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Quality management culture and inclusive readiness: evidence from Greek schools

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ABSTRACT

This study examines the relationship between total quality management (TQM) culture, school culture, and inclusive readiness in Greek mainstream schools with integration departments. A quantitative, cross-sectional design was employed with a sample of 931 teachers and school administrators. Data were collected using validated scales and analyzed through descriptive statistics, principal component analysis (PCA), confirmatory factor analysis (CFA), one-way analysis of variance (ANOVA), multiple linear regression, and two-step cluster analysis. Leadership and inclusion culture emerged as the strongest predictors of TQM school culture (β=.753, p<.001, R^2=.707), while participatory management was the dominant predictor of inclusive school culture (β=.471, p<.001, R^2=.528). Cluster analysis revealed three distinct school typologies: high-culture (39.6%), emerging-culture (30.9%), and low-culture (29.4%) schools. Perceived barriers to TQM implementation did not differ significantly across clusters (p>.05), indicating a decoupling between institutional constraints and organizational culture development. These findings suggest that quality and inclusion are interdependent dimensions of school governance, shaped primarily by leadership and participatory management rather than structural resources. Practical implications for educational policy and leadership development in centralized educational systems are discussed. By providing the first large-scale quantitative evidence of this decoupling effect in Greek schools with integration departments, the study offers a diagnostic framework with relevance to centralized educational systems more broadly.

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1. INTRODUCTION

The relationship between quality management and inclusive education has often been examined through parallel policy lenses, yet their interaction at the level of school culture remains insufficiently understood. While total quality management (TQM) frameworks emphasize structured processes, continuous improvement, and stakeholder engagement, inclusive education requires organizational environments that value diversity, collaboration, and equitable participation. Understanding how these two domains intersect within real school settings is essential for evaluating the conditions under which quality and inclusion can be mutually reinforced rather than competing priorities [1]–[4]. Despite growing interest in both fields, the organizational mechanisms through which TQM culture translates into inclusive readiness within centralized educational systems remain empirically underexplored, a critical gap addressed by the present research.

Once the preserve of manufacturing plants and corporate boardrooms, TQM has undergone a remarkable journey into the heart of educational governance. Its migration was neither accidental nor

frictionless. Early adopters in education saw in TQM a promise that systematic attention to processes, stakeholder engagement, and continuous improvement could elevate school performance and student outcomes [1], [2]. The European Foundation for Quality Management (EFQM) model, for example, was adapted from business to education with an emphasis on leadership, policy coherence, resource allocation, and impact assessment [2], [5]. In Greece, as in much of Southern Europe, such frameworks have been introduced into a context marked by centralized control and limited school autonomy [6]. Here, TQM's principles are filtered through layers of bureaucracy and tradition.

However, inclusion is not simply a pedagogical technique or an add-on program; it is a systemic organizational challenge. Creating truly inclusive schools requires more than differentiated instruction or accessible facilities. It demands a reimagining of school culture: a shift in values, beliefs, relationships, and power structures [4], [7], [8]. Leadership becomes pivotal: principals must navigate between compliance with national mandates and the cultivation of local cultures that value diversity and participation [9]–[11]. From an institutional perspective, schools operate within environments where formal structures may not fully reflect actual practices, creating conditions of decoupling between policy expectations and organizational culture. Organizational culture theory further suggests that leadership plays a central role in shaping shared norms and values, making it a critical mechanism for aligning quality management principles with inclusive practices. Literature increasingly recognizes that inclusive readiness, the capacity of a school to embrace all learners, is shaped as much by organizational climate as by individual teacher attitudes or resources [3], [7], [12]. This pattern is consistent with the organizational decoupling thesis advanced by Meyer and Rowan [13], who demonstrated that formal institutional structures often become decoupled from the actual practices and cultures that develop within organizations. Weick [14] similarly argued that educational organizations are loosely coupled systems in which subunits, including individual schools, retain considerable autonomy from the formal mandates of centralized governance structures.

Together, these theoretical perspectives suggest that the invariance of perceived barriers across school culture typologies reflects a fundamental organizational property rather than a specific feature of Greek education: internal cultural development proceeds through internal agency, not through the mechanical resolution of structural constraints. Schein [15] organizational culture framework further supports this reading, positing that big cultural change is driven by leadership and shared values rather than by the removal of environmental obstacles. These findings collectively support what may be termed an integrated organizational culture model of school quality and inclusion: a conceptual framework in which leadership practices and participatory governance structures function as the primary organizational levers through which both TQM and inclusive school cultures are shaped, while external structural barriers, though universally perceived, remain decoupled from actual cultural development outcomes. Meta-analytic evidence from Hallinger and Heck [16] shows that collaborative leadership improves school outcomes primarily through its effects on school culture and shared professional norms, consistent with the β=.753 association reported here.

However, there remains a conspicuous gap in research: few studies examine the interplay between TQM practices, school culture, and inclusive readiness within highly centralized educational systems such as Greece's [6], [15]. The present research draws on a sample of 931 teachers and school personnel across both primary and secondary education units in Greece, all operating within schools that include integration departments, a population rarely examined in the TQM literature. Even fewer address how integration departments (τμήματα ένταξης), designed to support students with disabilities within mainstream settings, function within broader efforts at cultural transformation [12], [15]. Under-resourced schools face challenges: limited professional development opportunities for teachers, insufficient collaboration between general and special educators, and persistent barriers to meaningful participation for marginalized students [4], [12], [17].

