




# “Effectiveness of the integrated school project and implications for the reform of the Moroccan education system: An approach based on managerial levers”

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<b>ARTICLE INFO</b>	Hamid Zahir, Mohammed Bougroum and Abdelilah Sadqaoui (2026). Effectiveness of the integrated school project and implications for the reform of the Moroccan education system: An approach based on managerial levers. <i>Knowledge and Performance Management</i> , 10(1), 88-104. doi: <a href="https://doi.org/10.21511/kpm.10(1).2026.07">10.21511/kpm.10(1).2026.07</a>
<b>DOI</b>	<a href="http://dx.doi.org/10.21511/kpm.10(1).2026.07">http://dx.doi.org/10.21511/kpm.10(1).2026.07</a>
<b>RELEASED ON</b>	Friday, 20 February 2026
<b>RECEIVED ON</b>	Thursday, 14 August 2025
<b>ACCEPTED ON</b>	Wednesday, 04 February 2026
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<b>JOURNAL</b>	"Knowledge and Performance Management"
<b>ISSN PRINT</b>	2543-5507
<b>ISSN ONLINE</b>	2616-3829
<b>PUBLISHER</b>	LLC “Consulting Publishing Company “Business Perspectives”
<b>FOUNDER</b>	Sp. z o.o. Kozmenko Science Publishing



NUMBER OF REFERENCES

**48**



NUMBER OF FIGURES

**3**



NUMBER OF TABLES

**9**

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## BUSINESS PERSPECTIVES



LLC "CPC "Business Perspectives"  
Hryhorii Skovoroda lane, 10,  
Sumy, 40022, Ukraine  
[www.businessperspectives.org](http://www.businessperspectives.org)

Type of the article: Research Article

Received on: 14<sup>th</sup> of August, 2025

Accepted on: 4<sup>th</sup> of February, 2025

Published on: 20<sup>th</sup> of February, 2026

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# EFFECTIVENESS OF THE INTEGRATED SCHOOL PROJECT AND IMPLICATIONS FOR THE REFORM OF THE MOROCCAN EDUCATION SYSTEM: AN APPROACH BASED ON MANAGERIAL LEVERS

## Abstract

Educational reform in Morocco continues to face persistent challenges related to learning outcomes, territorial disparities, and the limited effectiveness of centralized policy instruments. In this context, participatory governance at the school level has emerged as a potential lever for improving school effectiveness. This study examines how the internal participatory mechanisms embedded in the Integrated School Project influence teachers' perceptions of effectiveness in pilot schools. The analysis is based on data collected through a self-administered questionnaire distributed to teachers involved in the project in the Marrakech-Safi region between early June and late July 2025. Out of 420 questionnaires administered, 357 were retained after quality control. Measurement constructs were validated using confirmatory factor analysis, and the empirical relationships were estimated using median quantile regression with robust standard errors to address non-normality and heterogeneous perceptions. The results show that perceived effectiveness increases significantly when school action is structured around collective prioritization of objectives, inclusive working groups, clear assignment of responsibilities, and strong methodological rigor. Institutionalized decision-making spaces and teachers' involvement in concrete pedagogical choices also exert a positive effect. In contrast, collaborative project co-design and the formal documentation of collective decisions do not significantly influence effectiveness, while shared diagnosis has a more moderate impact. Overall, the findings indicate that participatory governance improves school effectiveness only when it is operationalized through structured and stable mechanisms rather than symbolic participation, with important implications for strengthening guided school autonomy in Morocco.

**Keywords** participatory governance, school reform, internal leadership, integrated school project, Morocco

**JEL Classification** I21, I28, H75, O15

## INTRODUCTION

Educational reform in Morocco lies at the intersection of major scientific and socio-economic challenges, as the quality of learning outcomes conditions future productivity, employability, social mobility, and territorial cohesion. Despite successive public policies, persistent disparities between schools and provinces, together with the limited effectiveness of certain centralized instruments, indicate that institutional responses still struggle to accommodate the diversity of school contexts. In many schools, constraints related to class size, material resources, organizational climate, and pedagogical coordination accumulate, resulting in uneven implementation of national priorities. This situation reinforces the relevance of proximity-based governance



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### Conflict of interest statement:

Author(s) reported no conflict of interest

models capable of linking local diagnosis, collective planning, and action monitoring while ensuring accountability and continuity. Beyond equity concerns, school effectiveness has become a determinant of social trust, the reduction of territorial disparities, and the sustainability of public investment. In this study, school effectiveness is understood conceptually as the capacity of a school organization to translate collective decisions into coherent pedagogical practices that mobilize actors, reduce resistance to change, and sustain action over time. Effectiveness is therefore not confined to academic performance alone, but refers to an organizational dynamic through which objectives, practices, and resources are aligned with locally identified needs and constraints.

Operationally, school effectiveness is defined as teachers' perceived ability of the school to mobilize human resources, coordinate pedagogical action, facilitate information flows, and maintain continuity in decision-making and implementation. This perception-based approach reflects the idea that effectiveness emerges through everyday practices and professional engagement rather than through formal compliance with centrally prescribed procedures. Teachers constitute a relevant analytical entry point, as they are directly involved in the enactment of pedagogical decisions and continuously exposed to the concrete functioning of participatory arrangements within schools. From a scientific perspective, however, the relationship between participatory governance and school effectiveness remains debated, as empirical findings are mixed and highly dependent on the modalities of participation. Participatory mechanisms are often formalized without ensuring clear prioritization of objectives, explicit allocation of responsibilities, methodological rigor, or stable decision-making spaces. Moreover, many studies rely on aggregate indicators that obscure the internal levers shaping daily governance, while conventional approaches tend to overlook the heterogeneity and asymmetry of perceived effectiveness. In the Moroccan context, where pilot schools are experimenting with participatory tools, the central research question is therefore to identify which participatory mechanisms genuinely enhance organizational effectiveness, which remain largely symbolic, and how these differences can inform the reform of school governance.

