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Innovation-Based School Facilities and Infrastructure Management Systems in Enhancing Elementary School Students' Learning Motivation

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Abstract. The management of school facilities and infrastructure is widely held to shape the quality of elementary learning, yet in practice it often remains administrative rather than pedagogical. This study analyzes how innovation-based facilities and infrastructure management is implemented, and how it is associated with students' learning motivation, at two contrasting elementary schools in West Java, Indonesia: SDN Citamiang in Cianjur Regency, which operates with limited facilities, and SDN 2 Pagerwangi in West Bandung Regency, which has more established infrastructure. A qualitative comparative case study was conducted with 24 participants (2 principals, 8 teachers, 10 students, and 4 school committee representatives), 16 observation sessions, and 42 documents. A practice was classified as innovation-based only when it met four explicit criteria—newness, pedagogical advantage, re-purposing beyond the national standard, and continuity—which separate innovation from ordinary compliant management. Learning motivation was operationalized through seven observable indicators drawn from the ARCS model and the engagement literature; no validated motivation scale or pre-test/post-test was administered. Of the 13 practices examined, eight met all four criteria. Participatory planning, task delegation extending to students, creative re-purposing of facilities, and continuous participatory maintenance were each associated with observed indicators of motivation, and re-purposing occurred at the less-resourced school as readily as at the better-equipped one. These associations are reported as observed patterns and participant perceptions, not as demonstrated causal effects.

Keywords: Facilities and Infrastructure Management, Educational Innovation, Learning Motivation, Elementary School, Qualitative Case Study.

1 Introduction

Elementary education is the primary foundation for forming students' thinking skills, attitudes and learning motivation, and its success depends on the availability and management of learning resources, of which school facilities and infrastructure are a principal pillar. Facilities are not merely physical structures but a dynamic environmental ecosystem that influences comfort, engagement and motivation both psychologically and pedagogically [1], [2]. In twenty-first-century education their

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management belongs to the strategic work of improving learning quality rather than to administrative routine [3], [4].

In modern educational governance, facilities management is understood as a systematic process resting on fundamental managerial functions. Adapting Terry's framework, effective management comprises Planning, Organizing, Actuating and Controlling, known as POAC [5]. Practice often diverges from this: in many elementary schools management is reduced to recording inventory and meeting minimum physical standards. The conventional approach leaves a gap between management centered on developing student potential and a bureaucratic reality in which facilities are not used creatively to stimulate learning motivation [6].

This gap indicates a needed shift from administrative to innovation-based management. Limited physical facilities do not necessarily produce a failing learning process where managerial innovation intervenes. Schools working under financial and geographical constraint have shown resilience and creativity by using the surrounding natural environment as an open laboratory, recycled materials as teaching aids, and pedagogy that demands higher-order thinking [7]–[10]. Such practices reduce boredom and make the classroom climate more interactive.

Schools with more modern facilities face a different risk: sophisticated provision that is never meaningfully integrated into the curriculum [11]. Innovation therefore requires a philosophical foundation. This study takes managerial innovation to be most effective when integrated with six value systems, namely theological, logical, ethical, aesthetic, physiological and teleological [12], so that every desk, book and corner of a classroom is managed with spiritual intent, rational assessment of need, justice of access, environmental beauty, physical comfort and orientation to the ultimate purpose of education. A safe school environment free from threats such as bullying likewise depends on the governance of the physical and social environment [13], [14].

This study describes and analyzes the implementation of innovation-based facilities and infrastructure management through a comparative case study at SDN Citamiang in Cianjur Regency and SDN 2 Pagerwangi in West Bandung Regency. The two sites represent variance in environmental characteristics and resources: SDN Citamiang relies on contextual innovation under limited facilities, while SDN 2 Pagerwangi has more established provision but requires innovation in utilization. The study examines how the four management functions are executed under the leadership of principals and teachers, and how these arrangements relate to students' learning motivation, with the aim of formulating a model of facility governance that reaches beyond physical feasibility standards.

The study is guided by the conceptual framework in Fig. 1, which links the four management functions and the six value systems to concrete facility practices, applies an explicit rule to separate innovation from ordinary good management, and relates innovation-based practices to observable indicators of learning motivation while keeping rival explanations in view.

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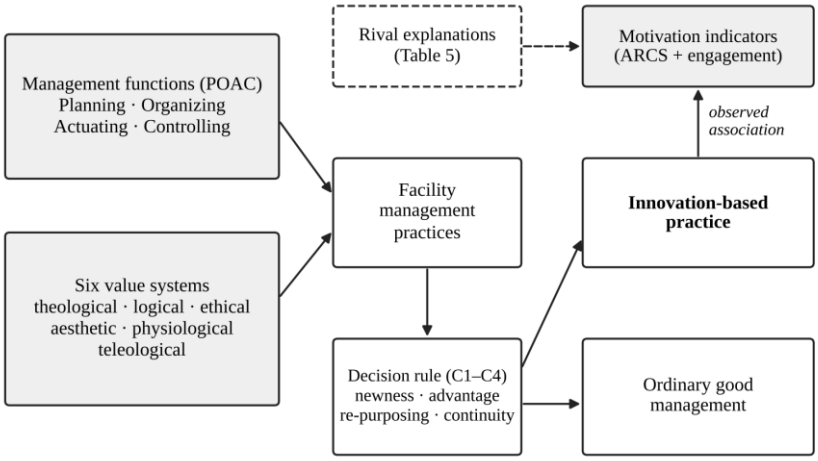


Fig. 1. Conceptual framework of the study.