The Greek context offers both unique obstacles and instructive possibilities. Centralized governance means that policy changes can be implemented swiftly but may lack sensitivity to local needs or conditions [6], [15]. Integration departments represent an official commitment to inclusion but often operate in isolation from whole-school reform efforts. Teachers' attitudes toward inclusion are generally positive but vary widely depending on experience and training; substantive professional development remains rare [12]. School principals' values have been shown to influence their beliefs and practices regarding inclusion. This finding underscores the importance of leadership in shaping organizational culture [10], [11]. Therefore, three interrelated research questions guided the investigation:

- What organizational and demographic factors predict TQM school culture in Greek mainstream schools with integration departments? (RQ1)
- Which structural and leadership factors most strongly predict inclusive school culture, with particular attention to the role of participatory management? (RQ2)
- Do distinct school typologies emerge regarding quality and inclusion culture development, and do perceived barriers to TQM implementation vary systematically across these typologies? (RQ3)

The present study advances existing knowledge along three dimensions. Theoretically, it extends organizational culture and neo-institutional theory [13], [14] to the domain of inclusive education within centralized systems, demonstrating that structural barriers exhibit organizational decoupling from cultural outcomes. Methodologically, it employs a nationally representative sample (N=931) across all Greek regional education directorates, integrating principal component analysis (PCA), confirmatory factor analysis (CFA), multiple regression, and cluster analysis within a single integrative design. Empirically, it provides the first quantitative evidence that leadership and participatory management jointly predict both quality and inclusive school culture in Greek schools with integration departments, with barriers remaining invariant across school culture typologies regardless of cultural level. This finding synthesizes TQM theory, organizational culture theory [15], and institutional theory into a coherent explanatory framework: quality and inclusive school cultures are jointly shaped by internal leadership and participatory processes, while external structural barriers, though perceived as significant by all schools regardless of culture level, do not determine the cultural trajectory of individual schools. This theoretical contribution has direct implications for school improvement policy in centralized educational systems.

2. METHOD

2.1. Research design

The present study adopted a quantitative, cross-sectional research design to investigate the relationships between the school culture of TQM, the culture of inclusion, and the demographic and professional characteristics of the participants. The choice of a quantitative design was considered suitable for achieving the research objectives, as it allows systematic measurement and statistical analysis of variables in a large sample, enhancing the generalizability of the findings [18]. This approach was selected because it permits the simultaneous examination of multiple constructs across a large and geographically diverse sample, enabling statistical modeling of complex organizational relationships. A cross-sectional design is well suited to the exploratory and confirmatory aims of the study. However, it precludes causal interpretation and should be regarded as a foundation for subsequent longitudinal inquiry.

2.2. Sample

The sample of the survey consisted of 931 teachers and administrators who served in primary and secondary education schools in Greece. The selection criterion of the school units was the existence of integration classes, so that the sample reflects the framework for the implementation of inclusive education practices within a centralized educational system [19]. Schools were selected using purposive sampling to ensure representation of both primary and secondary units operating integration departments. Participation was voluntary, and recruitment was facilitated through regional education directorates to avoid institutional bias. Of the total participants, 75.1% were women and 24.9% were men, with an average age of 47.9 years (SD=10.3). In terms of education level, 52.9% served in secondary education and 47.1% in primary education. Most participants held a master's degree (64.4%), while 44.8% had more than 21 years of professional experience. Questionnaires were distributed to 1,400 teachers and administrators across all regional education directorates of Greece, ensuring national geographic coverage across urban and rural contexts at primary and secondary levels. Of the 1,400 distributed questionnaires, 931 were completed and returned, yielding a response rate of 66.5%, which meets established norms for large-scale educational survey research. The purposive sampling strategy, while appropriately aligned with the research objectives, limits statistical generalizability to the broader school population; future studies employing stratified random sampling would strengthen external validity. One participant did not report their school level and was excluded from this tabulation (n=930 for school level distribution). Schools serving more diverse student populations, including refugee and migrant students, were also represented within the sample, reflecting the broader inclusive education mandate that increasingly characterizes Greek mainstream schooling [20].

2.3. Research tool

A structured questionnaire was used to collect data, including three validated measurement scales: the TQM scale, the school culture scale, and the inclusive education scale. The scales were rated on a 5-point Likert-type scale. The validity and reliability of the scales were verified via Kaiser-Meyer-Olkin (KMO), Bartlett's test of sphericity, Cronbach's alpha (α), and McDonald's omega (ω) indices [21].

2.4. Statistical analysis

The statistical analysis of the data was performed using the IBM SPSS Statistics software (version 30) and Jamovi (version 2.7). Descriptive and inferential statistical techniques were applied, which are described in detail in the following subsections. The software was used across all analytical stages, from

descriptive statistics and reliability analysis through to CFA, correlation, regression, and cluster analysis. This ensured consistency in analytical procedures and facilitated direct comparison of outputs across models.

2.4.1. Descriptive statistics

Initially, a descriptive statistical analysis of the research variables was performed. The means, standard deviations, minimum and maximum values, as well as confidence intervals for the main scales and subscales of the questionnaire were calculated [21]. This analysis was used to initially investigate the distribution of variables and understand the basic characteristics of the sample.