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## 1. LITERATURE REVIEW AND HYPOTHESES

Participatory management is grounded in the idea that involving organizational members in decision-making enhances not only their commitment but also the effectiveness of collective action. Lewin et al. (1939) showed that democratic leadership improves effectiveness by fostering motivation, responsibility, and coordinated behavior among group members. Likert (1961) extended this perspective by emphasizing that participatory systems based on trust and upward communication strengthen organizational effectiveness through better alignment between objectives and operational practices. In the educational context, Hoy and Tarter (1997) demonstrated that teacher involvement in school governance enhances the effectiveness of educational action by improving the coherence, consistency, and continuity of school projects. Senge (1990) further linked participation to effectiveness through the concept of the learning organization, in which collective in-

volvement supports continuous improvement and adaptive capacity. From this perspective, effectiveness at schools does not solely derive from formal structures or prescribed programs, but from organizations' ability to mobilize actors, coordinate decisions, and sustain action around shared goals. Accordingly, participatory management provides a relevant framework for analyzing school effectiveness as an organizational outcome rooted in involvement, horizontal cooperation, and accountability, which directly resonates with the objectives of the present study. Its operationalization relies on three main levers that structure collective action and reinforce the coherence and effectiveness of educational practices.

- **The co-construction of pedagogical actions:** This process begins with a shared diagnosis of student needs, combining teachers' professional perceptions with objective performance data. On this basis, educational teams collectively define priorities, objectives, and action plans, while distributing roles and responsi-

bilities in a way that reinforces accountability and ownership. The prioritization of interventions takes into account their pedagogical relevance, urgency, and the availability of local resources, ensuring that implementation remains feasible and aligned with the school's operational capacities. This collective structuring of action strengthens coordination among teachers and enhances the consistency of pedagogical responses.

- **The creation of mixed working groups:** This mechanism involves bringing together teachers, school leadership, non-teaching staff, parents, and, where appropriate, students, in order to ensure the integration of diverse perspectives and improve coordination across disciplines and organizational levels. Each group addresses specific issues within a structured framework defined by clear objectives, a timeline, and shared working tools. The presence of a designated facilitator and the establishment of regular reporting mechanisms ensure the continuity and effectiveness of collective work. This collaborative structure enhances transparency, strengthens collective responsibility, and promotes organizational cohesion among stakeholders.
- **The sharing of important pedagogical decisions:** This lever is implemented through formalized consultation spaces, such as pedagogical councils, where agendas are prepared collectively and relevant information is shared in advance to support informed discussion. Teachers actively contribute to decisions concerning pedagogical tools, assessment practices, and curriculum organization. The formalization and dissemination of decisions to the entire educational community, as well as their integration into internal monitoring mechanisms, strengthen their appropriation and ensure coherence in pedagogical practices. This shared decision-making process reinforces collective commitment and contributes directly to the effectiveness of educational action.

Alschuler (1972) emphasizes that the success of educational reforms depends on the stakeholders' ability to engage in a collective dynamic struc-

tured around a shared diagnosis, highlighting the need for coordination supported by institutional preparation and consistent leadership. Beer and Eisenstat (1996) argue that the absence of dialogue prevents the identification of root causes of dysfunctions, thereby reducing reform effectiveness, an observation illustrated by Joyner (1998) through an experience of systemic reform enabled by a collective diagnosis involving all concerned parties. Alghamdi and Prestridge (2015) show that aligning the visions of teachers and school leaders facilitates the integration of technologies into teaching practices by turning converging perspectives into a lever for innovation. In this sense, co-construction relies primarily on the dialogue of representations and priorities, which constitutes an essential condition for the emergence of a shared and sustainable strategy. The effectiveness of schools thus rests less on the mere presence of tools or programs than on the gradual construction of decisions made collectively by those who experience the educational reality on a daily basis.

Potari et al. (2018) demonstrate that the effectiveness of educational practices increases when co-construction transcends traditional institutional boundaries, enabling collaboration between teachers, researchers, and policymakers through shared objects and mediators. Akkerman and Bakker (2011) argue that the hybrid learning potential generated through interaction between distinct communities, especially when such exchanges reveal boundaries to be crossed. Kwon et al. (2014) stress that these collaborative projects offer teachers professional development opportunities closely tied to continuous improvement, combining the theory of change with practical pedagogical actions. Fullan (2001) underlines the strategic role of external facilitators, who should support rather than impose, fostering local innovation capacities. In this way, co-construction moves beyond mere consensus building to promote productive interactions between professional domains, embedding reforms in the realities of schools and ensuring their compatibility with local contexts.

Hamilton et al. (2013) observe that reforms imposed in a top-down manner generate instability and undermine pedagogical cohesion, whereas Lenhoff et al. (2019) show that structuring priorities sequentially within diverse stakeholder coalitions

tions maintains unity and supports progressive change. Fullan (2005) adds that sustainable transformation requires shared leadership based on collective responsibility, aligning with Berkowitz (2012), who insists that reforms must be anchored in explicit priorities and shared values to foster a coherent ethical culture. Milner (2013) advocates for collaboration between teachers, policymakers, and communities to overcome deficit-based views and design policies as redistributive opportunities. Woolner et al. (2016) highlight that engaging stakeholders in redesigning learning environments aligns physical spaces with pedagogical intentions, generating synergies for change. Fullan (2005) reiterates the importance of fostering commitment rooted in shared responsibility, while Beer and Eisenstat (1996) stress that turning diagnostic data into concrete actions depends on teams' appropriation of objectives. In this way, co-construction adapts innovation to local realities, ensuring gradual, collective, and needs-based implementation.

Spratt and Florian (2015) emphasize that inclusive pedagogy must aim to transform teaching practices in order to address learner diversity. They advocate for adapted learning environments that highlight students' abilities rather than their limitations, thereby improving overall effectiveness. Peurach and Neumerski (2015) argue that replacing bureaucratic systems with integrated collaborative frameworks enables all educational stakeholders to participate in change processes, helping to stabilize innovations and ensure their dissemination through shared governance. Robeyns (2016) underlines that equitable structures are essential to expanding individuals' capabilities and providing meaningful educational opportunities, while stressing that collective arrangements serve as levers for educational justice. Park and Byun (2021) state that professional learning communities foster shared and high expectations, creating coherent school environments where pedagogical practices are aligned with collective goals.

Howley et al. (2023) show that inclusive models based on cooperation between specialist and generalist teachers create coordinated systems capable of meeting diverse educational needs effectively. They emphasize the importance of pooling expertise within structured frameworks. Fullan

(2015) highlights that professional development – supported by organized assistance and linked to clear responsibilities – is necessary for successful pedagogical transformation. Villa and Thousand (2003) stress that a shared vision structures collective work, with multidisciplinary teams enhancing coherence and encouraging engagement in inclusive approaches. Dimmock et al. (2021) identify the alignment of internal and external levers as key to sustaining innovation, pointing to professional exchanges and local coordination as stabilizing mechanisms for reform implementation.

