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Quality management in schools: Analysis of mediating factors

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The objective of this study is to contribute to Quality Management Systems (QMS) and their impact on schools in the Basque Country, Spain. Specifically, it analyses two models: the EFQM Excellence Model, which originated in the business world, and the Integrated Quality Project (IQP) Model, which has a humanistic focus and arose from an educational research perspective. To do so, 14 schools were analysed by means of a sample of 315 subjects (42 managers and 273 teachers) who utilise one of these two QMS. The results show that the longer the period of time for which schools had had quality certification, the greater the perception of quality among the teaching staff, regardless of the model used. This leads to the conclusion that having in place a quality model in a school makes the teaching staff more aware of the existence and importance of quality management systems and models and leads them to aspire to higher educational quality.

Keywords: assessment methods; education; educational quality; EFQM Excellence Model; quality management systems; quality models

Introduction

Significantly, the quality approach originates from Japan, based on the works of renowned American experts like Crosby, Deming and Juran (Zairi, 2013), whose contribution had not been given sufficient importance and recognition in the United States. It was indeed in Japan where they developed their ideas and models that revolutionised quality systems (Silva, 2015). In Europe, the quality approach was implemented later in the eighties, as exemplified by the European Foundation for Quality Management (EFQM) Excellence Model (initially it was mainly implemented in industrial organisations and more recently in the educational sphere) and the ISO (*International Organization for Standarization*) as a reference models in quality (Gorenak, 2015; Torán Ibáñez, 2015).

The concern for quality that emerged in the business world has spread to other sectors, such as education, which has used models that have been successful in business, but are not necessarily appropriate for the education sector (Díaz, 2013). In this regard, the USA Malcolm Baldrige Award represents a milestone, since it is the first award of its kind that is open to other types of organisations as well as companies, including schools. Quality is no longer exclusively product-focused, but also people-focused (García, Quispe & Ráez, 2003).

In recent years, the so-called Quality Management Systems (QMS) have been implemented in numerous schools in many countries. These enable the introduction of improvements based on the results of assessment procedures that encompass the various components of the entire organisation. QMS are designed to determine continuous improvement processes for all the elements involved in school life (European Centre for the Development of Vocational Training [Cedefop], 2011). The implementation of QMS for the improvement of schools has been widely studied (Alfaro, 2010; Mayo & Gago, 2010; Ramírez & Lorenzo, 2009), although there have not yet been any research or reflection studies that show their effects on the organisational operation of schools, the improvement of procedures or the transformation of their culture (De Vries, 2005; Gibb, 2003).

Although there is still some debate within the educational organisations regarding the utility of QMS, several recent studies have suggested that they offer more advantages and improvements for schools than disadvantages, although the latter do exist (Cheng, Lyu & Lin, 2004; Detert, Schroeder & Mauriel, 2000; Johnson & Kattman, 2003; Stensaker, 2007). In a school, the design and development of a QMS helps to standardise both its administrative and academic procedures, including the teaching-learning process (De la Torre, 2013).

The impact of QMS on schools involves the observed effects that have occurred since their direct or indirect implementation, and which have significantly affected the work and 'ways' of the educational institution and its results. An impact may be defined as the magnitude of change or transformation, which can be measured in terms of quantitative and/or qualitative indicators. When referring to education, it must be made clear that an impact does not often occur immediately after the application of an improvement plan, but its effects are progressively consolidated and integrated into the organisation in such a way that it modifies the culture, planning, management and decision-making system, climate, etc. (Fernández, FJ, Santaolalla & Luna, 2013; Fernández, MJ 2013).

In this study, we analyse two QMS models: IQP and EFQM. The Integrated Quality Project or IQP Model (Álvarez & Santos, 2003; Díez, 2015; Villa, Goikoetxea, Auzmendi, Solabarrieta, Gorriño & Pereda, 2004; Villa,