2.4.2. Exploratory factorial analysis

To investigate the factorial structure of the scales, a PCA was carried out. The suitability of the dataset for factor extraction was confirmed through KMO and Bartlett's tests, ensuring that the correlation matrix met the assumptions required for dimensionality reduction [21]. Factor extraction was carried out using the principal components method, while a Varimax orthogonal rotation was applied to improve interpretability. Factors with eigenvalues greater than 1 (Kaiser criterion) were maintained, confirmed by a scree plot diagram, while factor loadings above .40 were considered acceptable [21]. Both PCA and CFA were conducted on the full sample (N=931) without split-sample cross-validation. While this practice is defensible when the theoretical factor structure is well-grounded and the sample substantially exceeds minimum requirements, it represents a limitation regarding construct validity robustness; model fit statistics should therefore be interpreted as indicative rather than confirmatory, and future studies are encouraged to employ independent validation samples.

2.4.3. Confirmatory factorial analysis

To confirm the factorial structure, a CFA was performed in the Jamovi software (version 2.7). Model fit was evaluated using the comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). CFI and TLI values above .90 and RMSEA below .08 were considered indicative of satisfactory model fit [22]. For all factor solutions, CFI>.90, TLI>.90, and RMSEA<.08 were achieved, confirming satisfactory model fit [23]. Exact fit indices for each subscale are available from the corresponding author upon request.

2.4.4. Reliability of scales

The internal consistency of the scales was assessed using Cronbach's alpha. Values above .70 were considered acceptable, while values above .80 indicated high reliability [21]. Both Cronbach's alpha and McDonald's omega [24] were computed for each scale, as omega provides a more robust estimate when factor loadings are unequal across items. Results are reported in Table 1 and discussed in relation to the factor structure of each subscale.

Table 1. Internal consistency reliability coefficients for all scales and subscales

Scale/subscale	k	N	α	ω
Leadership and inclusion culture	11	931	.930	.929
Infrastructure and support resources	3	931	.654	.674
Continuous improvement of learning	9	931	.935	.936
Participatory management and collaboration	7	931	.926	.926
TQM school culture	10	931	.936	.935
Inclusive school culture	2	931	.841	.841
TQM implementation barriers	3	920	.581	.589
Necessity of strategic and institutional TQM support	2	924	.677	.677

2.4.5. Correlation analysis

To investigate the relationships between the key variables, a Spearman correlation analysis (Spearman's rho) was performed, which was deemed suitable for Likert-type scale data that do not necessarily follow a normal distribution [21]. Spearman's rho was preferred over Pearson's r because the composite scale scores, while treated as continuous for regression purposes, cannot be assumed to follow a strictly normal distribution. Correlation coefficients were interpreted as negligible (<.10), small (.10–.29), moderate (.30–.49), or large (≥.50) in line with conventional guidelines.

2.4.6. One-way ANOVA

For the comparison of group means, a one-way analysis of variance (one-way ANOVA) was applied. Before each analysis, the homogeneity of the variances was checked using the Levene criterion.

In cases of violation of this hypothesis, the Welch robust test was employed. When the overall analysis was statistically significant, post hoc comparisons were applied with the Games-Howell method, which is considered suitable for groups with different sizes and possible violations of homogeneity of variances. At the same time, effect size indices (eta squared, η^2) were calculated to estimate the practical significance of the differences [21].

2.4.7. Multiple linear regression

To investigate the factors that influence school TQM culture and school culture of inclusion, multiple linear regression was performed using the enter method. Demographic variables (gender, education level, and job position), work experience variables across different types of school structures, training variables, and organizational culture indicators were included in the models. Model suitability was assessed using the R^2 coefficient of determination and the adjusted R^2, while statistical significance was examined using the F-test. For the multicollinearity assessment, the tolerance and variance inflation factor (VIF) indices were examined, with acceptable VIF values (all below 5.0) [21]. Comprehensive residual diagnostics were conducted for both regression models. The Durbin-Watson statistic was 2.084 (Model 1: TQM culture) and 1.991 (Model 2: inclusive culture), both within the acceptable range of 1.5–2.5, confirming independent residuals and the absence of first-order autocorrelation. Residual distributions showed skewness of −.478 and −.393 and kurtosis of 1.150 and .124, respectively, indicating approximate normality of the error distribution across both models. The Kolmogorov–Smirnov test on standardized residuals yielded D=.048, p=.025 (Model 1) and D=.075, p<.001 (Model 2); these statistically significant deviations are expected under large-N conditions and do not indicate substantive normality violations given the skewness and kurtosis values. Standardized residuals ranged from −3.88 to +3.35 (Model 1) and −3.30 to +2.65 (Model 2), with fewer than 1.5% of cases exceeding |z|=3.0, consistent with a normally distributed error structure. Model 1 showed no evidence of multicollinearity (maximum VIF=1.474, tolerance=.679). Model 2 showed elevated but acceptable inter-factor correlations (maximum VIF=4.135, tolerance=.242), remaining below the critical threshold of 5.0 and indicating that coefficient estimates are interpretable. Effect sizes were interpreted using standardized beta coefficients: |β|<.10=small, |β|≥.30=medium, |β|≥.50=large, following Cohen's conventional guidelines. Demographic variables (education: 3 categories; work experience: 5 categories; TQM training: 4 categories; gender: 2 categories; school level: 2 categories) were entered as categorical predictors in SPSS. SPSS indicator coding produced F(14, 914)=157.28 for Model 1 and F(16, 913)=63.84 for Model 2, reflecting the expanded degrees of freedom from dummy-coded categorical variables. The reported R^2, Adjusted R^2, and standardized β coefficients derive from this SPSS categorical-entry specification. For Model 1 (TQM school culture), predictors comprised two organizational factors (leadership and inclusion culture; infrastructure and support resources) and five categorical demographic variables (gender, school level, education level, work experience, and TQM training level), entered as categorical predictors using SPSS indicator coding. For Model 2 (inclusive school culture), all four organizational factors were included alongside the same five demographic covariates.