Viennet and Pont (2017) point to the importance of clearly defining roles and responsibilities to ensure coherent implementation, noting that clarity supports the involvement of all educational groups. Durlak and DuPre (2008) argue that explicitly assigning responsibilities and appointing mobilizing figures help guide teams toward common objectives. Gordon (2008) emphasizes that collaborative approaches based on action research allow practices to be adapted to local needs, increasing schools' capacity to implement effective changes. McNiff (2010) proposes formalizing this dynamic through structured action research, offering a framework for continuous collective reflection and progressive improvement. Ehren and Honingh (2011) show that participatory inspection systems, focused on risk management and dialogue with school authorities, can enhance governance by promoting a data-driven culture. Freire (2020) calls for a pedagogy of dialogue that actively involves learners through conscientization, fostering transformative and responsible practices. Roschelle et al. (2000) propose integrating educational technologies as catalysts for collaboration, strengthening group dynamics and improving learning through interactive and responsive exchanges.

Conley (1991) highlights that teacher involvement in decision-making, including both technical and managerial aspects, fosters support for educational reforms and improves their implementation. Spillane et al. (2011) show that institutionalized routines enable effective coordination across decision-making levels, strengthening coherence between educational policies, leadership, and pedagogical practices. Sarafidou and Chatzitoamidis (2013) emphasize that formaliz-

ing participation mechanisms enhances teachers' professional dynamics, satisfaction, and sense of efficacy. Ingersoll (2003) asserts that giving teachers a concrete decision-making role, especially in areas such as discipline or planning, increases engagement and strengthens their sense of belonging to the organization. Schildkamp and Kuiper (2010) point out that data-driven decision-making allows for more tailored pedagogical responses when objectives are clearly defined, facilitating cooperation through shared information management. Brass and Holloway (2021) stress that aligning pedagogical tools, such as educational games, with learning standards promotes adoption by teachers, particularly when this results from close collaboration between practitioners and designers.

Ladson-Billings (1995) affirms that teachers must play an active role in culturally adapting knowledge to address social and political challenges, extending their involvement to the critical review of teaching content. Suppes (1966) argues that the interpretation of data from educational technologies should remain in teachers' hands to allow for personalized learning. Zepke et al. (2014) demonstrate that incorporating emotional and cognitive dimensions of student engagement into pedagogical choices strengthens educational effectiveness, requiring decision-making autonomy. Sachs and Mockler (2012) note that adapting educational policies to local needs demands active stakeholder participation, with teachers central in reconciling institutional requirements and professional realities. Mattei (2020) emphasizes that alignment between individual and organizational goals is reinforced by accountability mechanisms centered on results. Keddie (2015) cautions that formalizing collective decisions can sometimes serve to legitimize existing power structures rather than empower actors, highlighting the need to preserve genuine autonomy.

Scott-Clayton (2012) shows that shared decisions are more effective when they consider the real constraints faced by beneficiaries, particularly regarding financial resources and career prospects, thereby improving adherence to educational mechanisms. Landri (2014) identifies the structuring role of "data governance," which promotes transparency and performance measurement, leading to more coherent and widely shared decision-making. Rose (1999) provides a sociological

perspective, showing how the use of psychological knowledge and regulatory tools produces internalized educational norms that reinforce conformity to institutional expectations. These insights suggest that participatory mechanisms, when built on traceability, shared evaluation, and openness to contextual diversity, can enhance the effectiveness of pedagogical practices. When embedded in structured frameworks that respect teachers' autonomy, use relevant data, and address varied constraints, shared decision-making becomes a driver for more inclusive, targeted, and contextually grounded educational actions.

This study seeks to determine the extent to which the participatory governance mechanisms embedded in the Integrated School Project shape teachers' perceptions of school effectiveness, with the broader goal of informing future reforms of the Moroccan education system. To address the objectives of the study and based on insights drawn from the literature review, the following hypotheses can be formulated:

- H1: The co-construction of pedagogical actions has a positive impact on the effectiveness of school practices.*
- H1a: A shared diagnosis among stakeholders has a positive impact on the effectiveness of school practices.*
- H1b: The collaborative design of pedagogical projects has a positive impact on the effectiveness of school practices.*
- H1c: The collective prioritization of objectives has a positive impact on the effectiveness of school practices.*
- H2: The creation of mixed working groups has a positive impact on the effectiveness of school practices.*
- H2a: The inclusive composition of working groups has a positive impact on the effectiveness of school practices.*
- H2b: The assignment of targeted tasks to working groups has a positive impact on the effectiveness of school practices.*

H2c: *The rigor of the working method has a positive impact on the effectiveness of school practices.*

H3: *The sharing of important pedagogical decisions has a positive impact on the effectiveness of school practices.*

H3a: *The institutionalization of decision-making spaces has a positive impact on the effectiveness of school practices.*

H3b: *Involvement in concrete pedagogical choices has a positive impact on the effectiveness of school practices.*

H3c: *The valorization and traceability of collective decisions have a positive impact on the effectiveness of school practices.*

## 2. METHODS

### 2.1. The model

Within the framework of this model, based on participatory management theory (Lewin et al., 1939; Hoy & Tarter, 1997), the dependent variable, effectiveness (EFFCY), was constructed from four items evaluated on a Likert scale from 1 to 5. A global index was first obtained by calculating the average of the scores related to these four items, each reflecting a dimension of perceived effectiveness: the mobilization of human resources made possible by stakeholder engagement, the reduction of resistance to change through the co-construction of decisions, the alignment of pedagogical practices with strategic priorities, and the fluid circulation of information enhancing responsiveness to difficulties. In addition, the development of a sense of belonging and the gradual professionalization of teams were considered. To allow for more robust econometric modeling, this index was normalized within the [0,1] interval, then transformed using the Logit function according to the formula

$$Y = \log\left(\frac{Y}{1 - Y}\right). \quad (1)$$

This transformation aims to linearize the distribution of the variable while amplifying the model's

sensitivity to perceived differences in effectiveness at the ends of the scale.

$$\begin{aligned} EFFCY = & \beta_0 + \beta_1 \cdot SHDIA + \beta_2 \cdot CODES \\ & + \beta_3 \cdot PRIAL + \beta_4 \cdot INGRP + \beta_5 \cdot MISTA \quad (2) \\ & + \beta_6 \cdot RIMET + \beta_7 \cdot DECES + \beta_8 \cdot PEDCH \\ & + \beta_9 \cdot DECVA + \varepsilon. \end{aligned}$$

The explanatory variables of the model are also measured using items rated on a scale from 1 to 5. However, before being integrated into the model, a confirmatory factor analysis (CFA) is conducted to ensure the convergent validity of the items. Only those with a convergent validity greater than 0.5 are retained, and the average of the retained items is then calculated for each variable. The explanatory variables are grouped into three main dimensions of participatory governance. The first, related to the co-construction of pedagogical projects, includes: SHDIA (Shared Diagnosis), which reflects the existence of a shared diagnosis among stakeholders; CODES (Collaborative Design), which measures collective involvement in project design; and PRIAL (Priority Alignment), which refers to the jointly agreed prioritization of objectives.

