



Improvements in climate and satisfaction after implementing a quality management system in education

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ABSTRACT

The overall aim of this study is to evaluate the impact of applying ISO:9001 on the school climate and satisfaction in schools. This was done by using a Likert-type evaluation instrument consisting of 21 items with an excellent reliability score for the general scale (Cronbach $\alpha = 0.955$) and specifically for the school climate dimension ($\alpha = 0.969$) and school satisfaction ($\alpha = 0.927$). The instrument was applied to a sample of 2189 subjects (1881 teachers and 308 members of the school management team) at 85 schools in Spain where ISO:9001 has been implemented for at least 3 years. The results show that implementation of this QMS has generally had a medium level impact on school climate and on satisfaction among the teachers, students, and families at the schools in the sample. Moreover, descriptive and differential analyses have been carried out to identify any significant differences in the impact of implementing the QMS on improvements in the two dimensions as a function of the position, gender, seniority at the school, ownership, and size of the school, and length of time with the QMS implemented there. In addition, other analyses were carried out using single-variant general linear models that revealed an effect of interaction between the variables of position and age. Furthermore, cluster analyses were also performed to identify three teacher and management profiles attending to the levels of improvement brought about from implanting the QMS on the dimensions under study.

1. Introduction

Quality Management Systems (QMS) are implemented at schools mainly in the quest for quality and excellence, although excellence is a term under considerable discussion in the context of education (Beare, Caldwell, & Millikan, 2018). Quality itself is also currently a topic of debate in different sectors, one of which is education, and authors such as Shroff (2019) warn of the need to explore the relevance of indicators of quality in this context.

One of the most widespread QMS globally is the ISO model from the International Organization for Standardization. Although this model was not created exclusively for education, it helps optimize education from a universal perspective (Senlle & Gutiérrez, 2005). In this context, the ISO Standards act as a basis for quality assurance (Arribas-Díaz & Martínez-Mediano, 2015), and schools and education institutions today are adapting to them to evident success for the improvement of schools and education systems in general.

Analysis of any direct or indirect changes that take place in school

organizations after implementation of a QMS is essential for their ongoing improvement, and therefore for their quality and excellence. Nevertheless, few studies have been done on assessing the impact in terms of lasting changes in the organization where they are implemented. Moreover, some of those studies are essentially based on descriptive analyses on the perceived impacted for a regional sample (Díez, Iraurgi, & Villa, 2018; Espiñeira-Bellón, Vázquez, & Barral, 2016). Other authors such as Arribas-Díaz and Martínez-Mediano (2017, 2018) affirm, for example, that there is a correlation between implementation of this QMS in schools and the improvement of their organization and their academic scores. Moreover, these same authors assure that its implementation has contributed to other aspects, such as improved management and levels of satisfaction of the various school users, noting that some of those improvements were long-lasting over time.

This research here forms part of a research project of wider scope that analyzes the impact of QMS on different aspects of school organizations. The present article focuses on analyzing the impact specifically

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of ISO Standards on two relevant factors in education quality: *school climate* and *satisfaction* of the different members of educational organizations. In this regard, policy decisions on education quality are made hand in hand with the implementation of ISO Standards in an attempt to ensure, among other factors, the learning climate and satisfaction of the different members of the teaching and learning community (Celik & Ölçer, 2018). Moreover, the quality systems themselves are geared to customer satisfaction, in this case the satisfaction of the different members making up the school organizations (To, Yu, & Lee, 2018). It is therefore to be expected that the implementation of these QMS has an impact on improving these aspects.

Regarding *school climate*, research over the last few decades has shown its relationship with different elements, including student achievement (Gage, Larson, Sugai, & Chafouleas, 2016; Maxwell, 2016; Ruiz, McMahon, & Jason, 2018). Indeed, there are longitudinal studies that analyze this relationship (Wang et al., 2018) and authors such as Maxwell, Reynolds, Lee, Subasic, and Bromhead (2017) note that student perceptions alone on the climate at school already significantly explain their academic achievement in writing, reading and numeracy. In this study, school climate encompasses factors such as getting along, conflict resolution, and cooperation among teachers.

In addition to its influence on academic achievement, school climate is also related to aspects such as the students' quality of life (Zullig, Ward, Huebner, & Daily, 2018) and their conduct, such that a good climate at school also helps reduce problematic behaviors (Wang & Degol, 2016). In this context, studies such as the one by La Salle, Wang, Parris, and Brown (2017) identify family context, bullying, and peer problems as being some of the most common causes for suicidal thoughts and behaviors. Other authors such as Jain et al. (2018) look into the association between school climate and abuse in the relationships with teenagers, affirming that interventions in the school climate may have addition benefits for preventing these abuses.

Accordingly, it is vital to consider how the students, teachers and families perceive school climate in order to plan interventions and prevent adverse outcomes (Ramsey, Spira, Parisi, & Rebok, 2016).

