An Empirical Study of International Quality Model for Education

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Abstract—**The purpose of this study is to identify the factors influencing educational quality and students' satisfaction of adult and continuing education, to examine the relationship between educational quality and students' satisfaction, and to investigate the impact of each element on students' satisfaction. The international quality model for education was used as a research instrument to measure education quality and students' satisfaction with Institutes of Continuing Education in Taiwan. Data were collected from questionnaires, and statistical analysis was carried out through factor analysis, reliability test and multiple regression analysis. Findings indicated that international quality model for education is an appropriate model for institutes of continuing education to measure educational quality and students' satisfaction. There is a significant correlation between educational quality and students' satisfaction; moreover, the elements of resource management (resources facilities, campus environment, teachers' ability), product realization (counseling and service), and measurement, analysis and improvement (learning achievement) have the ability to forecast students' satisfaction (R2=0.786), especially when the β value of learning achievement reaches as high as 0.446.**

Keywords—international quality model for education; students' satisfaction and institutes of continuing education

I. INTRODUCTION

International organization for Standardization (ISO) promulgated the contents and model of international quality standard in 2000, and continuously published the international education quality control guidelines for application on March in 2004 in Mexico. Therefore, how to utilize this model and its requirement into education system in our country, it is a worth topic to probe. In the past the literature seldom probed into this kind of subject, especially in adult and continuing education, so that initiates the research motivation.

There are 44 institutes of continuing education and training college in Taiwan, in which 32 institutes of continuing education subordinates the Department of Social Education of Ministry of Education, the others belong to the Department of Higher Education. The missions of institutes of continuing education are to provide the people who has job during weekday with two years program to take courses on weekend. They are awarded bachelor degree when they graduated (the Ministry of Education, 2004), this is one kind of adult and continuing education; is also one kind of recurrent education. Since it is a formal education system, its education quality should be assessed by the Ministry of Education, and the degree of satisfaction of students should also be verified, in order to conform the needs of students. The research problems are described as follows:

- Is the international quality model for education appropriate to apply for institutes of continuing education?

- Are the contents of the international quality model for education correlated with the degree of students' satisfaction of institute of continuing education?

- Could contents of the international quality model for education forecast the degree of students' satisfaction of institute of continuing education?

II. LITERATURE REVIEW

A. International Quality Standard for Education

To review the context of internationalization of quality control, the international standard organization (International Organization for Standardization, ISO) had established since 1947, 121 countries had participated in it around the world. ISO aims at promoting the world standardization and its interrelated matters, so as to promote the international product service exchange and cooperation. This organization promulgates the international quality control standard and integrated model in 2000 (ISO 9000: 2000), this model is suitable for all trades and professions, its main point of content is to design the customer demand into four service processes, including: the managers' responsibility, the resource management, the service realization and the measurement and analysis. The model also focuses on continuing quality improvement to meet the customers' demand, as shown in "Fig. 1".
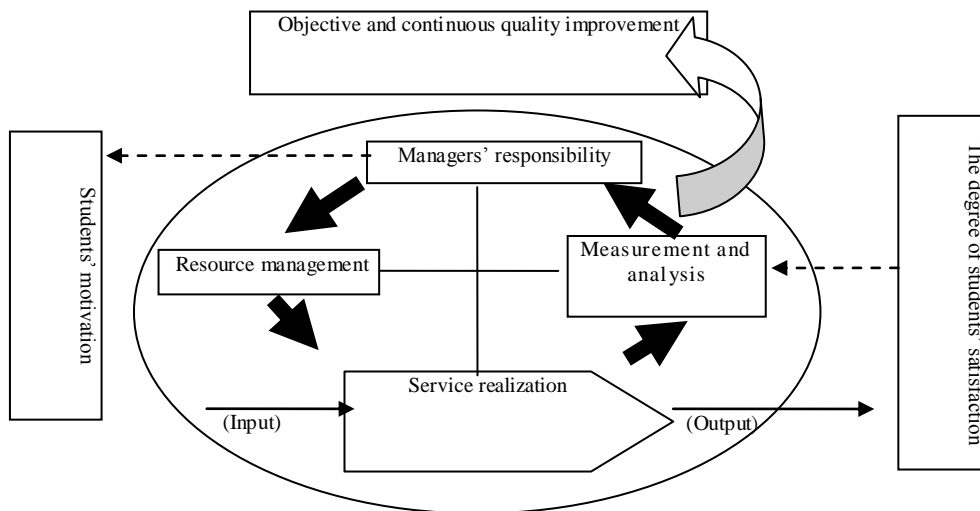
Fig. 1. International standard model (ISO 9000: 2000)

