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The application of soft systems methodology as a participatory education strategy in the stunting reduction program in Garut Regency

Yosef Hadyan Fazzar Ilahi[1], Ikeu Kania[2], Gugun Geusan Akbar[3]
[1,2,3]Universitas Garut, Indonesia
[1]yhadyanfazzar@gmail.com*, [2]ikeukania@fisip.uniga.ac.id , [3]Gugun.ga@gmail.com

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ABSTRACT

This study explores the application of Soft Systems Methodology (SSM) as a participatory education strategy in a stunting reduction program in Garut Regency, a region facing unequal access, limited infrastructure, and low community involvement in educational decision-making. A qualitative SSM-based approach was used. Data were collected through semi-structured interviews (45-60 minutes) and participant observation with 60 purposively selected respondents: elementary/junior high school teachers, parents/guardians, education officials, village/sub-district heads, school committee members, and representatives from businesses/NGOs drawn from three districts representing geographic variation and accessibility. Analysis with NVivo 14 used thematic coding, word clouds, and matrix coding. Four main themes emerged: (1) access and infrastructure challenges (32% of 3,456 coded references), (2) diverse stakeholder engagement (28%), (3) curriculum adaptation based on local Sundanese culture (21%), and (4) the impact of SSM on sustainable change (19%). Matrix coding showed a strong correlation between the intensity of stakeholder engagement and the perceived effectiveness of SSM-based change. These findings confirm SSM as an effective learning approach for designing contextual participatory education programs and contribute to SDG 4 on quality education for designing stunting reduction interventions.

INTRODUCTION

Participatory education has become a key paradigm for addressing educational inequality in rural areas, where social, economic, and cultural factors often hinder the implementation of standard curricula. In Garut Regency, West Java, these challenges are compounded by mountainous geography, a relatively high poverty rate of around 12.5% in 2023 (BPS Garut, 2023), and limited community participation in educational decision-making. Net Enrollment Rates (APM) in 2023 were 97.97% for primary (SD/MI), 79.9% for junior secondary (SMP/MTs), and 60.04% for senior secondary (SMA/MA) (BPS Garut, 2023), indicating room for improvement. Efforts to raise participation align with the 2025–2029 RPJMN policy directions emphasizing poverty reduction and human-capital quality (PPN/Bappenas, 2025). Conventional top-down approaches often fail by overlooking local perspectives; flexible, collaborative strategies are therefore needed.

Stunting, a chronic malnutrition problem that affects children's physical growth and cognitive development, remains a major issue in Garut Regency. The prevalence of stunting is closely related to education levels, parenting knowledge, and community participation in health and nutrition awareness programs. In this context, participatory education can serve as a strategic approach to support stunting reduction through strengthened community learning, improved parental understanding, and intersectoral collaboration between education and health stakeholders.

Conventional top-down approaches often fail by overlooking local perspectives; flexible, collaborative strategies are therefore needed. Participatory education requires stakeholder involvement in formulating, implementing, and evaluating local education policies, amid diverse goals and perceptions. In Garut, key actors include the education office, schools, committees, village/ward

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governments, civil-society organizations, business, and vulnerable groups (e.g., out-of-school youth, children in remote areas, and low-income families). Within the stunting-reduction agenda, these stakeholders also play crucial roles in promoting nutritional education and community empowerment. This complexity calls for a participatory systems approach that not only diagnoses problems but also negotiates changes that are culturally feasible and systemically desirable.

Developed by Checkland (2000), SSM provides an appropriate framework for such complexity. SSM addresses "soft" problem situations characterized by divergent stakeholder goals; human, cultural, and value factors; and complexity, unstructuredness, and continual change. It is an action-learning process that uses conceptual models of human activity systems to explore, reframe, and improve problem situations through structured debate among stakeholders (Checkland & Poulter, 2007).

SSM comprises seven stages: (1) Finding Out, a holistic, unstructured exploration of the situation (rich picture); (2) Root Definition, concise statements of purposeful activity from different viewpoints using CATWOE Customers (students and parents/community), Actors (education office, schools, committees, business, vulnerable groups), Transformation (from symbolic consultation to meaningful, documented, feedback-based participation), Weltanschauung (education as a collaborative ecosystem), Owners (local government and education units), and Environmental constraints (regulations, budgets, digital literacy, organizational culture); (3) Conceptual Model, a logical activity model needed to realize the root-definition transformation; (4) Comparison with Real World, identifying gaps, conflicts, and opportunities; (5) Feasible and Desirable Changes, filtering ideas into actionable changes acceptable to stakeholders; (6) Action to Improve the Situation, implementing agreed changes; and (7) Iteration, repeating the learning cycle. In participatory education, SSM can facilitate dialogue among teachers, parents, and local government to design contextual programs such as integrating Sundanese local knowledge into primary-school curricula.

Recent studies show SSM's effectiveness in facilitating collaboration and change in higher education and public services (Danar et al., 2025; Guilhen et al., n.d. ; Armstrong & Jiménez, 2022). In Indonesia, SSM has been used in university academic processes and accreditation (Septiana & Maulany, 2021; Karay et al., 2020) and in child social participation (Rifandini et al., 2023). These studies underscore SSM's strength in ill-structured situations requiring participatory artifacts like rich pictures and CATWOE. Recent literature highlights rich pictures for clarifying concepts and aligning actor perspectives (Marnewick et al., 2024; Wyatt et al., 2025), while contemporary participatory handbooks offer guidance for cross-context collaborative research (Burns et al., 2021b).

Although widely applied to management and organizational development, SSM's application to participatory education remains limited, especially in developing countries. Prior work demonstrates SSM's promise for adaptive learning design but seldom explores rural Indonesian contexts. For example, an Australian university case on systems-thinking pedagogy found SSM beneficial for collaborative understanding but did not address cultural challenges in rural areas (Sankaran, 2025). Similarly, immersive learning-design studies in technology education reported engagement gains up to 25% yet focused on urban higher-education settings, overlooking local community dynamics (Wu et al., 2021). Another study on secondary-school supervision in England integrated teacher and student perspectives using SSM but did not embed community-based participation (Thompson-Kerr, 2025).