2 Methods

2.1 Research Design and Case Boundaries

This study adopted a qualitative approach with a descriptive-analytical case study design. The selection of this methodology was based on the need to explore and portray the phenomenon of school facilities and infrastructure management in its natural setting, and to understand the meaning behind the managerial actions carried out by educational actors on the ground in a deep and holistic way [15].

The case is bounded as the management of facilities and infrastructure within one academic year at two schools, and the design is comparative rather than experimental. Following case-study logic, the study is organized around an analytical proposition rather than a hypothesis: that managerial practices which re-purpose available facilities pedagogically, rather than merely maintain them to standard, are associated with observable indicators of student learning motivation. The proposition directs data collection and is open to qualification by the evidence; it carries no claim of causal effect, since the design has no baseline, control school or before-and-after measurement [16]. The unit of analysis is the managerial practice of the school, not the individual student.

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2.2 Research Sites and Comparative School Profiles

The two sites were selected purposively to maximize contrast in facility resources while holding constant the level of schooling, the provincial policy environment and the curriculum. Because the two schools differ in more than their facilities, Table 1 documents the characteristics on which they differ, so that readers can weigh alternative explanations for any pattern reported later. The degree of facility provision is expressed against the national standard for elementary facilities and infrastructure [17], which provides a common benchmark independent of either school's self-assessment.

Table 1. Comparative profiles of the two research sites, academic year 2025/2026

Characteristic	SDN Citamiang (Cianjur)	SDN 2 Pagerwangi (West Bandung)
Enrollment / classes / setting	142 students / 6 classes / rural	268 students / 9 classes / semi-urban
Teaching staff	8 (6 class teachers, 2 subject teachers)	12 (9 class teachers, 3 subject teachers)
Student–teacher ratio	1: 18	1: 22
Fulfillment of the national facilities standard (Permendiknas 24/2007)	Approx. 62%; no laboratory, no dedicated library room, reading corners in classrooms	Approx. 85%; dedicated library room, portable projectors, internet connection
School accreditation	B	A
Principal's tenure at the school	4 years	3 years
Teacher certification	5 of 8 certified	9 of 12 certified
Predominant parental occupation (school register, aggregate)	Farming and informal sector	Trade, services and salaried employment
Proportion of students receiving state education assistance	Approx. 61%	Approx. 34%
Documented community involvement	Committee meets 4 times per year; 3 recorded self-help (gotong royong) events in the year	Committee meets 4 times per year; 1 recorded self-help event; contributions mainly financial

2.3 Participants, Selection Criteria and Information Adequacy

Table 2 summarizes the participants: twenty-four participants took part, twelve at each school, selected purposively on the criterion of direct involvement in, or direct exposure to, the management and use of school facilities.

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Table 2. Participants by category and school

Participant category	SDN Citamiang	SDN 2 Pagerwangi	Total	Data collection	Code
Principal	1	1	2	Semi-structured interview	PR
Class teacher (grades IV–VI)	4	4	8	Semi-structured interview; observation	TE
Student (grades IV–VI)	5	5	10	Focus group (one per school)	ST
School committee representative	2	2	4	Semi-structured interview	CO
Total	12	12	24		

Participants are cited by role code, school (C = Citamiang, P = Pagerwangi), and number, e.g., TE-C2.

Selection criteria were as follows. Principals held budget and policy authority over facilities. Teachers were class teachers of grades IV–VI, in post at least two years and responsible for a classroom's physical environment. Students came from grades IV–VI with at least two years at the school, varied in sex and academic profile on the class teacher's recommendation, with written parental consent. Committee representatives were office-holders involved in at least one facilities decision during the year.

Information adequacy was judged at the level of analytical categories rather than by a target number of informants [18]. Codes were tracked cumulatively as transcripts were analyzed: no new code appeared under any of the four management functions after the seventh adult interview, and the interviews conducted subsequently were confirmatory rather than generative. The student focus groups introduced no managerial sub-theme that adult accounts or documents had not already raised, although they supplied the students' own formulation of several indicators. Saturation is therefore claimed for the managerial categories that frame this study, and explicitly not claimed for the full range of student experience, which two focus groups cannot exhaust.

2.4 Data Collection Procedures

Sixteen observation sessions were conducted, eight per school, each of 90 to 120 minutes, covering lessons using classroom facilities, outdoor learning, library or reading-corner use, and routine maintenance periods. Observation used a structured field-note form with columns for the management function in view, the facility in use, the motivation indicators of subsection 2.6, and unanticipated events. Interviews followed a semi-structured guide organized by the four management functions. Forty-two documents were analyzed: the School Activity and Budget Plan and its facilities component (4), asset inventories (4), maintenance records (6), decrees appointing facility officers (4), school work programs (4), supervision notes (6), committee

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minutes (8), aggregate attendance registers (4), and school profile and staffing documents (2).

The overall research procedure, from data collection through classification and analysis to verification, is summarized in Fig. 2.

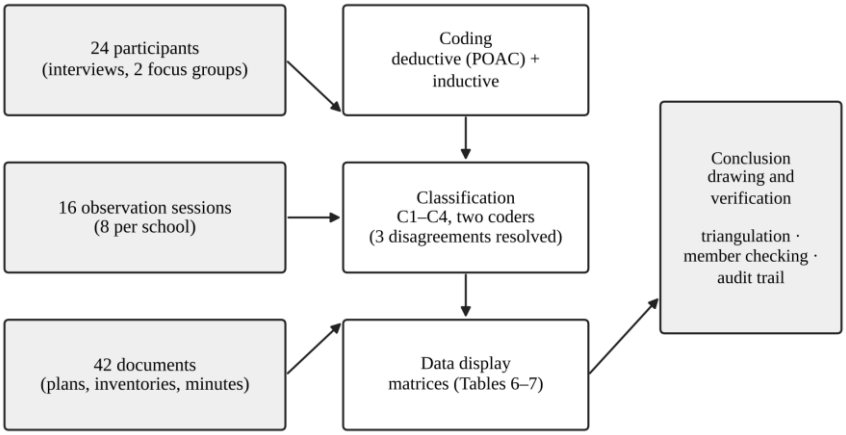


Fig. 2. Research procedure: data sources, analysis, classification, and verification.