The international standard organization publishes International Workshop Agreement in March, 2004 in Mexico (to be called ISO/IWA2) for educational system to develop guidelines of quality management; the goal lies in the promotion of the education quality to conform the international quality standard for education (ISO 9000: 2000). International quality control model for education (ISO 9000/IWA2) contains five requests: education quality assurance management system, managers' responsibility, resource management, product (service) realization, measurement and analysis, and the requests are subdivided into 23 clauses, as shown in the following "Table I".

TABLE I. CONTENTS OF THE INTERNATIONAL QUALITY MODEL FOR EDUCATION

	Five requests	23 articles
1	Education quality assurance management system	General requests The document requests
2	Managers' responsibilities	The managers' commitments The customer orientation 3.Quality policy 4.The planning 5.The responsibility, the authority and communication 6.Management review
3	Resource managements	1.Resources supply 2.Human resources 3.Infrastructure 4.The working environment
4	Products realization	1.Product realization 2.With customer related process 3.Designs and development 4.Purchases 5.The production and the service operation 6.Control of measurement and monitoring instruments
5	Measurement analysis and improvement	1.Outline 2.Measurement and monitoring 3.Control of nonconforming products 4.Analysis of data 5.Improvement

The purposes of the five requirements of ISO 9000/IWA2 are not only to promote the education quality to conform the international quality standard, but also to meet the ultimate objective of the integrated model (ISO 9000: 2000)—students' satisfaction, therefore it's necessary to review the previous research of students' satisfaction.

B. Factor Influencing Students' Satisfaction

The institute of continuing education is a kind of adult and continuing education, its objective is to provide the adults on the job in the society with potential development, enrich academic principles, innovation, technological improvement and the promotion of professional qualification, to guide them to obtain new development, and to make them changing behavior. How does school enable students to satisfy their desire and attain the psychological satisfaction by teaching activities? It's necessary to measure educational quality and students' satisfaction. Li (2002) points out that "the learning satisfaction" is the learning experience of the entire learning process, according to the entire learning perception and satisfaction, this kind of feeling comes from whether the learning process could make students pleasant, and whether learning achievement could make students satisfied with the subjective feeling. Therefore, curriculum design, teaching method are the important determinants to adult education, therefore the educational organizations should not only provide students with appropriate service of education according to their characteristics, but also need to offer the high quality service which could help adults to display the nature of independent learning, and assist them to accomplish developmental tasks (Li, 2003).

There are various dimensions of learning satisfaction because of the different research samples and research topics. This research reviews the literature and finds that there are nine dimensions of learning satisfaction, namely curriculum contents-1, teaching facilities-2, learning environment-3, learning achievement-4, faculties-5, interpersonal relationship-

6, administrative facilities-7, counseling service-8 and career development-9, as shown in the following "Table II".