Similarly, the different members' *school satisfaction* is also essential for the school organization. For teachers, job satisfaction is one of the key components to their motivation and performance (Kapa & Gimbert, 2018). In addition, he attends both to specific characteristics of his work and to general feelings of satisfaction in his work as a teacher (Skaalvik & Skaalvik, 2010).

Teacher job satisfaction is influenced by different institutional factors. These include school climate, communication, participation, social capital, leadership, and organizational support (Crisci, Sepe, & Malafrente, 2018; Edinger & Edinger, 2018; Martínez-Garrido, 2017). In addition, studies such as that of Gil-Flores (2017) show age, gender, control of discipline in the classroom, continuity at the school and employment status, among others, as teacher factors that explain their job satisfaction. Perceived self-efficacy is another personal factor that influences their satisfaction (Aldridge & Fraser, 2016). Indeed, authors such as Halder and Roy (2018) confirm the existence of a positive correlation between job satisfaction and teaching effectiveness.

Some aspects regarding the management team have also been found to have a significant influence on teachers' job satisfaction. Among them is the leadership of the members of the management team (Dou, Devos, & Valcke, 2017; John, 2017; Sun & Xia, 2018; von Fischer & De Jong, 2017), their relationship with the teaching faculty and acknowledgement of their work (Lacireno-Paquet, Bocala, & Bailey, 2016). It has also been found that correct enforcement of the rules at schools leads to greater job satisfaction (Kapa & Gimbert, 2018). In addition, the study by Ellis, Skidmore, and Combs (2017) shows that the quality of information in teacher recruitment processes can influence job satisfaction among teachers.

Student satisfaction is also essential to school organization. For example, the relationship between students and teachers influences student satisfaction and their perceptions of the quality of service of the

organization in their academic performance (Blazevic, Britvic, & Milakovic, 2015). In addition, authors such as Reynolds, Lee, Turner, Bromhead, and Subasic (2017) highlight, for example, how important it is for students to feel psychologically connected to the school for their own academic success.

Similarly, there is also a bilateral relationship between the satisfaction of families and the academic performance of their children. Thus, on the one hand, the satisfaction of families depends on factors such as the academic performance of their children. Moreover, the combination of strong relationships between schools and families and a high level of family satisfaction in school also influences the academic success of students (Hampden-Thompson & Galindo, 2017).

With all the above, the general objective of this work is to assess how greatly the implementation of ISO:9001 affects two of the main elements of an educational organization: the *school climate* and the *satisfaction* of some of its members such as teachers, students, and families.

2. Methodology

2.1. Design

This study was carried out using a quantitative research methodology using an ex-post-facto, non-experimental exploratory type design. This type of methodology was used due to the fact that ISO:9001 had already been implemented at the schools under study, but no data was available from before its implementation.

2.2. Participants

The study population was made up of teachers and members of the management team, such as directors, coordinators, and quality managers of Spanish primary and secondary schools where the ISO:9001 Standard had been in place for at least 3 years.

Incidental sampling was used, taking teachers and members of the management team who had been working for at least 3 years at the school and wished to participate. Specifically, the sample consisted of 2189 subjects, 1881 teachers (85.9%) and 308 members of the management team (14.1%). Regarding the years of seniority of the subjects in the sample, 22.2% had been working at the school for 5 years or less, 24.5% had been working between 6 and 10 years and 53.2% had 11 years or more of seniority at the school. A detailed description of the role of teachers and members of the management team can be seen in Table 1.

The subjects in the sample belong to 85 schools in the Autonomous Communities of Castilla y León (214 subjects), Comunidad de Madrid (451 subjects), Andalucía (1230 subjects) and Comunidad Valenciana (294 subjects). School ownership was public (9.1%), private (9.2%), and subsidized (81.7%). Regarding the schools size, and considering the classification established by Lee, Smerdon, Alfeld-Liro, and Brown (2000), 39.5% were small schools (with fewer than 500 students), 37.0% were medium-sized schools (between 500 and 1000 students) and 23.5% were large schools (more than 1000 students). The data on the years in which the ISO:9001 Standard had been implemented at the schools can be seen in Table 2.

2.3. Instrument

To assess the impact of ISO:9001 implementation on *school climate* and on *satisfaction* of the teachers, management team, families, and

Table 1
Distribution of the sample by years of seniority at the school.

	Teachers	Management team
5 years or less	356	111
Between 6 and 10 years	442	73
11 years or more	994	124

Table 2

Distribution of the sample according to *years of implementation* of the ISO:9001 Standard.

