JSE
Vol. 7, No. 1.1, (2026), pp. 1-15
ISSN: 2745-5351
https://doi.org/10.58905/jse.v7i1.1.807

Contextual-Based Management of Integrated Science and Social Studies Learning to Enhance Elementary Students' Collaborative Skills

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Abstract. The Independent Curriculum (Kurikulum Merdeka) emphasizes the mutual cooperation dimension of the Pancasila Student Profile, yet integrated science and social studies (IPAS) lessons in many elementary schools remain teacher-centered and do little to develop collaboration. This study describes and analyzes the planning, organizing, implementation, and evaluation of contextual-based IPAS learning for improving students' collaborative skills at SD Negeri Girijaya in Cianjur Regency and SD Negeri Cimonteng in Sukabumi Regency. A qualitative multiple case study drew on fourteen informants through participatory observation, in-depth interviews, and document study, analyzed with the interactive model of data condensation, data display, and conclusion drawing, and checked through triangulation, member checking, and an audit trail. Planning specified cooperation as a graded activity with assigned roles; organizing established heterogeneous or jigsaw groups and a teacher learning community; implementation followed the contextual teaching stages of relating, experiencing, applying, cooperating, and transferring; and evaluation used behavioral checklists and peer assessment. The rural school used its natural environment as a living laboratory, whereas the semi-urban school integrated digital media, yet school records at both show comparable gains in collaborative indicators across one semester; these figures are documentary rather than measured by the study. Neither school had documented its grouping decisions. The study concludes that geography determines the medium of contextual learning rather than its outcome, and that structured contextual learning management strengthens both the implementation of the Independent Curriculum and students' collaborative skills.

Keywords: Collaborative Skills, Contextual Learning, Cooperative Learning, Independent Curriculum, IPAS, Learning Management.

1 Introduction

National education serves as a strategic pillar in shaping a generation that is competent and possesses character and adaptability. Law Number 20 of 2003 concerning the National Education System states that education aims to develop capabilities and form the character of a dignified civilization [1]. The Kurikulum Merdeka represents a

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ISSN: 2745-5351
https://doi.org/10.58905/jse.v7i1.1.807

response to contemporary educational needs, shifting from a content-based paradigm toward competency-based and character-driven learning. Central to this transformation is the Pancasila Student Profile, which sets out six dimensions including global diversity, critical thinking, creativity, and mutual cooperation (gotong royong) [2].

The dimension of mutual cooperation corresponds to collaborative skill. Collaboration is identified in the widely adopted framework of 21st-century competencies as one of the four capabilities, alongside critical thinking, communication, and creativity, that learners require in order to participate in contemporary society and work [3]. Collaborative skills allow students to operate in diverse social settings, address problems collectively, and contribute to their communities. Transformative education must therefore emphasize these competencies if students are to be prepared for the demands of a digital and globalized environment [4], [5].

In the Kurikulum Merdeka, the subject of Natural and Social Sciences (IPAS) is designed to be interdisciplinary and contextual. By combining natural science and social studies, IPAS provides a vehicle through which students may understand their environment through direct experience and group inquiry. Theoretically, the development of collaborative skill rests on Vygotsky's sociocultural account, and particularly on the zone of proximal development, which holds that cognitive and social growth occur most readily through interaction mediated by a teacher or a more capable peer, so that through scaffolding a learner accomplishes what they cannot yet accomplish alone [6].

The mechanism by which group work produces collaborative skill nevertheless requires specification, since placing students in groups does not by itself produce cooperation. Research on cooperative learning indicates that positive interdependence, individual accountability, and structured interaction are the conditions under which group work develops social competence rather than permitting a few students to carry the task [7]. This proposition supplies the criterion against which the group arrangements observed in this study are assessed, and it explains why the assignment of specific roles within groups is a managerial rather than an incidental decision.