Troncoso & Díez, 2015) is a proposal that arose as a pedagogic alternative to the quality management systems used in business (Villa, 2001). It originates from educational research, specifically the School Effectiveness Movement (Botha, 2010), which is results-focused; the School Improvement Movement (Creemers, Kyriakides & Antoniou, 2013), which is process-focused; the merger of the two movements into what is known as *Effective School Improvement* (ESI, Murillo & Krichesky, 2015); as well as general educational research (Villa, 2001). The IQP Model involves seven primary areas: institutional approaches, organisational structures, system of community relationships, guidance and tutoring, curricular development, family and environment, and, finally, administration and services (Villa, 2001). The IQP Model uses a more accessible language and fits better with the reality of schools. It was designed by Professors Aurelio Villa Sánchez and Manuel Alvarez Fernández (Villa & Álvarez, 2001) and was quickly implemented in Spain (56 schools in different regions), after which it spread internationally to Latin American countries (viz. 37 schools in Bolivia, Guatemala, Mexico, Paraguay and Uruguay).

The EFQM Excellence Model emerged in the 1980s, and became a standard reference in the European Union (Fernando & Granero, 2008; Martínez, B 2008). It is grounded on the principles of Total Quality Management, and its development is based on the self-assessment of organisations as a method for achieving continuous improvement, in consonance with the Baldrige Model (USA) and the Deming Prize (Japan). To this end, the model proposes a review of all the factors that may determine the final result, by identifying those areas that may be enhanced and by implementing improvement actions by means of which to achieve excellence (Doeleman, Ten Have & Ahaus, 2014). The model proposed by the EFQM involves nine criteria or factors that, when related to one another, define a theoretically excellent organisation, which is capable of attaining and maintaining the highest levels of excellence, or the best possible results. These nine criteria are: leadership, strategic policy, people, partnerships and resources, processes, client results, results on people, results in society and key results.

The EFQM Excellence Model is an established model, which has been applied and tested at numerous schools, mostly in the Basque Country (Spain), where the Basque Government has financially and socially supported the achievement of the awards obtained (Zubieta & Rodríguez, 2008). It was adapted for application to schools in 1997, and has later been revised (Cuevas, Díaz & Hidalgo, 2008; Martínez, C & Riopérez, 2005; Ramírez & Lorenzo, 2009).

The purpose of this research is to analyse the assessment of the quality achieved at 14 schools in the Basque Country (Spain) that have implemented two Quality Management Systems, the IQP (eight schools) and the EFQM (six schools). The objective is to assess whether, when compared to a traditional model (EFQM), the specific model (IQP) entails differences in the perception of quality and, if so, whether this difference is influenced by other factors associated with both the management model and the inherent characteristics of implementing the quality models, such as the size of the centre, the number of awards received, the years that have passed since obtaining the certification and the development of the Improvement Plan. To this end, two hypotheses are proposed:

- Hypothesis 1: Given its higher profile in the education sphere, the IQP Model, as opposed to the EFQM Excellence Model, will produce a greater perception of quality among teachers at schools.
- Hypothesis 2: There are other factors associated with its implementation that may explain the effect on the perception of quality, and which act by mediating the effect of the former.

Method

Participants

This study is a part of the nationwide EDU 2009-14773-C02 ("Impact of the implementation of quality systems in schools") R&D+I project, funded by the Spanish Ministry of Economy and Competitiveness, and analyses the sample corresponding to schools in the Basque Country, in this case 315 participants, of which 42 were managers (headmasters, quality managers or members of the management team) and 273 of which were teachers.

The sample is made up of 14 schools in the Basque Country (Spain). All of them had to meet the requirement of having implemented one of the two QMS: six schools had implemented the EFQM Excellence Model and eight schools had implemented the IQP Model.

The mean age of the 14 schools was 50 years, which means that these are schools with a long history in education. The mean number of years of implementation of the QMS model was seven. Of the 14 participant schools, eight had received some award or recognition for quality. The mean age of the subjects in the samples was 44 years, and they had served at their centre for a mean of 16 years.

Instrument

The instrument used to collect data, designed jointly by the Innova research team at the University of Deusto and the Complutense University of Madrid, was code-named Education Management Quality Assessment Instrument (IVCGE). It presents optimum results in terms of construct validity and measurement accuracy (reliability) by means of two

confirmatory factor analyses (Villa et al., 2015). The reliability of the instrument was analysed using Cronbach's alpha by means of SPSS19, achieving excellent reliability (α = .955). Finally, its construct validity was analysed by means of Structural Equation Models (SEM), achieving highly satisfactory values (CMIN/DF = 4.83, IFI = .92, RMSEA = .057, PRATIO = .93).