2.5 Operational Definition of Innovation-Based Management

Because innovation-based management must be distinguished from ordinary good management, the study adopts an explicit decision rule. Drawing on the established attributes of an innovation, namely relative advantage, compatibility and observable adoption [19], a planning, organizing, actuating or controlling practice was classified as innovation-based only when it satisfied all four criteria in Table 3; a practice satisfying fewer was classified as ordinary compliant management and is reported as such. Both authors applied the classification independently to every candidate practice, and the three disagreements that arose were resolved against the documentary evidence.

Table 3. Criteria for classifying a management practice as innovation-based

Criterion	What must be shown	Evidence required
C1 Newness relative to the unit	The practice departs from the school's own prior routine; it need not be new to the field	Documented prior practice, or converging participant accounts of what was done before
C2 Pedagogical relative advantage	The stated advantage is expressed in learning terms, not only in terms of efficiency, tidiness or administrative compliance	Interview accounts plus program or planning documents stating the learning purpose

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Criterion	What must be shown	Evidence required
C3 Re-purposing beyond the standard	An existing resource is reconfigured or used for a function beyond that assigned to it by the national facilities standard, rather than simply being procured or maintained to it	Observation of the use, cross-checked with the inventory or the standard
C4 Adoption and continuity	The practice is embedded in routine rather than staged once	Observed on at least two separate occasions and traceable in schedules, rosters or minutes

The rule disciplines the findings in both directions. Repainting classrooms at SDN 2 Pagerwangi satisfies C1 and C4 but not C3, since it fulfills rather than exceeds the standard, and is therefore reported as ordinary good management; converting the school garden at SDN Citamiang into a working science space satisfies all four and is reported as innovation. Table 7 classifies every practice examined, so that a reader may disagree with a classification while seeing the criterion that produced it.

2.6 Operationalization of Student Learning Motivation

Learning motivation is the outcome named in the title, but the study administered no validated motivation scale and no before-and-after assessment, so the claim made about it is deliberately narrow. Motivation is treated as a construct with intrinsic and extrinsic components expressed behaviorally [20] and approached through observable indicators rather than a measured score. Seven indicators were specified in advance: four from the attention, relevance, confidence and satisfaction conditions of the ARCS model [21] and three from the behavioral, emotional and cognitive dimensions of school engagement [22]. Table 4 states each indicator, how it was recorded, and the strength of evidence obtained.

Table 4. Indicators used to observe learning motivation, with recording method and evidential status

Indicator	How it was recorded	Evidential status obtained
Attention: on-task behavior while a facility is in use	Time-sampled observation at five-minute intervals, recorded as a tally of pupils visibly on task	Direct, at group level; not scored or compared statistically
Relevance: students connect the facility to a learning purpose	Student focus groups; unprompted statements recorded in field notes	Direct, from a small number of students
Confidence: willingness to attempt or to volunteer	Observation of volunteering, question-asking and task initiation	Direct, at group level

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Indicator	How it was recorded	Evidential status obtained
Satisfaction: expressed enjoyment and voluntary return to a facility	Observation of use during breaks; student focus groups	Direct, with variation between classes
Behavioural engagement: attendance and participation in facility-care rosters	School attendance registers in aggregate; duty rosters	Descriptive only; registers were not analyzed as a time series and no trend is claimed
Emotional engagement: affect expressed toward classroom and outdoor spaces	Student focus groups; reflective statements noted by teachers	Direct, from participant report
Cognitive engagement: self-initiated continuation of a facility-based task	Observation of unprompted continuation; teacher accounts; student work displayed	Indicative only; recorded for some students on some occasions

Three consequences follow. First, no statement in this article asserts that motivation increased, because no baseline exists against which an increase could be established. Second, what the indicators support is the presence of motivational behavior in settings where particular managerial practices are in place, which is an observed association within each case rather than an effect attributable to the practice. Third, attendance figures from school registers are reported descriptively, not as evidence of change.

2.7 Data Analysis

Analysis followed the interactive model of Miles, Huberman and Saldaña [23] through data reduction, data display and conclusion drawing with verification. Coding was deductive in its first movement, with the four management functions as a priori categories and the criteria of Table 3 applied as a classification filter, and inductive in its second, with open coding of material the start list did not accommodate. Displays took the form of matrices with practices as rows and the two schools as columns, which produced Tables 6 and 7. Both authors coded a common subset of four transcripts independently and reconciled their code definitions by discussion before dividing the remaining material.

2.8 Rival Explanations and the Limits of Comparison

Differences between the two schools other than their facilities—leadership, teacher quality, student background, school size, community involvement, and academic culture—could each account for differences in motivation, and school leadership in particular is known to shape learning conditions [24]. The study cannot control for these statistically and does not claim to. It documents them, and applies the logic of rival explanations, in which each plausible alternative account is stated and tested against the evidence rather than left implicit [16]. Table 5 sets out each rival factor, how it was documented, how it was handled, and what limitation remains.

