Identification of profiles in educational organizations as a result of the implementation of a quality management system

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Abstract

Purpose – In the current education context, quality management has increasingly become a key element and more educational organizations are deciding to implement a Quality Management System. Because there are so few studies on the impact that implementation has on educational institutions, the main objective of this paper is to profile educational centers on the basis of their implementation of ISO 9001 quality standards.

Design/methodology/approach – Specifically, this was done by taking a sample of 83 educational centers from four regions of Spain (Comunidad de Madrid, Castilla y León, Andalucía and the Comunidad Valenciana) and analyzing assessments made by teachers and members of the center Management Teams (2,132 subjects in total). The first step was to carry out a number of descriptive and differential studies globally, analyzing 8 broad dimensions: Communication System, Management, Support and Recognition, Learning Process, Quality, Climate, Satisfaction, and External Relations. A cluster analysis was then performed to identify center profiles in terms of the degree of impact from their having implemented ISO 9001 standards.

Findings – The results show that the impact of is greater in educational centers in Comunidad Valenciana and Andalucía with 9–11 years of implementation, with internal financial aid or funding, and at charter centers.

Originality/value – The cluster analysis reveals three clearly differentiated profiles (with high, medium, and low degrees of impact) in the different dimensions evaluated in the study.

Keywords Quality management system, ISO STANDARDS 9001, Impact evaluation, Education, Cluster analysis

Paper type Research paper

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1. Introduction

1.1 Quality management systems in organizational settings

While at the beginning of the 20th century quality focused on products, in the middle of the 20th century the concept of quality was extended to the context of processes and resources. In this context, William E. Deming is one of the most outstanding pioneers in the field of quality. In the 1940s, Deming developed Statistical Quality Control, orienting it towards operations carried out in the field of business administration, demonstrating that it was just as effective as in the industrial field. He also developed some statistical analysis manuals as a tool for analyzing improvements with the most objective criteria possible (Deming, 1975). However, it was in the 1970s when the term total quality took shape, understood as a management system focused on satisfying the expectations and needs of customers as a result of improving the services and products offered by the organization (Rodríguez-Mantilla *et al.*, 2020a). Thus, total quality is a concept, a philosophy, a strategy and is customer-oriented.

This new conception of quality meant a fundamental change in the management policies that had been in place up to that time, leading to a growing interest in Total Quality Management (TQM). This, in general terms, is based on the understanding and implementation of a set of management principles and concepts at each and every level and activity of the organization. These principles are: a) focus on people (seeking their satisfaction), b) participation and teamwork (which implies the involvement of workers and adequate leadership on the part of management) and c) training and continuous improvement (this being the general strategy).

Thus, within the context of TQM, Quality Management Systems (QMS) emerge, which put these principles into practice and serve as a guide for organizations to carry out processes of efficiency, satisfaction and continuous improvement. These QMS are adopted in a wide variety of organizational settings (business organizations, goods producing organizations, environment, marketing, automotive sector, health, educational organizations, etc., according to Rodríguez-Mantilla *et al.*, 2020a).

A number of different models of QMS exist, including total quality or excellence (with the European Foundation for Quality Management -EFQM- one of the most often implemented in Japan, the USA, Europe and Latin America) as well as the ones within the ISO 9000 family referring to certifiable quality management systems (Espiñeira-Bellón *et al.*, 2016; Girmanová *et al.*, 2022).

On the one hand, the EFQM model (EFQM, 2020), created in 1988 and based in Brussels, aims to help organizations implement a management system that allows them to know themselves better. The basis of the model is systematic self-assessment, measuring the starting point before embarking on the path to excellence. The model is oriented towards results (understood as the measurable achievements that the organization has attained), with a special focus on stakeholder satisfaction and prioritizing process management. The model also emphasizes the management, evaluation and review of processes to ensure continuous improvement in coherence with the center's planning to achieve the satisfaction of users and collaborators. The model is made up of 7 criteria grouped into 3 dimensions: Direction (why does this organization exist, what purpose does it fulfill, why this particular strategy, etc.), Execution (how does the organization intend to fulfill its purpose and strategy) and Results (what has actually been achieved so far, what does it intend to achieve in the future), supported by 23 Sub-criterion and 2 Results Criterion (in addition to having the RADAR assessment tool). Although the model does not explicitly refer to quality, it is considered an effective model for promoting the achievement of results and addressing change for the future (Fonseca, 2022).

On the other hand, the International Standards Organization (ISO), based in Geneva, was created in 1947 to achieve the establishment of the quality system. In the early 1980s, ISO appointed several technical committees to develop a set of common standards that would be universally accepted. The result of this work was published in 1987 in the form of the ISO compendium of standards, with the main purpose of providing guidance, coordination,

simplification and unification of criteria for organizations in order to reduce costs and increase effectiveness. There are several ISO families, such as: ISO 14000 (Environmental Management), ISO 22000, OHSAS 18001, ISO 27001, ISO 22301 and others (Risk and Safety Management), ISO 26000 (Social Responsibility Management) or ISO 9000 (Quality Management).

Focusing on the ISO 9000, this family allows organizations a great deal of flexibility, being able to adapt them or even eliminate components of the quality management system depending on different circumstances or contexts (AENOR, 2015). The series specifies the generic requirements to be met in all kinds of organizations and proposes a model: a) customer-centered, b) open to continuous improvement and c) based on processes. The ISO 9001 standard (Quality Management Systems. Requirements) belongs to this family. It is the only certifiable standard in this series and is the standard that establishes the guidelines to be used to effectively meet requirements and regulations in order to achieve customer satisfaction. Specifically, it highlights the need to monitor the context and evaluate the various aspects that influence the organization, showing a greater emphasis on processes, greater flexibility and less focused on documentation (Fonseca et al., 2023). It can be applied to almost any organization, regardless of its nature or size. The ISO 9001 standard has been a worldwide quality benchmark since 2002 and stands out as a benchmark for the effective implementation and operation of a quality management system. It highlights the importance and influence of the social and economic environment on the organization. In this way, through an analysis of the strengths and weaknesses of each organization, we can establish objectives and strategies for improvement.