### 2.2. Construction of variables

Confirmatory factor analysis (CFA) in Table 1 is used to verify whether the observed items accurately reflect the latent variables. It relies on three key indicators: standardized factor loadings for convergent validity, composite reliability for internal consistency, and AVE (average variance extracted) for the proportion of variance explained by the factor. In this study, only items with a convergent validity above 0.5 were retained. This approach ensures the psychometric quality of the integrated variables. The results confirm that all retained variables meet the required quality thresholds. SHDIA reaches an AVE of 0.83 and a reliability of 0.80. CODES, although one item is just at the threshold, remains acceptable with a reliability of 0.75. PRIAL, INGRP, and MISTA show strong structures, with reliabilities above 0.74. RIMET and DECES display the highest scores, with reliabilities up to 0.90. PEDCH and DECVA also present satisfactory coefficients.

**Table 1.** Indicators of convergent validity, composite reliability, and average variance extracted (AVE) from CFA

Items	convergent validity	Composite reliability	AVE
SHDIA 2	0.7559633	0.8005237	0.8300436
SHDIA 3	0.8227149		
SHDIA 5	0.7823100		
CODES 1	0.5082696	0.7488877	0.6602171
CODES 3	0.7750878		
CODES 4	0.6439586		
CODES 6	0.7961128	0.7644116	0.7399842
PRIAL 1	0.5928252		
PRIAL 4	0.9316001		
PRIAL 6	0.6833761	0.7498299	0.6663432
INGRP 1	0.6124262		
INGRP 3	0.7256980		
INGRP 4	0.7870856	0.7937213	0.8149084
MISTA 2	0.6992215		
MISTA 4	0.7828892		
MISTA 6	0.7325116	0.8699703	0.8342103
RIMET 1	0.9200905		
RIMET 3	0.6744896		
RIMET 5	0.9250130	0.9017253	0.8693635
DECES 1	0.7924839		
DECES 3	0.8700184		
DECES 5	0.9075962	0.7104420	0.5979752
PEDCH 2	0.6252831		
PEDCH 4	0.6732122		
PEDCH 5	0.6023640	0.7359225	0.6101112
DECVA 1	0.5700549		
DECVA 3	0.8620843		
DECVA 5	0.6229350	0.6608898	
DECVA 6	0.6608898		

Discriminant validity presented in Table 2 aims to verify that each latent variable measured by a set of items remains distinct from the others, capturing only its own dimension. The Fornell-Larcker criterion is used for this purpose: the square root of the average variance extracted (AVE) of a construct must be greater than the correlations between that construct and the oth-

ers. In the discriminant validity matrix, this means that the values placed on the diagonal (square roots of the AVEs) must exceed the correlation coefficients appearing in the same row or column, indicating a relative independence between the constructs.

Based on the analyzed table, this condition is met for all variables in the model. For example, for SHDIA, the square root of the AVE is 0.77329, which is higher than its maximum correlations with other variables, such as MISTA (0.28488). Similarly, the variables CODES, PRIAL, INGRP, and MISTA all present square roots of AVE ranging from 0.78110 to 0.86022, exceeding their associated correlations. The dimensions RIMET, DECES, PEDCH, and DECVA also display high diagonal values (greater than 0.90), systematically above the bilateral correlations, even when these are relatively stronger (e.g., 0.41702 between PEDCH and DECES).

### 3. DATA

The study is based on a sample of teachers from the Marrakech-Safi region who were involved in the implementation of the integrated school development project. This region was selected due to the presence of pilot schools engaged in participatory approaches, as identified by academic authorities. The participating teachers were actively involved in activities such as shared diagnoses, project planning, and working groups. Data collection was conducted using a self-administered questionnaire focusing on teachers' perceptions of the participatory dimensions of the project and the observed organizational effectiveness. The questionnaire was completed between early June and late July 2025.

**Table 2.** Discriminant validity matrix from CFA

Variables	SHDIA	CODES	PRIAL	INGRP	MISTA	RIMET	DECES	PEDCH	DECVA
SHDIA	0.77329	-	-	-	-	-	-	-	-
CODES	0.04387	0.78110	-	-	-	-	-	-	-
PRIAL	0.13634	0.06482	0.81254	-	-	-	-	-	-
INGRP	0.08340	0.18697	0.04916	0.81630	-	-	-	-	-
MISTA	0.28488	0.07329	0.25456	0.23289	0.86022	-	-	-	-
RIMET	0.16459	0.00868	0.14542	0.15327	0.14916	0.90272	-	-	-
DECES	0.08892	0.17817	0.05585	0.14729	0.03917	0.18721	0.91107	-	-
PEDCH	0.18210	0.17737	0.20625	0.15038	0.08277	0.07262	0.41702	0.91335	-
DECVA	0.11492	0.17349	0.08658	0.05567	0.18283	0.14498	0.05523	0.14281	0.93240

The questionnaire addressed several aspects, including co-construction, group dynamics, participation in decision-making, and the perceived effects on mobilization and responsiveness. Of 420 questionnaires distributed, 357 were retained after a quality check, resulting in a valid response rate of 85 % as shown in Table 3. The excluded questionnaires contained incomplete or inconsistent data. The sample displays notable diversity in terms of subject areas, professional seniority, and types of schools, allowing for a contextualized analysis of the project's effects and the conditions of its appropriation.

**Table 3.** Questionnaire response rate

Filled	Valid	Invalid	Response rate valid/ filled
420	357	45	85 %

The descriptive analysis of the variables from the questionnaire in Table 4 allows for the examination of the distribution of responses collected from teachers involved in the Integrated School Project in Marrakech-Safi. It provides information on central tendencies, dispersion, and the shape of distributions before the econometric analysis. The dependent variable EFFCY, normalized and then transformed using a logit function, has a mean of  $-0.079$  and a median of  $-0.1057$ , indicating an overall centered distribution. The range of responses, from  $-2.82$  to  $2.52$ , and a standard deviation of  $0.76$ , reflect high variability. The skewness ( $0.08$ ) suggests a symmetrical distribution, and the kurtosis ( $3.97$ ) indicates a concentration around the mean with more pronounced extremes.

