory standards is to try to satisfy customers throughout the educational process with the ultimate standard being high levels of customer satisfaction.

The promissory standards and customers' satisfactory standards provide us with two dimensions to inspect education quality practically. According to these two dimensions, we can reduce actual provided education to four typical types shown as Figure 1. Quadrant I refers to "high standard education with deviation," meaning that the provided education can achieve the high promissory standards, e.g., students gain a great deal of knowledge and skills, obtain high scores, and a very high proportion of students enter schools of higher levels, but these achievements are made at the expense of students' spare time and students may view the burden of studying as a hardship. Quadrant II refers to "high standard education," which means that the promissory standards are achieved to a high level and students enjoy the educational process as well. Quadrant III refers to "low standard education," which means that promissory standards are not achieved and students do not enjoy the educational process. Quadrant IV refers to "high satis-faction education," which means that, although students
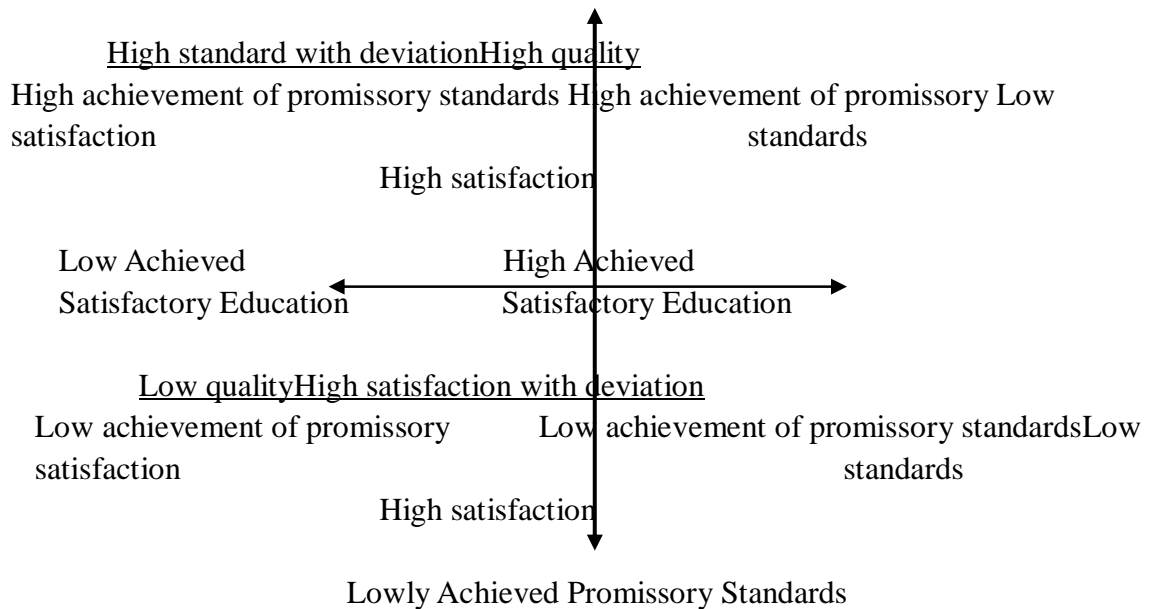
High standard with deviationHigh quality

High achievement of promissory standards High achievement of promissory Low
satisfaction   standards

High satisfaction

Low Achieved   High Achieved
Satisfactory Education   Satisfactory Education

Low qualityHigh satisfaction with deviation

Low achievement of promissory   Low achievement of promissory standardsLow
satisfaction   standards

High satisfaction

Lowly Achieved Promissory Standards

Figure 1. Interaction of promissory and satisfaction standards.

feel happy, they gain little in their studies and promised standards are not achieved.