A gap nevertheless exists between the intended design of IPAS and its implementation. Many elementary schools continue to employ teacher-centered approaches dominated by memorization and individual assignment, which provide limited scope for interaction. This absence of collaborative space constrains the development of the Pancasila Student Profile. Contextual Teaching and Learning offers an alternative: it links academic knowledge to students' own circumstances through the stages of relating, experiencing, applying, cooperating, and transferring, so that cooperation is a defined component of instruction rather than a by-product [8]. From a managerial perspective, the success of such an approach depends on systematic planning, organizing, actuating, and controlling as formulated by G. R. Terry [9], [10].

Effective management in schools is not a matter of administrative compliance but of creating a pedagogical environment that fosters mutual respect and cooperation and thereby reduces the conditions in which social problems such as bullying arise [11], [12]. Educational planning in Indonesian schools must further develop into a deep

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ISSN: 2745-5351
https://doi.org/10.58905/jse.v7i1.1.807

learning-based model, ensuring that the integration of local context and contemporary pedagogy is structured and sustainable [13].

Existing research has examined contextual teaching in science education and demonstrated its effectiveness for cognitive outcomes. There is, however, little work on how contextual learning is managed specifically in order to cultivate collaborative skill across differing geographical and social settings. Rural schools with limited infrastructure face conditions different from those of semi-urban schools with better digital access. SD Negeri Girijaya in Cianjur, located in a highland rural area, relies on its natural environment as a living laboratory, whereas SD Negeri Cimonteng in Sukabumi, with better connectivity, integrates digital media into its contextual approach.

This study addresses that gap through a cross-case analysis of contextual-based IPAS learning management. It is guided by five questions: how does planning integrate collaborative targets; how does organizing create a learning community; how does implementation follow the stages of contextual teaching; how does evaluation assess collaborative skill; and which elements of the management are consistent across sites as against contingent on geography and resources. The research contributes theoretically to the literature on contextual learning models and practically to educators implementing the Independent Curriculum in differing settings.

2 Methods

2.1 Research Design and Sites

This research adopts a qualitative approach with a multiple case study design. A case study is a systematic inquiry directed at exploring a phenomenon, whether single or multiple, through observation, interview, and documentation in order to describe findings comprehensively [14]. The multiple-case variant allows each school to be analyzed as a complete case on its own terms before a cross-case synthesis is developed, so that the comparison rests on two independently grounded analyzes [15]. The aim is to understand how contextual-based IPAS learning is implemented and experienced by principals, teachers, and students in their own settings.

The study was conducted at SD Negeri Girijaya (Cianjur Regency) and SD Negeri Cimonteng (Sukabumi Regency). These sites were chosen purposively because they represent different geographical and infrastructural conditions: SDN Girijaya is a rural highland school with limited digital access, while SDN Cimonteng is a semi-urban school with better connectivity. Both operate under the same curriculum policy, so holding the policy constant while varying the setting constitutes the comparative logic of the study. The design is summarized in Fig. 1.

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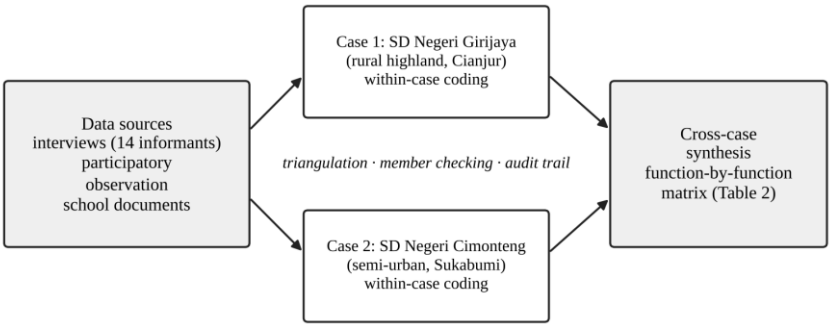


Fig. 1. Multiple case study design: within-case analysis of each school followed by a function-by-function cross-case synthesis.