	ISO:9001 Standard
Between 3 and 5 years	6.3%
Between 6 and 8 years	22.2%
Between 9 and 11 years	36.5%
More than 11 years	35.0%

students at the schools sampled, the instrument by Carballo-Santaolalla, Fernández-Díaz, and Rodríguez-Mantilla (2017) was used. This instrument makes it possible to assess different dimensions of the impact produced by the introduction of a QMS in schools, namely, the dimensions of *school climate* and *satisfaction*. The part of the instrument used consists of 21 items on a Likert scale from 0 to 4. Of these items, 17 are related to *school climate* considering aspects such as *rules for getting along*, *interpersonal relations*, *conflict resolution*, *cooperation among teachers*, *family participation*, etc. The remaining 4 items refer to the *satisfaction of teachers, families and students*. The psychometric reliability requirements of the instrument showed satisfactory results (a Cronbach α of 0.975 for the set of 21 items, 0.969 for items related to *school climate* and 0.927 for items related to *school satisfaction*).

The subjects in the sample also filled out a questionnaire with categorical variables regarding aspects of the school such as: *school ownership*, *enrollment*, *number of years with the ISO:9001 Standard implemented* at the school, etc.

2.4. Analyzing the data

With the data obtained, descriptive analyses were then carried out in terms of the impact of implementation of ISO Standards on *school climate* and the *satisfaction* of members of the educational community. After that, differential analyses were carried out (applying the t test for independent samples, ANOVA and Scheffé with a significance level of 0.05) in order to identify differences in the impact that implementation of ISO:9001 Standards had on those dimensions. Differential analyses were also carried out as a function of variables such as the *type of school* (according to the school's ownership) and *school size*, the *years of implementation* of the management system, as well as the *position* held and the *years of seniority* at the school, among others. These studies were complemented with an analysis of factorial variance in order to analyze the possible effect of interaction among the categorical variables of the study for the dimensions of *school climate* and *satisfaction*. Furthermore, a cluster analysis was also carried out for the purpose of identifying different profiles of teachers and members of the management team in terms of their perception of aspects regarding *school climate* and the *satisfaction* of teachers, students, and families.

3. Results

3.1. Descriptive studies

The descriptive studies carried out showed a medium level impact overall on the dimension of *school climate* (average score of 1.87 and standard deviation of 1.15, on a scale of 0–4 with a theoretical mean of 2) which indicates a medium heterogeneity in the scores (Table 3). Specifically noteworthy are medium level scores on the items that state that implementation of ISO:9001 at the school has led to an improvement in the *efficiency of the management team when it comes to resolving conflicts* at the school (item 11), has produced an increase in *teachers' interest in learning new teaching methodologies or in ICT training* (item 14), and has generated greater *involvement of teachers in complying with the school's rules for getting along* (item 6). However, after the implementation of ISO:9001, no noticeable improvement was found in the *relationship between teachers* at the school (item 3).

Table 3

Descriptive study of the items on the *school climate* dimension.

	Mean	S.D.
1. The ISO:9001 Standards have brought about an improvement in the enforcement of the rules for getting along at school.	1.97	1.11
2. The existence of a good school climate.	1.66	1.12
3. A better relationship among teachers.	1.58	1.12
4. Involvement of the management team in enhancing the school climate.	1.93	1.19
5. The relationship between families and the school.	1.94	1.11
6. The teachers' involvement in complying with rules for getting along.	2.12	1.14
7. Improvement in the relationship between teachers and students.	1.81	1.15
8. Improved application of measures taken with students with disruptive behavior.	1.96	1.15
9. Improved application of measures taken for the resolution of teacher conflicts.	1.60	1.13
10. The teachers' conflict resolution skills have improved.	1.70	1.12
11. The management team is effective in resolving conflicts at the school.	2.08	1.18
12. Cooperation among teachers in organizing events (Christmas, Science Week, etc.).	1.97	1.27
13. Teachers' interest in participating in innovation projects at the school.	1.93	1.22
14. Teachers' interest in learning new teaching methodologies, ICT training, etc.	2.11	1.21
15. The exchange of teaching experiences among teachers.	1.87	1.21
16. As a result of applying the quality model as per ISO:9001, the involvement of families at the school has improved.	1.74	1.10
17. Rate overall the impact that you consider that the implementation of ISO:9001 has had on the improvement of the climate at your school.	1.76	1.10
GLOBAL	1.87	1.15

With respect to the dimension of *satisfaction*, the descriptive studies showed a medium level impact (with an average of 1.88 and a standard deviation of 1.10, on a scale of 0–4 with a theoretical mean of 2), which indicates a medium heterogeneity on the answers to these items. The averages of the items that make up this dimension indicate improvements in the perceptions of teachers and members of the management team regarding the *satisfaction of teachers, students and families* following implementation of ISO:9001 (Table 4).

3.2. Differential studies

Next was to identify possible differences in the perception of teachers and members of the management team regarding the impact that implementation of ISO:9001 had on the *school climate* and *satisfaction* as a function of the categorical variables used in the study. This was done by carrying out differential analyses that applied the *Student t* test and ANOVA of a factor (Table 5 shows the size of the effect where significant differences were found).

In the *school climate* dimension, the results on the *position* variable showed that the members of the management team perceived improvement at significantly higher levels than the teaching staff regarding getting along and personal interactions, such as the *existence of a good school climate* (item 2), the *relationship among teachers and between teachers and students* (items 3 and 7), and a greater *involvement and relationship between families and the school* (items 5 and 16); with the

Table 4

Descriptive study of the items of the *satisfaction* dimension.