Based on an extensive bibliographical review of QMS and schools, the design of the instrument (IVCGE) was configured by two major axes of the quality of a centre: quality policy (Communication, Planning and Recognition), and quality processes (Climate, Teaching-learning process and Relations with the environment), which have been shown to be interrelated. The questionnaires were passed to the faculty at a specific date in advance, and subsequently an interview was held with the Director and the management team. Altogether 315 copies of the questionnaire were collected from the interviews with 42 managers and 273 teachers, which were used for statistical analysis of the results.

A priori, there were two different models as the starting-points. On the one hand, the EFQM Excellence Model, which originates from the business world, and which is implemented in schools that are larger (1,000–1,500 students), has more years of existence, and has received multiple quality awards and strong institutional support. On the other hand, the IQP Model, which originates from the education world and is implemented in schools that are smaller (100–200 students), has fewer years of existence, fewer awards and no institutional support.

Procedure

To conduct the empirical study, a letter was sent to 24 schools (invited sample), specifically to each of the Headmasters, requesting their collaboration. Out of the 24, 14 replied affirmatively (participant sample), and the rest declined to participate for various reasons that included: lack of time; not meeting the minimum requirements; not accepting the proposal; or not being willing to hand in a self-assessment report. This letter guaranteed the confidentiality of the data processing, as well as voluntary participation in the study, and the absence of any discrimination in the sample. It also specified three requirements: delivery of a copy of the self-assessment report made by the centre; delivery of a copy of the assessment with the scores obtained by the external committee of the system used by the centre (EFQM or IQP); and delivery of the plans of the centre's existing improvement teams.

Having obtained the schools' agreement to participate in the study, we arranged a visit to each school, where a 128-item questionnaire was given to the teaching staff, which featured an assessment scale of 1 (lowest value) to 5 (highest value). Some were key-type questions, such that, if the answer was yes, the procedure continued with an assessment scale from 1 to 5, and, if the answer was no, the respondent moved on to the next question.

The work was conducted between January 2013 and December 2013, and involved three visits to each centre, collection and mining of the data provided by the teaching staff, an interview with the headmaster and the management team, and delivery of a final report to each centre. Finally, a letter was sent to thank the schools for taking part in the study.

Preliminary Analyses

The EFQM Excellence Model is a reference model in Spain, which has been widely implemented in the education sector in Spain. In the rankings of the best schools in Spain, one of the criteria assessed, specifically in teaching models, is having a quality management model at the school (EFQM, ISO, etc.) that is applied in order to improve its internal operation.

The IQP Model is not so widely-known, but is being implemented in 56 schools in Spain and 37 schools in Latin America, in such countries as Bolivia, Guatemala, Mexico, Paraguay, and Uruguay. Of the three levels of certification, 92% of the schools have achieved level 1 and 2 certification (the highest).

Data Analysis

Although each dimension of the instrument used (Villa et al., 2015) has its own logic and identity within the context of educational quality, it was considered appropriate to obtain a single indicator that synthesises the contribution of these six dimensions as a whole. To this end, we performed an exploratory factor analysis that included the six indicators. Each of these was constructed on the basis of the mean sum of the component items in each case, and subsequently, the resulting score was converted into a decimal scale in such a way that zero would be the minimum expression of the construct and 10 would be its maximum expression. The Kaiser-Meyer-Olkin (KMO) coefficient (.86) was high and Bartlett's Test of Sphericity was statistically significant (χ^2_{15}= 588.02; p < .001); therefore, the correlation matrix was interpreted to be factorisable. The factor extraction offered a single factor, with a value of 4.09, which explains 68.24% of the variance. The factor weights achieved by each of the items were as follows: Teaching-learning Process (.91), Climate (.85), Relations with the Environment (.80), Communication (.80), Planning (.79) and Recognition (.79). The SPSS programme was commanded to save the factor scores as standardised z scores, which were then converted into a decimal scale to enable comparability with the indicators for the six basic dimensions of the quality management model.

In order to test our first hypothesis, the difference in the perception of quality as a function of the management model implemented (EFQM vs IQP), Student's *t*-test for independent samples was applied and Cohen's *d* coefficient was used to estimate the magnitude of the effect.