In short, both models are based on the basic pillars of quality management (leadership, process-oriented approach and ongoing improvement). In turn, correct application of them provides organizations with a useful and necessary tool to a) improve how they manage their processes, b) systematize how they plan, organize, monitor, evaluate and improve their management of substantive and support processes, and c) improve the efforts and satisfaction of the members who make up such organizations (AENOR, 2015; Roque et al., 2016; Busse et al., 2019; Sá et al., 2022). In all this process, as Juran et al. (2021) and Crosby (1996) points out, the active involvement of the management team (leaders) is fundamental as a key element for quality assurance.

Against this background, the following problem or research question arises: "Does the implementation of QMS have a real effect or impact on the functioning of organizations?" In this regard, it should be noted that there is a lack of research that provides evidence on the impact that the implementation of QMS has on organizations, so the purpose of the study presented here is to provide empirical evidence on the impact that QMS has on organizations, specifically educational organizations.

1.2 Quality management systems in the education context
In the education context (area that is the subject of study in the research presented here -specifically in primary and secondary schools-), interest in quality in some cases in some countries has led to considering it a key element and included in new education systems as a basis for social change (Palacios, 2015; Guerra et al., 2022) after making the necessary adjustments to fit the characteristics of the sector. In fact, research interest in TQM research in higher education is growing, and there is a trend toward quality management principles and practices in the governance and management systems of higher education institutions (Manatos et al., 2017; Nasim et al., 2020).

In this sense, educational laws in Spain have been establishing different principles in response to the challenges that society presents and, therefore, the treatment of evaluation and educational quality has been in constant evolution, from the establishment of quality factors (LOGSE, 1990) to the specification of aspects such as:

(1) Teaching programming, training resources, guidance and tutorial action and evaluation of the system (LOPEG, 1995).

(2) The strengthening of quality and equity as inseparable principles (LOE, 2006).

(3) The improvement of student results and the reduction of the dropout rate (LOMCE, 2013).

(4) The commitment to quality aimed at connecting excellence and equity, understood as part of the entire educational community (LOMLOE, 2020).

This last law of the Spanish educational system (LOMLOE, 2020) is aligned with the educational policies of the last decade at international level (OECD, 2018). Likewise, the European Commission compiles the fundamental bases of quality evaluation in the Spanish context, highlighting the management freedom of educational centers in the design of internal and external evaluations as a complement to improve their educational institutions (Eurydice, 2024). This reality has made it easier for educational institutions to advocate for continuous improvement, being reflected in various studies that evidence the commitment to quality and educational excellence (Ramírez and Lorenzo, 2009; Cabrero and Carretero, 2013; Tirado and Conde, 2015; Espiñeira-Bellón et al., 2016; Arribas-Díaz and Martínez-Mediano, 2017; Lorenzo et al., 2021; Otero-Mayer et al., 2021).

Along these lines, the implementation of QMSs in educational organizations (and more specifically in schools) is a strategic decision that seeks the improvement of educational performance and the quality of services offered to the entire educational community (Lushi et al., 2016; Linao and Gosadan, 2019; Pambreni et al., 2019; Paragas, 2020; Parso et al., 2021). This approach is based on several reasons why educational organizations adopt quality management practices. Among them, the following stand out:

(1) The improvement of educational planning, effective communication and the creation of evaluation strategies that allow progress in student learning and performance, as well as in the functioning of educational institutions (Díez et al., 2020).

(2) The need to better respond to the individual differences of students and their families, allowing the development of inclusive and innovative educational experiences (Bhatia, 2013; Msallam et al., 2020).

(3) The desire to increase teacher training in pedagogical skills that has an impact on the functioning of the educational center and the improvement of educational processes (Basbas, 2022). In this sense, the implementation of QMSs can favor the development of proper leadership, interpersonal communication, appropriate use of spaces and resources, teacher commitment, effective planning and improvement of teacher morale (Suleman and Gul, 2017; Díez et al., 2020; Nabaho et al., 2020; Azizi et al., 2023; Busahdiar et al., 2023).

(4) The development of a participatory culture of the center, favoring the participation of the members of the educational community. In addition to establishing itself as a center of reference at the local and regional level, promoting collaboration with other institutions (Basbas, 2022).

(5) The desire to create a culture of continuous improvement and excellence in education, which takes into account the importance of achieving objectives and user satisfaction (Celik, 2018; Permana et al., 2021; Busahdiar et al., 2023).

Likewise, many studies indicate that the main motivation is their interest in improving their management quality as a way to achieve their desired level of quality in teaching (Espiñeira-Bellón et al., 2016; Angelescu, 2021), although other authors point out that the reasons why schools decide to implement a QMS are due more to the increasing competition in the sector (Alustiza, 2010; Franco-Bravo and Zavala-Berbena, 2023). Although analyzing the motives

behind a school's decision to implement a QMS is beyond the scope of this paper, it may safely be said that an increasing number of schools do so to become ISO 9001 certified by implementing the EFQM model, etc. (Palacios, 2015; Guerra *et al.*, 2022). However, the question arises as to what the impact is of implementing these QMS at schools.

In any case, quality education is a need that all schools must meet. These needs must refer to the agreed quality standards. Schools are educational institutions that provide services to the community, so school leaders must manage the services that schools provide based on quality management principles (Firdaus *et al.*, 2022).

1.3 Impact of quality management systems implementation
In this sense, "impact" is understood here as the substantive, sustainable changes that take place over time at education organizations, whether in the attitudes of the faculty and staff, in the way they work, in the climate, in the culture of the school, or in the planning, evaluation, and development of the organizations (thereby generating better learning, which is the prime reason for schools) (Fernández-Díaz, 2013). Thus, the "time" factor plays a fundamental role in correct implementation of QMSs, since a relatively long period of time is needed to be able to distinguish the true impact QMS implementation has on a school from mere short-term results (Fernández-Díaz *et al.*, 2017). The specialized literature points out the need to evaluate the effects the QMSs have on organizations, which can only be done by analyzing schools with several years of implementation so as to be able to measure the real impact (Espiñeira-Bellón *et al.*, 2016; Fernández-Díaz *et al.*, 2016; Lasida *et al.*, 2016; Torres *et al.*, 2017; Díez *et al.*, 2020).