	Mean	S.D.
18. Teachers	1.85	1.14
19. Students	1.88	1.07
20. Families	1.93	1.09
21. Assess the overall impact you feel that the implementation of ISO:9001 has had on the school faculty and staff's satisfaction generally.	1.88	1.11
GLOBAL	1.88	1.10

Table 5
Differential study on the dimension of *school climate*.

	Item	η^2						
		Position	Gender	Age	Years of seniority	Type of school	School Size	Years of implementation
Getting along and personal interactions (teachers, family, and management team)	1	–	–	–	–	0.036	–	0.011
	2	0.008	–	0.007	–	0.029	0.004	–
	3	0.010	–	0.011	–	0.022	0.006	–
	4	–	–	–	0.006	0.030	0.005	–
	5	0.013	–	–	–	0.056*	–	–
	6	–	–	–	–	0.042*	–	–
	7	0.007	–	–	–	0.021	0.004	–
Conflict resolution (with students and teachers)	16	0.002	0.011	0.010	–	0.068*	–	–
	8	0.006	–	–	–	0.043*	–	0.013
	9	0.003	–	–	–	0.022	–	–
	10	0.002	0.003	0.010	–	0.032	–	0.011
Cooperation among teachers	11	–	–	–	0.006	0.038	0.006	0.009
	12	0.004	0.004	0.011	–	–	0.004	0.009
	13	–	0.008	–	–	–	–	–
	14	–	0.011	0.012	–	0.023	–	0.010
	15	0.003	0.013	–	–	0.028	–	–

* Moderate size of effect

application of measures with students with disruptive behavior (item 8) and resolution of conflicts (items 9 and 10); and with the cooperation between teachers by improving cooperation when organizing events (item 12) and the exchange of teaching experiences (item 15).

As a function of the gender variable, female teachers and women on the management team showed significantly more positive perceptions than the men in terms of improved family involvement at school (item 16), the conflict resolution skills of teachers (item 10) and cooperation among teachers.

In terms of the age variable, subjects aged 56 or over gave a significantly more positive score than those aged 36–55 regarding the improvement in the school climate (item 2), the relationship among teachers (item 3), conflict resolution skills of teachers (item 10), cooperation among teachers when organizing events and their interest in learning new teaching methodologies and training in ICT (items 12 and 14). In addition, those between the ages of 26 and 35 considered, with a significantly higher level than those between the ages of 36 and 55, the improvement in the involvement of families in the school (item 16) as a consequence of the application of the quality model according to the ISO:9001 Standards.

With respect to the number of years of seniority at the school, teachers and members of the management team with 5 years or less of seniority at the school had a significantly more positive perception than those with more than 5 years in the involvement of the management team in enhancing the school climate (item 4) and in its effectiveness in resolving conflicts (item 11) after implementation of the quality management system. No significant differences were found for this variable in aspects related to cooperation among teachers.

With regard to the type of school, the teachers and members of the management team at private subsidized schools considered the effects of implementation of ISO:9001 to be significantly more positive than public and private schools in terms of the school climate and in the management team's involvement to enhance it (items 2 and 4), in the enforcement of the rules for getting along at school and the involvement of the teaching staff in their compliance (items 1 and 6), in the relations among teachers and between teachers and students (items 3 and 7) and in cooperation among teachers, with a moderate effect size (according to Pardo & Ruiz, 2009) in the improvement of the application of measures taken with students with disruptive behavior (item 8). In contrast, workers in public schools showed significantly lower perceptions than those in private and private subsidized schools regarding the improvement of the relationship and involvement between families and the school (items 5 and 16) (with a moderate effect size according to Pardo & Ruiz, 2009) and increased interest of teachers in learning new teaching methodologies and in ICT

training and exchange teaching experiences (items 14 and 15).

In relation to the school size, the results of the differential analyses showed that teachers and members of the management team at small schools gave significantly higher values than the faculty staff at large schools in terms of their perceptions of the improvement of the school climate, the involvement of the management team (items 2 and 4), the relationship between teachers and teachers and students (items 3 and 7), the increased effectiveness of the management team in resolving conflicts in the school (item 11), and the cooperation among teachers when organizing events (item 12).

As for the how long ISO:9001 has been implemented in schools, the results showed significantly more positive perceptions at schools where the system was implemented 9–11 years ago than at schools where it was implemented more recently in terms of improving enforcement of the rules for getting along (item 1) and cooperation of teachers when organizing events (item 12). In addition, in schools with the QMS implemented 9–11 years ago, the values obtained were significantly higher on aspects such as improving the application of the measures taken with students with disruptive behavior, the conflict resolution skills of the teaching staff and the effectiveness of the management team in resolving conflicts at school (items 8, 10 and 11), as well as increasing teachers' interest in learning new teaching methodologies and training in ICT (item 14). No significant differences were found in any of the school climate items in terms of financial aid and, where appropriate, the type of aid given (internal or external).