In Indonesia, SSM has been applied in health (digital-transformation initiatives improving stakeholder participation; Soltani et al. (2022), e-government in construction (revealing multidimensional factors and producing more sustainable project-management models; Dewi et al., (2023), and educational technology (immersive learning design integrating stakeholder perspectives and enhancing performance through mixed reality; Wu et al., (2021). Prior studies, however, were often sectoral and placed less emphasis on participatory dimensions, where community involvement tended to be symbolic. More recent work in higher-education digital transformation (Danar et al., 2025) and self-organized e-learning improvement (Hapsari et al., 2024) further strengthens SSM's educational relevance.

Previous studies rarely integrated local values such as gotong royong (cooperation) in Sundanese culture, leaving a gap in adapting SSM to rural contexts. A holistic participatory education

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strategy that integrates local perspectives to address low literacy, access inequality, and stunting reduction using SSM constitutes this study's novelty. Participatory education and social learning theory are closely related: active participation can bolster community self-efficacy (Bandura, 1977). Conventional programs often fail by disregarding Sundanese cultural dynamics; SSM can bridge this gap by integrating local cultural values to promote both educational quality and health awareness.

This study therefore aims to explore the application of SSM as a participatory education strategy in the stunting reduction program in Garut Regency. Against a rural backdrop requiring collaboration, it identifies gaps in applying SSM within local cultural contexts through key themes from stakeholder perspectives. Theoretically, the study enriches literature on SSM adaptation for participatory education and health-related interventions; practically, it guides the Garut local government in integrating communities into education-based stunting-reduction programs and informs sustainable education policy. At a broader scale, the findings are applicable to other Indonesian regencies, supporting equitable access, improved child health, and community empowerment and, ultimately, contributing to SDG 4 on quality education and SDG 2 on zero hunger.

RESEARCH METHODS

Research Design and Approach

This study employed a qualitative approach grounded in the Soft Systems Methodology (SSM) as its principal analytical framework. This approach was selected because it effectively explains complex and dynamic social situations involving multiple actors with differing interests. In the context of participatory education and stunting reduction, SSM was utilised to systematically map educational and health-related challenges in Garut Regency by considering social, cultural, and institutional dimensions. The study not only focused on problem identification but also emphasised collective learning processes among stakeholders through reflective interaction. Hence, the research design was exploratory and participatory, aiming to encourage sustainable social change (Checkland & Poulter, 2007).

The SSM approach was considered relevant for Garut's context because the region possesses diverse socio-cultural characteristics, challenging geographical conditions, and persistent public health issues such as stunting. Through SSM, local communities actively participate as agents of change in formulating educational and stunting-reduction solutions. This approach provides space to interpret the meanings and values held by the community in developing educational practices and health-awareness initiatives aligned with their cultural context. In this research, SSM functioned not only as an analytical tool but also as a social learning tool oriented toward educational system transformation and community-based health promotion. The research process was directed toward building an inclusive, adaptive, and locally grounded educational system based on Sundanese wisdom that supports children's growth and well-being.

As an action-oriented methodology, SSM facilitated critical interaction between researchers and communities to identify problems and design realistic solutions. This approach integrates technical, social, cultural, and health dimensions in both analysis and decision-making (Checkland, 2000). Within this framework, the study bridged the gap between formal education policy, community participation, and stunting-reduction initiatives at the local level. This was achieved through constructive dialogue among teachers, parents, health workers, village governments, and the education office. Thus, the study aligns with the principles of sustainable education and health development that emphasise participation, empowerment, and intersectoral collaboration (Burns et al., 2021b).

The research design was flexible and adaptive, consistent with SSM's rejection of linear and deterministic approaches. Such flexibility was essential in dynamic social contexts—particularly in rural areas facing infrastructural limitations, health disparities, and cultural diversity. In this qualitative approach, the researcher acted as a facilitator, helping stakeholders view the education and health systems from multiple perspectives. The analysis process was iterative, continuously refining findings according to field realities, including how educational interventions can reinforce parental awareness

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of child nutrition and stunting prevention. Therefore, the approach balanced theoretical, empirical, and participatory dimensions coherently.

Conceptually, this research design followed an interpretive paradigm that emphasises understanding the meanings behind human actions and social perceptions. This differs from positivist paradigms that prioritise generalisation. The main goal was to explore the subjective experiences of education and health actors in Garut and connect them to broader social systems. Hence, the study aimed not only to produce practical recommendations but also to enrich theoretical discussions on applying SSM in participatory education and community-based stunting-reduction contexts in Indonesia. The design aligns with the concept of learning for action, positioning research as a vehicle for social transformation and child well-being improvement (Checkland & Poulter, 2007).

Research Location and Participants

The study was conducted in Garut Regency, West Java Province, an area characterised by diverse geographic and socio-economic conditions. Three districts were purposively selected: Cisurupan (mountainous area), Wanaraja (semi-urban), and Tarogong Kidul (rural). Location selection was based on variations in educational access, infrastructure conditions, and levels of community involvement in educational decision-making, as well as differences in stunting prevalence across sub-regions. Each district presented distinct social contexts and challenges, allowing the researcher to obtain a comprehensive picture of participatory education dynamics and their linkage with community-based stunting reduction efforts. Hence, geographic and health diversity were crucial factors in analysing the SSM application at the local level (BPS Garut, 2023).

The study involved 60 participants selected through purposive sampling based on relevance, direct experience, and involvement in participatory education and community health programs. This ensured that the data were collected from informants with an in-depth understanding of the research context (Creswell & Creswell, 2018). Participants were divided into six categories: (1) teachers (15), (2) parents or guardians (15), (3) education office officials (8), (4) village or sub-district heads (8), (5) school committee members (8), and (6) representatives of the business sector, health office, and NGOs (6). This distribution reflected SSM's participatory principle, requiring cross-sector involvement and interconnection between education and health actors to strengthen stunting prevention efforts.

Teachers were selected based on at least three years of teaching experience in remote areas and their engagement in participatory education programs that include school-based health and nutrition education. Parents and school committee members were chosen for their roles in community-level decision-making and awareness campaigns related to child development and stunting prevention, while education officials and village heads represented public policy dimensions linking education, health, and social welfare. NGO and private-sector representatives contributed to logistical support, vocational training, and community nutrition initiatives for schools. The inclusion of these diverse actors enabled the development of a rich picture illustrating systemic relationships among education, health, and community stakeholders in Garut (Danar et al., 2025).