2.2 Informants

Informants were selected purposively on the basis of direct involvement in IPAS learning, as presented in Table 1. The inclusion criterion required that teachers had taught IPAS under the Independent Curriculum for at least two semesters and that students had participated in a full semester of contextual IPAS activity, so that informants could describe change rather than first impressions.

Table 1. Distribution of research informants

No.	Informant	SDN Girijaya	SDN Cimonteng	Data Focus
1	School principal	1	1	Policy, organizing, and evaluation
2	IPAS teacher	3	3	Planning, implementation, and assessment
3	Student	3	3	Experience of group work
	Total	7	7	14 informants

2.3 Data Collection

Data collection involved three techniques. In-depth interviews were conducted with principals, IPAS teachers, and students in order to explore each management function, with student interviews conducted in pairs and in familiar settings so as to reduce the asymmetry between adult researcher and young respondent. Participatory observation focused on the quality of group interaction, teacher scaffolding, and the conduct of the

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ISSN: 2745-5351
https://doi.org/10.58905/jse.v7i1.1.807

contextual teaching stages during IPAS lessons, and was distributed across lesson types so that both field activity and classroom work could be observed. Documentation study covered teaching modules (Modul Ajar), student worksheets, assessment rubrics, behavioral checklists, and school evaluation reports.

The three techniques were combined so that claims made in interviews could be tested against observed practice and written records, which mattered particularly for the controlling function, where accounts of assessing collaborative skill could only be verified by examining whether the corresponding rubrics and checklists existed. Interviews were recorded with permission and transcribed, and field notes were written immediately after each visit.

2.4 Data Analysis and Trustworthiness

Data analysis followed the interactive model of Miles, Huberman, and Saldaña, involving data condensation, data display, and conclusion drawing [16]. Coding proceeded deductively from the four management functions and the five contextual teaching stages, with sub-codes emerging inductively for themes such as helping behavior, role assignment, and conflict resolution. Qualitative data analysis software was used to support the systematic coding and visualization of themes, and data were displayed in comparative matrices juxtaposing the two schools function by function.

The figures reported in the findings require a methodological note. The proportions of IPAS topics linked to local geography and the averages for collaborative indicators across one semester were taken from each school's own planning documents and assessment records, including the behavioral checklists and peer assessment rubrics maintained by teachers. They are presented in this study as documentary evidence of the direction of change that the schools themselves record, not as measurements generated by this research, and because the design is qualitative they are used to characterize trend rather than to establish statistical relationships between management practice and outcome.

Trustworthiness was established through the criteria of credibility, transferability, dependability, and confirmability [17]. Credibility was pursued through source triangulation among principals, teachers, and students and through technique triangulation across interview, observation, and documentation, supported by prolonged engagement and member checking of interpretations with participants. Transferability was addressed through thick description of each school's context, dependability through an audit trail of instruments, transcripts, and coding decisions, and confirmability through peer debriefing with colleagues not involved in the fieldwork.

2.5 Research Ethics

Permission was obtained from the relevant education offices and both schools; informants were informed of the purpose of the research and of their right to withdraw, parental consent was secured before any student was interviewed, and individual identities are not disclosed.

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https://doi.org/10.58905/jse.v7i1.1.807

3 Results

3.1 Planning of Contextual-Based IPAS Learning

The planning phase at both SDN Girijaya and SDN Cimonteng indicates a shift toward deep learning-based planning, in which the focus is not the delivery of content but the structuring of experiences that develop thinking and social skills [13]. At SDN Girijaya, planning begins with a survey of the school's surroundings. Because the school is situated in a highland agricultural area, teachers plan their IPAS modules by mapping local ecosystems such as rice fields, rivers, and plantations as primary learning resources. Planning documents record that the large majority of IPAS topics are linked directly to the local geography; the topic of ecosystems, for instance, is planned around observation of the local irrigation system.