Along the satisfaction dimension, the results from the differential analyses showed that for the position variable, the members of the management team perceived a significantly higher level of improvement than the teaching staff on the satisfaction of the teaching staff, the students and the families. For the gender variable, the results revealed that women in the sample perceived a significantly greater improvement than men in teacher satisfaction, student satisfaction and family satisfaction (items 18, 19 and 20). Depending on age, teachers and members of the management team aged 56 or over considered improvement in teacher satisfaction as being significantly more noticeable than members aged 36–45 or 25 or younger.

With regard to the type of school, participants at private subsidized schools gave significantly higher ratings to the satisfaction of teachers, students and families than public and private schools, with a moderate effect size on family satisfaction (item 20). On the other hand, the results revealed significant differences in the variable of school size, highlighting that, once they implemented the management model, large schools have a significantly higher level of teachers and students satisfaction (items 18 and 19) than small and medium-sized schools

Table 6
Differential study on the dimension of *satisfaction*.

Item	Position	η^2			
		Gender	Age	Type of school	School size
18	0.015	0.005	0.009	0.038	0.013
19		0.005	–	0.031	0.006
20	0.023	0.010	–	0.077*	–
	0.024				

* Moderate effect size

(Table 6).

No significant differences were found in the level of satisfaction of the teaching staff, students, and families by *years the management team and teaching staff had been at the school*; the *years of implementation of ISO:9001* and the *granting of financial aid*.

3.3. Analysis of the effect of interaction between variables

In order to identify interaction effects between variables along the dimensions of *climate* and *school satisfaction*, an analysis of factorial variance was carried out using univariate general linear models. The results of these analyses showed a significant interaction effect between the variables *position* and *age* on both dimensions (Table 7).

Specifically, the results showed that teachers under the age of 35 have significantly more positive perceptions than members of the management team that their school's implementation of ISO:9001 has led to an improvement in the *school climate*. In contrast, members of the management team who are over 35 years old perceive a greater impact than the teachers. Similar results have been obtained in the analyses on the dimension of *satisfaction*, where the ratings are significantly higher in the case of teachers under 25 years of age with respect to the members of the management team at that same age (Fig. 1).

3.4. Cluster analysis

Different profiles of teachers and members of the management team in the study sample were identified according to their perceptions of the dimensions of the *school climate* and *satisfaction* after ISO:9001 had been implemented at their school. Several cluster analyses were subsequently carried out using the *k means* clustering procedure. The results of these analyses made it possible to identify 3 clusters (Table 8) defined as follows:

- Cluster 1 is made up of 26.5% of the sample. It is identified with teachers and members of the management team who consider that ISO:9001 implementation at their school has brought about slight improvement both in terms of the *school climate* and the *satisfaction* of teachers, students, and families.
- Cluster 2 is made up of 30.1% of the sample. It corresponds to the teaching staff and members of the management team who perceive a very notable improvement in both dimensions after the implementation of the management system. Specifically, the subjects of this cluster highly value aspects related to getting along, such as the *involvement and efficiency of the management team in enhancing the school climate* and *resolving conflicts* and the *involvement of the teaching*

Table 7
Effects of interaction between *position* and *age*.

	Position*Age	
	Sig.	η^2
School climate	0.016	0.006
Satisfaction	0.039	0.005

staff in enforcing rules of getting along and with teacher actions such as *cooperation among teachers when organizing events* and their *interest in participating in innovation projects, learning new methodologies and training in ICT*.

- Finally, cluster 3 is made up of 43.4% of the sample. It consists of teachers and members of the management team who perceive a medium level improvement in the *school climate* and *satisfaction*. The lower ratings of the subjects in this cluster allude to a medium level improvement in the *relationship among the teaching staff* after implementation of the management system.

With respect to the *Autonomous Community* variable, the results of the cluster analysis showed that in the Comunidad de Madrid and Castilla y León, the schools belonging to cluster 2 had the highest scores but barely exceed 18%, while percentages higher than 40 are obtained at schools belonging to cluster 3 (medium level) in the Comunidad de Madrid and 50 at schools in cluster 1 (low level) in Castilla y León. In Andalusia and Valencia, it should be noted that more than 75% of their schools belong to clusters 2 and 3 (see Fig. 2).

On the other hand, depending on the *type of school*, the results of the cluster analysis showed that almost 55% of the public schools belong to cluster 1 (low level) with only 12% in cluster 2. In turn, more than 40% of the private and private subsidized schools are in cluster 3 (see Fig. 3).