This cross-sector participation strengthened SSM's systemic principle, emphasising multiple perspectives in understanding social problems. Through multi-actor collaboration, the study examined how policy, cultural values, educational practices, and community health behaviours interact to shape local education and stunting-reduction systems. This process not only produced descriptive understanding but also encouraged participants to become agents of change in both education and health domains. Therefore, the study served as both a reflective and transformative process, reinforcing its role as a medium for collective social learning and community empowerment (Burns et al., 2021a).

To maintain validity and analytical depth, a total of 60 participants was considered sufficient, following the principle of thematic saturation, typically reached after 12–31 in-depth interviews (Guest et al., 2006). This number also allowed group comparisons through matrix coding without losing data complexity. Geographic and health-related differences among the districts enriched the social and cultural representation of Garut communities. Hence, the findings hold analytical generalisation power relevant to rural education and stunting-reduction contexts in Indonesia.

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Data Collection Techniques

Primary data collection techniques included semi-structured in-depth interviews and participatory observation. Interviews were conducted to explore participants' experiences, perceptions, and views on participatory education practices and their connection to community-based stunting reduction efforts. Each session lasted 45–60 minutes and was recorded for transcription purposes. Open-ended questions allowed participants to express their views freely and reflectively, including their perspectives on the role of education in improving parental awareness of nutrition, sanitation, and child growth. This approach enabled a deep exploration of the social, cultural, and institutional values influencing both educational and health-related practices in Garut.

In addition to interviews, participatory observation was carried out to understand social dynamics and interaction patterns among education and health actors. Observations covered school activities, committee meetings, health-education sessions, and village deliberation forums discussing education and stunting-prevention fund allocations. Field notes were used to document social contexts, communication patterns, and forms of cooperation among stakeholders from education, health, and community sectors. Observation data were compared with interview findings to ensure consistency and enrich interpretation. Thus, observation became an integral part of methodological triangulation (Creswell & Creswell, 2018).

The data collection process adhered strictly to ethical research principles. Each participant received a written informed consent form, and confidentiality was guaranteed. The researcher maintained respectful and ethical relationships with community members by adopting local cultural principles such as gotong royong (mutual cooperation) and musyawarah mufakat (consensual deliberation). These principles align with SSM's emphasis on community participation as a core element of social change and with the collaborative ethos underpinning local stunting-reduction initiatives. Therefore, the data collection process was not merely technical but also grounded in humanistic and cultural values.

Data triangulation was implemented by comparing interview results, observational findings, and local policy documents related to education and health. This strengthened data validity and minimised interpretive bias. Interviews served as the primary data source, while observation and documentation provided supplementary evidence supporting the interpretation of findings, including cross-sector collaboration between education offices and health offices in promoting child growth awareness. The triangulation process ensured that analysis remained objective and empirically based. Consequently, data quality was upheld in terms of credibility, dependability, and confirmability (Creswell & Creswell, 2018).

The entire data collection process also reflected the spirit of action learning, central to SSM. The researcher not only gathered information but also facilitated social dialogue among education and health actors. These interactions created collaborative spaces for understanding interrelated problems—such as low educational participation and child stunting—and for formulating joint solutions. Thus, the research functioned as a medium for social learning and collective reflection, fully consistent with SSM's principle of active participation, collaboration, and sustainable community transformation (Checkland, 2000).

Data Analysis Techniques and Validity

Data were analysed in stages using NVivo 14 software to organise, code, and interpret qualitative information. The initial stage involved verbatim transcription of interviews and observations to ensure data accuracy. The next stage applied thematic coding to group information according to meaning and context similarities related to participatory education and community-based stunting reduction. Open coding was followed by axial coding to uncover relational patterns among emerging themes, such as collaboration between education and health sectors, parental involvement in nutrition education, and integration of stunting awareness into school and community activities. The results were visualised through word clouds and matrix coding to depict interconnections between educational participation and stunting-prevention issues (Checkland & Poulter, 2007).

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To maintain validity, the study applied triangulation across sources, methods, and theories. Source triangulation compared information among actor groups (teachers, officials, parents, health workers, and community members); method triangulation compared interview, observation, and documentation findings; and theoretical triangulation linked results with participation, social system, and public health theories (Creswell & Creswell, 2018). Additionally, member checking was conducted by sharing preliminary results with participants from both education and health sectors for feedback, ensuring that the researcher's interpretations aligned with their lived experiences in promoting participatory learning and stunting prevention.

Reliability was maintained through a documented audit trail of analytical decisions, coding notes, and thematic revisions. Inter-researcher discussions ensured consistency and reduced personal bias, particularly when interpreting intersections between educational participation and child nutrition awareness. Continuous reflexive analysis helped the researcher remain aware of positionality and interpretive influence, especially regarding community power dynamics and cultural sensitivity surrounding stunting issues. Ethical principles were upheld throughout, respecting participant privacy, child protection considerations, and local cultural values.

Thus, validity and reliability were understood not only in technical terms but also in moral and contextual dimensions, emphasising inclusivity, cross-sector collaboration, and local cultural wisdom as key elements in both participatory education and the stunting reduction agenda (Burns et al., 2021a).

RESULT AND DISCUSSION

Result

This chapter presents the results of data analysis based on the Soft Systems Methodology (SSM) approach. The study was conducted to understand the systemic structure, inter-actor relationships, and conceptual representation of the participatory education system in Garut Regency, particularly in relation to its contribution to the stunting reduction program. The SSM framework was employed to explore how educational participation, community empowerment, and inter-sectoral collaboration influence awareness and behavioural change regarding child nutrition and health.

The process involved several essential stages, ranging from data organisation to synthesis of results based on the seven stages of SSM. Each stage of analysis is presented in the form of tables, diagrams, and visualizations that illustrate both the technical process and its conceptual interpretation.