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Table 5. Rival explanations for the observed motivation patterns and their analytical treatment

Rival factor	How documented	Analytical treatment	Residual limitation
Leadership style	Principal tenure; supervision records; participant descriptions	Treated as a co-occurring explanation, not a controlled variable; where a pattern could equally be attributed to leadership, the Results say so	Leadership and facility management are enacted by the same actors and cannot be separated in this design
Teacher quality and qualification	Certification, education level and years of service (Table 1)	Compared across sites; classroom observation included the teacher's instructional handling, so that facility use and teaching quality were recorded separately	No measure of teaching effectiveness was applied
Student socioeconomic background	Aggregate parental occupation and state assistance share (Table 1)	Reported for both sites; no between-school comparison of motivation is drawn, because the intakes differ	Individual-level background data were not collected
School size	Enrollment, number of classes and student–teacher ratio (Table 1)	Within-case analysis only, so that size differences do not enter the claim	Size may condition which practices are feasible at all
Community involvement	Committee minutes; recorded self-help events; contribution records	Treated as part of the managerial practice under study at SDN Citamiang, not as an external confounder	The boundary between community involvement and management is analytical, not natural
Academic culture	Accreditation status; school work programs; routines observed	Documented in Table 1 and acknowledged as a plausible alternative account of motivational climate	Not independently assessed

Two decisions follow and govern the Results. The study reports within-case associations between a specific managerial practice and specific observed indicators at the school where that practice occurs, and does not attribute any difference in motivation between the two schools to a difference in their facility management. It also refrains from ranking the schools on motivation, which the design cannot support: the comparison concerns managerial practice, which is documented, not motivational outcome, which is not measured.

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2.9 Trustworthiness and Research Ethics

Credibility rests on source triangulation across principals, teachers, students, committee members and documents, on technique triangulation between interview, observation and documentation, and on member checking in which the fourteen adult participants were invited to contest the draft interpretation. Dependability rests on an audit trail of field notes, transcripts, the coding framework, the classification decisions recorded against Table 3, and the document log. Confirmability was addressed through a reflexive memo recording the authors' prior expectation that the better-resourced school would show the stronger practice — an expectation the evidence did not bear out.

Because the study involves minors, institutional permission was obtained from the postgraduate program of Universitas Islam Nusantara and, in writing, from both principals. Adult participants gave written informed consent covering purpose, procedures, recording, publication and the right to withdraw. Written parental consent was obtained before any student data were collected, and age-appropriate verbal assent was sought from each student and restated at each focus group. Participants are referred to by the codes in Table 2. Focus groups were held in open school rooms with a teacher within sight, no researcher was alone with a student, and no video or identifying photograph was made. Observation was non-participant and took place during regularly scheduled activities, so no additional activity was created for the research.

3 Results

3.1 Innovation-Based Planning and Organizing of Facilities and Infrastructure Management

Planning determines the direction of facilities governance, and both schools have moved from a top-down model to a participatory one. At SDN Citamiang, planning confronts a limited budget and inherited physical constraints, and proceeds through what may be called contextual substitution analysis: the principal and teachers work with the local community to map natural resources that can be converted into learning tools. Logical values are strongly present, in that basic needs are calculated rationally while the solutions are innovative, as in planning the school garden as an open science laboratory [25].

SDN 2 Pagerwangi, with more modern infrastructure, directs its planning toward utility optimization. The annual working meeting with the school committee plans the integration of technology into regular classrooms, including portable projectors, digital literacy corners and furniture renewal. Aesthetic and physiological values are prominent here, in decisions such as classroom wall colors and circular table layouts that support active learning. Different as the approaches are, both share a teleological orientation: every item budgeted is justified by its contribution to the quality of student learning.

The documentary evidence supports this account. The shift to participatory planning satisfies criteria C1, C2 and C4 of Table 3 at both schools, and C3 at SDN Citamiang,

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where the garden was planned for a function the facilities standard does not assign to it. The documents record the change: at SDN Citamiang the facilities component of the School Activity and Budget Plan moves from a list of procurement items in the preceding year to a schedule naming the learning purpose of each item.

In organizing, the implementation of innovation depends on the clarity with which authority is distributed, and the findings show that responsibility is delegated rather than centralized in the principal. At SDN 2 Pagerwangi the structure is formalised through a principal's decree appointing a head of library, a school health unit coordinator and an information technology officer, which prevents overlapping duties and ensures that specific staff attend to specific assets. At SDN Citamiang, with fewer teaching staff, organization is more fluid and collective: the class teacher manages the physical environment of their own classroom, and upper-grade students are organized into a Class Committee responsible for reading corners and for the plants on the classroom terrace. This inclusive delegation instils social responsibility early and reframes facilities as a communal mandate rather than state property, generating a sense of belonging among school members.

The organizing arrangements are documented rather than inferred. At SDN 2 Pagerwangi the decrees appointing a head of library, a health unit coordinator and an IT officer were examined, and the duties they assign corresponded in each case to the tasks observed. At SDN Citamiang no comparable decree exists, and the class-teacher-as-manager arrangement appears instead in the school work program and the classroom duty rosters. Against Table 3, the student Class Committee satisfies all four criteria: it departs from prior routine, its stated purpose is pedagogical rather than custodial, it assigns a managerial function beyond any provision of the standard, and it was observed on six of eight occasions and appears in the rosters. Teachers described its purpose in pedagogical rather than custodial terms.

3.2 Actuation and Controlling in Creating a Learning Environment

Actuating is where innovation is tested in practice, and it is most visible in the creative use of facilities as learning media. At SDN 2 Pagerwangi, static classrooms have been transformed into dynamic ones: desks and chairs formerly arranged in rows are now modular, so that teachers can reconfigure the room within minutes for group discussion or collaborative projects, and classroom walls serve as exhibition boards for student work. These arrangements express physiological and aesthetic values, conditioning the environment to be healthy, comfortable and visually engaging.