One could ask, "Aren't promissory standards of education quality based on customers' demands (quality characteristics)? Why does there exist the situation in which the standards are highly achieved but customer satisfaction is low?" In fact, this situation is quite possible. Promissory standards of education quality are transformed from customers' demands and expectations, but, because of customers' career choices and view of education value, customer needs may lead to deviation of standards. That is to say, the promissory standards may not be what customers really expect, but they are adopted in the name of customers' standards. Conducting or directing education in this way may lead to the situation that the standards are highly achieved but customers are not satisfied. The problem lies in that the promissory standards of educational quality may be unreasonable standards.

Even though the promissory standards are scientific and reasonable, there still may be the situation of "high standard with deviation." Schools have two means to achieve high promissory standards. One is that the teachers try their best to improve teaching methods, selecting appropriate content, but without adding unreasonable burdens to the students. In this situation, high standards are achieved and the students feel satisfied as well. The other means is that the teachers place the preponderance of the burden of learning on the students in an unreasonable manner. Although the promissory standards are highly achieved in the latter context, the

students feel unhappy. The situation is contributed to by the educational process rather than the promissory standards. Seen from the perspective of pedagogy and psychology, making students satisfied and happy has value in the present and as a means to obtaining future goals. In the present, students who are happy more fully participate in the educational process. As a means to obtain future goals, greater participation in the educational process may accelerate students' learning and accomplishments, leading to greater success both in school and in future employment or higher levels of education. We can see from the above analysis that customers' satisfactory standards are necessary from the perspective of student customers and also may facilitate the quality of educational outputs.

The education of "high satisfaction with deviation" is not what we should pursue, either. This does not seem in accordance with normal practice. Based on ISO9000, quality is a measure of the degree to which substantial characteristics satisfy customers. Why might "customers' high satisfaction" not be truly high quality? To enterprises, there cannot be the situation of "high satisfaction with deviation." This is because, in enterprises, the customers are always right. However, that is not the case in schools. Education is an enterprise oriented towards the future. Education should consider not only students' present demands but also their demands when they enter society in the future. That is to say, education should not only be concerned about students' present satisfaction but also about their future satisfaction. Sometimes, the present satisfactions have to be sacrificed for the sake of future

satisfactions. Or from another perspective, present satisfaction may mean the loss of future satisfaction. John White, a British educationist and philosopher, said:

If one's aim is only that children are happy now, then why is their later life to be left out of the picture? Suppose an emphasis on present sacrificed to the present? There is a similar arbitrariness in the other alternative: I f happiness as an adult is all the matters, perhaps even at the cost of present unhappiness, then why is a later stage of life to be seen as more important than an earlier one. The only way of avoiding the arbitrariness is to see each stage of life as equally worthy of consideration as each other. If happiness is to be the aim, or an aim, of education, it should be happiness in one's life taken as a whole (White, 1982, p. 52).

So we must achieve a balance between students' present happiness and future happiness. In order to accommodate the relationship between happiness now and later in life, we need to draw support from promissory standards of education quality which reflect more universally held views on students' present and future needs and demands.

At the same time, schools have various customers, including internal customers and external customers. In enterprises, customers do not have any benefit contradiction with each other. One customer's satisfaction usually will not have any influences on another customer's satisfaction. For example, suppose two customers go to the shop and buy cups separately. One's satisfaction with the cup probably will not influence the other person's satisfaction. The same is not true with education. The requirements and expectations of students vary a great deal from those of governments or society. As a result, putting undue stress on students' satisfaction may be at the expense of satisfactions of governments and society. To treat all the satisfaction requirements of all customers equally, we should not blindly chase a certain customer or a certain group's satisfaction. Instead, a balance should be achieved. Support can be drawn from the promissory standards of education quality. Moreover, the capacity of schools should be taken into consideration. We should create realistic standards which schools are capable of accomplishing. Promissory standard are also highly valuable here. Therefore, we can draw the conclusion that promissory standards and customers' satisfactory standards are requisites for guidance in the practical educational work and education quality measurement, and the best way is to try to achieve a certain balance without overemphasizing one at the expense of the other.