2.4.8. Two-step cluster analysis

To identify typologies of school units, a two-step cluster analysis was performed. This method was chosen because it is suitable for large samples, allows the combination of continuous variables, and automatically determines the optimal number of clusters based on the Bayesian information criterion (BIC) [21]. In all statistical tests the significance level was set at p<.05. Cluster solution quality was confirmed via the silhouette coefficient (overall=.27, Fair zone: .20–.50 per SPSS classification): cluster 3 showed the highest internal cohesion (mean silhouette=.35, no negative values), cluster 2 satisfactory cohesion (.25), and cluster 1 the lowest (.22, with 16.8% negative values indicating partial boundary overlap). Common method bias was assessed using Harman's single-factor test [25] on all 47 Likert-scale items; the first unrotated factor accounted for 48.49% of total variance, remaining below the critical 50% threshold, indicating that common method bias does not pose a substantial threat to validity. Procedural controls were also employed: items from different constructs were interleaved in the questionnaire, and participation was fully voluntary and anonymous.

3. RESULTS AND DISCUSSION

The findings demonstrate that organizational culture plays a decisive role in shaping both TQM and inclusive readiness. Leadership emerged as the central mechanism through which quality principles are enacted, while participatory management was the strongest predictor of inclusive culture. These results highlight the importance of internal organizational dynamics in contexts where external constraints are pronounced.

3.1. Sample characteristics

Table 2 presents the demographic and professional profile of the sample (N=931). The sample was predominantly female (75.1%; n=699), with males comprising 24.9% (n=232). The mean age was 47.9 years (SD=10.3). Regarding educational level, 52.9% (n=492) served in secondary education and 47.1% (n=438) in primary education. In terms of professional role, the majority were classroom teachers (57.6%; n=536), followed by school principals (33.4%; n=311), vice-principals (3.9%; n=36), support and specialist staff (EEP-EVP) (2.6%; n=24), and educational advisors/staff (2.4%; n=23). Nearly half of the participants (44.8%; n=417) had more than 21 years of teaching experience, while 19.3% (n=180) had up to 5 years. Regarding academic qualifications, 64.4% (n=600) held a master's degree, 27.0% (n=251) a bachelor's degree, and 8.6% (n=80) a doctorate. One participant did not report their professional role and was excluded from role tabulation (n=930 for role distribution).

The demographic profile of the sample reflects a typical distribution of the Greek teaching workforce, with substantial representation across roles and experience levels, allowing for reliable comparisons across organizational variables. The predominance of female teachers is consistent with national statistics on the Greek teaching workforce, where women represent approximately 70% of primary and secondary school staff. The relatively high proportion of participants with postgraduate qualifications reflects a broader trend in Greek education toward advanced academic training among serving teachers.

Table 2. Demographic and professional characteristics of the sample

Variable	Category	n	%
Gender	Male	232	24.9
	Female	699	75.1
Age (M, SD)		47.9 (10.3)	
Education level	Primary	438	47.1
	Secondary	492	52.9
Professional role	Principal	311	33.4
	Vice-principal	36	3.9
	Teacher	536	57.6
	EEP-EVP	24	2.6
	Educational advisor/staff	23	2.4
Years of experience	0–5	180	19.3
	6–10	130	14.0
	11–15	73	7.8
	16–20	131	14.1
	21+	417	44.8
Academic qualifications	Bachelor's	251	27.0
	Master's	600	64.4
	Doctorate	80	8.6

Regarding professional experience across different school structures (multiple responses permitted; total responses=1,143), the most frequently reported context was the mainstream classroom with students with special educational needs (SEN) and/or refugee background (52.0% of cases; n=484 responses), followed by integration departments (31.1%; n=290), parallel support (24.4%; n=227), reception classes (7.9%; n=74), and DYEP units (7.3%; n=68). A substantial proportion of participants had accumulated experience in more than one school type, including integration departments, special schools, and intercultural schools. This breadth of experience suggests that the sample has meaningful familiarity with inclusive education contexts, which strengthens the relevance of their responses to the study's constructs. Experience in multiple school types was particularly common among participants in secondary education settings, where transfer between school types is more frequent. This diversity of experience strengthens the ecological validity of the sample with respect to inclusive education contexts.

Table 3 presents the distribution of professional training across three thematic areas. A striking finding is that 61.9% of participants (n=576) reported no training in TQM whatsoever, while 42.3% (n=394) reported no training in intercultural education. These figures suggest that quality management practices in Greek schools are being implemented largely without systematic professional preparation, consistent with observations regarding centralized educational systems where policy implementation often precedes professional development [6], [15]. Variation in training exposure was most pronounced for TQM-specific training, where fewer than 20% of participants reported having received any formal preparation. This pattern reflects the limited institutionalization of quality management training within Greek in-service professional development structures.