In order to test other possible factors that mediate the relationship between the management model and the perception of educational quality at the academic centre (second hypothesis), we calculated the correlation coefficient (point-biserial and/or Pearson's, as applicable) of the variables *management model* and *perception of quality*, with four possible mediating factors: the *number of awards* received for the implementation of the management system; the *number of years* since it was recognised as a quality school; the *size of centre;* and the *implementation of a continuous improvement plan*. In order to test the multiple regression mediation model, we used the macro application for SPSS - Statistical Package for the Social Sciences - (Indirect) developed by Hayes and Preacher (Hayes, 2018a, 2018b), which, in addition to the direct and indirect effects, offers a bootstrap estimate of 95 percent confidence intervals (if 95%-CI includes the value zero, the effect must be interpreted as being statistically non-significant). For this second hypothesis, a single variable was used, the result of which is the total quality indicator derived from the factorisation of the dimensions of the instrument, the solution for which is presented graphically.

Results

Table 1 shows the differences in the means, in relation to the six dimensions of quality and total quality for each of the models that have been implemented or used in the sample analysed. On the one hand, 180 participants belonged to schools that have implemented or are implementing the EFQM Excellence Model, while on the other, 135 people belonged to schools where the IQP Model has been implemented or is being implemented. As may be observed, the means show differences in all the dimensions except for *Planning*, i.e. for the *Planning dimension* the EFQM and the IQP models tend to obtain equivalent means or, at least, the differences observed must be considered to be random. However, in the case of *Communication*, *Recognition*, *Climate*, *T-L Process*, *Relations with the environment*, and the *Total Quality indicator*, statistically significant differences appear, and it may be observed that the mean scores for the EFQM group are higher than those for the IQP Model. These differences are highest in the case of *Recognition* (*d* = .60) and *Relations with the environment* (*d* = .65), where, as may be observed, the effect sizes may be considered to be moderate-high, the total magnitude of the effect for the total indicator being .54.

Table 1 Contrast of means in the quality dimensions as a function of the management model

	EFQM (*n* = 180)		IQP (*n* = 135)		Contrast test		
	M	DE	*M*	DE	*t*	*p*	*d*
Communication	7.39	1.70	6.94	2.01	2.15	.032	.24
Planning	7.19	1.99	6.95	1.83	1.08	.280	.12
Recognition	5.23	2.23	3.59	2.58	5.86	.001	.65
Climate	6.72	2.11	5.62	2.29	4.39	.001	.49
T-L process	6.87	1.87	6.12	2.26	3.23	.001	.36
Relations with the environment	5.99	1.85	4.74	2.17	5.25	.001	.60
Total Quality	6.62	1.64	5.68	1.74	4.78	.001	.54

Note. *SD* = Standard Deviation; *t* = Student's *t*-test for independent samples; *p* = probability value; *d* = Cohen's *d* test effect size.

We have also considered that there may be other factors that explain the perception of quality reflected by the centre. In this regard, Table 2 shows the correlation matrix between the *total quality index* and the *management model* with respect to the variables of interest: *Size of schools*, *Number of Awards received*, *Years since receiving the first certification* and an indicator that would refer to the processes that have been undertaken in order to *develop the improvement plan*, i.e. a higher score for this variable would express that a greater number of processes are currently being implemented.

Table 2 Correlation matrix

	Management Model		Total Quality	
Management Model*	1.00		-.27	(.001)
No. Awards Received	-.67	(.001)	.42	(.001)
Years since Certification	-.80	(.001)	.50	(.001)
Size of Centre	-.85	(.001)	.34	(.001)
Development of Improvement Plan	-.16	(.005)	.49	(.001)

Note. Correlation and probability values, *r* (*p*). *Management model: value 1 represents the EFQM model, and value 2 represents the IQP model.

All of the correlation coefficients were statistically significant. In the case of the *Management Model variable*, the associations are negative, which indicates that the EFQM Excellence Model is the one that expresses the highest values for the variables as a whole. On the other hand, having received a greater number of awards, being certified for a longer time, being larger schools and the implementation of an improvement plan are associated with a greater perception of educational quality.