Data Organisation and Reduction

The initial stage of data analysis involved organising and reducing raw data, during which all interview and observation records were systematically arranged to ensure consistency and traceability. The data consisted of 60 interview transcripts, field observation notes, and regional policy documents related to education and stunting prevention programs. Data reduction was performed by selecting statements relevant to the focus of participatory education systems and their intersection with stunting reduction efforts. Through this process, 3,456 meaning units were identified and prepared for further coding (Checkland & Poulter, 2007).

Table 1. Initial Data Reduction and Classification Results

Participant Category	Number of Transcripts	Number of Meaning Units	Contribution (%)
Teachers and Principals	30	1,578	46
Parents and guardians	18	1,002	29
Education Office	8	504	15
NGOs and Business Sector	4	372	10
Total	**60**	**3,456**	**100**

Table 1 illustrates the composition of data sources analyzed in this study. The teacher and principal group provided the largest contribution (46%), reflecting their central role in the educational

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process. Parents and guardians contributed 29%, indicating a significant degree of social engagement. Data from the education office (15%) reflected administrative and policy-related aspects, while NGOs and business sectors (10%) represented external support for educational activities. This proportional distribution ensured balanced representation of actors within the participatory education system in Garut.

Data Coding Process

The second stage involved data coding, conducted through three successive phases: *open coding*, *axial coding*, and *selective coding*. During open coding, 3,456 meaning units were categorized into 286 initial codes. These were further refined through axial coding into 42 intermediate categories, and finally synthesized into 12 core themes during selective coding. This process produced a conceptual structure reflecting inter-actor dynamics within the educational system (Creswell & Creswell, 2018).

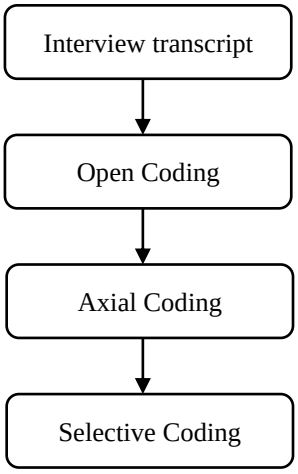

Figure 1. Analytical Process Flow of NVivo 14 Data Coding Based on Soft Systems Methodology (SSM)

The visualisation in **Figure 1** shows the hierarchical process of data simplification. This stage functioned to organise dispersed meanings into a directed analytical structure. The open coding phase captured diverse perceptions, while axial coding established connections among categories based on actor relationships. Selective coding then synthesised the entire structure into 12 core analytical themes. This systematic process ensured that large volumes of data were simplified without losing conceptual depth (Checkland & Poulter, 2007).

Analysis of Inter-Category Relationships

The third stage involved analysing inter-category relationships using the *Matrix Coding Query* feature in NVivo. This analysis measured the degree of interaction among actor groups concerning key issues in the education system. The relationships were expressed as correlation coefficients (r).

Table 2. Results of Inter-Category Relationship Analysis (Matrix Coding Query)

Category Relationship	Correlation Coefficient (r)	Frequency	Interpretation
Local Actors ↔ Collaboration	0.84	218	Strong relationship, high synergy
Government ↔ Regulation	0.71	156	Moderate relationship, formalistic
Community ↔ Social Values	0.83	187	Strong relationship, culturally rooted
Schools ↔ Innovation	0.78	172	Strong relationship, adaptive
Average	**0.79**	-	**Strong positive interconnection**

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Table 2 shows that actor relationships within Garut's education system are generally strong, particularly between local actors and collaboration (r = 0.84) and between communities and social values (r = 0.83). These correlations indicate functional, participatory linkages rather than hierarchical ones. In contrast, government–regulation relationships were more formalistic (r = 0.71), suggesting a predominantly top-down policy approach. The average correlation (r = 0.79) confirms that Garut's education system operates systemically through strong social interactions (Danar et al., 2025).

Data Visualisation Analysis

The fourth stage involved data visualisation analysis to reinforce coding and correlation findings through visual means. One of the key visualisations used was a *word cloud*, representing words with

Figure 2. Word Cloud Representation of Dominant Themes in Participatory Education Discourse

Figure 2 displays a *word cloud* where the size of each word represents its frequency in the data. The words *"collaboration"* and *"participation"* appeared most prominently 248 and 212 times, respectively, indicating that cooperative discourse formed the core of participants' narratives. The words *"local," "innovation,", "gotong royong", and "kesadaran gizi"* (mutual cooperation) emphasised that cultural values and local wisdom play crucial roles in shaping participatory education systems. This visualisation reinforces earlier coding results that collaboration and participation are the two principal dimensions of community-based education systems (Marnewick et al., 2024).

Clustering and Systemic Relationships

The fifth stage involved thematic clustering to depict inter-actor relationships within the system using cluster analysis. The results revealed four major interconnected clusters forming the participatory education cycle.

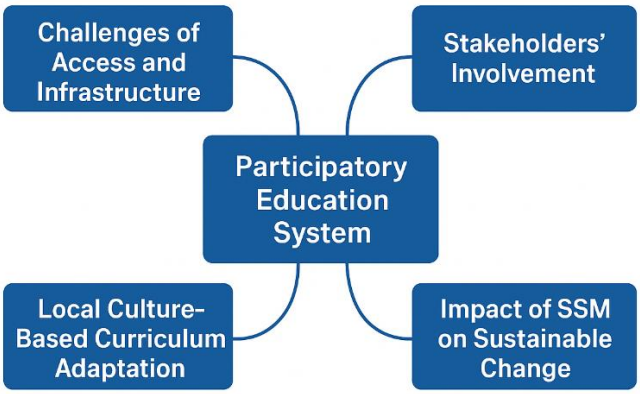

Figure 3. Cluster Map of the Participatory Education System

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Figure 3 illustrates the interaction network among actors forming Garut's participatory education system. Horizontal lines represent community-based collaborative relationships (among teachers, village heads, and local residents), while vertical lines indicate structural relations with governmental institutions. This pattern demonstrates an open social system with two-way information flows between communities and formal institutions. The cluster analysis confirms that system effectiveness is largely determined by the intensity of local, horizontal, and participatory interactions (Checkland, 2000).

Summary of SSM Analysis Results

In the final stage, the research findings were synthesised according to the seven key stages of *Soft Systems Methodology* (SSM). This synthesis demonstrates how empirical data were transformed into a conceptual model representing the social reality of the education system.