At SDN Cimonteng the planning phase is more technologically mediated. Teachers integrate digital resources such as virtual tours of cultural sites and simulations of natural phenomena to complement physical observation. Planning at Cimonteng also specifies collaborative milestones within lesson plans, with teachers determining in advance which tasks require cooperation, such as joint experimentation or peer-led data collection. This specification matters because it converts cooperation from an expectation into a planned activity with an identifiable point of assessment.

Both schools use a structured teaching module in place of the earlier lesson plan format, designed around the contextual teaching components of relating, experiencing, applying, cooperating, and transferring [8] (Fig. 2). The cooperating element is planned as a graded activity in which students are assigned specific roles such as leader, observer, or reporter, which ensures that the collaborative dimension of the Pancasila Student Profile is addressed deliberately rather than left to chance. The assignment of roles also establishes individual accountability within the group, which is one of the conditions under which group work produces cooperation rather than allowing a minority of students to carry the task [7].

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https://doi.org/10.58905/jse.v7i1.1.807

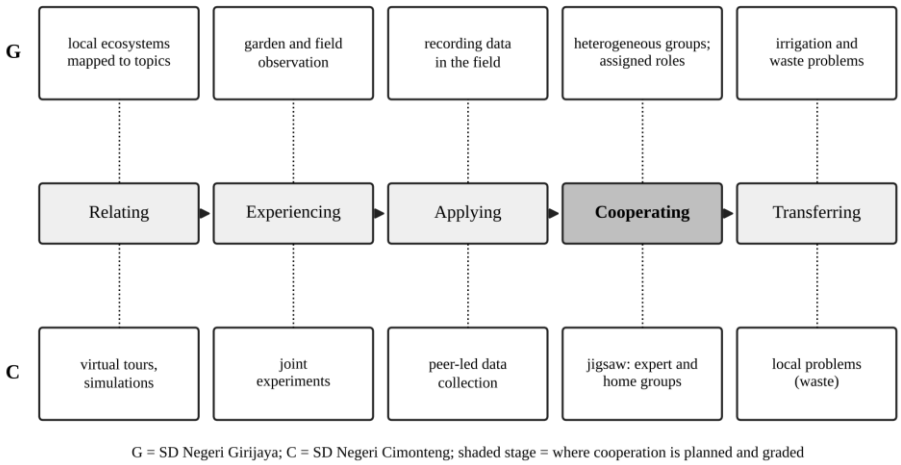


Fig. 2. The contextual teaching stages as enacted at the two schools; cooperation is planned and graded at the cooperating stage.

3.2 Organizing Collaborative Learning Communities

Organizing at these schools extends beyond the distribution of tasks toward creating conditions in which teachers and students can work together without fear of failure, which the principals described in terms of kindness-based leadership [18]. At SDN Girijaya the principal organizes the learning environment by fostering a teacher learning community through the school-level teacher working group. In the classroom, students are organized into heterogeneous groups of four to five, combining different academic abilities and social dispositions. This structure permits scaffolding in which more capable students assist their peers, which operationalizes the zone of proximal development [6].

At SDN Cimonteng the organization of students is more formally structured around the division of labor. Because the school has better digital resources, students are organized into expert groups that research specific topics and then return to home groups to teach their peers. This arrangement follows the jigsaw structure, in which each member holds material that the group requires, so that interdependence is built into the task rather than requested of the students [19]. Teachers reported that the arrangement obliged students who would otherwise remain silent to contribute, since the group could not complete the task without their segment.

The comparison identifies a difference in how each school addresses the risk that group work becomes unequal. At Girijaya, where groups work on shared physical tasks, teachers monitor contribution by direct observation during field activity. At Cimonteng, where contribution is mediated through material each student holds, the structure itself distributes participation. Both arrangements address the same problem through

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https://doi.org/10.58905/jse.v7i1.1.807

different means, and neither school had documented the grouping decisions in a form that a substitute teacher could apply.