4. Conclusions

With the results from this study, we can state that in general, implementation of the ISO:9001 quality management system standards at the schools in the sample had a medium level impact on the *school climate* and on the *satisfaction* of teachers, students, and families. In addition, specific conclusions have been drawn from the results of the different analyses carried out. Specifically, from the descriptive analyses of both dimensions it can be concluded that:

- The implementation of the QMS has brought about a medium level improvement of the *management team's effectiveness when resolving conflicts at the school*, in the *teaching staff's interest in learning new teaching methodologies or training in ICT*, in the *teaching staff's involvement in enforcing the rules for getting along at school* and in the perceptions of the teaching staff and members of the management team on the *satisfaction* of the teaching staff, students, and families. These improvements may originate in the relationship between the historical evolution of quality management systems and different school management theories that highlight the importance of conflict resolution, the analysis of employees' expectations, personal interests, and equal treatment of workers, among other aspects, at organizations such as schools (Dahlggaard-Park, Reyes, & Chen, 2018).
- However, the implementation of ISO:9001 does not seem to have had any impact on the *relationship among teachers at the school*. Accordingly, it must be borne in mind that educational institutions have been giving priority to academic aspects for many years, relegating to second place the development of the students' social skills and, consequently, those of the teaching staff. Thus, despite an increasing amount of research and the implementation of strategies to improve social relations in general, and particularly at schools, a great deal clearly remains to be done in this regard. Therefore, it is not surprising that although factors such as group dynamics and teamwork are also taken into account in theories of quality management systems (Dahlggaard-Park et al., 2018), implementation of these systems does not produce, for the time being, any significant impact on teacher relations. Improvement in this aspect is vital, as authors such as Meristo and Eisenschmidt (2014) have also revealed that emotional support within relationships among teachers has a special impact on their professional satisfaction.

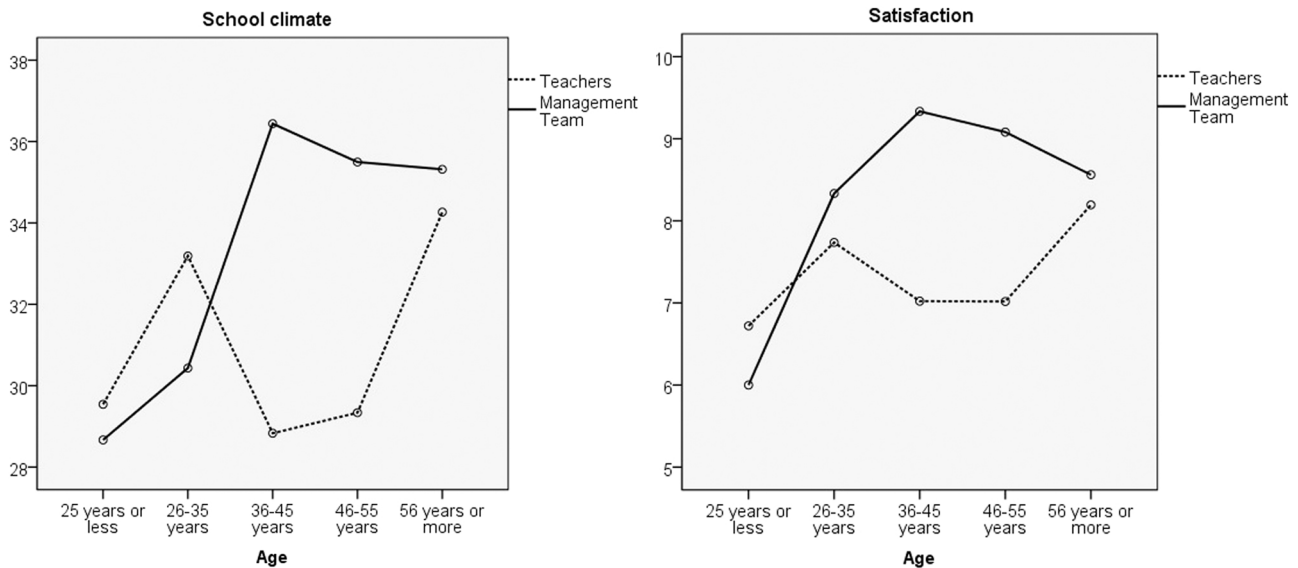


Fig. 1. Effects of interaction on school climate and satisfaction (position*age).

Table 8

Analysis of clusters. *K means* method (final average scores for each cluster).

	Cluster 2	Cluster 3	Cluster 1
School climate (0–68)	50	32	10
Satisfaction (0–16)	11	8	3

involvement of families, conflict resolution, cooperation between teachers and the satisfaction of teachers, students, and families. In this context it must be borne in mind that, from the point of view of quality management, an educational institution is just another company, so that educational activities are managed in a similar way to the business context, and even headmasters today are called managers (Díaz, 2013). Thus, the management team is directly interested in quality management systems and, in this sense, it seems logical that their perception of improvements in different aspects of schools on account of their implementation of such systems is more positive than that of teachers.