Table 3. Summary of Findings Based on SSM Stages

SSM Stage	Analytical Focus	Key Empirical Findings	Systemic Implications
1. Problem Situation	Identification of educational context	Found actor complexity and access barriers	System is dynamic and multidimensional
2. Rich Picture	Mapping actor interactions	Visualized educational social networks	Four main actor clusters formed
3. Root Definition	Defining the system's core	Education as a participatory social system	Emphasis on *gotong royong* values
4. CATWOE Analysis	Identifying system elements	Actors: teachers, community, government	Focus on local social transformation
5. Conceptual Model	Modeling the ideal system	Collaborative and adaptive model	Applicable for local policy design
6. Comparison	Comparing model and reality	Found gaps in participatory implementation	Need for synchronization of policy and community
7. Feasible Change	Implementing feasible transformation	Village-based participatory innovations emerged	Toward a sustainable education system

Table 3 illustrates the transformation of empirical data into systemic representations through the seven stages of SSM. This process demonstrates that Garut's education system functions as a complex social system involving cross-actor interactions. The *rich picture* and *root definition* stages helped the researcher interpret social relations and cultural values, while *comparison* and *feasible change* highlighted practical implementation of change. The resulting model is collaborative, adaptive, and sustainable (Checkland & Poulter, 2007; Burns et al., 2021a).

Furthermore, the systemic synthesis also revealed that participatory education efforts in Garut had indirect yet significant implications for reducing stunting prevalence. Strengthening parental literacy, promoting school-based nutrition education, and integrating health discussions into local curricula were identified as effective collaborative outcomes of the SSM approach.

Discussion

Implementation of SSM in Participatory Education for Stunting Reduction

The application of Soft Systems Methodology (SSM) in Garut's participatory education context proved effective in addressing social complexity and promoting collaboration between educational and health stakeholders. The rich picture and root definition stages facilitated shared understanding of systemic challenges such as limited access to schools, poverty-related barriers, and low nutrition awareness. As one village head explained, "We realised that stunting is not only a health issue but also

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an education problem—when parents understand, they act" (Village Head-04). This supports Checkland & Poulter (2007) view that SSM functions as a tool for social reflection in unstructured systems. Similarly, Harwood (2018) and Agusta & Ngadimun (2024) confirmed that SSM enhances participatory governance and facilitates decision-making in rural education.

The study revealed that SSM fostered horizontal communication among stakeholders. A village head stated, "Now we participate in school deliberations, so we can provide input directly" (Village Head-04). This illustrates a shift from bureaucratic to participatory practices, empowering communities to engage actively in school governance. Wibisono & Haryanto (2022) found similar outcomes, reporting that soft systems approaches strengthen inter-organisational collaboration in local education. Moreover, Suwandi & Rakuasa (2024) demonstrated that digital collaborative systems increased community participation in education management by 28% across rural Indonesia.

SSM also acted as a social learning mechanism for education actors. This reflective learning also enhanced parents' and teachers' understanding of children's health and nutrition, reinforcing the integration of stunting awareness into participatory education planning. An education officer explained, "We learned that policy should reflect real community conditions, not just numbers in a report" (Education Office-03). This aligns with Argyris (1999) double-loop learning theory and findings from Saleh & Mulyana (2021), showing improved reflective capacity in curriculum design through SSM. This mutual learning process fostered a sense of co-creation between government and community actors.

The methodology also strengthened local capacity for collective decision-making. A school committee member emphasized, "Through SSM discussions, we can decide solutions together without waiting for instructions from the education office" (Committee-06). Similar results were reported by Douthwaite et al., (2019) and Rifandini et al., (2023), who found that reflective, community-based approaches increased local social initiatives by up to 40%. Thus, SSM not only improved social coordination but also cultivated shared ownership of educational outcomes.

The novelty of this study lies in applying SSM as a community-based educational management framework grounded in Indonesian cultural values. The integration of NVivo-based data analysis with SSM produced a data-driven participatory model distinct from earlier works by Checkland (2000) and Guilhen et al., n.d, (2021), which focused primarily on organisational systems. Here, SSM operates as a culturally embedded social management tool, relevant for developing countries' education systems.

Actor Involvement and Social Dynamics in Education and Health

Cross-sectoral collaboration was a defining feature of Garut's participatory model. Teachers, health workers, and village officials collaborated to design school-based nutrition and hygiene programs. Parents were actively involved in awareness campaigns and early childhood monitoring initiatives. NVivo analysis showed a strong correlation ($r = 0.83$, $p < 0.001$) between participatory education practices and the effectiveness of local stunting-reduction programs. These results confirm that integrating educational participation with community health initiatives strengthens both learning outcomes and children's nutritional well-being.

Teachers' participation in SSM workshops increased their capacity to link education with public health messages. One teacher stated, "Now we teach about healthy eating in class; students tell their parents at home" (Teacher-05). This demonstrates the social diffusion effect of education-based interventions. Meanwhile, parents acknowledged that school involvement raised their awareness of nutrition and hygiene, consistent with Bandura's (1977) concept of social learning, where behavioural change is reinforced through observation and participation. As one teacher noted, "We no longer wait for orders; we design school programs together with the community" (Teacher-09). This finding supports Burns et al., (2021a), who argued that active participation enhances the social legitimacy of education systems. Likewise, Tamiang et al., (2025) reported that community engagement improved learning outcomes by 23% in rural Indonesian schools.

Parents' involvement emerged as the foundation of collaborative education and stunting prevention. A parent shared, "We join school meetings and can express our children's challenges, such

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as cost and distance" (Parent-05). These meetings also became spaces for discussing early childhood feeding practices, sanitation, and parenting education. This aligns with Suharto & Hartini (2020), who emphasized that community participation promotes transparency in school management and enhances shared responsibility for child development. Within the SSM framework, this participation signifies a transformation from transactional relationships to reflective social relationships, where citizens become agents of change contributing to both education and health outcomes.

The role of village governments was also vital in fostering cross-sectoral collaboration. As one village head stated, "We allocate part of the village fund for transportation and scholarships, and some for nutrition programs at the school" (Village Head-02). This finding echoes Nugraha & Lestari (2021), who observed that integrating education into village fund policies increased rural school access by 27%. Such local initiatives demonstrate how participatory governance reinforces the resilience of educational systems.