The following discussion includes graphic representation of the quality expectations of various education stakeholders regarding the services provided by schools. Stakeholder concerns or expectations with various aspects of the educational process, importance of the

different outcomes to each group, and then how promissory and satisfaction standards can be used to assess education organizations are each discussed and graphically represented, as well as a model of how each element is related to the other elements.

Suppose education quality is EQ, customers' Satisfaction Degree is SD, the degree the promissory standards achieved is PSD, promissory standard of education input quality is PSD_1, promissory standards of education process quality is PSD_2, and promissory standard of education output quality is PSD_3. As we know, educational input, process, and output are equally important and independent from each other. So we can use the following formula to express their relation.

$$PSD = PSD_1 + PSD_2 + PSD_3$$

At the same time, we can use these symbols above to express the four situations in Figure 1, as follows:

（1）high SD, high PSD, lead to high EQ (quadrant II)
（2）high SD, but low PSD, lead to low EQ (quadrant IV)
（3）low SD, high PSD, lead to low EQ (quadrant I)
（4）low SD, low PSD, lead to lower EQ (quadrant III)

The above reflects a kind of special logical relationship among EQ, SD, and PSD, which can be expressed in the following second formula and, by this formula, four situations above can also be deduced:

$$EQ = SD \times PSD$$

Based on the first formula, we can combine the two formulas to create a third formula as follows:

$$EQ=SD \times PSD=SD \times (PSD1+PSD2+PSD3)=(SD \times PSD1)+(SD \times PSD2)+(SD \times PSD3)$$

Three independent items appear at the right of formula equality sign. (SD×PSD1) reflects the total quality of education inputs. Education, especially elementary education, is a quasi-public product and should not be planned regarding educational inputs according to customers' satisfaction. There are several reasons for this. On one hand, education, especially elementary education, is supported by public funds, cannot be too expensive for the sake of meeting customers' satisfaction, and thus, educational inputs shall be regulated in order to use public funds reasonably, effectively, and fairly. On the other hand, school inputs (especially human resources, financial resources, and material resources) are the responsibility of government's and parents' and not controlled by schools. We should not, therefore, require schools to satisfy customers in terms of school education input. The quality of education input could only be formulated by specialized and professional standards,

Table 4. TEQ standards' order.

Customers / Education Quality Standards		Students	Parents	Government	Society (Schools of higher levels and employing units)
Education Input	Promissory Standards	◎	◎	◎	◎
	Satisfactory Standards				
Education Process	Promissory Standards			◎	◎
	Satisfactory Standards	◎	◎		
Education Output	Promissory Standards	◎	◎		
	Satisfactory Standards			◎	◎

◎indicates a standard that should be considered in the educational process.

i.e. to evaluate education input quality by promissory standards as shown in Table 4. (SD × PSD2) reflects "education process quality." To parents and students, happiness with the education process is very important. Thus, satisfactory standards should be a priority rather than promissory standards, which implies that schools shall not only adhere to the education process with promissory standards, the more important thing is to satisfy students and parents. Community, government, schools of higher levels, and employing units care more about educational results, and, in a certain sense, education process has less influence on the satisfaction of governments and society. From the government's and society's perspective, promissory standards should be considered as a priority, as shown in Table 4.

(SD x PSD3) reflects "education output quality." We know that governments, communities, schools of higher levels, and employers are concerned more about educational outputs. To them, educational outputs should be considered above all else. That is to say, schools should coordinate educational outputs with promissory standards. More importantly, outputs should satisfy governments, communities, schools of higher levels, and employing units. The achievement of promissory standards means that students can enter schools of higher levels, gain more knowledge and achieve better academic results, and increase their capability, all of which are what parents and students expect from education. This means that, in the achievement of education outputs, promissory standards meet the requirements of students and parents also. From the perspective of students and parents, education outputs take precedence, as shown in Table 5.

