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NGUYEN TRUNG KIEN

MANAGEMENT OF STEM EDUCATION ACTIVITIES FOR PRIMARY SCHOOL STUDENTS IN HUNG YEN PROVINCE UNDER A PARTICIPATORY APPROACH

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INTRODUCTION

1. Rationale for the Study

STEM education is understood as an interdisciplinary educational approach that integrates science, technology, engineering, and mathematics through learning activities connected to real-world contexts. Research shows that early exposure to STEM education helps students establish a solid foundation in science and mathematics while stimulating their interest in learning and enhancing their thinking, creativity, collaboration, and problem-solving abilities. Primary education is the stage at which learners develop their intellectual interests and foundational personal qualities and competencies. Introducing STEM education at this level is therefore both a requirement for innovation in educational practice and an initial step in the strategy for developing a highly qualified science and technology workforce, consistent with the national policy direction for breakthroughs in science, technology, innovation, and digital transformation [4].

The 2018 General Education Curriculum clearly emphasizes competency development through integrated teaching, experiential learning, and the practical application of knowledge. Within this framework, STEM education is regarded as an important direction for developing students' competencies in science, technology, engineering, and mathematics, as well as their creative thinking, problem-solving abilities, and adaptability to modern society [5]. Accordingly, the Ministry of Education and Training has issued various policies and directives to promote STEM education in the general education system, including Plan No. 526/KH-BGDĐT dated May 17, 2022, on implementing STEM education in general education [8]; Official Dispatch No. 909/BGDĐT-GDTH dated March 8, 2023, providing guidance on organizing STEM education activities at the primary level [10]; and Official Dispatch No. 3227/BGDĐT-GDĐH dated June 2, 2026, on implementing approved talent development programs in STEM fields [11]. These documents have established an important legal framework for local authorities and schools to implement STEM education. However, they primarily provide professional guidance on STEM teaching. Local authorities and individual schools remain responsible for establishing specific school-level management mechanisms, particularly those for engaging participating stakeholders and defining their responsibilities.

STEM education activities in primary schools are inherently interdisciplinary, address real-world problems, and take various forms, including STEM lessons, experiential STEM activities, learning projects, and introductory scientific inquiry. Their effectiveness depends on the contributions of multiple stakeholders and resources: teachers design and organize activities; students engage in experiential learning and creative work; and parents, enterprises, production facilities, higher education institutions, and communities provide learning materials, expertise, and experiential learning environments

[56], [97]. These interdisciplinary and multi-stakeholder characteristics make an administrative management approach confined to the school inadequate. They require an approach in which the principal provides leadership and coordination while relevant stakeholders participate in every stage, from planning and implementation to monitoring and evaluation, adjustment, and improvement.

A participatory approach addresses this requirement. When applied to the management of STEM education activities in primary schools, it is operationalized through a mechanism defining lead and coordinating roles, with each stakeholder's roles, responsibilities, and required competencies specified at every step of the organizational process. Integrated with the PDCA (Plan-Do-Check-Act) cycle [93], the participatory approach extends beyond resource mobilization to form a complete management cycle based on evidence and continuous improvement, linking each stakeholder's responsibilities to the school's STEM education objectives.

Nevertheless, the literature review indicates that studies in Vietnam and internationally have focused mainly on STEM teaching methods, the design of STEM themes, and the development of students' and teachers' STEM competencies [31], [55]. Research on managing STEM education activities under a participatory approach has explored such directions as the CIPO model [34] and STEM education ecosystems [97], but has not examined the distinctive characteristics of primary education in depth. At this level, a theoretical framework is still needed to clarify: (i) the process for organizing STEM education activities under a participatory approach; (ii) the lead and coordinating roles and competency requirements of each participating stakeholder group at every step; and (iii) how to integrate a participatory approach into the PDCA management cycle, with the principal as the central coordinating actor. This is the theoretical gap that the dissertation seeks to address.