The explanatory variables, evaluated on a scale from 1 to 5, have means close to 3, indicating neu-

tral to moderately positive perceptions. For example, SHDIA has a mean of  $2.96$  and a standard deviation of  $0.88$ , reflecting a certain level of dispersion. The other dimensions (CODES, PRIAL, INGRP, MISTA, RIMET, DECES, PEDCH, DECVA) show similar trends, with low and slightly negative skewness, indicating nearly symmetrical distributions and a slight concentration toward higher values. The kurtosis coefficients, ranging between  $2.18$  and  $2.83$ , suggest slightly flattened distributions.

### 3.1. Choice of the empirical methodology

As part of verifying the statistical assumptions prior to modeling, a normality test of the residuals from the OLS regression was conducted in order to assess whether the random error conforms to a normal distribution. This verification is essential to ensure the validity of inferences drawn from parametric tests. The Jarque-Bera test was used, based on two indicators: skewness and kurtosis. Under the null hypothesis, the residuals should exhibit zero skewness and a kurtosis equal to 3; if these conditions are not met, it suggests a non-normal distribution. The residual statistics show a mean close to zero ( $-1.07e-16$ ) and a median of  $0.011$ , indicating a centered distribution. The observed skewness is low ( $-0.084$ ), suggesting slight symmetry, while the kurtosis of  $1.734$  indicates a platykurtic distribution, meaning slightly flattened (Figure 1). However, the Jarque-Bera test yields a statistic of  $24.25733$  with a p-value of  $0.000005$ , leading to the rejection of the normality hypothesis at the 5% significance level. Despite the apparent regularity of the descriptive indica-

**Table 4.** Descriptive statistics for study variables

Variable/ statistic	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis
EFFCY	-0.079221	-0.105717	2.516164	-2.824590	0.762552	0.083470	3.973472
SHDIA	2.961718	3.000000	5.000000	1.000000	0.885500	0.140012	2.351798
CODES	3.009104	3.000000	4.750000	1.250000	0.729414	-0.019716	2.557447
PRIAL	2.968254	3.000000	5.000000	1.000000	0.872803	-0.035151	2.450367
INGRP	2.938375	3.000000	5.000000	1.000000	0.867250	-0.059291	2.183443
MISTA	3.006536	3.000000	5.000000	1.000000	0.794186	-0.017029	2.829746
RIMET	3.079365	3.000000	5.000000	1.000000	0.817788	-0.023690	2.480297
DECES	3.019608	3.000000	5.000000	1.000000	0.804902	-0.064208	2.664370
PEDCH	3.079365	3.000000	5.000000	1.000000	0.829158	-0.041527	2.542549
DECVA	3.028011	3.000000	4.750000	1.000000	0.688682	-0.076509	2.689473

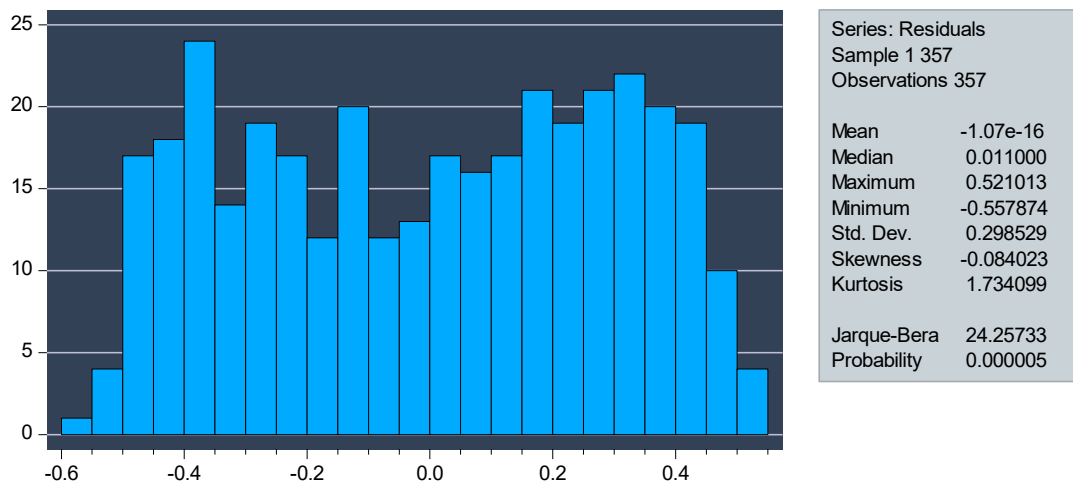


Figure 1. Jarque-Bera normality test for OLS residuals

tors, this statistically significant deviation from normality calls for the use of econometric methods that are robust to distributional irregularities.

The analysis of heteroscedasticity aims to assess whether the variance of the residuals remains constant regardless of the values taken by the explanatory variables. The Breusch-Pagan-Godfrey test in Table 5 examines this through three indicators: the F-statistic, the ObsR-squared (or LM statistic), and the Scaled Explained Sum of Squares, testing the null hypothesis of homoscedasticity. The results show an F-statistic of 1.716 with a p-value of 0.0839, and an ObsR-squared statistic of 15.21454 with a p-value of 0.0852. These two values are above the 5% threshold, leading to a failure to reject the null hypothesis of homoscedasticity at this confidence level. However, the Scaled Explained Sum of Squares statistic reaches 18.85037 with a p-value of 0.0265, indicating significance at the 5% level. This result introduces a divergence in interpretation, suggesting possible heteroscedasticity according to one criterion, without confirmation from the other two. These elements point to an intermediate situation, requiring that this potential variance instability be considered in the choice of estimation method and in the interpretation of the results.

Given the deviations observed from the classical assumptions of OLS regression – notably the non-normality of the residuals revealed by the Jarque-Bera test and the partial signs of heteroscedasticity detected by the Breusch-Pagan-Godfrey test – the use of quantile regression proves to be appropriate. This method, less sensitive to non-normal distributions and variance fluctuations, allows for the estimation of the effect of explanatory variables at different points in the distribution of the dependent variable. It thus provides a more robust and nuanced analysis of the relationships between variables, taking into account the heterogeneity of the observed responses.