<p style="text-align:center">TABLE II.   F<small>ACTORS</small> I<small>NFLUENCING</small> S<small>TUDENTS'</small> S<small>ATISFACTION</small></p>

Influential Factors / Previous Research	1	2	3	4	5	6	7	8	9
ISO/IWA2,2004		V	V	V	V		V	V	
Shau,2004		V			V		V		
We,2003			V		V		V		
Shu,2001		V	V	V	V	V			
Hen,2000				V		V	V		
Lin,1998		V			V	V			
Lee,1998		V			V				
Chen,1997				V		V		V	
Cheng,1995		V			V	V			
Lin,1994	V	V				V			V
Binner,1994	V	V			V			V	
Wu,1993	V			V	V	V			

<p style="text-align:right">^{a.} (Source: This study)</p>

This research integrates the five main requirements of ISO/IWA2, and the literature related influential factors of students' satisfaction into five- dimension factor, namely "administration", "facilities and faculties", "teaching and student's service", "learning achievement" and "students' satisfaction". The comparisons among the international quality model for education, the previous research and this study are shown in the following "Table III".

<p style="text-align:center">TABLE III.   T<small>HE</small> C<small>OMPARISONS OF</small> I<small>NFLUENTIAL</small> F<small>ACTORS OF</small> S<small>TUDENTS'</small> S<small>ATISFACTION AMONG</small> ISO/IWA2, P<small>REVIOUS</small> R<small>ESEARCH AND THIS</small> S<small>TUDY</small></p>

	ISO/IWA2	Previous Research	This Study
Students' satisfaction	Managers' responsibility	Administrative activities-7	Administration
	Resource management	Teaching facilities-2, learning environment-3, faculties-5	Facilities and faculties
	Product realization	Curriculum content and design-1, counseling service-8, interpersonal relationship-6, career development-9	Teaching and students' service
	Measurement, analysis and improvement	Learning achievement-4	Students overall achievement

III. RESEARCH METHODOLOGY

A. Research Framework

The framework shown in "Fig. 2" has three major variables; they are independent variables (Teaching quality), dependent variables (students' satisfaction), and moderating variables (students' characteristics).
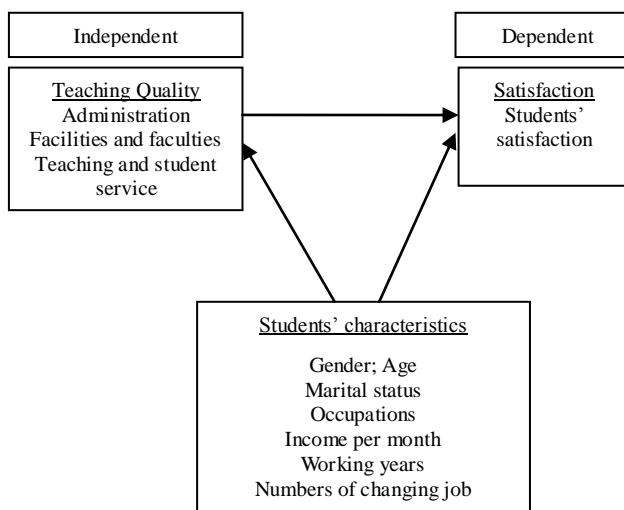

Fig. 2. Research Framework

An independent variable is one "that influences the dependent variable in either a positive or a negative way" (Cavana et al., 2001, p. 84; Sekaran, 1992, p. 66). In this study, quality initiatives account for the variances in the students' satisfaction. Thus, the four elements of the modified ISO/IWA2 model were considered as independent variables in this study. The goal of this study was to explain or predict the variability in the students' satisfaction. In other words, students' satisfaction was the main variable that lends itself as a viable issue for investigation, thus students' satisfaction will be the dependent variable. The students' characteristics in terms of gender, age, marital status, occupations, and income per month, working years and numbers of changing job were deemed to be the moderating variables in this study.

B. Design Questionnaire

This study utilized the modified five dimensions of International quality model for education (ISO/IWA2, 2004) to investigate the teaching quality and student's satisfaction and to examine the relationships between teaching quality and student's satisfaction. The questionnaire consisted of three parts; the first part (part A) pertains to demographic information, including gender, age, marital status, occupations, income per month, working years and numbers of changing job. The following part (part B) was derived from four of the five elements of modified ISO/IWA2, namely administration, facilities and faculties, teaching and students' service, students overall achievement. The final part (part C) focused on

evaluating students' satisfaction. The responses to questions were designed according to the Likert five scales; the higher score expressed the higher performance.