On July 1, 2025, the new Hung Yen Province was established through the merger of Hung Yen and Thai Binh Provinces, alongside the introduction of a two-tier local government model [41]. The province's primary education system expanded substantially to include 197 primary schools, 255 combined primary and lower secondary schools, 08 combined primary, lower secondary, and upper secondary schools, and 257,682 primary school students (Hung Yen Department of Education and Training, 2025). This context creates new requirements for managing STEM education. First, implementation must be harmonized across two former provinces with different mechanisms: the former Hung Yen Province followed a progression from pilot implementation to wider adoption, relying mainly on community resource mobilization, whereas the former Thai Binh Province integrated STEM into life skills education through licensed centers. Second, the two-tier local government model places increasing demands on primary school principals' proactive planning and coordination.

Resolution No. 767/2025/NQ-HĐND of the Provincial People's Council uniformly recognizes STEM education as an educational support service provided on a voluntary and mutually agreed basis [22], establishing a favorable legal framework for resource mobilization. In the 2024-2025 school year, primary schools in the province worked with partner organizations to deliver STEM programs to 79,577 students [30]. Various STEM events and competitions were organized jointly by the Provincial Youth Union, the Department of Education and Training, and Hung Yen University of Technology and Education. These results demonstrate the existing potential for engaging community stakeholders in local STEM education. However, their involvement has largely been limited to providing learning materials and funding and organizing events, rather than becoming organized participation in the stages of the management process.

Moreover, public primary schools in the province continue to face substantial constraints in implementing STEM education, including shortages of specialist rooms, equipment, and dedicated learning materials; considerable dependence on partners' learning materials and resources contributed by parents; shortages of teachers in Informatics and Technology; and limitations in teachers' capacity for integrated, interdisciplinary teaching. Local access to experts and technology partners is also limited, as enterprises operating in high-technology STEM fields account for only 2.53% of all enterprises in the province [41]. Under these conditions, engaging and effectively coordinating available stakeholders, including families, production facilities, farms, enterprises, and higher education institutions, under a participatory approach offers a feasible direction for the sustainable development of STEM education.

In management practice, STEM education activities in the province's primary schools have not been organized through a standardized process, and the roles, responsibilities, and competency requirements of participating stakeholders have not been fully specified. Planning, implementation, monitoring and evaluation, and adjustment and improvement have yet to function as an integrated cycle. Mechanisms for stakeholder engagement and coordination remain insufficient, while evaluation criteria for STEM activities are not specific enough to support monitoring, adjustment, and improvement. To the author's knowledge, no study has systematically examined the management of STEM education activities for primary school students in Hung Yen Province under a participatory approach, particularly in the context following the provincial merger.

Based on these theoretical and practical considerations, the author selected the topic "Management of STEM Education Activities for Primary School Students in Hung Yen Province under a Participatory Approach" to establish a scientific basis and propose feasible management solutions that

contribute to improving the quality and effectiveness of STEM education activities for primary school students in Hung Yen Province.

2. Research Aim

The study aims to clarify the theoretical foundations and practical basis of managing STEM education activities for primary school students under a participatory approach. On this basis, the dissertation proposes management solutions for STEM education activities in primary schools in Hung Yen Province under a participatory approach, with a view to improving the quality of these activities and contributing to the development of students' personal qualities and competencies in response to current educational reform requirements.

3. Research Object and Subject

3.1. Research Object

STEM education activities for primary school students under a participatory approach.

3.2. Research Subject

The management of STEM education activities for primary school students in Hung Yen Province under a participatory approach.

4. Research Questions

1) What process should be followed in organizing STEM education activities for primary school students under a participatory approach, what lead or coordinating roles should each stakeholder perform, and what competencies are required? How should the PDCA cycle be applied to the management of these activities?

2) What are the strengths and limitations of current STEM education activities and their management in primary schools in Hung Yen Province under a participatory approach, and what causes them?