At SDN Citamiang, actuating innovation is born of limitation. The absence of language or science laboratories has not halted practice: teachers use outdoor learning, treating the school yard, the grass field and the surrounding area as extensions of the classroom, and using plastic bottles collected by students as hydroponic planting media or mathematics props. This reflects an adaptation of ecopedagogy, in which the use of facilities carries theological and ethical values by teaching students gratitude for and care of the environment [26], [27].

The actuating practices were classified against the same criteria. Modular desk arrangement at SDN 2 Pagerwangi satisfies all four and was observed on five of eight

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occasions, reconfiguration being completed within the lesson each time. Outdoor learning at SDN Citamiang likewise satisfies all four and was observed on four of eight occasions across science, mathematics and language lessons. By contrast, repainting classrooms and replacing damaged whiteboards at SDN 2 Pagerwangi are recorded as ordinary good management, since they fulfill the standard rather than exceed it, and reporting them as innovation would inflate the study's central claim. Teachers at SDN Citamiang described the outdoor practice as a deliberate response to the absence of laboratories.

In controlling, both schools operate mechanisms more comprehensive than annual inventory inspection, treating supervision as continuous quality assurance. Principals at both schools conduct walk-around managerial supervision, monitoring classroom lighting, whiteboard condition, toilet sanitation and water availability. Innovation appears in participatory maintenance: at SDN 2 Pagerwangi students check the condition of their desks, chairs and equipment before class ends each day, while at SDN Citamiang facility problems are raised in morning briefings and, rather than waiting for operational assistance funds, the school coordinates with the committee or the community for immediate repair. This responsiveness keeps small infrastructure problems from accumulating and, in the accounts of participants, limits premature deterioration of assets.

3.3 Obstacles, Innovative Solutions, and Impact on Student Learning Motivation

Both schools encountered substantial obstacles. SDN Citamiang faces minimal government allocation for large-scale physical repair and buildings vulnerable to extreme weather. SDN 2 Pagerwangi, despite better provision, faces high maintenance costs for electronic equipment and internet connectivity. A difficulty common to both is the fluctuation in school members' care for cleanliness and facility integrity during periods of leadership transition.

The responses are collaborative in both cases. At SDN Citamiang, budget constraint is addressed through community-based asset management: the school draws on community leaders, local craftsmen and parents for self-help renovation and for making school furniture from local materials, which addresses the shortage of desks and chairs and, in the accounts of participants, strengthens the relationship between school and community. At SDN 2 Pagerwangi, maintenance cost is addressed through a facility literacy program that trains students and teachers in the correct use and care of electronic equipment, with the stated aim of extending the service life of the equipment.

The relationship between these managerial practices and student learning motivation must be stated carefully. The design includes no baseline, no comparison condition and no measurement of motivation, so no increase can be established and none is claimed. What the data support is the presence of the indicators defined in Table 4 in settings where the managerial practices described above are in place, which is an observed association within each case. Table 6 reports the indicators, the evidence recorded for each at each school, and the status of that evidence.

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Table 6. Motivation indicators observed at each school, with the practice in view and the status of the evidence

Indicator	SDN Citamiang: what was recorded	SDN 2 Pagerwangi: what was recorded	Status
Attention (on-task behavior)	In outdoor science sessions, tallies showed most pupils visibly on task throughout the segment; indoor tallies in the same classes were lower	In modular-layout group work, tallies were higher than for the same class in rows seating	Observed association within each case; no statistical comparison; class and task also differed
Relevance (facility linked to purpose)	Students described the garden and bottle planters as where the lesson happens rather than as decoration	Students described the display board as a reason to finish work	Participant report from ten students in total
Confidence (volunteering, initiating)	Volunteering to carry equipment and to lead group tasks recorded in outdoor sessions	Volunteering to reconfigure the classroom layout recorded in four sessions	Observed at group level
Satisfaction (enjoyment, voluntary return)	Voluntary visits to the plant area during breaks recorded on five occasions	Voluntary use of the reading corner during breaks recorded on four occasions	Observed; frequency varied by class and by weather
Behavioural engagement (attendance, rosters)	Attendance registers in aggregate; duty rosters fully completed in the classes observed	Attendance registers in aggregate; duty rosters completed with some gaps	Descriptive only; no trend analyzed and no change claimed
Emotional engagement (affect toward spaces)	Students expressed pride in plants they had cared for	Students expressed preference for the classroom after rearrangement	Participant report
Cognitive engagement (self-initiated continuation)	Some students continued recording plant growth outside the lesson	Some students continued work for the display board outside the lesson	Indicative only; some students, some occasions

Two further observations belong with this table. The reduction in desk writing and similar damage reported by teachers at both schools draws on participant accounts and on maintenance records, which show fewer repair entries of that type in classes where students hold care responsibilities; since those records were not kept for research and the classes were not matched, this is a pattern worth further study rather than an effect. And the indicators recorded at SDN Citamiang are not weaker than those at SDN 2 Pagerwangi despite the difference in provision — the finding this study regards as most

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instructive — while recalling from subsection 2.8 that the intakes differ and that no between-school comparison of motivation is drawn.

3.4 Classification of Practices against the Innovation Criteria

Table 7 applies the decision rule of Table 3 to every management practice examined at the two schools. Its purpose is to make the study's central term auditable: a reader can see which practices the study counts as innovation, which criterion each one fails where it fails, and therefore how much of the managerial activity at these schools is innovation in the stated sense rather than competent routine.