- Depending on the *gender* variable, the teachers and women in the management team had significantly greater perceptions of men in improving the *involvement of families in the school*, the *conflict resolution skills of teachers* and the *satisfaction of teachers, students and families*. Differences in perception in the case of the management team may be related to the greater effectiveness of leadership in the female gender than the male gender (Kauts & Sharma, 2017). In this context, effectiveness is promoted by quality management systems through improving stakeholder satisfaction and fostering proactive leadership (Nawelwa, Sichinsambwe, & Mwanza, 2015).

- Going by the *age* variable, teachers and members of the management team aged 56 or over gave significantly more positive ratings than those aged between 36 and 55 to the improvement of the *school climate*, the *relationship between teachers and conflict resolution*, *cooperation between teachers when organizing events* and their *interest in learning new teaching methodologies and training in ICT*. In addition, members of this age group significantly considered a more noticeable improvement in teacher satisfaction than members aged 36–45 or 25 or younger. This greater satisfaction of teachers may derive precisely from aspects related to their personality (Perera, Granziera, & McIlveen, 2018) or their teaching practice, such as the use of new methodologies (Unal & Unal, 2017) and collaborative activities among teachers, such as visiting fellow teachers' classes (Reeves, Pun, & Chung, 2017). On the other hand, teachers and members of the management team aged between 26 and 35 perceived the improvement of the *involvement of families in the educational school* with a significantly higher level than those aged between 36 and 55.

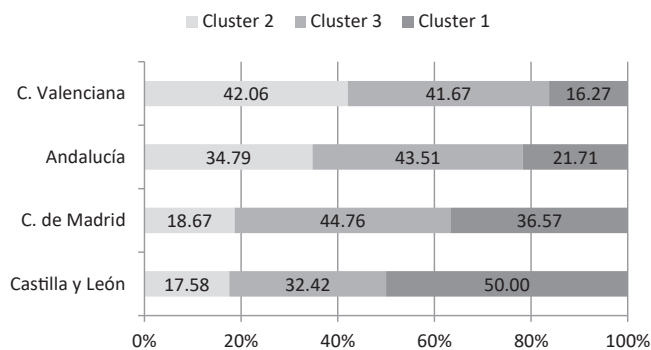


Fig. 2. Results of the cluster analysis by Autonomous Community (in %).

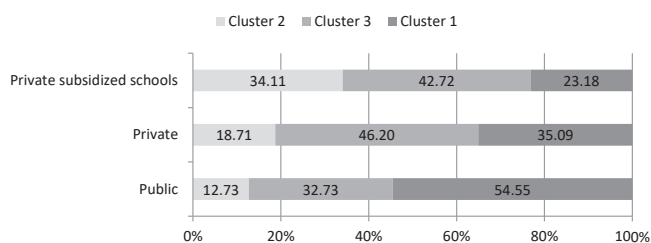


Fig. 3. Results of the cluster analysis by type of school (in %).

The results of the differential analysis allow the following conclusions to be drawn regarding the *climate* and *school satisfaction* at the schools in the sample:

- With regard to the *position* variable, the members of the management team showed significantly more positive evaluations than the teachers in improving the *school climate*, *personal relationships*, the

- In relation to the number of *years of seniority* at the school, teachers and members of the management team with 5 years or less seniority at the school had a significantly more positive perception than those with more than 5 years seniority in the *involvement of the management team in enhancing the school climate* and in their *effectiveness when resolving conflicts*. This more positive perception of the involvement of the management team by teachers with only a few years of experience is of particular importance, as the quality of management is one of the key determinants in the commitment of teachers and their motivation to remain in the profession (Brown & Roloff, 2011). It should also be borne in mind that effective leadership is directly related to the self-efficacy and satisfaction of teachers (Shen, Leslie, Spybrook, & Ma, 2012), so if in this context the perception of teachers is positive, it is to be expected that this will influence their satisfaction and, consequently, their daily work at the school.
- At private subsidized schools, perceptions of impact were significantly higher than in public and private schools in matters of *coexistence*, *conflict resolution* and *school climate*. Specifically, the improvement in the *enforcement of measures in students with disruptive behavior stands out*. On the other hand, in public schools the perceptions were significantly lower than in private and private subsidized schools with regard to the impact that ISO Standards have had on the improvement of *cooperation among teachers* and the *relationship and involvement between families and the school*. In this connection, it should be borne in mind that there is a general consensus that students in private schools tend to belong to families with more privileged socio-economic backgrounds (Flaker, 2014). This fact generates a situation of self-selection that, undoubtedly, can explain part of the differences in perception depending on the ownership of the schools.
- On the *school size*, the results showed that the staff at small schools perceive a greater impact than the staff at large schools on issues such as the *school climate*, *personal relations*, *involvement of the management team* and *effectiveness in conflict resolution* and *cooperation among teachers when organizing events*, among others. These results coincide with those of Egido-Gálvez, Fernández-Cruz, and Fernández-Díaz (2016). On the other hand, the staff at large schools valued the satisfaction of the teaching staff and students significantly higher than did the staff at small and medium-sized schools. This result is in line with studies such as that of authors Ismyrlis and Moschidis (2015) where it is stated that the benefits derived from implementing a QMS are scarcer at small and medium-sized organizations than at large organizations on account of the lower availability of relevant resources. In contrast, authors such as Fotopoulos, Psomas, and Vouzas (2010) state that small and medium-sized organizations are more flexible and open to change than large organizations, so the size of the organization may not be relevant to the benefits of implementing the QMS. However, in the particular case of educational organizations the authors Bellibas and Liu (2018) affirm, for example, that the size of the educational center is one of the most important factors that predict the school climate of the institution.
- For its part, it has become clear that the longer ISO:9001 has been implemented at the school, the greater is the perception of improvement of teachers and management in matters such as the *enforcement of rules of getting along* and *aspects of conflict resolution* and *cooperation between teachers*. These results are in line with the study by Díez et al. (2018) where it is further interpreted that having a QMS implemented at the school makes its staff more aware of its importance and thus aspire to greater educational quality. Along the same lines, authors such as Fonseca (2015) and del Castillo-Peces, Mercado-Idoeta, Prado-Roman, and del Castillo-Feito (2018) affirm the need for time to pass so that the benefits derived from implementing the QMS can be appreciated. However, in contrast to these results, and in a general context of implementation of ISO:9001 Standards in different organizations, it seems that the perceived benefits derived from the implementation of this QMS could decrease