3) Which management solutions, appropriate to the conditions of Hung Yen Province, can improve the quality and effectiveness of STEM education activities for primary school students under a participatory approach? Are these solutions necessary, feasible, and effective?

5. Research Hypothesis

The management of STEM education activities in primary schools in Hung Yen Province under a participatory approach has achieved initial results but remains limited. There is no mechanism that clearly defines stakeholders' lead and coordinating roles; parents and community stakeholders mainly provide resources, with little involvement in planning, monitoring and evaluation, and adjustment and improvement; and school managers' competencies in managing STEM education activities under a participatory approach do not yet meet requirements. If a coherent set of management solutions is proposed and implemented through the PDCA cycle, establishes a mechanism defining stakeholders' lead and coordinating roles, develops school

managers' management competencies, and engages internal and external stakeholders in all four stages of planning, implementation, monitoring and evaluation, and adjustment and improvement in ways appropriate to local conditions, the quality and effectiveness of STEM education activities will improve, contributing to the development of primary school students' personal qualities and competencies.

6. Research Tasks

6.1. To establish the theoretical foundations for the management of STEM education activities for primary school students under a participatory approach.

6.2. To survey, analyze, and evaluate the current status of STEM education activities and their management in primary schools in Hung Yen Province under a participatory approach.

6.3. To propose management solutions for STEM education activities in primary schools in Hung Yen Province under a participatory approach, assess the necessity and feasibility of the proposed solutions, and conduct a pilot trial of 01 solution proposed in the dissertation.

7. Scope and Delimitations of the Study

7.1. Content scope: The study examines the management of STEM education activities in public primary schools in Hung Yen Province under a participatory approach, with the principal as the primary management actor, within a framework of decentralized management and the delegation of responsibilities to vice principals and subject team leaders.

7.2. Geographical scope: The dissertation investigates and conducts a survey of the management of STEM education activities under a participatory approach at 20 public primary schools in Hung Yen Province.

7.3. Survey participants: The survey was conducted with 3 groups of participants at 20 public schools within the study area, comprising:

- 150 educational managers: representatives of the Hung Yen Department of Education and Training; commune-level officials responsible for culture and social affairs in Hung Yen Province; and principals, vice principals, subject team leaders, and deputy subject team leaders at primary schools in Hung Yen Province;
- 550 teachers;
- 80 community stakeholders, representing enterprises, production facilities, farms, higher education institutions, vocational education institutions, and research institutes;
- 120 parents.

7.4. Time frame: Secondary data cover the school years from 2021-2022 to 2024-2025. Primary data for the survey of current practice were collected in 2025. The research and completion of the dissertation took place during 2022-2026.

8. Research Approaches and Methods

8.1. Research Approaches

8.1.1. Approach Based on Participatory Theory

8.1.2. Systems Approach

8.1.3. Competency-Based Approach

8.1.4. Practice-Based and Contextual Approach

8.1.5. PDCA Quality Management Approach

8.2. Research Methods

8.2.1. Theoretical Research Methods

The dissertation uses analysis and synthesis, generalization, and modeling to examine documents, books, and scholarly materials in order to establish its theoretical foundations and identify the key theoretical issues concerning STEM education activities and their management for primary school students under a participatory approach.

8.2.2. Empirical Research Methods

- Questionnaire survey;
- Review of practical experience;
- In-depth interviews;
- Expert consultation;
- Pilot trial.

8.2.3. Statistical Methods

To process and analyze data collected through the survey instruments, the dissertation uses SPSS statistical software together with appropriate statistical techniques. Specifically, descriptive statistics are used to summarize the characteristics of the data, and Cronbach's alpha is used to test the reliability of the scales.

9. Key Arguments for the Defense of the Dissertation

9.1. Managing STEM education activities for primary school students under a participatory approach is a process in which the principal applies the PDCA cycle, comprising planning, implementation, monitoring and evaluation, and adjustment and improvement, to engage and coordinate internal and external stakeholders at each step of the 07-step process for organizing STEM education activities. This process is based on clearly defined lead and coordinating roles and competency requirements for each stakeholder at every step. It is a management approach suited to the interdisciplinary and multi-stakeholder nature of STEM education at the primary level.