Studies done in the field of education on the effectiveness of implementing management models show a wide range of results, and a number of authors point out the need to continue gathering empirical data on the effects QMSs have on the quality of the processes at schools (Stensaker *et al.*, 2011; Hernández *et al.*, 2013; Ghaith *et al.*, 2023). In this way, some studies show improvement in the school's relations, it management, its communication system, customer service, etc. (Espiñeira-Bellón *et al.*, 2016; Fernández-Cruz *et al.*, 2016; Rodríguez-Mantilla *et al.*, 2020b; Martínez-Zarzuelo *et al.*, 2022) whereas others criticize or question the effectiveness of implementing QMSs, noting that their effects are irrelevant or even detrimental, especially in the education sector, by stimulating the bureaucracy in organizations without having any effect on the most relevant aspects of the learning processes (Hernández *et al.*, 2013; Budeli *et al.*, 2022).

1.4 Dimensions of impact
On the basis of these and other such studies, it is possible to identify different areas or dimensions to assess the impact QMSs may have on educational organizations. Some of the most relevant dimensions are presented below:

(1) *Information and Communication System:* Refers to communication between the school and teachers, families, departments, etc. Horizontal communication among the faculty is a key factor in planning and intervening in the students' learning processes. Moreover, quality management systems consider that communication is one of the most important dimensions (Fernández-Díaz *et al.*, 2016; Bugdol and Jedynak, 2022).

(2) *Management System:* characterized by the systematization of the work processes, information management, and the actions for organizing and structuring activities, be they academic (teaching-learning processes, guidance, etc.) or management (extracurricular activities, complementary activities or any other kind). Specifically, this dimension refers to Planning (of programmes, meetings, etc.), Effectiveness of meetings (of the management team with teachers, meetings between coordinators,

etc.), Review of school documentation (evaluating the usefulness of the review of documents such as the Educational Project, Strategic Planning, etc.) and Annual Planning (taking into consideration the results of students, teacher evaluation, etc.) (Hidayah and Syahrani, 2022; Rodríguez-Mantilla *et al.*, 2020a).

(3) *Support and Recognition Policy*: This dimension is also related to the educational administrators' support and recognition policy towards teachers for the tasks they perform, a key factor to the teachers' motivation and personal and professional development (Rodríguez-Mantilla *et al.*, 2019; Janovac and Jovanovic, 2021).

(4) *Climate and Satisfaction*: Other dimension include the climate at the educational organization and the satisfaction of the teaching community as regards the effectiveness of the QMS in changing and improving the internal (and social) relations among teachers, students, families, staff, and administrators as well as increasing everyone's participation in and commitment to improving the performance and quality of the organization (Alustiza, 2010; Egido-Gálvez *et al.*, 2016; Silva *et al.*, 2021; Martínez-Zarzuelo *et al.*, 2022; Cuenca *et al.*, 2023). Similarly, this dimension includes conflict resolution and conflict management (between teachers, students, etc.).

(5) *Learning processes*: This dimension represents an essential element at educational organizations. The most important aspect in implementing a QMS at a school is that of fostering improvement in the teaching and learning processes to bring about better results (Fernández-Cruz *et al.*, 2016). Specifically, this dimension refers to issues such as: implementation of action plans based on the results of student performance evaluations (internal and external), involvement of families (in the teaching process of their children, participation in the school, etc.), evaluation of teaching methodology, variety and appropriateness of evaluation techniques, etc.

(6) *External relations and community outreach*: This dimension refers to: the relationships that educational organizations maintain with other institutions (for joint projects, sports activities, etc.), the exchange programmes (for language learning and sports practice), recognition that the institution has received (in the press, on television, etc.), and the educational organizations' use of environmental resources (resources offered by the city council, commercial and financial companies, etc.) (Fernández-Díaz *et al.*, 2016; Seyfried and Pohlenz, 2018).

(7) *Quality*: This dimension refers, in itself, to the actual process of quality management at the institution. Thus, this dimension refers to issues such as: periodic reviews (of the institutional evaluation programme, the needs of the institution's staff and external agents, the functioning of the departments, the satisfaction of the different educational agents, etc.), the use of the results of the evaluations (to analyze the level of achievement of the institutional objectives, to reinforce the aspects that could be improved, to analyze the satisfaction of those involved, etc.) or the functioning of the information system, or the management of complaints, suggestions and claims, among others.

QMSs are implemented for the purpose of being useful for the organizations (whether, public, private, or chartered) to achieve relevant improvements in the dimensions noted above. Nevertheless, authors such as Arrizabalaga and Landeta (2007) and Alustiza (2010) highlight the greater participation and initiative at chartered and private schools, both of which also outperform public schools on the dimensions of Satisfaction and Management. Similarly, these authors and other such as Alonso-Arévalo (2003) note that one of the reasons why charter schools implement a QMS is the need to attract students and thereby obtain grants and subsidies either internally (i.e. ones that come from the school itself or from its head

organization) or, more importantly, externally (funding from the Public Administration on the national, regional, provincial, or municipal level or from private entities such as banks, savings and loans, etc.).

1.5 Study aims
Given the above, the main aim of the present study is to identify and define potential profiles of educational organizations (specifically primary and secondary schools) as a consequence of implementing a QMS (namely, ISO 9001) for at least 3 years. Likewise, the following specific aims are to be achieved:

(1) Analyze the overall impact such systems have on the different dimensions evaluated (Communication, Management, Support and recognition, Learning Process, Quality, Climate, Satisfaction and External Relations).

(2) Analyze the differences among schools as a function of the Autonomous Community they belong to, the type of ownership of the school, the number of years the ISO 9001 standards have been implemented at the school, and the type of funding they have received for implementing them.

2. Method
2.1 Design
This study is encompassed in the framework of non-experimental quantitative ex post facto research, since it was not possible to carry out an experimental or quasi-experimental study (given the impossibility of manipulating the independent variable, i.e. the implementation of the QMS).