Table 7. Classification of observed practices against criteria C1–C4

Practice (school)	C1	C2	C3	C4	Classification
Participatory planning forum with community (Citamiang)	Yes	Yes	Yes	Yes	Innovation-based
Garden planned and used as an open science space (Citamiang)	Yes	Yes	Yes	Yes	Innovation-based
Student Class Committee managing reading corners and plants (Citamiang)	Yes	Yes	Yes	Yes	Innovation-based
Outdoor learning using yard and recycled materials (Citamiang)	Yes	Yes	Yes	Yes	Innovation-based
Community self-help renovation and furniture making (Citamiang)	Yes	Yes	Yes	Yes	Innovation-based
Annual working meeting with committee for utility planning (Pagerwangi)	Yes	Yes	No	Yes	Ordinary good management
Decrees appointing library, health unit and IT officers (Pagerwangi)	Yes	Partly	No	Yes	Ordinary good management
Modular classroom layout for collaborative work (Pagerwangi)	Yes	Yes	Yes	Yes	Innovation-based
Classroom walls used as student work exhibition boards (Pagerwangi)	Yes	Yes	Yes	Yes	Innovation-based
Facility literacy training in care of equipment (Pagerwangi)	Yes	Yes	No	Yes	Ordinary good management
Repainting classrooms and replacing whiteboards (Pagerwangi)	Yes	No	No	Yes	Ordinary good management
Daily end-of-lesson check of desks and equipment by students (Pagerwangi)	Yes	Yes	Yes	Yes	Innovation-based

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Practice (school)	C1	C2	C3	C4	Classification
Walk-around managerial supervision (both)	No	Partly	No	Yes	Ordinary good management

Two patterns emerge. Of the thirteen practices examined, eight meet all four criteria and five do not, which means that a substantial part of what these schools do well is competent routine rather than innovation, and the study does not claim otherwise. More instructive is the distribution: the practices meeting C3, re-purposing beyond the standard, cluster at the school with fewer resources, whereas the better-resourced school meets C3 where it reconfigures what it already owns and fails it where it procures or maintains. This supports the proposition of subsection 2.1 in a specific form, that re-purposing is a managerial disposition rather than a function of budget, while leaving open whether it is the re-purposing or the leadership that produces it, for the reasons in Table 5.

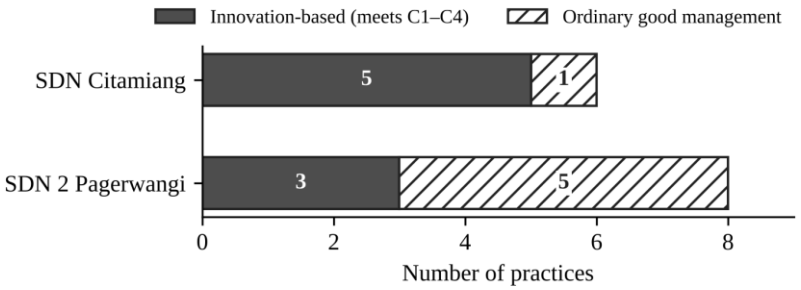


Fig. 3. Classification of the 13 management practices by school (walk-around supervision, observed at both schools, is shown under each school).

4 Discussion

The two schools provide a basis for discussing how facilities management should be operationalized at elementary level. Examined through Terry's management functions [5], the quality of management appears to depend less on the physical luxury of the buildings than on managerial method and on the culture built by school leadership [6].

Theoretically, the findings reaffirm that facilities management must go beyond clerical and administrative boundaries [15], [28]. SDN 2 Pagerwangi represents a formal-structured model, in which managerial functions rest on hierarchical clarity, task specialization through decrees, and the optimization of technology-based service standards; this suits larger schools with adequate resources, where structure secures efficiency and clear procedures for asset maintenance. SDN Citamiang represents an organic-contextual model, in which the process is fluid and relational and relies on social capital through committee involvement and community self-help, with the

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principal acting as a moral driver who consolidates the commitment of teachers and parents. In resource-constrained settings, management innovation thus shifts its orientation from purchasing toward re-purposing and community involvement [29].

The integration of the six value systems is the element that distinguishes this management from technical administration [12]. Where conventional management sees a dirty classroom as a cleaning problem, value-based management sees a physiological issue that threatens children's health and an aesthetic one that disturbs visual harmony. The conversion of classroom layouts into interactive learning spaces and the greening of unused school land are manifestations of these values, and the concrete practice of theological and ethical values cultivates manners, gratitude and discipline, contributing to a friendly and inclusive school climate.

The relationship between innovative facility management and learning motivation, is stated here in the terms the evidence permits. Research on the physical learning environment reports that classroom design characteristics account for a measurable share of variation in pupils' learning progress [30], [31], and motivational theory holds that an environment supporting autonomy, competence and relatedness sustains intrinsic motivation rather than compelling it [20]. The present findings are consistent with both propositions without testing either. What was observed is that where facilities were re-purposed pedagogically, the indicators of Table 4 were present in the lessons observed, and participants attributed their engagement to those arrangements. An attractive and varied learning environment functions as external reinforcement for children [1], and the data here are compatible with that account; they do not establish it, because no comparison condition was observed and no motivation measure was taken.

In the controlling function, the mitigation of obstacles rests on cultural rather than punitive means. Cultivating a sense of ownership through the Class Committee, and the social control formed by cooperation among principal, teachers and parents, proved more durable in these cases than written rules alone. Taken together, the two cases point toward transformative education [29]: the critical thinking, creativity and collaboration demanded of twenty-first-century learning are unlikely to grow in a statically managed classroom, and agile, participatory and context-adaptive management of facilities, grounded in explicit values, is a condition for elementary schools seeking to cultivate motivated learners.