9.2. The management of STEM education activities in primary schools in Hung Yen Province under a participatory approach has begun to take shape but is not yet fully coordinated. The involvement of parents, enterprises, and communities is largely confined to providing resources and has not extended to planning, evaluation, and improvement. The underlying causes are the absence

of a multi-stakeholder coordination mechanism, limitations in school managers' competencies in participatory management, and inadequate enabling conditions.

9.3. The system of 05 solutions proposed in the dissertation is necessary and feasible. Within this system, the management mechanism provides the foundation; professional development for school managers enables implementation; multi-stakeholder coordination and STEM spaces provide the implementation environment; and multi-stakeholder evaluation serves as a tool for improvement. If implemented coherently, these solutions will address existing limitations and enhance the quality and sustainability of STEM education activities for students in primary schools in Hung Yen Province.

10. Original Contributions of the Dissertation

10.1. Theoretical Contributions

The dissertation develops, extends, and refines the theoretical framework for managing STEM education activities for primary school students under a participatory approach. It establishes the dissertation's core concepts, identifies participating stakeholders and the competencies they require to engage in STEM education for primary school students, develops the organizational process, and clarifies the system of management tasks undertaken by primary school principals under a participatory approach in the context of educational reform. On this basis, the study provides a scientific foundation for the current management of STEM education activities in primary schools.

10.2. Practical Contributions

Based on a survey and evaluation of the management of STEM education activities in primary schools in Hung Yen Province under a participatory approach, the dissertation identifies strengths, limitations, opportunities, challenges, and the causes of those limitations. The system of management solutions proposed for STEM education activities in primary schools in Hung Yen Province under a participatory approach offers a practical reference. These solutions can be applied in the leadership and management work of education-sector leaders, educational managers, and primary school principals, thereby contributing to more effective management of STEM education activities in the current context of educational reform.

The dissertation can serve as a reference for teacher educators in higher education institutions and for teachers and managers in general education schools, particularly primary schools, to consult and apply in school practice.

11. Structure of the Dissertation

In addition to the Introduction, Conclusions, List of Publications, References, and Appendices, the dissertation is planned to comprise three main chapters:

Chapter 1: Theoretical foundations of the management of STEM education activities for primary school students under a participatory approach.

Chapter 2: The practice of managing STEM education activities for primary school students in Hung Yen Province under a participatory approach.

Chapter 3: Management solutions for STEM education activities for primary school students in Hung Yen Province under a participatory approach.

CHAPTER 1: THEORETICAL FOUNDATIONS FOR THE MANAGEMENT OF STEM EDUCATION ACTIVITIES FOR PRIMARY SCHOOL STUDENTS UNDER A PARTICIPATORY APPROACH

1.1. Review of related research

1.1.1. Research on STEM education activities for students

According to English & King (2015), teaching methods used in STEM education activities place learners at the center of the teaching and learning process [53].

1.1.2. Research on STEM education activities for students under a participatory approach

According to Sanders (2009), STEM education activities should be implemented within the framework of a "community-based collaborative program," in which schools play a central role in connecting students, teachers, and social, economic, and technical organizations [90].

1.1.3. Research on the management of STEM education activities for students under a participatory approach

In their study "A Model for Managing STEM Education Activities in General Education Schools," Thái Văn Thành, Nguyễn Thị Nhị, and Lê Thị Bình (2022) present a model for managing STEM education based on the CIPO approach. This approach follows the content and functions of educational management in schools; in other words, managers influence the educational process by managing inputs, processes, and outputs, with attention to stakeholders and contextual influences, to ensure educational quality [34].

1.1.4. General observations on previous studies and issues for further investigation in the dissertation

1.1.4.1. General observations on previous studies

Research on STEM education activities for students in Vietnam and internationally has largely followed three main approaches: interdisciplinary integrated teaching in subjects with STEM content; STEM through the scientific research process; and STEM as an experiential education activity.