Table 1. Training distribution by thematic area and level

Training area	None, n (%)	Seminar, n (%)	Master's, n (%)	Doctorate, n (%)
Special education	204 (21.9)	460 (49.4)	257 (27.6)	10 (1.1)
Intercultural education	394 (42.3)	478 (51.3)	58 (6.2)	1 (.1)
TQM	576 (61.9)	250 (26.9)	98 (10.5)	6 (.6)

3.2. Descriptive statistics of the inclusion scale

Analysis of the 14-item school administration and environment for inclusive education scale revealed mean scores ranging from 3.06 to 4.21 on a 5-point Likert scale (N=931), indicating generally positive attitudes toward inclusive education with notable variation across dimensions. The highest mean was recorded for the item "The school administration actively supports inclusive education" (M=4.21, SD=.90), followed by "The school community shows respect for student diversity" (M=4.13, SD=.91) and "Leadership decisions consider the needs of students with SEN" (M=4.08, SD=.96). These results align with findings emphasizing the pivotal role of school leadership in promoting inclusion [9], [10]. The subscale means ranged from 3.46 to 3.82 across the two dimensions of the instrument, indicating moderate-to-high perceptions of leadership and the school environment for inclusion across the sample.

Conversely, the lowest mean was recorded for "Teachers are continuously trained for managing diversity in the classroom" (M=3.06, SD=1.13). At the same time, "School facilities are accessible to students with disabilities" also scored relatively low (M=3.24, SD=1.44). The substantially higher standard deviation for the latter item (SD=1.44) reflects considerable inter-school variation in physical infrastructure, underscoring the uneven implementation of inclusive policies across Greek schools [7], [15]. This finding is consistent with prior research indicating that in-service TQM training in Greek schools is both infrequent and insufficiently institutionalized. The limited spread of quality management training reflects broader systemic constraints in a centralized educational system where professional development mandates are rarely enforced at the school level.

3.3. Effects of professional training on TQM and inclusion dimensions

3.3.1. Special education training

One-way ANOVA revealed that special education training markedly differentiated several dimensions. Significant differences were found for leadership and inclusion culture, $F(3, 927)=3.52$, $p=.015$, $\eta^2=.011$; infrastructure and support resources, $F(3, 927)=3.40$, $p=.017$, $\eta^2=.011$; continuous improvement of learning processes, $F(3, 927)=3.07$, $p=.027$, $\eta^2=.010$; participatory management, collaboration and resource management, $F(3, 927)=4.39$, $p=.004$, $\eta^2=.014$; TQM school culture, $F(3, 927)=2.75$, $p=.042$, $\eta^2=.009$; and TQM implementation barriers, $F(3, 924)=3.76$, $p=.011$, $\eta^2=.012$. No significant differences were found for inclusive school culture, $F(3, 927)=2.01$, $p=.111$, nor for the necessity of strategic and institutional TQM support, $F(3, 925)=1.26$, $p=.288$. Although the effect sizes were small, they indicate consistent patterns suggesting that training contributes incrementally to the development of quality-related cultural dimensions.

Participants with doctoral-level training in special education consistently showed the highest mean scores on positive dimensions (leadership and inclusion culture: M=4.34, SD=.46; continuous improvement: M=3.94, SD=.66; participatory management: M=4.09, SD=.54; TQM school culture: M=3.93, SD=.64). However, this group was very small (n=10), warranting caution in interpretation. Bonferroni post hoc tests indicated that the main substantive differences were between the seminar and master's groups: participants with seminar training rated participatory management higher than those with a master's degree (MD=.224, p=.002), while master's-level participants reported higher TQM implementation barriers compared to seminar participants (MD=.177, p=.016).

3.3.2. Intercultural education training

ANOVA indicated that intercultural education training markedly differentiated leadership and inclusion culture, $F(2, 927)=4.00$, $p=.019$, $\eta^2=.009$; continuous improvement of learning processes, $F(2, 927)=7.94$, $p<.001$, $\eta^2=.017$; and TQM school culture, $F(2, 927)=8.62$, $p<.001$, $\eta^2=.018$. No significant differences were found for infrastructure ($p=.471$), participatory management ($p=.248$), inclusive school culture ($p=.501$), TQM barriers ($p=.809$), or strategic support necessity ($p=.923$). Games-Howell post hoc comparisons showed that participants with seminar training scored markedly higher than those with no training on leadership and inclusion culture (MD=.144, p=.019), continuous improvement (MD=.235, p<.001), and TQM school culture (MD=.235, p<.001).

3.3.3. TQM training

The most pronounced training effects were observed for TQM training, as presented in Table 4. Significant differences were found across nearly all dimensions, with effect sizes ranging from small to medium. Specifically, leadership and inclusion culture, $F(3, 925)=22.91$, $p<.001$, $\eta^2=.069$; infrastructure and

support resources, F(3, 925)=16.16, p<.001, η^2=.050; continuous improvement, F(3, 925)=25.24, p<.001, η^2=.076; participatory management, F(3, 925)=11.68, p<.001, η^2=.037; TQM school culture, F(3, 925)=24.84, p<.001, η^2=.075; inclusive school culture, F(3, 925)=6.50, p<.001, η^2=.021; and TQM implementation barriers, F(3, 922)=7.65, p<.001, η^2=.024. The only non-significant result concerned the necessity of strategic and institutional TQM support, F(3, 925)=1.80, p=.146.

Games-Howell post hoc tests showed that participants with no TQM training consistently reported markedly lower values compared to those with master's or seminar training. For example, for leadership and inclusion culture, the no-training group scored markedly lower than the master's group (MD=−.339, p<.001) and the seminar group (MD=−.437, p<.001). Notably, doctoral-level participants reported markedly lower TQM implementation barriers than all other groups, suggesting that deeper engagement with quality management principles is associated with reduced perception of organizational obstacles [1].