over time (Casadesús & Karapetrovic, 2005a, 2005b; Karapetrovic, Casadesús, & Heras, 2010; Terzioviski, Power, & Sohal, 2003). Consequently, it is of special interest to increase the number of studies that objectively evaluate and evidence the true impact of the implementation of these systems in organizations, considering the passage of time as the main factor and, especially, the measurement of lasting changes.

- No significant differences were found in the dimensions of *climate* and *school satisfaction* depending on the *granting of financial aid*. In this context, although implementation and maintenance of certification each has its associated costs, this lack of significant differences may be related to the fact that the implementation of this type of quality management system is, in some cases, a requirement (Melão & Guia, 2015; Melão, Amorim, Marimon, & Alegre, 2016). Thus, irrespective of the existence of financial support or not, perceptions of the benefits of the introduction of the QMS on climate and school satisfaction might not be influenced by this aspect.

On the other hand, an interaction effect has been found between the *position* and *age* variables in *climate* and *school satisfaction*. Thus, teachers under the age of 35 have a more positive perception of the impact of ISO Standards on the *school climate* than do members of the management team of those same ages. In this same way, the members of the management team with more than 35 years have a more positive perception than the teaching staff. In the *satisfaction* dimension the results are similar for the age of 25. This interaction effect is related to studies such as those by Gómez, Incio, and O'Donnell (2013) where it is stated that workers in higher positions have a higher degree of job satisfaction than those in lower positions, in the same way that they state that the older the workers, the greater the degree of job satisfaction.

In addition, the results of the cluster analysis have revealed 3 different profiles of teachers and members of the management team in the study sample when taking into account the levels of improvement (high, medium and low) implied by implementation of the ISO management model along the dimensions of *school climate* and *satisfaction*, which underscores the variability of perceptions and their association with other variables. Specifically, the teaching staff and the members of the management team in the Comunidad Valenciana and at private subsidized schools are the ones who most highly value the impact of the implementation of ISO Standards at the schools.

Consequently, this study adds to the provision of objective evidence on the impact produced by implementation of a QMS such as the ISO:9001 Standards on two of the main elements of a school organization: *climate* and *school satisfaction*. It is important to bear in mind that the provision of objective evidence is key in this context, since most research studies on the implementation of this QMS offer subjective conclusions based on results obtained using different methodologies (Sampaio, Saraiva, & Guimarães, 2009). Therefore, although the type of research in this study does not lend itself to establishing any causal relationships, the results obtained through a system of perceptions of the teaching staff and different members of the management team at the schools under study nevertheless allow relevant conclusions to be drawn for the scientific community.

Author statement

Conceptualization: Angélica Martínez-Zarzuelo (member of the research group *Quality and Evaluation of Educational Institutions*, No 940148 of the Complutense University of Madrid) formulated the research goals and aims. She and María José Fernández-Díaz (leader of the above-mentioned research group from 2004 to 2022) have been the main responsible for the development of the theoretical framework of the study. Methodology: Angélica Martínez-Zarzuelo and Jesús Miguel Rodríguez-Mantilla (leader of the above-mentioned research group since 2022) have designed and developed the methodology. Formal analysis: Angélica Martínez-Zarzuelo and Jesús Miguel Rodríguez-Mantilla have

used Statistical Package for the Social Sciences for data analysis. Editorial staff - Original draft: Angélica Martínez-Zarzuelo has prepared the initial draft. Writing - Review & Editing: Angélica Martínez-Zarzuelo, Jesús Miguel Rodríguez-Mantilla and María José Fernández-Díaz have prepared the critical review.

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