3.3 Implementation through the Contextual Teaching Stages

The actuating phase at SDN Girijaya is characterized by direct experience. During the experiencing stage, students are taken to the gardens surrounding the school to observe plant growth, and teachers act as facilitators rather than lecturers. Observation recorded frequent helping behavior during these sessions, including students sharing tools and assisting peers with recording. This correspondence between concrete activity and comprehension reflects Piaget's account of concrete operational thought, in which children at this stage process information most readily when it is connected to tangible experience, so that the local environment functions as the bridge between the abstract topic and the child's understanding [20].

At SDN Cimonteng implementation proceeds through the jigsaw technique and peer mentoring. Students in expert groups research a topic and then teach it to their home groups, which requires sustained communication and active listening. The principal supports this through a leadership approach emphasizing psychological safety, which allows students to express differing opinions during group discussion. Teachers reported that the willingness of students to disagree productively, rather than deferring to the most confident member, was the clearest indication that the arrangement was working.

In both schools the transferring stage extends collaboration beyond the classroom. Students apply their collective findings to local problems such as waste management or irrigation, which connects the subject to the community and gives the cooperation a purpose beyond assessment. This actuating process internalizes the values of gotong royong and transforms the classroom into a setting in which collaboration is the expected mode of work rather than an occasional activity [21].

3.4 Controlling and Evaluation of Collaborative Skills

The controlling function at both schools uses authentic assessment to monitor both subject knowledge and collaborative skill, and evaluation is treated as an instrument of development rather than as an administrative obligation. At SDN Girijaya the evaluation of collaborative skill is conducted through behavioral checklists and teacher journals. Because the school's activity is field-based, the teacher observes how students share equipment, resolve disagreements about their observations, and take responsibility for their group's materials.

At SDN Cimonteng evaluation incorporates peer assessment, with students given rubrics to evaluate their teammates' contribution, communication, and handling of disagreement. This process makes students accountable to their groups and provides the teacher with information about participation that is not visible from the group's product alone. Teachers noted that peer assessment required preparation, since students initially rated their friends uniformly highly and only produced discriminating judgments once the rubric criteria had been discussed with them.

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ISSN: 2745-5351
https://doi.org/10.58905/jse.v7i1.1.807

School assessment records from both schools show an upward trend in collaborative indicators across one semester. Communication skills rose from an average of 2.4 to 3.3 on a four-point scale at SDN Girijaya and from 2.6 to 3.5 at SDN Cimonteng, and the conflict management indicator also improved as students adopted discussion and mediation to resolve differences during group projects. As noted in the method and shown in Fig. 3, these figures are drawn from school records and indicate the direction of change rather than a measured causal effect of the management approach. The records nevertheless establish that both schools assess collaboration systematically, which is the condition that makes the development of social skill visible to teachers rather than a matter of impression, and assessment of individual contribution is what sustains individual accountability within cooperative groups [7].

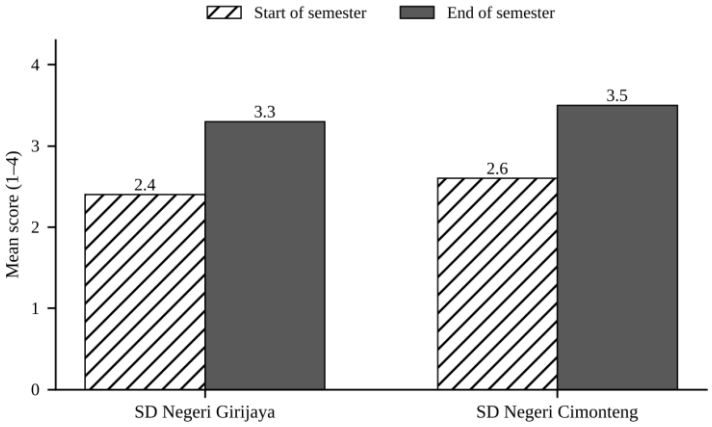


Fig. 3. Communication indicator recorded in school assessment records at the start and end of one semester (documentary data, four-point scale).