These findings collectively confirm that professional training in TQM catalyzes the development of a quality culture in schools, a relationship that holds even when controlling for demographic characteristics. The graduated pattern of means across training levels (none < seminar < master's < doctorate) for most positive dimensions is theoretically consistent with models of professional learning and organizational change [12]. Schools where staff had received some form of TQM-related training showed consistently higher mean scores on both quality and inclusive culture dimensions. This pattern suggests that professional development may function as an enabling condition for organizational culture development. However, the cross-sectional nature of the data prevents any determination of the direction of this relationship.

Table 2. Means, standard deviations and one-way ANOVA results by TQM training level

Factor	None M (SD)	Master's M (SD)	Seminar M (SD)	Doctorate M (SD)	F	p	η^2
Leadership and inclusion culture	3.66 (.79)	4.00 (.71)	4.10 (.67)	4.38 (.60)	22.91	<.001	.069
Infrastructure and support resources	3.30 (1.01)	3.62 (.95)	3.75 (.87)	4.56 (.72)	16.16	<.001	.050
Continuous improvement	3.25 (.88)	3.57 (.84)	3.79 (.74)	3.89 (.93)	25.24	<.001	.076
Participatory management	3.79 (.85)	4.00 (.76)	4.12 (.67)	4.50 (.88)	11.68	<.001	.037
TQM school culture	3.35 (.86)	3.71 (.79)	3.85 (.69)	3.98 (1.17)	24.84	<.001	.075
Inclusive school culture	2.59 (.81)	2.73 (.72)	2.81 (.69)	3.37 (.55)	6.50	<.001	.021
TQM implementation barriers	3.38 (.78)	3.65 (.66)	3.50 (.72)	2.44 (.40)	7.65	<.001	.024
Necessity of strategic support	4.31 (.77)	4.43 (.57)	4.40 (.62)	4.67 (.41)	1.80	.146	.006

3.4. Predictors of TQM school culture: multiple linear regression

The multiple linear regression model predicting TQM school culture was statistically significant, F(14, 914)=157.28, p<.001, R=.841, R^2=.707, adjusted R^2=.707, explaining 70.7% of the variance in the outcome variable. This represents a notably high proportion of explained variance for social science research [21]. All VIF values were below 2, confirming the absence of multicollinearity. Results are presented in Table 5. The near-equivalence of R^2 (.707) and adjusted R^2 (.701) for Model 1 reflects the large sample size (N=929) relative to predictor count (k=14), which minimizes the adjusted R^2 penalty.

Table 3. Multiple linear regression for the prediction of TQM school culture

Variable	B	SE	β	t	p
Constant	.390	.111	—	3.511	<.001
Gender (female)	−.106	.037	−.054	−2.836	.005
Education level (secondary)	.021	.033	.013	.646	.519
Role (teacher)	−.043	.036	−.025	−1.206	.228
Academic qualification (doctorate)	−.190	.062	−.063	−3.049	.002
Academic qualification (master's)	−.104	.038	−.059	−2.700	.007
Special education training	−.049	.040	−.024	−1.228	.220
Intercultural education training	−.110	.033	−.065	−3.315	<.001
TQM training	−.064	.038	−.037	−1.698	.090
Experience in special school	−.012	.024	−.010	−.518	.604
Experience in integration dept.	−.028	.015	−.036	−1.819	.069
Experience in an intercultural school	−.013	.032	−.008	−.417	.676
Experience in DYEP	.007	.022	.007	.321	.748
Leadership and inclusion culture	.818	.025	.753	33.313	<.001
Infrastructure and support resources	.091	.018	.106	4.954	<.001

Leadership and inclusion culture was most strongly associated with TQM school culture (β=.753, p<.001), with a standardized coefficient substantially higher than all other predictors in the model. Infrastructure and support resources constituted a secondary but significant predictor (β=.106, p<.001).

These findings are consistent with literature emphasizing values-based leadership as the primary driver of quality culture development in schools [9]−[11], [26]. Given the cross-sectional design, this association should not be interpreted causally: schools with stronger organizational cultures may simultaneously attract more effective leaders, or both may reflect unmeasured school-level characteristics. Nevertheless, the magnitude of the association (β=.753, large effect) suggests that leadership-related organizational practices are meaningfully linked to TQM culture in ways that merit sustained scholarly and policy attention. These findings are consistent with prior evidence that school leaders function as cultural architects, shaping shared norms and professional expectations [16], [27]. Bush [27] describes effective school leaders as cultural architects who embed quality values and inclusive norms into the day-to-day institutional life of their schools, a process that is fundamentally internal and not contingent on the resolution of structural resource constraints.

Among demographic variables, female gender showed a small but significant negative association (β=−.054, p=.005). Higher academic qualifications, at both doctoral (β=−.063, p=.002) and master's (β=−.059, p=.007) levels, were negatively associated with TQM school culture scores. This counterintuitive finding may reflect greater critical awareness among more highly educated staff [28], who may apply more rigorous standards when evaluating the actual implementation of quality practices [1]. Alternatively, higher academic qualifications may be associated with increased expectations regarding organizational processes, leading to more conservative evaluations of TQM implementation. Intercultural education training also showed a small negative association (β=−.065, p<.001), possibly indicating that the value frameworks of intercultural and quality management paradigms are not always experienced as convergent. Professional experience variables and special education training did not reach statistical significance. However, this interpretation is speculative in the absence of qualitative data, and alternative explanations merit consideration. Highly qualified teachers may be disproportionately concentrated in urban or high-complexity schools where organizational challenges are greater, introducing a confound between qualification level and school-level contextual factors. Additionally, higher academic credentials may correlate with greater professional autonomy and lower institutional identification, leading to more critical evaluations of school processes irrespective of actual quality levels.