The first element of part B (independent variables) is administration; the objective of the variable is to investigate the relationship between institutes' administration, such as the objective of institute's development, the administrative policy, administrative grouping and students' satisfaction. The second element is facilities and faculties, the purposes of the element is to understand the correlations between learning environment for students, various types of hardware and software facilities, the profession and enthusiastic of faculties and students' satisfaction. The third element is teaching and student services, which aim to realize the impact of the curriculum design and arrangement, the student's counseling, the interaction between institute and students and the service providing by institutes on students' satisfaction. The fourth element is students' achievement, which is used to investigate the value that students gain from the adult and continuing education, for example new knowledge, the promotion of the social position or the expansion of interpersonal relationship and so on.

The part C is dependent variable, namely students' satisfaction; which is the overall satisfaction of the four elements, regarding the administration, the facilities and faculties, the teaching and the student service and the student's achievement.

C. Data Collection and Analysis Method

There were 11 institutes of continuing education chosen through the systematic sampling to administrate the questionnaire, they are National Kaohsiung University of Applied Sciences, Tajen Institute of Technology, Tung-Fang Institute of Technology, National Chin-Yi Institute of Technology, National Formosa University, Chihlee Institute of Technology, Takming Institute, Vanung University, Jin Wen Institute of Technology, Chungchou Institute of Technology and Ming Hsin University of Science and Technology. The 1100 questionnaires were sent to the 11 institutes to ask their students to complete, then, send the completed questionnaire back to one of the researcher. 220 completed questionnaires were collected, and get a return rate of 61.5%. The respondent's data of the three parts was entered into the software of SPSS v 12.0. The reliability test, factor analysis, correlation and regression analysis were utilized to analyze the collected data.

IV. ANALYSIS RESULTS

A. Demographic Profile of Participants

The "Table IV" will present the percentage of respondents' demographic information, in terms of gender, age, and marital status, income per month, working years and numbers of changing job.

TABLE IV. RESPONDENTS' DEMOGRAPHIC INFORMATION

Demographic Information		Percentage
Gender	Male	53.2%
	Female	46.8%
Age	<20	5.5%
	21-30	54.1%
	31-40	34.5%
	41-50	5.9
Marital status	Single	70.5%
	Married	26.8%
	Divorce	2.7%
Occupation	Government officer	5.0%
	Education	4.1%
	Agriculture	0.5%
	Labor	33.2%
	Business	24.1%
	Service industry	20.0%
	Free industry	3.6%
	Others	9.5%
Income (per month)	<20000	13.2%
(NT$)	20001-30000	30.9%
	30001-40000	33.2%
	40001-50000	11.4%
	50001-60000	5.5%
	60001-70000	2.3%
	70001-80000	0.9%
	> 80001	2.7%
Working years	0	2.7%
	1-5 years	46.4%
	6-10 years	293.5%
	11-15 years	16.4%
	16-20 years	5.0%
Numbers of changing job	Never	15.0%
	1-2times	39.1%
	3-5 times	39.5%
	> 6times	6.4%

B. Factor Analysis and Reliability Analysis

Factor analysis is a multivariate statistical technique, which would confirm the dimensions of the concept that have been operationally defined, as well as indicate which of the items are most appropriate for each dimension. The principal component factor analysis was used to extract the factors, which Eigen value is bigger than 1, finally the varimax variation was utilized to make the factor rotation, and the questions of low loading (less than 0.45) were cut off (Samon, 1999).

The reliability of the four elements of teaching quality and students' satisfaction were examined using reliability test program of SPSS version 12.0. All the values are more than .70, and met the recommended standard Alpha > .70 (Hair

et al. 1998). The results of factor analysis and reliability test are shown in "Table V".