2.2 Participants
Two prerequisites were established to select the samples of schools and subjects: a) the schools needed to have implemented the ISO 9001 standards for at least 3 years (for this purpose, the centers showed documentary evidence on the implementation and external evaluations of ISO 9001 standards), and b) only teachers and administrators with a minimum of 3 years of experience at their school were eligible to participate.

The sampling procedure was incidental and the final sample consisted of a total of 2,132 subjects (80.55% teachers and 19.45% members of the Management Team) belonging to 83 schools in 4 Autonomous Communities of Spain (21.2% in Comunidad de Madrid, 55.3% in Andalucía, 13.6% in Comunidad Valenciana, and 9.8% in Castilla y León). As to the school ownership type, 81.5% were charter, 9.5% private, and 9% public.

The schools had different years of implementation of ISO 9001: 3–5 years (3.6%), 6–8 years (22.8%), 9–11 years (37.6%), and more than 11 years (36%). Regarding the grants to implement the ISO 9001 standards, 12.1% received outside funding, 55.3% received internal funding, and the remaining 32.6% received no financial aid whatsoever.

Regarding the size of the schools, and considering the classification established by Lee *et al.* (2000), 39.5% were small schools (with less than 500 students), 37.0% were medium-sized schools (between 500 and 1,000 students) and 23.5% were large schools (more than 1,000 students).

In terms of the number of teachers in the center, 25% of the schools had 29 teachers or less, 35.4% had between 30–50 teachers and 39.6% of the schools had more than 50 teachers.

In terms of the level of studies offered by the schools, 10.84% offered Pre-school and Primary Education, 79.52% of the schools offered Pre-school, Primary and Secondary Education and 9.64% offered only Secondary Education.

2.3 Instrument

To identify the different school profiles as a function of the impact ISO 9001 has had on them, the instrument used was the one designed by Rodríguez-Mantilla *et al.* (2019) to evaluate the impact of that system on schools, where subjects were asked to answer 115 items on a Likert scale of 0–4 (where 0 means Not at all, never, and 4 means Very much, always). The instrument evaluates 8 broad dimensions: the communication system (9 items, scale of 0–36), support and recognition (8 items, scale 0–32), climate at the school (17 items, scale 0–68), learning process (21 items, scale 0–84), satisfaction (4 items, scale 0–60), and quality (22 items, scale 0–88). The ratio of observations to items is 18.53, above the value of 10 as recommended by Hair *et al.* (2013). The instrument satisfactorily meets the psychometric requirements of validity and reliability (Cronbach alpha >0.93 overall and on each dimension).

2.4 Procedure

School participation in the study was achieved by holding an initial meeting with the director and the head of quality to explain the purpose of the study and set the dates for applying the questionnaire. For that application, the members of the research team went to the schools on the accorded date and ensured full anonymity and confidentiality of the assessments and results. Likewise, each school was assured to receive a report on the results.

2.5 Data analysis

The data were analyzed using the SPSS 28 software package to standardize the direct scores obtained on each dimension and thereby facilitate interpretation of the results in the various analyses. Firstly, a descriptive study was carried out of each dimension to analyze the impact of implementing ISO 9001 standards at the schools. These studies were complemented with differential analyses by Autonomous Community, Years of implementation, School ownership, and Type of financial aid received (using the ANOVA and Scheffé test with a level of significance of 0.01 and calculating the size of the effect with eta squared. Lastly, a cluster analysis was carried out (by the average k method) so as to identify and define the different school profiles as a result of implementation of ISO 9001.

3. Results

### 3.1 Global descriptive study by dimensions

To evaluate the impact implementation of ISO 9001 has had on schools, descriptive studies were carried out and show that, generally, implementation has had (according to the criteria of the authors of the instrument: Rodríguez-Mantilla *et at.*, 2019) a high degree of impact on the Management and Quality System, and a medium degree on the communication system, learning process, and External Relations (see Table 1 and Figure 1).

	Average	DT**	Score standard
Communication (0–36)	20.25	8.11	3.61
Management System (0–76)	47.58	15.06	4.42
Support and Recognition System (0–32)	12.63	7.43	2.78
Climate (0–68)	31.48	16.38	2.96
Learning Process (0–84)	49.17	17.81	3.94
Satisfaction (0–16)	7.56	4.07	2.84
External Relations (0–60)	30.53	14.03	3.25
Quality (0–88)	61.55	16.39	5.10
Source(s): Authors own work			

Table 1.
Descriptive analysis by dimension

In contrast, a mid-to-low impact was observed in the three dimensions of Support and Recognition, Climate, and Satisfaction. In each case, the typical deviations show average homogeneity in the subjects' responses.
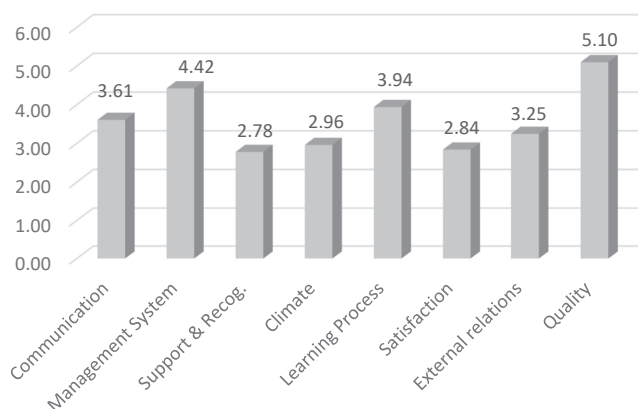
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3.2 Differential studies

Differential analyses were used to study each dimension as a function of the category variables indicated above. Results from ANOVA and Scheffé (the latter not included on account of their scope) on the impact of implementing ISO 9001 standards at the schools by the Autonomous Community they belong to showed that the schools of Andalucía and Comunidad Valenciana show significantly higher levels of impact ($p < 0.01$) than those of Comunidad de Madrid and Castilla y León in all dimensions (except Quality, which showed no difference), with a large effect on Management and Learning Process and moderate in all the other dimensions (as per Pardo and Ruiz, 2009) (Table 2).