3.5 Cross-Site Comparison of Contextual IPAS Management

Compared across sites, the two schools converge on the substance of all four management functions, on the explicit planning of cooperation as a graded activity with assigned roles, and on the absence of documented grouping decisions, while differing in the medium through which contextual learning is delivered, as summarized in Table 2.

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ISSN: 2745-5351
https://doi.org/10.58905/jse.v7i1.1.807

Table 2. Cross-site comparison of contextual IPAS learning management

Management Function	SDN Girijaya (Cianjur)	SDN Cimonteng (Sukabumi)
Planning	Environment survey; most IPAS topics mapped to local ecosystems	Digital resources complement observation; collaborative milestones specified in modules
Organizing	Heterogeneous groups of four to five; teacher learning community through the working group	Expert and home groups on the jigsaw structure; interdependence built into the task
Implementation	Field observation in school gardens; teacher as facilitator; frequent helping behavior	Peer teaching between expert and home groups; emphasis on psychological safety in discussion
Controlling	Behavioral checklists and teacher journals based on direct field observation	Peer assessment rubrics on contribution, communication, and conflict resolution
Shared gap	Grouping decisions not documented for use by other teachers	Grouping decisions not documented for use by other teachers

The pattern in Table 2 indicates that geography and infrastructure determine the medium of contextual learning rather than its managerial logic or its outcome. At SDN Girijaya the natural environment functions as the context, and collaboration is observed directly during shared physical work. At SDN Cimonteng digital resources supply the context, and collaboration is structured through the distribution of material among group members. Both produced comparable movement in collaborative indicators, which is the principal benefit of comparing the sites rather than studying either alone [15].

4 Discussion

The findings confirm that integrating Terry's management cycle with a contextual teaching approach provides a workable framework for developing collaborative skill in elementary education [8], [9]. The planning phase at both schools indicates that character development is not an incidental outcome of teaching but a designed one. By adopting deep learning-based planning [13], these schools ensure that IPAS lessons address thinking and cooperation rather than the coverage of content. The decisive planning decision identified in this study is the specification of cooperation as a graded activity with assigned roles, since this is what converts an expectation into an assessable component of instruction.

The actuating phase bears most directly on theory. By following the contextual teaching stages, particularly cooperating and transferring, students are required to work beyond individual effort. In the cooperating stage the zone of proximal development is activated, and scaffolding comes not only from the teacher but from peers, which makes horizontal peer learning an effective means of building social capability alongside

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ISSN: 2745-5351
https://doi.org/10.58905/jse.v7i1.1.807

vertical instruction [6], [21]. The findings qualify this, however: scaffolding by peers occurred reliably where the task structure made each student's contribution necessary, which is the condition cooperative learning research identifies as positive interdependence [7]. Where groups worked on a shared task without distributed material, teachers had to monitor contribution directly, as was observed at SDN Girijaya.

The comparison between the rural context of Cianjur and the semi-urban context of Sukabumi provides a lesson in organizational resilience. SDN Girijaya indicates that limited digital infrastructure is not a barrier to quality learning: by using the natural environment as the contextual medium, the school achieved collaborative engagement comparable to that of a school with digital resources, and in the experiencing stage arguably a more concrete one, better matched to the developmental stage of the learners [20]. SDN Cimonteng demonstrates in turn how technology can be used for inquiry and collaboration and for the development of higher-order thinking [22]–[24].

The role of the principal as an instructional leader is a further significant finding. The implementation of a kindness-based leadership strategy is important to the operation of the management cycle [18], consistent with accounts of transformative leadership in early and elementary Islamic education [25]. Where principals lead with support, teachers are willing to experiment with contextual methods and students are willing to collaborate and express differing views. This leadership style affects the actuating phase directly by establishing the classroom climate in which cooperation becomes possible, and the teachers' observation that students learned to disagree productively rather than defer to the most confident member indicates that the climate, and not only the task structure, contributed to the outcome.