Given this set of associations, a final data analysis was considered, which involved using a regression model to assess the possible mediating effect of the variables introduced in the previous analysis. Figure 1 shows the flow diagramme of the total, direct and indirect effects obtained. The total effect (c) shows a negative unstandardised coefficient (b = -.94), which indicates that the EFQM management model would present higher scores for quality than the IQP Model. The introduction of the four mediating variables modifies the sign of the coefficient towards positive values (direct effect, c´; b = 1.33), which indicates that, when controlling the effect of these variables, the participants in the IQP Model would be the ones to express a greater perception of quality. On the other hand, three of the mediating variables showed a statistically significant effect: the number of years of recognition (b = -.93); the size of the centre (b = -.61); and the development of an improvement plan (b = -.18).

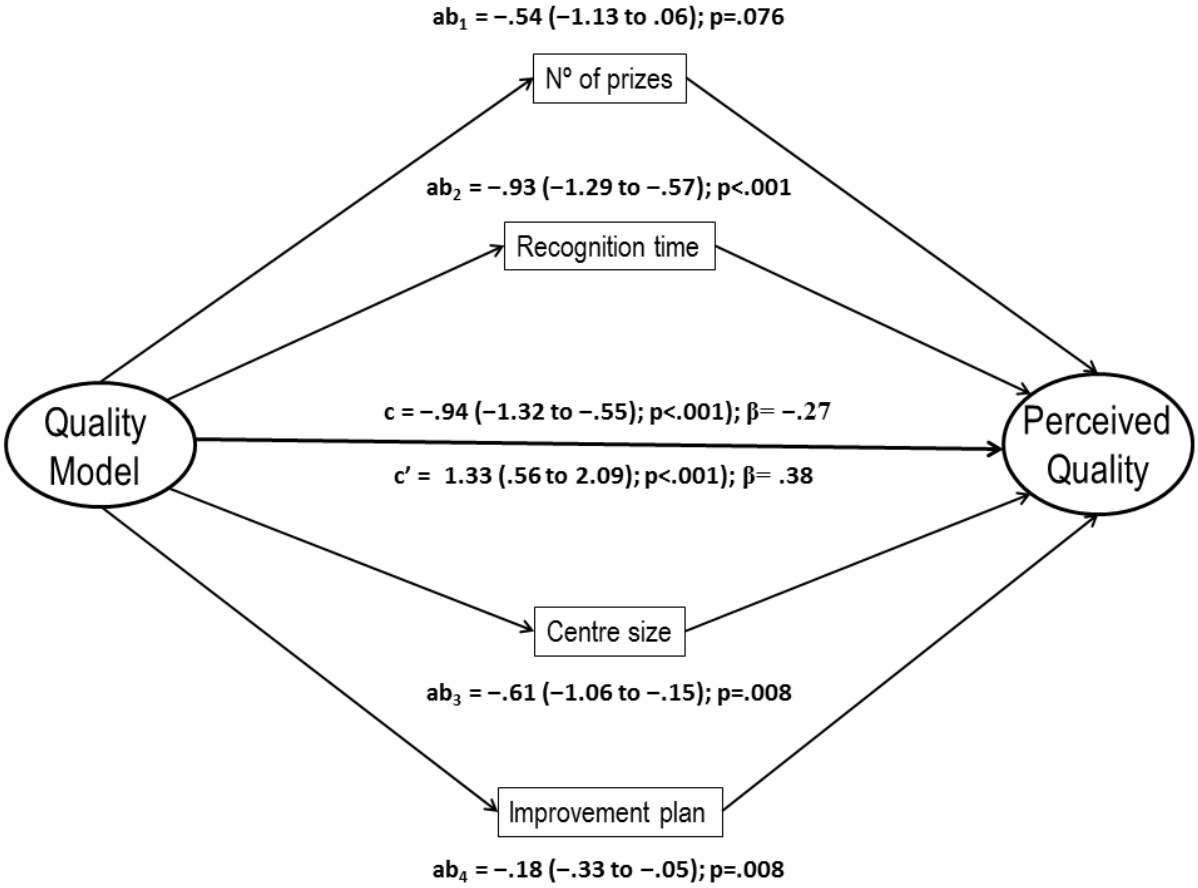

Figure 1 Model of mediation between management model and the perception of educational quality