As a function of the *type of school*, the results show that, except in the *Quality* dimension, where no differences were found as a function of type of school, the charter schools show significantly higher levels of impact of ISO 9001 codes and standards than public and private schools on all dimensions (with a moderate size of effect in all cases). Similarly, private schools show significantly greater levels than public schools on said dimensions with a moderate size effect (Table 2).

Differential studies as a function of the *Years of implementation* show that schools with 9–11 years of implementing ISO 9001 standards show greater impact than schools with 3–5 and 6–8 years on the dimensions of *Communication, Management, Support and recognition, Climate* and *Learning Process*. Likewise, schools with 9–11 years of implementation show greater impact than schools with more than 11 years in *Support and Recognition* and in *Learning Process*. Lastly, schools with more than 11 years of implementation reach higher levels than 6–8 years in *External Relations*, and higher than 3–5 years in *Climate*. In all cases, the differences found show a small effect size (in accordance with Pardo and Ruiz, 2009) (Table 2).

In terms of *Funding Received*, schools that received internal funding show higher levels than those that received outside funding or no funding at all in *Communication, Management, Support and Recognition* and *Learning Process*. In all cases the size of the effect was small (Table 2).

	Aut. Community			Type of school			Years of implementation			Financial aid		
	F	Sig.	Eta^2	F	Sig.	Eta^2	F	Sig.	Eta^2	F	Sig.	Eta^2
Communication	34.32	0.000	0.063	49.04	0.000	0.061	6.50	0.001	0.010	3.75	0.013	0.004
Management System	89.17	0.000	0.148	92.12	0.000	0.088	7.83	0.000	0.018	3.50	0.047	0.004
Support and Recog.	49.56	0.000	0.066	51.74	0.000	0.064	12.42	0.000	0.023	3.76	0.074	0.004
Climate	54.38	0.000	0.076	52.28	0.000	0.068	8.42	0.000	0.017	1.82	0.175	–
Learning Process	75.73	0.000	0.141	77.06	0.000	0.091	10.18	0.000	0.021	9.54	0.000	0.010
Satisfaction	57.26	0.000	0.080	48.86	0.000	0.061	4.34	0.063	–	1.93	0.174	–
External relations	34.45	0.000	0.062	50.08	0.000	0.062	5.81	0.001	0.014	2.99	0.034	0.003
Quality	18.87	0.689	–	9.25	0.282	–	1.21	0.767	–	1.89	0.184	–

Source(s): Authors own work

Table 2.
Differential studies (ANOVA) by autonomous community, type of school, years of implementation and financial aid received

3.3 Cluster analysis
To identify and define potential profiles of educational schools as a consequence of implanting the ISO 9001 standards, a cluster analysis was carried out using the *average k* procedure using the assessments from the teachers and management team as the unit of measurement. Clusters were set at 2, 3 and 4, with 3 clusters being the most suitable for interpretation. The results did not show any significant variability in item 19, so it was removed from the interpretation of the clusters. The results (which can be found in the Appendix) were then used to define each cluster as follows:

(1) Cluster 3 (making up 34% of the sample, see Figure 2) consists of schools where implementation of ISO 9001 has had a high impact on the systems of *Communication, Management, Learning Process* and *Quality*, and a medium impact on the other dimensions, i.e. *Support and Recognition, Climate, Satisfaction* and *External Relations.*

(2) Cluster 2 (44% of the sample) corresponds to the profile of schools with a medium level of impact in the systems of *Communication, Management, Learning Process* and *Quality*, and a low level of impact on the rest of the dimensions.

(3) Profile 1 (21% of the sample) corresponds to the cluster of schools where implementation of ISO 9001 has had a medium impact on *Quality*; low impact on the systems of *Communication, Management* and *Learning Process;* and very low impact on *Support and Recognition, Climate, Satisfaction* and *External Relations.*

The distribution of schools by their profile and Autonomous Community shows that the Comunidad Valenciana and Andalucía have the greatest percentages of Profile 3 schools (i.e. the highest scoring cluster) in comparison with Comunidad de Madrid (with its predominance of Cluster 2 schools) and Castilla y León (where the percentages of Clusters 2 and 1 are above 41% in both cases) (see Figure 3).

As regards *School ownership*, the results show that charter schools have the greatest proportion with Profile 3 (38.2%) whereas public schools have the lowest percentage with that profile. Similarly, most of the Profile 1 schools are the publically owned ones (45.1%). Nevertheless, as Figure 4 shows, in all types of schools, the highest percentage of schools corresponds to Profile 2.

As regards the distribution of the schools according to the *Number of Years of Implementation* of ISO 9001 standards, Figure 5 shows that schools with 3–5 years and 9–11 years of implementation have the highest percentage of Profile 3 schools.

Lastly, although the differential studies as a function of the *Type of Funding* displayed the highest results for schools with internal funding (in 5 of the 8 dimensions analyzed), Figure 6 shows a very similar percentage of Profile 3 schools in the case of schools that received
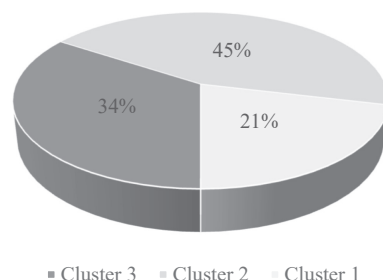
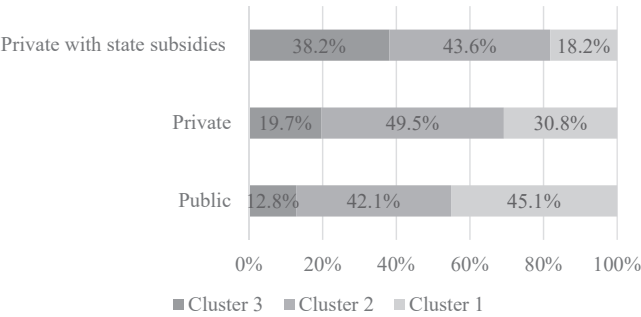■ Cluster 3   ■ Cluster 2   ■ Cluster 1
Source(s): Authors' own work