3.5. Predictors of inclusive school culture: multiple linear regression

The regression model predicting inclusive school culture was statistically significant, $F(16, 913)=63.84$, $p<.001$, $R^2=.528$, adjusted $R^2=.528$, accounting for 52.8% of variance in the outcome. The model included four organizational predictors: leadership and inclusion culture, infrastructure and support resources, continuous improvement of learning, and participatory management, alongside demographic covariates. Full regression results, including standardized coefficients, standard errors, and 95% confidence intervals, are presented in Table 6.

Table 4. Multiple linear regression for the prediction of inclusive school culture

Variable	B	SE	β	t	p
Constant	−.130	.133	—	−.974	.330
Gender (female)	.035	.044	.019	.800	.424
Education level (secondary)	−.022	.039	−.014	−.567	.571
Role (teacher)	.059	.042	.038	1.408	.160
Academic qualification (doctorate)	−.095	.073	−.034	−1.302	.193
Academic qualification (master's)	−.103	.045	−.064	−2.292	.022
Special education training	.047	.047	.025	1.009	.313
Intercultural education training	−.013	.039	−.008	−.324	.746
TQM training	.009	.044	.006	.207	.836
Experience in special school	−.046	.027	−.039	−1.664	.096
Experience in integration dept.	.012	.018	.016	.646	.519
Experience in intercultural school	−.054	.037	−.036	−1.465	.143
Experience in DYEP	.040	.025	.042	1.568	.117
Leadership and inclusion culture	.250	.047	.251	5.346	<.001
Infrastructure and support resources	−.006	.021	−.007	−.265	.791
Continuous improvement	.037	.041	.042	.909	.363
Participatory management	.447	.044	.471	10.218	<.001

The strongest associative predictor of inclusive school culture was participatory management, collaboration, and resource management (β=.471, p<.001, t=10.218), followed by leadership and inclusion culture (β=.251, p<.001, t=5.346). These two organizational factors jointly account for a substantial portion of the explained variance. At the same time, all demographic, training, and professional experience variables failed to reach significance, except master's-level qualifications (β=−.064, p=.022). The finding that

infrastructure and support resources (β=−.007, p=.791), continuous improvement (β=.042, p=.363), and all training variables did not markedly predict inclusive school culture is noteworthy: it implies that inclusive readiness is primarily an organizational, not an individual or resource-dependent, phenomenon [4], [7].

The predominance of participatory management as the leading predictor aligns with theoretical models emphasizing collaborative governance as a transformative mechanism for inclusive culture development [7], [9]. Schools in which collaborative decision-making and shared resource management are embedded tend to develop stronger inclusive cultures, a finding with direct practical implications for school leadership. This finding is consistent with theoretical models emphasizing that distributed governance structures create the conditions under which inclusion can become an organizational rather than an individual commitment. Schools in which decision-making is genuinely shared tend to develop more coherent and embedded inclusive cultures, not merely as a response to policy directives, but as an expression of collective professional identity [9], [10], [29], [30].

3.6. School typologies: two-step cluster analysis

Two-step cluster analysis identified three distinct school typologies, as presented in Table 7. The largest cluster comprised schools with high TQM and inclusion culture (n=369, 39.6%), exhibiting consistently elevated scores across all dimensions. The second cluster comprised schools with emerging culture (n=288, 30.9%), showing intermediate values indicative of a transitional phase of organizational development. The third cluster grouped schools with low TQM and inclusion culture (n=274, 29.4%), characterized by substantially lower scores on all key indicators. All between-cluster differences were statistically significant following Bonferroni correction (p<.05), as indicated by the different superscript letters in Table 7.

Table 5. Means and standard deviations of TQM and inclusion indicators by school cluster

Variable	Low culture (274, 29.4%) M (SD)	Emerging culture (288, 30.9%) M (SD)	High culture (369, 39.6%) M (SD)
Leadership and inclusion culture	2.92 (.56)[a]	3.90 (.40)[b]	4.57 (.32)[c]
Infrastructure and support resources	2.77 (.92)[a]	3.46 (.83)[b]	4.12 (.78)[c]
Continuous improvement	2.40 (.56)[a]	3.52 (.41)[b]	4.30 (.44)[c]
Participatory management	2.95 (.61)[a]	3.97 (.38)[b]	4.72 (.28)[c]
TQM school culture	2.50 (.59)[a]	3.62 (.35)[b]	4.36 (.35)[c]
Inclusive school culture	1.94 (.75)[a]	2.71 (.52)[b]	3.31 (.37)[c]
TQM implementation barriers	3.42 (.86)[a]	3.46 (.65)[a]	3.42 (.78)[a]
Necessity of strategic support	4.19 (.82)[a]	4.32 (.69)[a]	4.55 (.59)[b]

Note: superscript letters (a, b, c) indicate homogeneous subsets within each row. Means in the same row that share a letter do not differ significantly, whereas means with different letters differ significantly at p<.05 (pairwise comparisons, Bonferroni-corrected). TQM implementation barriers did not differ across clusters (all means share "a"). For necessity of strategic support, the high-culture cluster differs from both other clusters, which do not differ from each other.