Drafting and Selection of Education Quality Promissory Standard

Seen from the above analysis, every element of the educational process needs promissory standards. From this aspect, education promissory standards are more important than satisfaction standards. In educational practice, education quality promissory standards have encompassing effects. First, they provide education and related work with a reference and guide for action. Second, they provide students and parents with a criterion to judge school's education quality in the selection of schools. Third, they provide schools with a criteria to evaluate internal teaching quality and external comments, including self-evaluations of every department and every staff member, as well as school administrator's evaluations of school's every department and every staff member. Fourth, they provide all customers (students, parents, society, and the government), schools, and educators with a criteria to evaluate and comment on educational facilities and educational outputs provided by a school and its staff. This promotes a common language that all customers can use to communicate regarding educational issues. In order to ensure the above effects, education quality promissory standards should have the following characteristics:

The characteristic of comprehensiveness

The characteristic of comprehensiveness refers to promissory standards that have the function of fully reflecting all aspects of the educational process and

Table 5. Components of Education Quality Standards

Quality Standard / Education Processes	Promissory Standard							Satisfactory Standard			
	Function	Civilization	Comfort	Time	Safety	Economy	Trustfulness	Students	Parents	Government	Employers
Education Input	◎	◎			◎		◎				
Education Process	◎	◎	◎	◎	◎	◎		◎	◎		
Education Output	◎						◎			◎	◎

◎indicates appropriate inclusion of element or group.

requirements and guiding the school's work in all aspects. Comprehensiveness of promissory standards includes the following aspects:

(1) Consideration of the requirements of a school's internal and external customer needs and expectations to that the school can effectively respond to those needs and expectations. We can never attend to one thing and lose sight of another.
(2) Comprehensively take every element and related factors in the education process into account. We should not only consider the educational achievements of a school, in terms of the proportion of students entering schools of a higher level, academic attainment, knowledge, skills, attitudes, creativity, and so on, but also consider factors that relate to the process of teaching and learning.
(3) Consider the long-term and short-term requirements of customers and schools. Avoid over emphasizing long-term benefits at the expenses of immediate interests.
(4) Comprehensive promissory standards serve a guidance function. Promissory standards should inform a school's staff as to what they should do, how do they do what they do, how they exercise control, and how they evaluate, notifying external customers about what services and products the school provides, and how the school's education and teaching quality will be evaluated.

Comprehensiveness refers to the fact that a promissory standards system ought to be systematic, taking all factors into consideration. In order to create comprehensive promissory standards, standards should include the following:

(1) A combination of single standard indexes and comprehensive standard indexes. For certain or specific jobs, a single index would be adequate if the goal is a single item. For more complex jobs, a comprehensive index is needed. Single and comprehensive standard indexes should be aligned to ensure the achievement of total education quality.
(2) Include the key or critical aspects of a position or task. The famous Italian economist Vilfredo Pareto made a conclusion, after analyzing economic phenomenon, that in a certain system, key determinants are in the minority while insignificant determinants account for the majority. Juran called the regular pattern the "Pareto Principle." According to the Pareto Principle, we can simplify the standard by looking atkey customers, key inputs, key processes, and key outputs to ensure standard comprehensiveness.
(3) Combine practical standards with evaluation standards. Traditional education quality management systems focus on evaluation, emphasizing particularly the setting up of evaluation standards focused on judging and evaluating work quality of every department and every individual. Quality management systems based on ISO9000 should combine evaluation with concrete guidance that outlines work standards. Specifically, promissory standards should indicate what should be taught, how it should be taught, and how the process will be evaluated,

The characteristic of advancement and rationality

Education quality promissory standards shall not only be the reference for work, but a driving force for promoting improvements in education and pedagogy. The advancement of education quality promissory standard includes two elements. First, it should reflect the requirements of development and updates in education and teaching technology, method, and content, so as to encourage educators to use new methods and new technologies. At the same time, it should encourage local school competitiveness. Finally, educational advancement should be

seen as a long-term process rather than a series of dramatic and unstable changes and also adhere to any established laws and policies.

The characteristic of stability and dynamic state.