4.1 Limitations and Directions for Further Research

Four limitations bound every finding above. First, learning motivation was not measured: no validated scale and no before-and-after assessment was administered, so the study reports observed indicators and participant perceptions, and enthusiastic use of facilities must not be read as an increase in motivation. Second, the two schools differ in leadership, staffing, intake, size, community involvement and academic culture, as Table 1 documents; these rival explanations were made explicit and tested against the evidence rather than controlled, so no difference in motivation between the schools is attributed to their facility management. Third, the classification of practices rests on a decision rule stated by the authors; it is explicit and its application is shown

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in Table 7, but a different rule would produce a different count. Fourth, attendance figures were not analyzed as a time series and no trend is claimed.

Three directions follow. A mixed-methods design administering a validated motivation instrument at two points in the year, in classes differing in facility management but matched on intake, would convert the association reported here into a testable proposition. A larger multi-case design varying facility provision while holding leadership tenure and accreditation constant would partly disentangle the rival explanations of Table 5. And a longitudinal study following one cohort through a change in facility management would address the before-and-after question that this design, which observed both schools only after their practices were established, cannot answer.

5 Conclusion

The implementation of innovation-based facilities and infrastructure management at SDN Citamiang and SDN 2 Pagerwangi can be described with some precision once the term innovation is given an explicit definition. Of the thirteen practices examined against the four criteria set out in this study, eight qualify as innovation-based and five are competent routine management. Both schools operate a POAC framework integrated with the six value systems, and they do so from opposite ends of the resource spectrum.

The innovation is manifested in participatory planning accommodative to local resources, clear task organization extending to student participation, creative use of facilities as learning resources through both technology optimization and natural laboratories, and preventive, communally based monitoring. At SDN Citamiang, physical limitation and budget scarcity were converted into occasions for community-based creativity rather than treated as impediments.

What this study can report about students is an association observed within each case: in lessons where facilities had been re-purposed pedagogically, the motivation indicators defined here were present, and participants attributed their engagement to those arrangements. Because no motivation instrument was administered and no baseline exists, the study does not claim that motivation increased, and it does not rank the two schools, whose intakes and leadership also differ. The finding it advances is managerial: practices that re-purpose existing facilities beyond the minimum standard were found at the school with fewer resources as readily as at the better-equipped one, which suggests that this form of management is a disposition that can be cultivated rather than a consequence of budget.

DECLARATIONS

Author Contributions

Conceptualization, H. and O.R.; methodology, H. and O.R.; investigation and data curation, H.; formal analysis, H. and O.R.; writing—original draft preparation, H.; writing—review and editing, O.R. Both authors have read and agreed to the published version of the article.

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Research Ethics and Informed Consent
Institutional permission was obtained from the postgraduate program of Universitas Islam Nusantara and, in writing, from both school principals. Adult participants gave written informed consent; written parental consent and the verbal assent of each student were obtained before any student data were collected (see Section 2.9).

Data Availability Statement
Anonymized field notes, coding frameworks, and classification records are available from the corresponding author upon reasonable request. Interview and focus-group transcripts are not publicly available because they involve minors and could identify participants.

References

[1] A. M. Sardiman, *Interaksi dan Motivasi Belajar Mengajar*. Jakarta, Indonesia: Rajawali Press, 2010.
[2] C. Uline and M. Tschannen-Moran, "The walls speak: The interplay of quality facilities, school climate, and student achievement," *J. Educ. Admin.*, vol. 46, no. 1, pp. 55–73, 2008, doi: 10.1108/09578230810849817.
[3] M. S. Siregar, N. Usman, and N. Niswanto, "Implementasi pendidikan karakter melalui model pembelajaran berbasis masalah (literature review manajemen pendidikan)," *J. Pendidik. West Sci.*, vol. 1, no. 11, pp. 701–712, 2023, doi: 10.58812/jpdws.v1i11.762.
[4] E. Mulyasa, *Manajemen Pendidikan Karakter*. Jakarta, Indonesia: Bumi Aksara, 2022.
[5] G. R. Terry, *Principles of Management*, 6th ed. Homewood, IL, USA: Irwin, 1972.
[6] U. Suherman et al., "Implementing a kindness-based leadership strategy in Islamic elementary education," *EDUKASIA J. Pendidik. dan Pembelajaran*, vol. 6, no. 1, pp. 281–292, 2025, doi: 10.62775/edukasia.v6i1.1384.
[7] A. Musa, "Harnessing knowledge for institutional advancement in tertiary educational institutions," *Int. J. Technol. Manag. Res.*, vol. 1, no. 1, pp. 81–87, 2020, doi: 10.47127/ijtmr.v1i1.14.
[8] D. Wahyudi, C. A. Kamila, and S. W. Agustin, "Peran kepemimpinan dalam pengembangan mutu pendidikan Islam," *J. Syntax Transform.*, vol. 2, no. 7, 2021, doi: 10.46799/jst.v2i7.334.
[9] C. Becker, G. Lauterbach, S. Spengler, U. Dettweiler, and F. Mess, "Effects of regular classes in outdoor education settings: A systematic review on students' learning, social and health dimensions," *Int. J. Environ. Res. Public Health*, vol. 14, no. 5, Art. no. 485, 2017, doi: 10.3390/ijerph14050485.