## 4. RESULTS

### 4.1. Robustness analysis of quantile regression

The Ramsey RESET specification test in Table 6 applied to the quantile regression is used to verify the model's functional adequacy by testing the hypothesis that no relevant variable has been omitted. The results obtained indicate non-significant values for the t-statistic (0.79), F-statistic (0.63),

Table 5. Breusch-Pagan-Godfrey heteroscedasticity test on OLS residuals

Statistical	Value	Probability
F-statistic	1.716296	Prob (F (9, 347)) = 0.0839
Obs-R-squared	15.21454	Prob (Chi-Square (9)) = 0.0852
Scaled explained SS	18.85037	Prob (Chi-Square (9)) = 0.0265

**Table 6.** Ramsey RESET specification test applied (quantile regression)

Ramsey RESET Test			
Equation: UNTITLED			
Specification: EFFCY C SHDIA CODES PRIAL INGRP MISTA RIMET DECES PEDCH DECVA			
Omitted Variables: Squares of fitted values			
Test	Value	df	Probability
t-statistic	0.790829	346	0.4296
F-statistic	0.625411	(1, 346)	0.4296
Likelihood ratio	0.644711	1	0.4220
F-test summary			
Test	Sum of Sq.	df	Mean Squares
Test SSR	0.052779	1	0.052779
Restricted SSR	29.25181	347	0.084299
Unrestricted SSR	29.19903	346	0.084390

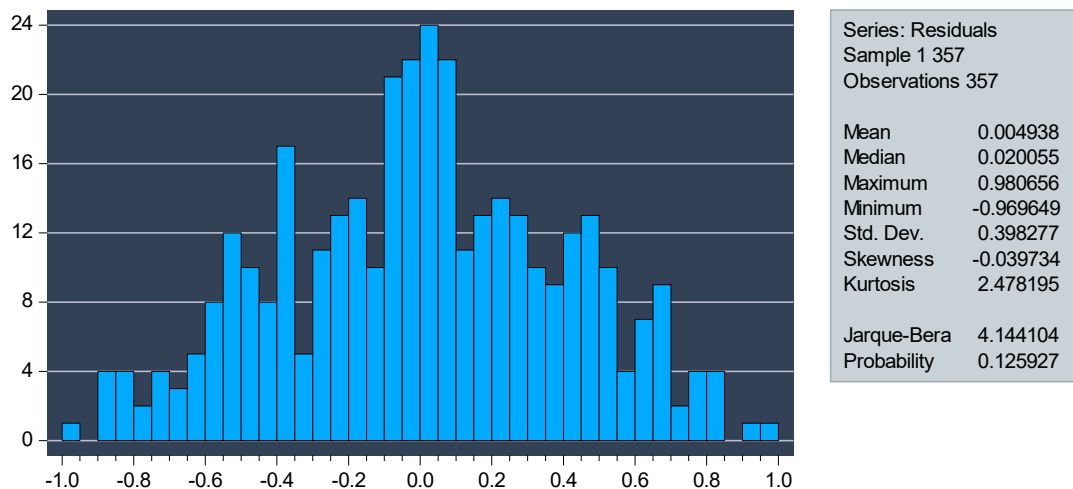
and likelihood ratio test (0.64), all with probabilities greater than 0.42. These results suggest that the model is not affected by functional misspecification. Therefore, the linear form used in the quantile regression appears to be appropriate.

The analysis of variance inflation factors in Table 7 is used to assess the potential presence of multicollinearity among the explanatory variables in the regression model. The centered VIF values for all variables are very close to 1, ranging between 1.018 and 1.044, which indicates no problematic multicollinearity. Indeed, these values are well below the commonly accepted critical threshold of 5. Therefore, correlations among the explanatory variables remain low, and no significant redundancy appears to affect the estimates.

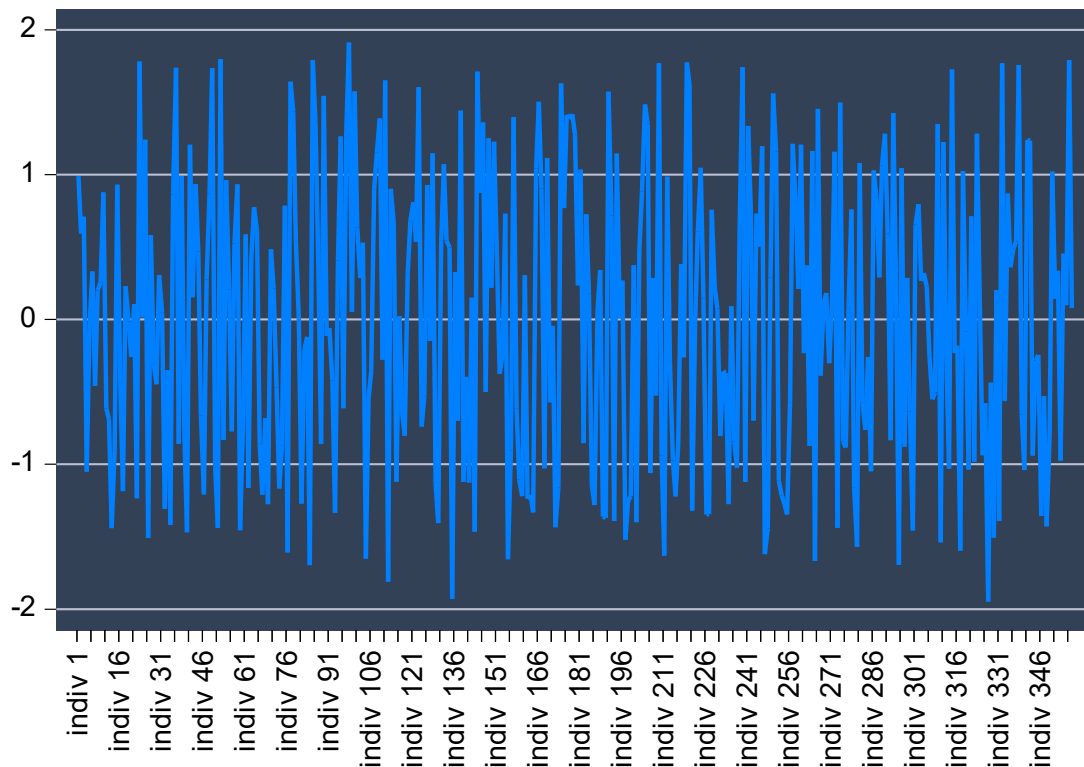
**Table 7.** Variance inflation factors (VIF) in the quantile regression model

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	0.006719	28.45518	NA
SHDIA	0.002961	3.728570	1.028274
CODES	0.002863	3.635864	1.044277
PRIAL	0.002844	3.950250	1.039065
INGRP	0.002885	3.943953	1.018821
MISTA	0.002695	3.713166	1.038369
RIMET	0.002869	3.891019	1.026767
DECES	0.002901	4.086957	1.041908
PEDCH	0.002873	3.839944	1.022707
DECVA	0.002891	4.125132	1.026093

Residual analysis in quantile regression, although normality is not a methodological requirement, allows for an assessment of the regularity of predic-



**Figure 2.** Jarque-Bera normality test for quantile regression residuals



**Figure 3.** Values of studentized residuals (RStudent) for detecting influential observations

tion errors, particularly in comparison with those observed in the OLS model. While the Jarque-Bera test applied to the OLS residuals revealed a significant deviation from normality, the results from the quantile regression show a distribution more in line with expectations. The Jarque-Bera statistic (4.1441), with a p-value of 0.1259, does not lead to the rejection of the normality hypothesis. The mean of the residuals (0.0049), the skewness (-0.0397) close to zero, and the kurtosis (2.4781) indicate a relatively balanced distribution as presented in Figure 2. The variability, measured by a standard deviation of 0.3983, remains moderate, with no excessive concentration or pronounced asymmetry.