The integration of local context and environmental concern in IPAS ensures that students do not learn to collaborate solely for assessment but in relation to their community [10]. In both schools the transferring stage involved applying collaborative findings to local problems such as waste management or irrigation, which indicates that IPAS functions as a setting for developing the Pancasila Student Profile rather than as a subject alone. This corresponds to accounts of curriculum as relational, contextual, and co-constructed rather than transmitted [26], and it also connects the management of learning to the wider aim of fostering a school environment in which cooperation reduces the conditions for social conflict [11], [12].

The controlling phase indicates that authentic assessment is necessary if collaborative skill is to be evaluated at all, since conventional testing cannot capture a student's capacity to compromise or contribute. By using peer assessment and teacher observation, both schools align their evaluation with the aims of the Independent Curriculum [5]. The finding that peer assessment required preparation before students produced discriminating judgments is practically significant, because it indicates that peer assessment is itself a skill to be taught rather than an instrument that can be distributed and used immediately.

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https://doi.org/10.58905/jse.v7i1.1.807

4.1 Limitations

Several limitations should be acknowledged. The study involved two elementary schools in two regencies, so its findings are analytically rather than statistically generalizable. The collaborative indicators reported are drawn from school assessment records rather than from instruments administered by the researcher, and they were not attributed causally to the management approach; nor were the records independently verified. Observation covered one semester, which is sufficient to move beyond the novelty of a new arrangement but not to establish whether the gains persist across school years or transfer to other subjects. Finally, neither school had documented its grouping decisions, which means that the practice as observed depends on the teachers who designed it.

5 Conclusion

This research concludes that contextual-based management of IPAS learning is an effective strategy for developing students' collaborative skills within the framework of the Kurikulum Merdeka. Through the systematic application of the management cycle, schools can convert IPAS from a content-heavy subject into an activity that develops character. Planning that is contextual and localized, organizing that creates a supportive learning community, and implementation that follows the contextual teaching stages together contribute to the growth of communication, contribution, and responsibility among students.

The decisive managerial decisions identified by this study are two. First, cooperation is planned as a graded activity in which students hold assigned roles, which establishes individual accountability within the group and prevents collaborative tasks from being carried by a minority. Second, collaborative skill is assessed through authentic instruments, namely behavioral checklists and peer assessment rubrics, which makes the development of social capability visible to teachers rather than a matter of impression. Peer assessment was found to require preparation before students produced discriminating judgments, and is therefore itself a skill to be taught.

The study further reveals that geographical and infrastructural differences do not determine the success of collaborative education; success is determined instead by the school's capacity to manage its own context and resources. Whether through a living laboratory in a highland setting or digital resources in a semi-urban town, the recorded outcomes were comparable where the management cycle was applied and where instructional leadership supported it.

It is recommended that teachers continue to develop contextual modules that specify cooperative tasks and assign roles within them, that principals maintain their role as pedagogical facilitators, and that schools document their grouping and assessment decisions so that the practice does not depend on the teachers who devised it. For future research, a larger-scale study employing instruments administered independently of school records would allow the relationship between contextual learning management and collaborative skill to be examined rather than described, and longitudinal work

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ISSN: 2745-5351
https://doi.org/10.58905/jse.v7i1.1.807

would establish whether the gains observed over one semester persist across school years.

DECLARATIONS

Author Contributions

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

Funding

This research received no external funding.

Conflict of Interest

The authors declare that there are no conflicts of interest regarding the publication of this article.

Research Ethics and Informed Consent

Permission was obtained from the relevant education offices and both schools, informants were informed of the purpose of the research and of their right to withdraw, parental consent was secured before any student was interviewed, and individual identities are not disclosed.

Data Availability Statement

Anonymized interview transcripts, field notes, and coding records are available from the corresponding author upon reasonable request. Student assessment records and worksheets are not available because they contain personal data of minors.

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