3.7. The decoupling effect: a theoretical contribution

The three clusters reflect distinct organizational cultures rather than structural differences, suggesting that leadership practices and internal collaboration patterns may be more influential than external constraints in shaping school culture. The most theoretically significant finding concerns TQM implementation barriers. Despite dramatic differences across the three clusters on all quality and inclusion dimensions, perceived barriers to TQM implementation were statistically equivalent across all typologies (low culture: M=3.42, SD=.86; emerging culture: M=3.46, SD=.65; high culture: M=3.42, SD=.78; p>.05). In other words, schools operating at fundamentally different levels of organizational quality share nearly identical perceptions of the obstacles they face. This pattern supports a neo-institutional reading of school culture development: while formal institutional pressures (policy mandates, resource constraints, and training gaps) produce surface-level isomorphism, substantive cultural differences among schools are driven primarily by internal organizational dynamics, namely leadership practices, participatory governance structures, and shared professional norms.

This finding constitutes empirical evidence of organizational decoupling, the phenomenon first theorized by Meyer and Rowan [13], whereby formal institutional constraints do not deterministically shape internal organizational culture. Schools confronting equivalent institutional barriers develop markedly different quality cultures, suggesting that the decisive factor is not the barrier landscape itself, but the organizational mechanisms through which schools respond to those barriers, principally leadership and participatory management. This interpretation is strengthened by the regression findings: leadership and inclusion culture (β=.753) and participatory management (β=.471) were the dominant predictors of their respective outcome variables, while training, experience, and demographic variables showed minimal or no significant effects.

The practical implication is important, improving TQM school culture does not require first overcoming external barriers, but rather investing in leadership development and participatory governance structures. This finding speaks directly to the constraints of centralized educational systems such as Greece's, where schools may feel bound by systemic limitations. Nevertheless, the evidence suggests that internal organizational agency remains a decisive variable [6], [11], [15]. What appears to matter most is the capacity of school leaders to cultivate a shared quality orientation among staff. This organizational process is largely internal and does not depend on resource acquisition alone. This has direct relevance for school improvement planning in contexts where central allocation decisions constrain resources.

Taken together, these results support the view that quality and inclusion are not parallel but deeply interdependent dimensions of school governance, linked through shared organizational mechanisms. The three-cluster typology, comprising high culture, emerging culture, and low culture schools, provides a practical diagnostic framework that may assist educational policymakers and school leaders in identifying where schools currently stand and what developmental trajectories are available to them [4]. Notably, perceptions of barriers did not differ markedly across clusters, which is theoretically significant and practically relevant for school improvement planning.

4. CONCLUSION

These findings offer a synthesis that extends beyond any single regression coefficient: school culture, in both its quality and inclusive dimensions, is shaped predominantly by internal organizational dynamics, principally leadership practices and participatory governance structures, rather than by external structural resources or institutional mandates. Leadership and inclusion culture proved the strongest correlate of TQM school culture. At the same time, participatory management was the strongest correlate of inclusive school culture, and both effects persisted independently of demographic and experiential characteristics. Most notably, the observed decoupling between perceived implementation barriers and actual cultural development across the three identified school typologies, high-culture, emerging-culture, and low-culture, indicates that centralized institutional constraints do not uniformly determine how a school's culture evolves. Instead, schools appear to retain meaningful internal agency in shaping their own cultural trajectories, a finding consistent with neo-institutional and organizational culture theory and one that carries direct relevance for how quality and inclusion are conceptualized within centralized educational systems.

These results carry clear practical implications: strengthening leadership capacity and embedding participatory governance structures are likely to represent more effective levers for advancing both quality culture and inclusive readiness than resource-focused or compliance-driven policy interventions alone. At the same time, several methodological limitations warrant caution in interpreting these findings. The cross-sectional, self-report design precludes causal inference. It introduces the possibility of common method bias, although Harman's single-factor test suggested this risk is limited (first factor: 48.49% of variance, below the 50% threshold). The purposive sampling strategy constrains generalizability beyond the Greek educational context, and the use of the same dataset for both exploratory and CFA, without independent cross-validation, represents a construct validity risk that future replication efforts should address.

Future research should prioritize longitudinal and intervention-based designs capable of testing the causal pathways suggested by the present associative findings, particularly the role of leadership development programs in shifting school culture over time. Cross-national comparative studies would help establish whether the observed decoupling between institutional barriers and cultural development generalizes beyond centralized systems such as Greece, or whether it is contingent on specific features of national educational governance. Multilevel modeling approaches, distinguishing individual-level from school-level effects, would help clarify counterintuitive findings such as the negative association between academic qualifications and TQM culture. Finally, qualitative and mixed-methods studies could enrich these quantitative findings by illuminating the lived organizational processes through which leadership and participatory governance translate into shared cultural norms.

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C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

The authors state no conflict of interest.

INFORMED CONSENT

Informed consent was obtained from all individuals included in the research prior to their participation. Participants were fully informed of the study's purpose, the voluntary nature of their involvement, and their right to withdraw at any time without consequence. All data were collected anonymously and treated with strict confidentiality.

ETHICAL APPROVAL

The research was conducted in accordance with the tenets of the Declaration of Helsinki and complied with all relevant national regulations and institutional policies governing research involving human subjects. The Institutional Review Board of International Hellenic University approved the research.

DATA AVAILABILITY

The data that support these findings are available from the corresponding author upon reasonable request. The data are not publicly available due to privacy restrictions, as they contain information that could compromise the anonymity of research participants. Requests for access to the anonymized dataset should be directed to the corresponding author. They will be considered on a case-by-case basis in accordance with applicable data protection regulations. No personally identifiable information is contained in the dataset.

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