Discussion

There has been very little research that analyses the impact and/or results produced by the quality systems implemented in the education sphere and, more specifically, at non-university levels (De Vries, 2005; Gibb, 2003). The objective of this study was to test whether a quality management model for schools (the IQP Model) as an alternative to one of the consolidated management models (the EFQM Excellence Model) presents a greater perception of reach among participants in schools where the said models are implemented. The starting hypothesis was that, due to its greater specificity for the education sector, the IQP Model would present higher values in the management quality assessment instrument. Bivariate comparison of the means for the two management models have not corroborated the said hypothesis; instead, the data present evidence that the EFQM Excellence Model achieves higher scores for the perception of the implementation of quality in the schools.

On a scale of 10, all the scores obtained in the six dimensions of the measurement instrument, and in the total index in the case of the EFQM Excellence Model were greater than five, that is, they would receive a positive assessment of the various characteristics of the quality management conducted in the schools. In the case of the schools where the IQP Model has been used, four of the dimensions and the total quality index were also greater than five, but in two dimensions (Recognition and Relations with the environment), the values were inferior, which indicates a lower perception among participants of the scope of the results for quality in those areas. Other variables analysed, such as the number of quality awards that the schools have received and the time elapsed since the implementation, indicate that the EFQM Excellence Model is the one that obtains the highest values. This is because the EFQM Excellence Model created in the business sphere was transferred to educational environments prior to the development of the IQP Model, such that this longer history may explain the differences in the perception of management. That is to say, the differences found when contrasting the perception of quality as a function of the management model may be influenced by other intervening variables, thus mediating the effects and this has been verified. In addition to the actual model being implemented, when managing a given quality system, a relevant effect is caused through such contextual variables as the size of the school, social recognition through the number of awards received, and a longer period of time established the first certification and the improvement plan developed. It is notable that when these factors are neutralised, the sign of the coefficient changes, which clearly shows that the perception of quality among the teaching staff primarily emerges from the pedagogic dimensions of which it is constituted. Therefore, the more favourable model is the so-called IQP Model, which is grounded on a pedagogic model based on educational research.

Likewise, the results reflect that, when education schools incorporate a quality system, whichever it is, just having a model improves self-perception among the teaching staff and the management team, most likely because it is evident that its implementation necessarily entails a change in ways of acting and behaving, and the use of structures and procedures as demanded by any quality system (Díaz, 2013).

Albeit interesting and novel, the results obtained through this research still include certain limitations that restrict the scope of its implications. In the first place, access to the schools that participated in the study was not random, which may have caused a selection bias effect on the results. Most of the schools within the geographical scope of the study that have implemented quality management systems were included, but there was no data to check the homogeneity of the perception of quality among those schools that declined to participate. Moreover, this study assessed differences in the perception of educational quality at schools where a quality management system has been implemented, and excluded, for procedural reasons, those schools that had no such management system. Along similar lines, it is not only the results regarding the perception of quality that are being assessed, but also the impact on inputs arising from education programmes (Colella & Díaz-Salazar, 2015; Díaz, 2013; UNESCO, 2004).

In conclusion, the results provided by this study show that the perception of the quality of education systems is associated with the actual implementation of quality management models. In our case, both the EFMQ and the IQP models showed high scores for the perception of quality among teachers and education managers. However, the control of contextual variables such as time of implementation of the management system and awards/recognitions received, for example, have revealed a mediating effect that confers on the IQP Model a greater effect on the perception of quality. In this respect, the recommendation would be to use the IQP Model, due to its greater specificity in terms of education management than the EFQM or ISO models, which originated from the business world and were later adapted to the education sector.

Finally, recognition is always something to be grateful for, but seeking such social recognition, especially in those models where the certification is unique and granted only once, may cause the feeling of having definitely achieved what was being sought. Quality is always a continuous improvement process and, therefore, we vouch for models that grant certification for a given period of time and require re-certification once the period specified by the system has expired.

This research leads us to think that from the educational point of view, the most important thing in a quality system is not to obtain social recognition, not even customer satisfaction, but to improve school performance. A quality system ought to provide for a philosophy of educational activity based on innovation and a transformational culture that leads to a common and shared strategic vision and a style of teamwork with a significant positive impact on the results of the work of students; as well as on their personal, social, and academic development.

Note

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