Figure 2.
Percentages of schools according to their cluster

Figure 3.
Distribution of schools
by cluster and
autonomous
community
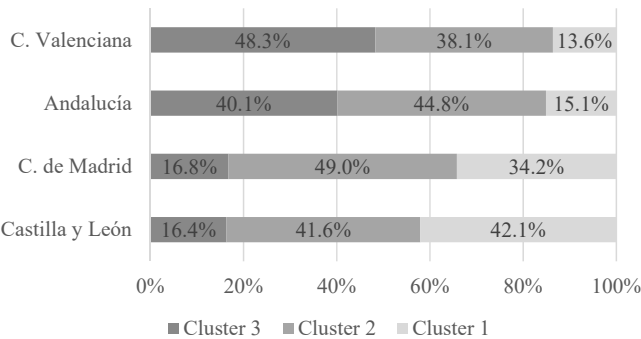
Source(s): Authors' own work

Figure 4.
Percentages of schools
according to their
cluster by type of
school

Source(s): Authors' own work

Figure 5.
Percentages of schools
per their cluster by
years of
implementation

Source(s): Authors' own work

external, internal or no funding whatsoever to implement ISO 9001 standards. Nevertheless, the results show that the biggest percentage of Profile 1 schools (33.7%) falls to the ones that received outside funding.
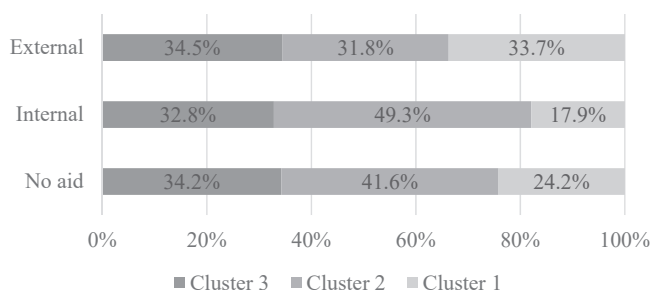
4. Conclusions
The main objective of this paper has been to identify different profiles of educational organizations (specifically schools) as a result of their having implemented ISO 9001 standards for a period of at least 3 years. To do so, a cluster analysis was carried out and revealed three clearly differentiated profiles on the basis of the level of impact displayed by implementing the system in the eight dimensions evaluated here (e.g. Communication, Management, Support and recognition, Learning Process, Quality, Climate, Satisfaction and External Relations). Overall descriptive analyses were also performed on the level of impact the ISO 9001 standards have had on the different dimensions mentioned above and differential studies as a function of the Type of School, Autonomous Community, Years of Implementation and Type of Financial Aid or Funding Received. Below are the main conclusions drawn from the results.

The descriptive analyses have found the following:

(1) In general terms, implementation of ISO 9001 standards had a high impact on the Management and Quality systems of the schools in the study, both of which are dimensions managed by the Management Team of each school. These findings are therefore consistent with the fact that the impact on these areas is so high, since the role and involvement of the Management Team is vital in starting up and proper functioning of QMSs (AENOR, 2015; Espiñeira-Bellón et al., 2016; Cuatrecasas and Babón, 2017; Fernández-Díaz et al., 2017; Knyvienė, 2020; Nápoles et al., 2023).

(2) Although the systems of Communications, Learning Process and External Relations show a medium level of impact (in keeping with Fernández-Cruz et al., 2016; Fernández-Díaz et al., 2016), the impact on the dimensions of Support and Recognition, Climate and Satisfaction reveals a low-to-mid level (in keeping with Martínez-Zarzuelo et al., 2022; Arribas-Díaz and Martínez-Mediano, 2017). These lower levels may in part be due to the conception itself of the ISO standards, which are perhaps not as focused on aspects such as sensitization of people and encouraging them to get involved, or of planning and managing external alliances more akin to management models such as EFQM (Martínez and Riopérez, 2005; Arjona-Granados et al., 2022). It should also be noted that there is a close relationship between Climate and Satisfaction (as pointed out by Rodríguez-Mantilla et al., 2019), so that the levels of both dimensions tend to have similar scores.

Differential studies show that there are no differences in the Quality dimension as a function of the variables chosen (Type of School, Autonomous Community, Years of Implementation and Type of Financial Aid Received). However, all the other dimensions did in fact show

Figure 6.
Percentage of schools per their cluster by type of funding

Source(s): Authors' own work

different impact levels as a function of those variables. Consequently, some of the most relevant conclusions are the following:

(1) The schools in Andalucía and the Comunidad Valenciana show higher levels of impact on all dimensions than did Comunidad de Madrid and Castilla y León (Fernández-Cruz *et al.*, 2019).

(2) Similarly, charter schools showed significantly higher levels of impact than the rest of the schools on all dimensions (which coincides with Alustiza, 2010). This fact may be related to the motivations that specifically move charter schools to implement a QMS, such as the need to offer an education with noteworthy value added, so as to appeal to demand and to obtain funding (Alonso-Arévalo, 2003; Arrizabalaga and Landeta, 2007). On the other hand, some authors highlight other aspects related to public schools, especially regarding their dependence on resources and budgetary allocations defined by the educational policies of each country (Arjona-Granados *et al.*, 2022).

(3) In fact, the results show that schools with internal funding have higher levels of impact on Communication, Support and Recognition and Learning Process in comparison to schools that do not receive any financial aid at all or ones that receive outside funding. Clearly, the fact of having subsidies that help implement ISO 9001 standards (and particularly, funding of an internal nature) contributes to greater impact of that implementation, perhaps because the continuity of having such funds is conditioned by the need to prove the effectiveness of the system and the on-going improvement of the school (Hu *et al.*, 2018).

(4) As regards the dimension of the number of years the school has implemented ISO 9001 standards, it can be seen that schools with 9–11 years of implementation have higher levels of impact in Communication, Management, Support and Recognition, Climate and Learning Process in contrast to schools with 3–8 years of implementation. In contrast, schools that have been implementing ISO 9001 for more than 11 years show higher levels than ones that have done so for 3–8 years in dimensions such as External Relations and Climate. It therefore seems clear that the number of years of having implemented a QMS is a factor to take into account when assessing the impact and long-term improvement implementation may bring about at educational schools (Espiñeira-Bellón *et al.*, 2016; Fernández-Díaz *et al.*, 2016; Torres *et al.*, 2017).