The Breusch-Pagan-Godfrey test applied to the quantile regression as presented in Table 8 shows that the hypothesis of homoscedasticity is not challenged. The p-values associated with the three statistics – F-statistic (0.3070), Obs-R-squared (0.3044), and Scaled Explained SS (0.8961) – are all well above the conventional threshold of 0.05. This indicates no statistical evidence of heteroscedasticity in the quantile model, in contrast to the OLS results, where one of the statistics suggested non-constant variance. Thus, quantile regression

appears to better fit the empirical properties of data, avoiding the limitations associated with error variance instability.

**Table 8.** Breusch-Pagan-Godfrey heteroscedasticity test applied to the quantile regression model

Statistical	Value	Probability
F-statistic	1.179452	Prob (F (9, 347)) = 0.3070
Obs-R-squared	10.59681	Prob (Chi-Square (9)) = 0.3044
Scaled explained SS	4.223167	Prob (Chi-Square (9)) = 0.8961

Figure 3 displays the studentized residuals (RStudent) to identify potential influential observations. The points fall within the interval between -2 and +2, which suggests that the deviations between observed and fitted values are generally contained. No value visibly exceeds the critical threshold of  $\pm 3$ , which is often used to indicate potential outliers. The absence of extreme spikes or any particular structural pattern in the series indicates good residual stability. Thus, no individual observation appears to exert excessive influence on the model's estimates, showing that the model is generally stable.

The empirical approach is based on a quantile regression model grounded in participatory management theory. Effectiveness (EFFCY), the dependent variable, is measured using an index constructed from four Likert-scale items, then normalized and transformed using a logit function to correct for non-normality. The explanatory variables, drawn from three dimensions of participatory governance, were validated through confirmatory factor analysis, retaining only items with a convergent validity greater than 0.5. Data were collected from 357 teachers in the Marrakech-Safi region. The quantile method was chosen for its robustness against the non-normality and heteroscedasticity detected in OLS.

#### 4.2. Results of the quantile regression model

Table 9 presents the results of quantile regression applied to 357 observations to model the variable EFFCY, which measures the perceived effectiveness of the integrated school development project. Unlike OLS, this method estimates effects on the median, providing greater robustness against extreme values. The estimation is based on weight-

ed absolute deviations, with robust errors (Huber Sandwich) and a residual density evaluated using the Epanechnikov kernel, following the Hall-Sheather method (bandwidth 0.13696). The pseudo-R<sup>2</sup> reaches 0.4269, confirming a good explanatory power. The standard deviation of the residuals is low (0.1976), and the estimated median (0.5151) is very close to the observed mean (0.5101). The model converges toward a unique optimal solution, with a high quasi-likelihood statistic (347.38), indicating a significant fit.

The variable SHDIA, which measures the existence of a shared diagnosis among stakeholders, presents a coefficient significant at the 10% level ( $p = 0.0583$ ), indicating a moderately positive influence on perceived effectiveness. This confirms hypothesis *H1a*, highlighting that the collective construction of an initial assessment of needs is a favorable condition for the success of educational actions. In contrast, the variable CODES, associated with the collaborative design of pedagogical projects, is not significant ( $p = 0.2767$ ), leading to the rejection of hypothesis *H1b*. This lack of statistical relationship suggests that participation in the design stages alone is not sufficient to influ-

**Table 9.** Estimation of the quantile regression model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.684078	2.496662	3.478276	***0.0006
SHDIA	3.748755	1.973133	1.899900	*0.0583
CODES	-0.483377	0.443698	-1.089428	0.2767
PRIAL	13.577839	1.924483	7.055319	***0.0000
INGRP	9.901366	2.859354	3.462798	***0.0006
MISTA	9.335504	2.769443	3.370896	***0.0008
RIMET	2.356820	1.145685	2.057127	**0.0404
DECES	0.771142	0.278822	2.765718	***0.0060
PEDCH	9.498032	3.586917	2.647965	***0.0085
DECVA	4.309419	3.320602	1.297782	0.1952
Pseudo R-squared	0.426894	Mean dependent var		0.510123
Adjusted R-squared	0.412030	S.D. dependent var		0.286706
S.E. of regression	0.197602	Objective		25.58211
Quantile dependent var	0.515129	Restr. objective		44.63767
Sparsity	0.438838	Quasi-LR statistic		347.3819
Prob (Quasi-LR stat)	0.000000		-	

Note: \*\*\* Significant at 1%; \*\* Significant at 5%; \* Significant at 10%.

ence effectiveness if it is not accompanied by more structured mechanisms. Conversely, the variable PRIAL, which captures the joint prioritization of objectives, is highly significant at the 1% level ( $p = 0.0000$ ), confirming hypothesis *H1c*. These results imply that the effectiveness of educational reforms depends primarily on the ability to structure collective action around jointly established priorities based on a shared diagnosis, while co-design without a hierarchical framework limits its transformational impact.

The variable INGRP, representing the inclusive formation of working groups, is significant at the 1% level ( $p = 0.0006$ ), which confirms hypothesis *H2a*. This positive correlation highlights the importance of diversity among the profiles involved in the collective dynamic. Similarly, the variable MISTA, which measures the assignment of targeted tasks, is also significant at the 1% level ( $p = 0.0008$ ), validating hypothesis *H2b*. It shows that the precise allocation of responsibilities within organized frameworks strengthens team mobilization. Furthermore, the variable RIMET, linked to methodological rigor in carrying out actions, is significant at the 5% level ( $p = 0.0404$ ), confirming hypothesis *H2c*. This set of results highlights that the success of mixed working groups relies on three joint conditions: their inclusive nature, the clarity of missions, and adherence to rigorous procedures. These conditions help stabilize reforms and promote the appropriation of objectives by various educational stakeholders.