On one hand, promissory standards are important references to direct education and the work of teaching. A balance must be achieved between systemic stability which provides customers with an understanding of what is to be done and how and responsiveness to external changes which might impact customers' expectations or needs. A stable process focused on continuous improvement will result in a higher quality of education rather than frequent, poorly planned or implemented changes that leave customers and educators unsure of the educational system.

CONCLUSION AND RECOMMENDATIONS

Education Quality

First, education quality is judged by customers. To meet customers' needs is the final goal of EQ. This includes both the obvious customer demands and the "hidden" or future demands which may not be clearly self-evident in the present. For example, students may enjoy school but not be able to demonstrate their learning. Students and parents may still consider the school to be of comparable high quality, until the students graduate and are unprepared to enter the workforce or go on to high levels of education. Customer demands at the present may be met but not future expectations. The opposite can also be true in that students may not enjoy their educational experiences but graduate very well-prepared to enter the workforce or go on to higher levels of education. The ideal situation is that both the immediate and the future demands of customers are met with an enjoyable and effective educational experience.

Second, educational quality rests on key, critical characteristics. Secondly, the characteristics of education quality are the key foundation of education quality. Generally speaking, education quality characteristics include functionality, comfort, well timing, security, economical efficiency, and dependability. Schools must work to continuously improve each of these characteristics to maintain quality. Schools shall improve education quality through its quality characteristic enhancement.

Third, educational quality must be reflected throughout the educational process of inputs, processes, and outputs. Every aspect of education can impact customers' evaluation of education quality. A parent's dissatisfaction with a school's quality may not be related to curriculum, pedagogy, or teachers but rather with school administration, management systems, or facilities. Similarly, a student may be dissatisfied with a specific teacher but quite satisfied with all of the other facets of the school. Educational quality covers all of these factors, however, from individual teachers, curriculum, and pedagogy to student support services, management, and facilities. A parent's disappointment to school's education quality may be not the dissatisfaction to class teaching but the management staff, managing system or unpleasant teaching facility; a student's dissatisfaction to school's education quality could be referring to the teachers, instead of the course. Education quality covers various aspects of school work, from teaching quality in common sense, to education managing system and assistant teaching activity's quality. The quality of the end results of the educational process—the graduates—are an essential aspect of educational quality as well, of course. Thus, each element of the educational process must be included in assessing and working toward greater educational quality.

Educational inputs should include a rigorous and appropriate curriculum, effective teachers, and sound pedagogy. The educational processes should include effective administration, sound management systems, and good student support services. Outputs would then ideally include graduates with a high level of academic attainment who are very well prepared to enter the workforce or higher levels of education and who also physically, mentally, emotionally, and socially well developed. Educational quality must be manifested throughout each of these elements in the education process. Moreover, it contains the quality of education result-graduates as well as the quality of those activity, course, condition, department and system, individually or combining with one another aiming to help the graduates. So the efforts for school education quality enhancement should not be put on education results, on class, or on teachers only, but education managers should monitor all aspects to promote school education quality as well. We can bring all school education factors into the entire course of education, from education input, education process, and education output. These include education input, such as curricula, teaching material, teachers and so on; education process, such as class interaction, curricula development, educational administration and so on; education output, such as graduates, academic attainments, physical and mental development, social achievement, entering schools of higher levels and so on. Schools' education quality should be manifested through all-round aspects of education input, education process and education output.

Fourth, education quality is dynamic and comparative. Different customers require different things and the education system must respond to each of these needs. Parents in rural areas may have different expectations and needs from the educational system than parents in

highly developed urban areas. This may require development or change in one or more elements of the educational process. Likewise, as the global economy grows and technology continues to develop, graduates will require different skills to be successful in an ever-changing workforce. Societal changes may also bring new, more immediate expectations from education by students and parents. While educational systems must respond dynamically to these change forces, the key components of educational quality discussed in this paper are unlikely to change. How each of those processes is carried out may very well change, of course. There must be stability within the process of planned continuous improvement for the education system to improve.