The cluster analysis helped identify and differentiate 3 profiles of schools according to the level of impact from implementing ISO 9001 standards. Taking Profile 3 as the one that features the greatest impact in the different dimensions and Profile 1 as the one that features the least, the main conclusions to be drawn from this analysis are as follows:

(1) Profile 1 is made up of 21% of the samples in which the schools feature a medium level of impact in Quality, a low level in Communication, Management and Learning Process, and a very low level in Support and Recognition, Climate, Satisfaction and External Relations. Profile 2 corresponds to schools with a medium level of impact on the systems of Communication, Management, Learning Process and Quality; and with a low level of impact on the rest of the dimensions (making up 44% of the sample). In addition, 34% of the schools show a high impact on the systems of Communication, Management, Learning Process and Quality; and a medium level of impact on Support and Recognition, Climate, Satisfaction and External Relations (Profile 3).

(2) The Comunidad Valenciana and Andalucía are the two regions that have the highest percentage of schools in Profile 3. Similarly, the charter schools show a greater proportion of schools fitting Profile 3 whereas the public schools are the ones with the highest number of schools in Profile 1.

(3) As regards the number of years of implementing ISO 9001 standards, the schools with 3–5 years and 9–11 years of experience comprise a higher percentage of Profile 3 schools, a fact that is consistent with the results obtained on the differential studies.

(4) In addition, although schools with internal funding scored higher on the differential studies, the percentage of Profile 3 schools was found to be similar to that of schools that received external, internal or no funding whatsoever.

4.1 Theoretical and practical implications of the research

Thus, this research shows the impact that the implementation of a QMS (specifically ISO 9001 Standard) has on some aspects of educational organizations, so that, in addition to having theoretical implications for total quality management, it also has practical implications for society.

In terms of theoretical implications, the research carried out allows us to obtain reliable and valid conclusions that increase the knowledge on the impact, effectiveness and usefulness of the implementation of this ISO 9001 Standard in organizations (specifically in schools). However, it is not easy to compare the results obtained in this research with other similar studies, due to the lack of scientific literature related to the application of the ISO 9001 Standard in the field of education (as pointed out by Sweis *et al.*, 2020; Arribas-Díaz and Martínez-Mediano, 2018; Espiñeira-Bellón *et al.*, 2016). This lack of research has been noted by our research group in the exhaustive literature reviews carried out in recent years about the implementation of QMS, including ISO Standards (Fernández-Cruz, *et al.*, 2019, 2020; Rodríguez-Mantilla *et al.*, 2020b; Fernández-Díaz *et al.*, 2017). For this reason, this research contributes to providing knowledge on the impact of the application of these Standards in education, increasing the scientific literature in the face of the gap in this field. Similarly, the results of this research support the implementation of these systems and give greater credibility about their impact to those who, from a purely theoretical point of view, are opposed to the QMS, questioning the improvements derived from their implementation (Egido-Gálvez *et al.*, 2016). In any case, this research can also help a wide audience of readers, such as: other researchers, politicians, managers of organizations, quality management managers, heads of certifying agencies in different countries, etc.

With regard to the practical implications, the implementation of the ISO 9001 Standard has several benefits in different areas of the organization. On the one hand, greater teacher participation in improving the school climate and improving conflict resolution by the management team (Fernández-Cruz *et al.*, 2020). On the other hand, taking into account the importance that the effectiveness and efficiency of communication have for the continuous improvement of the quality of schools (Ainscow *et al.*, 2013), the implementation of a QMS also has practical implications in the communication system of schools (Rodríguez-Mantilla *et al.*, 2020b) and in the external communication system of organizations (López, 2015). Thus, another practical implication produced by the implementation of a QMS is the improvement of the image of the organization in which it is implemented (Galloway, 2002). Similarly, it cannot be forgotten that QMSs are oriented to the satisfaction, in this case, of the different members of the educational centers (To *et al.*, 2018). Therefore, another tangible benefit of the implementation of a QMS in an educational center is the improvement of the satisfaction levels of the different users (teachers, students, families, etc.) (Arribas-Díaz and Martínez-Mediano, 2018). In addition, the implementation of a QMS has also demonstrated

improvements in economic efficiency, reflected in sustainability, investment and decision-making, among others.

4.2 Limitations and future research lines

At this point, it is important to remember that the provision of objective evidence is fundamental in this context, since most research studies on the implementation of QMSs offer subjective conclusions based on results obtained with different methodologies (Sampaio *et al.*, 2009). Therefore, although one of the main limitations has been the difficulty of evaluating the impact of QMS implementation through an ex-post-facto study (causal relationships could not be established), the results obtained (based on the perceptions of the subjects that made up the study sample) have made it possible to draw relevant conclusions for the scientific community on the changes that have occurred in educational centers as a result of the implementation of ISO 9001.

On the other hand, it should be pointed out that, although a sample size of 2,132 subjects was obtained, given the limitations of incidental sampling (where the subjects who wish to participate voluntarily), it would be of interest and necessary to increase this number with greater participation of quality managers, members of dean's teams, degree coordinators and teachers.

Similarly, another possible limitation of this study is the proportion of respondents belonging to private-subsidized schools versus the proportion of private and public schools (remember that a larger sample of private schools with state subsidies was obtained). In this regard, it should be noted that it was very difficult to identify schools that had implemented ISO 9001, since there is no database with this information (for example, many public schools that were contacted did not have ISO 9001 implemented).

Finally, another limitation is the participation of only 4 Autonomous Communities in Spain. Undoubtedly, this limitation (together with those mentioned above) affects the external validity of the research, and the results obtained can only be generalized to Spain and the Autonomous Communities mentioned above (although, as mentioned above, the representation of public and private centers is limited).

For all of the above, it would be interesting for future research:

(1) Improve the proportion of respondents from private charter schools, private schools and public schools and extend the study sample to other Autonomous Communities in Spain. In any case, this research provides interesting conclusions, although it would be useful to study examples of new QMS implementations in other schools. For this purpose, it would be necessary to use designs that allow experimental or quasi-experimental causal relationships to be established, although this evaluation system is much more complex and difficult to carry out since it requires prior planning and an adequate design over time.