The variable DECES, which measures the institutionalization of decision-making spaces, is significant at the 1% level ( $p = 0.0060$ ), validating hypothesis *H3a*. This shows that when consultation mechanisms are durably integrated into school structures, they enhance the coherence and continuity of actions. The variable PEDCH, associated with teacher involvement in concrete pedagogical decisions, is also significant at the 1% level ( $p = 0.0085$ ), confirming hypothesis *H3b*. This result underscores that active participation in decisions concerning content, tools, and assessment methods improves professional engagement and perceived effectiveness. In contrast, the variable DECVA, referring to the valorization and traceability of collective decisions, is not significant ( $p = 0.1952$ ), leading to the rejection of hypothesis *H3c*.

This may be explained by the still limited or insufficiently recognized use of these tools in schools. The overall results related to hypothesis *H3* suggest that the impact of shared decision-making depends less on their documentary formalization than on their integration into a legitimate, participatory decision-making process embedded in professional practices.

## 5. DISCUSSION

The results largely converge with existing research on participatory management by showing that stakeholder involvement strengthens school effectiveness, while also clarifying the specific conditions under which this influence becomes significant. The positive effect of shared diagnosis on organizational effectiveness is consistent with AlSchuler (1972), Beer and Eisenstat (1996), Joyner (1998), and Alghamdi and Prestridge (2015), who argue that reforms perform better when grounded in a collective understanding of educational needs. The empirical evidence presented here reinforces this argument by demonstrating that when actors collectively identify priorities and barriers, effectiveness improves. This implies that future reforms should institutionalize broad consultations to anchor their legitimacy and orient decision-making. In contrast, the lack of impact associated with simple collaborative project design nuances earlier claims suggesting that participation alone is sufficient. The findings indicate that collaborative planning produces no measurable effect when it is not supported by clearly defined and prioritized objectives, which underlines the necessity of structured and operational shared planning integrated into school routines.

The significant influence of collective prioritization of pedagogical goals aligns with Hamilton et al. (2013), Lenhoff et al. (2019), Fullan (2005), and Berkowitz (2012), who emphasize the value of strategic coherence and shared responsibility. The present results extend these contributions by showing that priority-setting becomes effective only when articulated with local constraints and available resources, thereby strengthening ownership and continuity of implementation. Similarly, the positive association between mixed working groups and effectiveness confirms findings

by Spratt and Florian (2015), Howley et al. (2023), Villa and Thousand (2003), and Dimmock et al. (2021). The current evidence indicates that diversity of profiles, clarity of roles, and structured task organization constitute the mechanisms through which such groups enhance performance. This is in line with Viennet and Pont (2017), Durlak and DuPre (2008), and Gordon (2008), who argue that authentic participation requires stable organizational arrangements rather than sporadic collaboration.

The significant effects related to involvement in pedagogical choices and institutionalized decision-making corroborate insights from Conley (1991), Spillane et al. (2011), Sarafidou and Chatzitoamidis (2013), and Ingersoll (2003), who highlight the contribution of professional autonomy to effectiveness. However, the absence of any measurable impact from decision traceability challenges assumptions that formalization automatically improves governance. As Keddie (2015) and Rose (1999) suggest,

documentation becomes meaningful only when connected to shared use, information flow, and recognition processes. The findings, therefore, indicate that future reforms should embed traceability within feedback and learning dynamics so that organizational memory supports collective action rather than serving mere administrative purposes. Overall, the results confirm Sachs and Mockler (2012), Zepke et al. (2014), and Mattei (2020), who underline that effectiveness increases when pedagogical objectives, responsibilities, and local contexts are aligned. These findings show that school improvement relies on credible, contextualized participatory mechanisms. The Integrated School Project in Morocco provides institutional tools that facilitate priority-setting, cooperation, and shared pedagogical decisions, thereby offering a solid basis for sustainable reform. Strengthening guided autonomy, professionalizing leadership, and ensuring that governance instruments remain legitimate, operational, and locally adapted appear as essential next steps.

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## CONCLUSION

The purpose of this study was to examine how the internal mechanisms of participatory governance embedded in the Integrated School Project influence perceived school effectiveness in Moroccan pilot schools. The empirical results show that school effectiveness is significantly higher when participatory governance is operationalized through structured and stable mechanisms, notably the collective prioritization of objectives, inclusive working groups with clearly assigned responsibilities, methodological rigor in implementation, institutionalized decision-making spaces, and teachers' involvement in concrete pedagogical choices. Conversely, more formal or symbolic dimensions of participation, such as simple project co-design or the documentation and traceability of decisions, do not significantly contribute to effectiveness when they are not embedded in recognized routines and professional practices. These findings indicate that participation becomes effective not through its declarative presence but through its capacity to structure collective action and sustain pedagogical coherence over time.

Several implications can be drawn from these results. First, they highlight the importance of strengthening guided school autonomy by professionalizing participatory routines and providing methodological support to school teams. Second, they justify the choice to measure effectiveness through teachers' perceptions, as teachers are the primary actors directly involved in pedagogical implementation, daily coordination, and the translation of collective decisions into classroom practices. Their assessments capture organizational dynamics – such as mobilization, coherence, and continuity of action – that are not immediately observable through administrative or outcome-based indicators. However, this perception-based measure does not exhaust the multidimensional nature of school effectiveness and remains limited by its subjective scope. Future research could extend the analysis by integrating the perspectives of school leaders, inspectors, parents, students, and local authorities, or by combining qualitative perceptions with quantitative indicators such as student achievement, attendance, progression, and internal management metrics. While limited, the teacher-based measure adopted here remains a relevant and coherent proxy for assessing the internal functioning of participatory governance mechanisms at the school level.

## AUTHOR CONTRIBUTIONS

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 Software: Hamid Zahir, Mohammed Bougroum, Abdelilah Sadqaoui.  
 Supervision: Hamid Zahir, Mohammed Bougroum, Abdelilah Sadqaoui.  
 Validation: Hamid Zahir, Mohammed Bougroum, Abdelilah Sadqaoui.  
 Visualization: Hamid Zahir, Mohammed Bougroum, Abdelilah Sadqaoui.  
 Writing – original draft: Hamid Zahir, Mohammed Bougroum, Abdelilah Sadqaoui.  
 Writing – review & editing: Hamid Zahir, Mohammed Bougroum, Abdelilah Sadqaoui.

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