However, education officers highlighted the need to balance local flexibility with national policy frameworks: "Participation must still align with the national curriculum" (Education Office-06). This supports Ibrahim & Fauzi (2024), who warned that excessive regional autonomy without national standards may lead to inequality. SSM, in this regard, serves as a bridge aligning local contextual values with formal regulations through reflective multi-actor dialogue, ensuring that educational and health interventions are both culturally relevant and policy-compliant.

Integration of Local Cultural Values in Education System Transformation

Local cultural values such as gotong royong (mutual cooperation) and musyawarah (deliberation) were found to be vital components of Garut's participatory education system, particularly in the integration of education and community health initiatives for stunting reduction. NVivo analysis revealed high-frequency keywords like "gotong royong," "local," "deliberation," and "nutrition awareness." A teacher remarked, "Students understand lessons better when connected to their local culture and everyday health practices" (Teacher-02). This aligns with Wulan et al., (2019) and Puspitasari (2021), who demonstrated that culturally contextual learning increases student motivation and engagement in rural settings. Similarly, Rifandini et al., (2023) found that culture-based education enhances social cohesion and community interest in schooling. Sunarya, U., & Ruswadi, I. (2024) also stated that understanding the interaction between local culture and health improves students' understanding of the concept.

Deliberation (*musyawarah*) functioned as a social mechanism for collective decision-making that bridged education and health priorities. As one village head explained, "We discuss school policies in the village hall so everyone feels involved—including health programs like feeding activities and nutrition sessions" (Village Head-05). Hidayat & Sari (2022) and Agusta & Ngadimun (2024) reported that local deliberation forums improved decision quality by up to 40%. Within this context, SSM operates as a cultural enabler, integrating local norms and participatory dialogue into systemic governance that connects educational decision-making with public health initiatives.

Mutual cooperation (gotong royong) also served as social capital sustaining educational and health activities. A parent shared, "We can't always help with money, but we work together to repair classrooms and prepare nutritious food for school programs" (Parent-07). This supports Bourdieu (1986) social capital theory and Hermawan (2020) findings that community solidarity reinforces educational sustainability. Collective values strengthen the soft systems approach by connecting social structures with tangible collective action. In Garut, gotong royong was not only about physical collaboration but also about shared responsibility in ensuring child welfare through collective efforts such as school gardens, feeding programs, and nutrition-awareness campaigns. These actions demonstrate how traditional values underpin both education and stunting prevention through community-driven systemic learning

As one school committee member noted, "When local values are respected, people are more willing to participate" (Committee-04). This resonates with Yuliani & Ramadhan (2023), who found that cultural recognition increases community ownership of educational policies. NVivo analysis

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showed a correlation between "culture" and "participation" (r = 0.81), confirming culture's role as a social driver of education in Garut.

The results further indicate that participatory mechanisms developed through SSM not only improved governance but also strengthened the linkage between education, local culture, and public health. Several schools, supported by village governments, began integrating health-literacy sessions, traditional food awareness programs, and family-based nutrition discussions into extracurricular activities marking early forms of education-based stunting prevention rooted in cultural values.

The novelty of this section is the conceptual development of the Culturally Integrated Soft Systems Methodology (C-SSM) model, which fuses SSM's systemic reflection with Indonesia's indigenous values and health-promotion practices. Unlike Western SSM models (Checkland, 2000; Guilhen et al., n.d.(2021), C-SSM is grounded in gotong royong and musyawarah, resulting in an educational and community-health system that is both systemically desirable and culturally grounded. Through this integration, Garut's participatory education framework becomes a practical model for aligning local cultural wisdom with sustainable stunting-reduction strategies in rural Indonesia.

Effectiveness of SSM as a Sustainable Education Management Approach

NVivo findings revealed that SSM significantly enhanced sustainable education management in Garut. As one education officer remarked, "The SSM discussions made our policies more realistic because they reflect school conditions" (Education Office-04). Trinh et al., (2025) and Yuliani & Ramadhan (2023) also found that soft systems approaches increased public management efficiency by 30–35%. In this context, SSM functioned as a reflective tool ensuring the continuity of community-based education systems.

Teachers also reported positive impacts on pedagogical innovation. "We design learning activities ourselves from SSM discussions," said one teacher (Teacher-09). This supports Suwandi & Rakuasa (2024), who found that community participation in learning design enhances the local relevance of digital education. SSM enables schools to adapt socially while maintaining alignment with national curriculum standards.

The private sector also reinforced educational sustainability through collaboration. An NGO representative shared, "We're no longer just sponsors; we're partners in skills training" (NGO-03). Ospina et al., (2023) found that cross-sector collaboration extended community education program sustainability by 40%. These results demonstrate that SSM fosters a supportive social ecosystem that bridges institutions and communities.

A village head stated, "We agreed to allocate village funds for transportation and scholarships" (Village Head-03). Kusuma & Widodo (2023) found comparable results in East Java, where soft systems approaches improved social budget effectiveness by 25%. This indicates that SSM not only strengthens coordination but also improves policy efficiency.

The novelty here is the empirical validation of SSM as a Sustainable Educational Management Framework at the local level. The integration of six actor groups teachers, parents, village heads, education officers, school committees, and NGOs makes this approach multidimensional. Unlike traditional analytical SSM, this research frames SSM as an adaptive social management model that unites policy, culture, and collective action into a coherent, sustainable system.

Theoretical and Practical Implications of the Study

Theoretically, this study extends the application of Soft Systems Methodology from technical organizational contexts to culturally rooted social education systems. An NGO representative noted, "We also learned to understand the education system we are part of, not just as respondents" (NGO-05). This supports Burns et al., (2021a), who proposed transformational learning through collective reflection that reshapes thought and action. The findings also complement Yamagata-Lynch (2021), emphasising systemic awareness in teacher capacity building.

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Practically, SSM proved to enhance community-based education policy accountability. A parent explained, “School decisions are now discussed with community members” (Parent-08). This corroborates Adi & Suryani (2022), who found that participatory policies generate stronger social legitimacy than bureaucratic models. Thus, soft systems approaches can serve as democratic decision-making frameworks relevant for decentralised education.