(2) Given the lack of existing literature on the topic discussed here (as pointed out by Rodríguez-Mantilla *et al.*, 2019), it is of particular interest to continue to deepen and promote studies on the effects and impact that the implementation of QMSs has on schools. This will make it possible to increase the amount of evidence through the use of objective and rigorous procedures (Fernández-Díaz, 2013) and will make it possible to assess whether QMSs really generate consolidated improvements in the functioning of school organizations and the quality of the training they offer.

(3) Given that the implementation of QMSs is carried out in countless countries, it is considered interesting to develop studies that allow for international comparative analyses, using instruments that make it possible to evaluate common dimensions and indicators among the different countries.

However, and in any case, based on the results and conclusions given here, this study provides objective evidence to the scientific and professional community on the impact of implementing ISO 9001 codes and standards at schools. Although the specialized literature highlights the need for more studies along this line, we are aware of the fact that this type of study requires using methodological, experimental, quasi-experimental or longitudinal designs associated with implementation in order to establish genuine causal relationships (Fernández-Díaz, 2013). Nevertheless, the results of the work presented here provide worthwhile conclusions that may open new paths of reflection and study. It goes without saying that it would be very reasonable to come up with new research on the implementation of QMS at other types of schools by following the designs outlined above.

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Appendix

Category	Item	Cluster 3	Cluster 2	Cluster 1
Communication	1	2.83	2.07	1.24
	2	3.25	2.49	1.46
	3	3.24	2.49	1.54
	4	2.95	2.22	1.27
	5	3.13	2.37	1.28
	6	2.71	1.89	1.03
	7	2.61	1.75	0.95
	8	2.85	2.00	1.14
	9	3.11	2.38	1.36
Management system	10	3.31	2.51	1.55
	11	3.24	2.56	1.44
	12	3.12	2.30	1.20
	13	3.22	2.41	1.15
	14	2.96	2.08	0.96
	15	3.06	2.22	1.04
	16	3.21	2.49	1.53
	17	3.16	2.45	1.63
	18	3.02	2.35	1.50
	19	3.77	3.44	3.06
	20	3.27	2.52	1.26
	21	3.25	2.49	1.27
	22	3.37	2.64	1.44
	23	3.33	2.54	1.36
	24	3.18	2.47	1.64
	25	3.17	2.37	1.39
	26	3.06	2.34	1.32
	27	2.73	1.91	1.02
	28	3.28	2.55	1.45
Support and recognition	29	2.51	1.54	0.57
	30	2.78	1.88	0.90
	31	2.93	2.02	1.02
	32	2.61	1.59	0.63
	33	2.22	1.27	0.43
	34	2.11	1.15	0.29
	35	1.96	1.03	0.28
	36	2.16	1.13	0.35

Category	Item	Cluster 3	Cluster 2	Cluster 1
Climate	37	2.85	1.89	0.72
	38	2.61	1.54	0.41
	39	2.52	1.45	0.35
	40	2.91	1.84	0.55
	41	2.81	1.86	0.68
	42	3.03	2.07	0.78
	43	2.76	1.72	0.50
	44	2.82	1.88	0.73
	45	2.52	1.47	0.39
	46	2.65	1.58	0.44
	47	3.01	2.02	0.73
	48	2.99	1.86	0.56
	49	2.93	1.82	0.56
	50	3.04	2.07	0.72
	51	2.84	1.77	0.55
	52	2.64	1.64	0.50
	53	2.76	1.64	0.43
Learning process	54	3.14	2.28	1.15
	55	2.73	1.87	0.82
	56	3.02	2.16	0.93
	57	2.76	1.79	0.61
	58	2.51	1.51	0.43
	59	3.09	2.22	0.93
	60	2.88	1.91	0.93
	61	3.24	2.39	1.20
	62	3.31	2.48	1.18
	63	2.87	1.90	0.75
	64	3.06	2.17	0.80
	65	3.17	2.42	1.19
	66	3.03	2.31	1.12
	67	3.02	2.26	1.14
	68	3.51	2.92	2.01
	69	3.43	2.87	1.87
	70	3.31	2.63	1.56
	71	3.44	2.76	1.55
	72	3.53	2.91	1.76
	73	3.10	2.41	1.25
Satisfaction	74	3.18	2.29	0.99
	75	2.84	1.75	0.49
	76	2.74	1.81	0.58
	77	2.80	1.86	0.61
	78	2.85	1.79	0.52

Category	Item	Cluster 3	Cluster 2	Cluster 1
External relations	79	2.69	1.67	0.57
	80	2.76	1.86	0.67
	81	2.69	1.74	0.55
	82	2.84	1.92	0.70
	83	2.69	1.92	0.83
	84	2.40	1.45	0.47
	85	2.39	1.55	0.55
	86	2.48	1.70	0.67
	87	3.26	2.48	1.31
	88	2.97	2.11	1.11
	89	3.47	2.70	1.59
	90	3.15	2.25	0.96
	91	3.12	2.18	0.83
	92	3.05	2.13	0.75
	93	3.03	2.06	0.75
Quality	94	3.33	2.78	2.28
	95	3.20	2.57	1.97
	96	3.25	2.71	1.97
	97	3.30	2.68	2.28
	98	3.11	2.46	1.93
	99	3.28	2.57	2.21
	100	3.48	2.99	2.59
	101	3.50	2.90	2.31
	102	3.23	2.68	1.86
	103	3.41	3.01	2.24
	104	2.88	2.06	1.10
	105	3.42	2.78	2.10
	106	3.52	2.97	2.48
	107	3.25	2.63	1.93
	108	3.42	2.87	2.10
	109	3.24	2.45	2.10
	110	2.83	2.06	1.28
	111	3.02	2.27	1.72
	112	3.61	2.96	2.38
	113	2.76	2.21	1.45
	114	2.87	2.32	1.59
	115	3.25	2.54	1.34

Source(s): Authors own work

Table A1.
Schools of the final
clusters (standardized
scores)