TABLE V.   RESULT OF FACTOR ANALYSIS AND RELIABILITY TEST

Variables	Questions	KMO	The Accumulation % to Explain the Variation	Alpha
Independent variables	Resources facilities	0.874	55.379%	0.8500
	Administrative policy			0.8365
	Teachers' ability	0.899	65.616%	0.8784
	Curriculum and teaching			0.8693
	Campus environment			0.8243
	Counseling service	0.929	63.572%	0.9348
	Tuition fee			0.7793
	Learning achievement	0.924	63.995%	0.9290
Dependent variables	Learning satisfaction	0.690	55.622%	0.7322

C. Hypotheses Testing and Regression Analysis

This research proposed eight hypotheses based on the study construction and the result of the factor analysis, and the stepwise regression analysis was proceeded to test the following eight hypotheses.

Ｈ１ : The administrative policy has significant impact on learning satisfaction.

Ｈ２ : Resources facilities have significant impact on learning satisfaction.

Ｈ３ : Campus environment has significant impact on learning satisfaction.

Ｈ４ : Teacher ability has significant impact on learning satisfaction.

Ｈ５ : The curriculum and teaching has significant impact on learning satisfaction.

Ｈ６ : Counseling service has significant impact on learning satisfaction.

Ｈ７ : The charge prizes have significant impact on learning satisfaction.

Ｈ８ : Learning achievement has significant impact on learning satisfaction.

Firstly, the Pearson correlation analysis was used to investigate the correlation of eight influential factors and students' satisfaction; the result discovered eight factors have significant correlations with students' satisfaction, as shown in "TableVI".

TABLE VI.   THE PEARSON CORRELATION ANALYSIS

Factors	F1	F2	F3	F4	F5	F6	F7	F8	F9
F1:Resources facility	1.00								
F2:Administrative policy	.581	1.00							
F3:Leachers' ability	.331	.318	1.00						
F4: Curriculum and teaching	.377	.464	.677	1.00					
F5:Campus environment	.566	.479	.387	.530	1.00				
F6: Counseling service	.603	.637	.497	.549	.547	1.00			
F7: Tuition fee	.457	.385	.436	.446	.424	.693	1.00		
F8: Learning achievement	.383	.484	.644	.690	.494	.615	.512	1.00	
F9: Students' satisfaction	.597	.603	.645	.658	.615	.737	.615	.800	1.00

The following section initially used stepwise multiple regressions to reveal the predictors of students' satisfaction. In stepwise regression, the variable with the strongest correlation that can meet the entry criteria was entered first, so model 1 contained first one predictor- learning achievement, following resources facilities, counseling service, teachers ability, campus environment were entered. The five variables, explained 79% variation of students' satisfaction. The regression results were shown in "Table VII" and "Table VIII".

TABLE VII.   VARIATION ANALYSIS OF REGRESSION ANALYSIS

	Sum of Square	Degree of Freedom	Average Sum of Square	F Test	Significance
Regression	56.812	5	11.362	161.621	.000
Residual	15.045	214	.070		
Amount	71.857	219			
R＝.889, R2＝.791, after adjusting R2＝.786, Durbin-Watson examination＝1.964					

TABLE VIII.   RESULTS OF THE REGRESSION ANALYSIS

	Non-Standardized		Standardized	T Values	Significant
	Beta	*Standard error*	*Beta*		
Constant	4.820 E-02	.124		.390	.697
Learning achievement	.407	.043	.446	9.578	.000
Resources facilities	.167	.039	.180	4.279	.000
Counseling service	.187	.040	.218	4.663	.000
Teachers ability	.135	.039	.144	3.459	.000
Campus environment	9.55E-02	.033	.118	2.862	.005

V. DISCUSSION

Some implications emerged from regression analysis were mentioned above and will be discussed as follows:

There are five variables among the eight independent variables have significant impact on students' satisfaction, they are resources facilities, campus environment, teachers ability, counseling service and learning achievement. However, the other three variables have no significant impact on students' satisfaction, in terms of curriculum and teaching, administrative policy and tuition fee.