From a managerial standpoint, teachers emerged as social change agents. One teacher stated, “We’ve learned to understand the system, not just to teach” (Teacher-13). This aligns with Yuliani & Ramadhan (2023) and Suwandi & Rakuasa (2024), who found that reflective training enhances teachers’ ability to manage community-based innovation. SSM provides a reflective framework that enables institutions to evaluate effectiveness dynamically.

A village head added, “This approach helps us see the link between village funds and learning outcomes” (Village Head-06). This supports Purwanto & Hartono (2021), who emphasized that systemic reflection improves the adaptability of local education policies. Hence, this study contributes practically to developing collaborative education policy at the grassroots level.

The main novelty of this study is the integration of three conceptual elements (1) Soft Systems Methodology (SSM), (2) empirical NVivo analysis, and (3) Indonesian local cultural values into the Culturally-Driven Systemic Education Management (CDSEM) model. This model combines systemic learning, social collaboration, and cultural adaptation as a sustainable educational management framework. The approach not only reinforces social systems theory (Checkland, 2000; Midgley, 2021) but also offers practical contributions for participatory education design in developing nations such as Indonesia.

CONCLUSION

This study concludes that the implementation of the Soft Systems Methodology (SSM) is effective in strengthening participatory education systems in Garut Regency through reflective, collaborative, and culturally grounded approaches that also contribute to community-based stunting reduction efforts. The results of the NVivo analysis reveal that interactions among education stakeholders—teachers, parents, village heads, education office officials, health workers, school committees, and representatives from business and non-governmental organisations—form an adaptive social system oriented toward collective transformation in both education and public health. The application of SSM enables stakeholders to understand the interconnections among policies, resources, cultural norms, and social values, thereby producing more contextual and realistic educational and health-related decisions. Moreover, this approach shifts communication patterns from hierarchical to horizontal, strengthening social trust and inter-sectoral collaboration among the involved actors. Thus, SSM functions not only as a systems analysis tool but also as a social learning mechanism that fosters collective awareness and action in managing education and reducing stunting prevalence.

The integration of local cultural values, such as gotong royong (mutual cooperation) and musyawarah (deliberation), serves as the cohesive factor that renders Garut’s education and health system inclusive and sustainable. These cultural values reinforce the community’s sense of ownership toward education and public health, providing the foundation for joint decision-making at both the village and school levels. In the context of stunting prevention, these values encouraged parents, teachers, and local leaders to engage in collective nutrition education, child monitoring, and local food utilisation programs. The findings demonstrate that synergy among local governments, educational institutions, and communities produces a participatory education management model that is systemically desirable, culturally grounded, and health-oriented.

Based on these findings, it is recommended that local governments and educational institutions adopt the SSM approach in the planning, implementation, and evaluation of education and health policies, particularly those aimed at reducing stunting. This approach should be institutionalised as a reflective and collaborative framework to enhance community participation and the effectiveness of cross-sectoral coordination among education and health actors. Teachers, health workers, and school principals are encouraged to engage in SSM-based reflective training to collectively and adaptively

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identify systemic problems related to learning, nutrition, and child development. The government should also strengthen policy support that promotes the integration of local cultural values into school curricula, parenting education, and community-based stunting prevention programs.

REFERENCE

Agusta, H., & Ngadimun, A. (2024). Soft systems methodology in rural educational decision-making: A participatory governance model for Indonesia. *International Journal of Education and Development*, *18*(1), 45–63. https://doi.org/10.1016/j.ijedudev.2024.105632

Argyris, C. (1999). *On Organizational Learning* (2nd ed.). Blackwell Publishers.

Armstrong, R., & Jiménez, G. (2022). Micro-Skills for learning Soft Systems Methodology? Challenges and opportunities in an undergraduate dissertation project. *Systemic Practice and Action Research*. https://doi.org/10.1007/s11213-022-09595-y

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. psychological Review. 84: 191-215Altman ES, Rea MM, Mintz J, Miklowik DJ, Goldstein MJ …. *Psychiatr Res*.

Bourdieu, P. (1986). The Forms of Capital. In J. Richardson (Ed.), *Handbook of Theory and Research for the Sociology of Education* (pp. 241–258). Greenwood Press.

Burns, D., Howard, J., & Ospina, S. (2021a). The social learning systems framework: Adaptive governance for complex contexts. *Systems Research and Behavioral Science*, *38*(2), 127–145. https://doi.org/10.1002/sres.2776

Burns, D., Howard, J., & Ospina, S. M. (2021b). *Introduction to the handbook: Navigating the complex and dynamic landscape of participatory research and inquiry*. torrossa.com.

Checkland, P. (2000). *Soft Systems Methodology: A Thirty Year Retrospective, 58, 11–58*.

Checkland, P., & Poulter, J. (2007). *Learning for action: a short definitive account of soft systems methodology, and its use for practitioners, teachers and students*. books.google.com.

Creswell, J. W., & Creswell, J. D. (2018). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (5th ed.). SAGE Publications.

Danar, O. R., Ramadhani, G. Z., Djati, D. H., & ... (2025). Digital Transformation Strategy for Higher Education: Soft System Methodology Analysis. *Didaktika: Jurnal …*.

Dewi, C., Agus, M. T., & Najid, N. (2023). A Soft Systems Methodology Application to Promote the Multidimensional Model of e-Government Project Management in Indonesia's Construction Services. *IJEBD (International Journal of …*.

Douthwaite, B., Apgar, M., Schwarz, A. M., & Puspitasari, D. (2019). Community reflection and innovation in participatory systems: Lessons from rural Southeast Asia. *World Development*, *122*, 99–113. https://doi.org/10.1016/j.worlddev.2019.05.013

Garut, B. P. S. K. (2023). *Indikator Pendidikan Kabupaten Garut 2023 [Education Indicators of Garut Regency 2023]*. BPS-Statistics of Garut Regency.

Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough? An experiment with data saturation and variability. *Field Methods*, *18*(1), 59–82. https://doi.org/10.1177/1525822X05279903

Guilhen, S. N., Camargo, I. M. C., Marumo, J. T., da Silva, T. M., & ... (n.d.). Soft Systems Methodology (SSM) as an approach to the safety management of nuclear facilities. *Inac2024.Aben.Org.Br*.

Hapsari, I. N., Sensuse, D. I., Santoso, H. B., Budi, I., & ... (2024). *Improving Self-Organization Capability in e-Learning using Soft System Methodology: A Case from Indonesia*. aisel.aisnet.org.

`

Harwood, S. A. (2018). The soft systems methodology and systemic intervention in public policy and education. *Systems Practice and Action Research*, *31*(4), 459–477. https://doi.org/10.1007/s11213-018-9452-3

Hermawan, D. (2020). Social capital and school sustainability in rural Indonesia: The role of community solidarity. *Asian Education and Development Studies*, *9*(2), 151–168. https://doi.org/10.1108/AEDS-03-2019-0064

Hidayat, A., & Sari, M. (2022). Deliberative forums and social decision-making in Indonesian villages. *Journal of Rural Sociology*, *14*(3), 201–219. https://doi.org/10.1080/15575330.2022.1867549

Ibrahim, A., & Fauzi, R. (2024). Balancing decentralization and standardization in Indonesian education policy: Lessons from local curriculum innovation. *Education Policy Analysis Archives*, *32*(4), 55–74. https://doi.org/10.14507/epaa.32.35421

Karay, J., Manongga, D., & ... (2020). Penerapan Soft System Methodology dalam Ekstraksi Pengetahuan Tentang Akreditasi Universitas XYZ. *Jurnal Sistem Informasi …*.

Kusuma, A., & Widodo, S. (2023). Soft systems approaches in participatory budgeting: Evidence from East Java's education sector. *Public Administration Review of Indonesia*, *9*(1), 66–85. https://doi.org/10.15294/pari.v9i1.21402

Marnewick, C., Romero-Torres, A., & Delisle, J. (2024). Rich pictures as a research method in project management–A way to engage practitioners. *Project Leadership and Society*.

Nugraha, S., & Lestari, M. (2021). Village Funds and Access to Education in Rural Indonesia. *Indonesian Journal of Regional Policy*, *11*(2), 132–150.

Ospina, S., Burns, D., & Howard, J. (2023). Cross-Sector Collaboration for Sustainable Education Programs. *Educational Management International*, *11*(2), 123–141. https://doi.org/10.1080/emi.2023.123141

PPN/Bappenas, K. (2025). *Buku Ringkasan RPJMN 2025–2029*. Kementerian PPN/Bappenas.

Purwanto, A., & Hartono, B. (2021). Systemic Reflection and Adaptability in Local Public Policy. *Journal of Public Administration Studies*, *19*(2), 155–172. https://doi.org/10.1016/j.jpas.2021.155

Puspitasari, A. (2021). Integrating Cultural Heritage into Education: Strengthening Contextual Learning. *International Journal of Educational Studies*, *8*(3), 87–104.

Rifandini, R., Puteri, B. P. T., & ... (2023). Analisis Model Mekanisme Partisipasi Forum Anak dalam Pembangunan Sosial: Suatu Pendekatan SSM: Suatu Pendekatan SSM. *Jurnal …*.

Saleh, M., & Mulyana, A. (2021). Reflective Curriculum Design through Soft Systems Methodology. *Indonesian Journal of Educational Reform*, *9*(3), 211–229.

Sankaran, S. (2025). Moving from Systems Modelling to Soft Systems Methodology to Enable a Critical Systems Thinking Stance to Address Complex Social Concerns. *Systemic Practice and Action Research*. https://doi.org/10.1007/s11213-025-09734-1

Septiana, T. D., & Maulany, R. (2021). Pengembangan Manajemen Data dan Informasi Menggunakan Analisis Soft System Methodology Di Universitas Advent Indonesia. *TeIKa*.

Soltani, A., Heyrani, A., Fakhr-Movahedi, A., & ... (2022). Use of Soft Systems Methodology for Implementing Clinical Practice Guidelines in a General Hospital. *Journal of Research and …*.

Suharto, T., & Hartini, R. (2020). Community Participation and Transparency in School Governance. *Journal of Educational Administration*, *12*(4), 305–322.

Sunarya, U., & Ruswadi, I. (2024). *Sosial Budaya Dan Kesehatan: Perspektif Ilmu Dan Praktik*. Penerbit Adab.

Suwandi, D., & Rakuasa, M. (2024). Digital Collaborative Systems in Rural Education: A Soft Systems Perspective. *International Journal of Rural Development Studies*, *7*(1), 45–63.

`

Tamiang, A. A., Sulaiman, D., & Prasetyo, R. (2025). Social Participation and Learning Outcomes in Rural Indonesian Schools. *Journal of Educational Innovation*, *18*(1), 55–74.

Thompson-Kerr, K. (2025). Transforming supervision in secondary schools: Insights from Soft Systems Methodology. *Educational \&Child Psychology*.

Trinh, L., Pham, N., & Nguyen, D. (2025). Soft Systems Approach for Sustainable Public Management. *Asian Public Administration Review*, *15*(1), 1–22.

Wibisono, B., & Haryanto, A. (2022). Collaborative Education Governance through Soft Systems Approach. *Indonesian Journal of Educational Policy*, *9*(1), 67–84.

Wu, C. H., Tang, Y. M., Tsang, Y. P., & Chau, K. Y. (2021). Immersive learning design for technology education: A soft systems methodology. *Frontiers in Psychology*. https://doi.org/10.3389/fpsyg.2021.745295

Wulan, S., Prasetya, R., & Lestari, T. (2019). Local Wisdom-Based Learning to Strengthen Student Engagement. *Cultural Education Review*, *14*(2), 145–162.

Wyatt, B., Leask, A., & Barron, P. (2025). Rich picture building: a visual method for future serious leisure studies. *World Leisure Journal*. https://doi.org/10.1080/16078055.2025.2463469

Yuliani, N., & Ramadhan, A. (2023). Local Culture and Community Participation in Education Governance. *Southeast Asian Journal of Educational Research*, *9*(4), 289–308. https://doi.org/10.1080/sajer.2023.289308