In many educational systems, schools do not recruit the same type of student and should not be compared to one another. The evaluation criteria should rest on whether a school meets their specific customers' needs. These criteria, applied to all aspects of the educational process, should determine the level of quality of a school.

Evaluation of standards of quality

The evaluation of education quality should continue to be based on a combination of promissory and satisfaction standards. Different elements in the educational process may emphasize different standards. Education inputs should emphasize promissory standards, whereas education processes and outputs must emphasize both satisfaction and promissory standards. Education quality promissory standards should include prescribed education quality characteristics which include parameters for evaluating the characteristic of function, civilization, comfort, time, safety, economy, and trustfulness.

As we know from the above analysis, the order of importance of educational quality characteristics is different for each element in the educational process. Regarding education input, the characteristics of function, civilization, safety, and trustfulness are important. For the educational process, the characteristics of function, civilization, comfort, timeliness, security, and economy are important. For educational outputs, the characteristics of function and trustfulness are important. In this way, we can arrive at a basic structure of education quality standards (Table 5).

In the past, we used to understand education quality as "students' learning degree of goodness or badness reflected through teachers' teaching and students' learning in the education process," and education quality defined as "talents' quality," that is, the quality of the students cultivated by schools (Ming, 1997, p. 362). This distinguishes the education process quality from the education output quality to some extent. However, when dealing with the relationship between the elements in the

educational process, "education process quality is the precondition and basis of education output quality; education output quality is realization and end-result of education process quality" (Ming, 1997, p. 362). This opinion actually claims that only education output quality is fundamental and the ultimate aim, while education process quality, on the other hand, is method, means, or tool. This neglects the decisive effects of education's direct customers, that is, the students, on education quality. With significant improvements in science and technology, coupled with rapid social progress and in accordance with society's and people's demands of education becoming more and more individualized and varied, we should include the opinion of all customers in defining quality and establishing an evaluation process regarding educational quality. The balance of promissory and satisfaction standards related to the various elements of the educational process, as outlined in this paper, would accomplish this goal and provide a much more accurate depiction of education quality rather than the application of the ISO9000 standards without any modifications to address the unique and complex aspects of the service of education. The feedback of students, parents, government officials, and society as a whole can improve the elements that make up the educational process and improve education quality effectively.

Conflict of Interests

The authors have not declared any conflict of interests.

REFERENCES

Cheng FC, Hong CW (2000). "Ideas of the total quality management in the West educational management in the 1990s," Comparative Educ. Rev. 7.

Garnie RM, Briggs LJ, Wager W (1999). Principles of instructional design (In Chinese, trans. Pi L S, Pang W G). East China Normal University.

Husen T (1987). On the quality of education," Journal of East China Normal University. 3.

Jisheng Z (2002). "New understanding of education quality," J. Chongqing University, 5.

Kaufman R, Zahn D (1993). Quality management plus: The continuous improvement of education. Thousand Oaks, CA: Corwin Press

Minn W (2000). "Implication of education and its standard of testing," J. Northeast China University, 2.

Ming L (1997). An introduction to the modern teaching management. Beijing, China: Educational Science Publishing House.

Quanlin W (2000). "Studying of the evaluation of teaching achievements and the standards of education quality," Teach. Educ. Res. 1.

Rui L (1995). Quality management and quality assurance standards implementation   guide. Beijing, China: Standards Press of China.

Sallis E (1993). Total quality management in education. London: Kogan Page Limited.

State Quality Supervision Bureau. (2001). National standards of the People's Republic of China—Quality management system standards. Beijing, China: Standards Press of   China. http://www.sirris.be/uploadedFiles/SIRRIS/Subsites/ROHS/GB18455 _2001_marking(1).pdf

White J (1982). The aims of education restated (in Chinese, trans. Li Y H). Beijing, China: Education Science Publishing House.
Yongtao J, Qingyong Y (2003). "Studying on connotations and criteria of the quality of education," J. Dalian University, 5.