The five variables could explain 79 percent (R=0.889, R2=0.791) of the variation of students' satisfaction, so it can be said that it is a good model to explain students' satisfaction. The five variables mentioned above have significant influences on students' satisfaction (F=161.621, P < 0.000), and the β value of "learning achievement" is the biggest (β=0.446).

The regression equation could be expressed as follows:

Students satisfaction ＝ 0.048 + 0.407 ＊ learning achievement + 0.167 ＊ resources facilities ＋ 0.187 ＊ counseling service＋0.135 ＊ faculties ability + 0.096 ＊ campus environment.

In sum, this study supports H 2, H 3, H4, H 6 and H 8 and rejects H 1, H 5 and H 7, as shown in the following "Table IX".

TABLE IX.   THE RESULTS OF HYPOTHESES TESTING

Iso/Iwa2	The Extracted Factors	Hypotheses	The Results of Hypotheses Testing
Management responsibility	Administrative policy	H 1	Reject
Resource management	Resources facility Campus environment Teacher ability	H 2 H 3 H 4	Accept (β=0.180) Accept (β=0.118) Accept (β=0.144)
Product realization	The curriculum teaches Counseling service The charge prizes	H 5 H 6 H 7	Reject Accept (β=0.218) Reject
Measurement, analysis and improvement	Learning achievement	H 8	Accept (β=0.446)

According to the results and the research questions will be answered as follows:

- The international quality model for education is appropriate to apply for institutes of continuing education.

- The contents of the international quality model for education are strong correlated with the degree of students' satisfaction of institute of continuing education.

- The contents of the international quality model for education could forecast the degree of students' satisfaction of institute of continuing education.

VI. CONCLUSION

The study utilized the integrated model of international quality for education to identify the factors influencing educational quality and students' satisfaction of adult and continuing education. The findings of the study are that eight

elements of teaching quality have correlation with students' satisfaction. Among the eight elements, there are five elements, namely learning achievement, resources facilities, counseling service, teacher's ability and campus environment, are able to forecast students satisfaction, and the learning achievement has the strongest impact on students satisfaction. However, the administrative policy, teaching curriculum and tuition fee have no significant impact on students' satisfaction. The probable reasons are that the students of adult and continuing educations are almost getting job, so they support the tuition fee for themselves, and have no financial difficulty. What they concern is whether they could obtain knowledge and technique to improve their salary and life quality.

This research makes a contribution to both practice and academic knowledge of adult and continuing education. It bridges the research gap in the relationship between education quality and students' satisfaction and also offers a solid foundation for future academic research. The contribution in academic is, to the author's knowledge, the first piece of research to study the relationship between teaching quality and students' satisfaction in Taiwan using the ISO/IWA2 model in Institutes of Continuing Education. The ISO/IWA2 model could be seen as an appropriate model to measure teaching quality and students' satisfaction. In practice, the instrument developed in this study can be useful for a snapshot view of what may be facilitating or inhibiting features of students' satisfaction. The successful practice of ISO/IWA2 depends on continuous self-assessment to identify the opportunities for improvement. Therefore, Institutes of Continuing Education that are providing a quality teaching service should consider ISO/IWA2 as a strategy that will help them to become more successful Institutes of quality in education.

This study suggests that the efforts in learning achievement, resources facilities, counseling service, faculty ability and campus environment are more likely to be fruitful than efforts in improving administrative policy, teaching curriculum and tuition fee. Moreover, ISO/IWA2 is a comprehensive management approach, and the elements of ISO/IWA2 are inter-dependent and influence one another. In search of high teaching quality and students' satisfaction, it has been suggested that a systematic perspective is necessary.

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