License: CC BY SA 4.0

ISSN: 2745-5351
https://doi.org/10.58905/jse.v7i1.1.794

[10] M. Kuo, M. Barnes, and C. Jordan, "Do experiences with nature promote learning? Converging evidence of a cause-and-effect relationship," *Front. Psychol.*, vol. 10, Art. no. 305, 2019, doi: 10.3389/fpsyg.2019.00305.

[11] S. Cheryan, S. A. Ziegler, V. C. Plaut, and A. N. Meltzoff, "Designing classrooms to maximize student achievement," *Policy Insights Behav. Brain Sci.*, vol. 1, no. 1, pp. 4–12, 2014, doi: 10.1177/2372732214548677.

[12] A. Sanusi, *Sistem Nilai dalam Pendidikan*. Bandung, Indonesia: Program Pascasarjana UNINUS, 2017.

[13] M. Musnaeni, "Pentingnya manajemen strategi dalam meningkatkan kualitas pendidikan," *CENDEKIA J. Ilmu Pengetah.*, vol. 2, no. 2, pp. 98–104, 2022, doi: 10.51878/cendekia.v2i2.1168.

[14] N. M. Maryati, H. Hidayat, N. Sulastri, and S. Anwar, "School management in preventing bullying in primary schools," *J. Innov. Res. Prim. Educ.*, vol. 4, no. 4, pp. 1891–1903, 2025, doi: 10.56916/jirpe.v4i4.1770.

[15] I. Bafadal, *Manajemen Perlengkapan Sekolah: Teori dan Aplikasinya*. Jakarta, Indonesia: Bumi Aksara, 2004.

[16] R. K. Yin, *Case Study Research and Applications: Design and Methods*, 6th ed. Thousand Oaks, CA, USA: SAGE, 2018.

[17] Kementerian Pendidikan Nasional Republik Indonesia, *Peraturan Menteri Pendidikan Nasional Nomor 24 Tahun 2007 tentang Standar Sarana dan Prasarana untuk SD/MI, SMP/MTs, dan SMA/MA*. Jakarta, Indonesia: Kementerian Pendidikan Nasional, 2007.

[18] J. W. Creswell and C. N. Poth, *Qualitative Inquiry and Research Design: Choosing Among Five Approaches*, 4th ed. Thousand Oaks, CA, USA: SAGE, 2018.

[19] E. M. Rogers, *Diffusion of Innovations*, 5th ed. New York, NY, USA: Free Press, 2003.

[20] R. M. Ryan and E. L. Deci, "Intrinsic and extrinsic motivations: Classic definitions and new directions," *Contemp. Educ. Psychol.*, vol. 25, no. 1, pp. 54–67, 2000, doi: 10.1006/ceps.1999.1020.

[21] J. M. Keller, "Development and use of the ARCS model of instructional design," *J. Instr. Dev.*, vol. 10, no. 3, pp. 2–10, 1987, doi: 10.1007/BF02299469.

[22] J. A. Fredricks, P. C. Blumenfeld, and A. H. Paris, "School engagement: Potential of the concept, state of the evidence," *Rev. Educ. Res.*, vol. 74, no. 1, pp. 59–109, 2004, doi: 10.3102/00346543074001059.

[23] M. B. Miles, A. M. Huberman, and J. Saldaña, *Qualitative Data Analysis: A Methods Sourcebook*, 3rd ed. Thousand Oaks, CA, USA: SAGE, 2014.

[24] K. Leithwood, A. Harris, and D. Hopkins, "Seven strong claims about successful school leadership," *School Leadership Manage.*, vol. 28, no. 1, pp. 27–42, 2008, doi: 10.1080/13632430701800060.

[25] D. Blair, "The child in the garden: An evaluative review of the benefits of school gardening," *J. Environ. Educ.*, vol. 40, no. 2, pp. 15–38, 2009, doi: 10.3200/JOEE.40.2.15-38.

[26] W. Purwasih and A. Sahnan, "Peningkatan mutu lembaga pendidikan dasar melalui manajemen sarana dan prasarana," *Madako Elem. Sch.*, vol. 1, no. 2, pp. 99–117, 2022, doi: 10.56630/mes.v1i2.51.

[27] R. Manurung, E. Harahap, T. Tahrun, and A. Suharyadi, "Manajemen sarana prasarana di Sekolah Dasar Negeri 1 Kota Prabumulih," *J. Manaj. Pendidik. J. Ilm. Adm. Manaj. dan Kepemimp. Pendidik.*, vol. 2, no. 2, pp. 168–177, 2020.

[28] E. Mulyasa, *Manajemen dan Kepemimpinan Kepala Sekolah*. Jakarta, Indonesia: Bumi Aksara, 2013.

License: CC BY SA 4.0

ISSN: 2745-5351
https://doi.org/10.58905/jse.v7i1.1.794

[29] S. Anwar and H. Umam, "Transformative education: Emphasizing 21st century skills and competencies in the independent learning curriculum," *AIM J. Islam. Educ. Manag.*, vol. 1, no. 1, pp. 1–16, 2020, doi: 10.15575/aim.v1i1.28886.

[30] P. S. Barrett, Y. Zhang, J. Moffatt, and K. Kobbacy, "A holistic, multi-level analysis identifying the impact of classroom design on pupils' learning," *Build. Environ.*, vol. 59, pp. 678–689, 2013, doi: 10.1016/j.buildenv.2012.09.016.

[31] P. Barrett, F. Davies, Y. Zhang, and L. Barrett, "The impact of classroom design on pupils' learning: Final results of a holistic, multi-level analysis," *Build. Environ.*, vol. 89, pp. 118–133, 2015, doi: 10.1016/j.buildenv.2015.02.013.

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