1.1.4.2. Research gap

The unresolved issue is therefore the absence of a theoretical framework for managing STEM education activities for primary school students that combines a participatory approach with the PDCA cycle. Such a framework needs to specify the components and process for organizing STEM education

activities; the lead and coordinating roles and levels of participation of each stakeholder; and the management tasks at each stage of the PDCA cycle.

1.1.4.3. Research issues addressed by the dissertation

In response to the issues that have not yet been investigated, the dissertation focuses on the following:

- Identifying the components of STEM education activities for primary school students under a participatory approach on the basis of the 2018 General Education Curriculum; developing a seven-step process for organizing these activities; and specifying the lead and coordinating roles and the competencies required of each group of participating stakeholders at each step.

- Developing a theoretical framework for managing STEM education activities for primary school students under a participatory approach using the PDCA cycle. The framework covers the management tasks at each stage of planning, implementation, monitoring and evaluation, and adjustment and improvement; the lead and coordinating roles and levels of participation of each stakeholder; and the influencing factors.

- Surveying and evaluating the current state of STEM education activities and their management for primary school students in Hung Yen Province using the theoretical framework developed, and identifying strengths, limitations, and their causes.

- Proposing solutions for managing STEM education activities for primary school students in Hung Yen Province under a participatory approach, with management operating through the PDCA cycle; appraising the necessity and feasibility of these solutions; and conducting a pilot trial of one solution.

1.2. Key concepts of the dissertation

1.2.1. STEM education activities

Drawing on an analysis and selective synthesis of the perspectives of the authors discussed above, the dissertation defines STEM education activities as the process of organizing opportunities for students to apply interdisciplinary knowledge of Science, Technology, Engineering, and Mathematics to solve practical problems through activities such as exploration, design, fabrication, and product testing, thereby developing the personal qualities and competencies specified in the objectives.

1.2.2. STEM education activities for primary school students under a participatory approach

STEM education activities for primary school students under a participatory approach can be understood as a process in which multiple stakeholders—teachers, students, parents, schools, businesses, and the wider community—collaborate to share responsibilities and resources in designing, implementing, and evaluating students' STEM learning activities. By solving simple practical problems, students develop scientific thinking and the personal

qualities and core competencies required by the objectives of primary education.

1.2.3. Management of STEM education activities for primary school students under a participatory approach

The management of STEM education activities for primary school students under a participatory approach is the process through which the school principal plans, implements, monitors and evaluates, and adjusts and improves STEM education activities. This process aims to mobilize, coordinate, and make effective use of the participation of multiple stakeholders—teachers, students, families, communities, and social organizations—in designing, implementing, and evaluating STEM education activities for students, thereby ensuring the development of students' personal qualities and competencies in accordance with the objectives of primary education.

1.3. Fundamental issues concerning STEM education activities for primary school students under a participatory approach

1.3.1. Characteristics of STEM education activities under the 2018 General Education Curriculum, participating stakeholders, and their competencies in STEM education for primary school students

1.3.1.1. Characteristics of STEM education activities for primary school students under the 2018 General Education Curriculum

- Influence of the 2018 General Education Curriculum on the specification of the components of STEM education activities

+ Objectives (degree of influence: direct specification). The expected outcomes for personal qualities, general competencies, and subject-specific competencies in Mathematics, Nature and Society, Science, Informatics, and Technology provide the outcome standards for defining the objectives of each STEM theme [5].

+ Content (degree of influence: specifies the scope while allowing flexibility).

+ Methods and organizational formats (degree of influence: provides direction).

+ Assessment (degree of influence: direct specification). Circular No. 27/2020/TT-BGDĐT requires ongoing assessment through descriptive feedback, emphasizes the learning process, and encourages students' self-assessment and peer assessment with parental participation [7]. This provides a basis for involving multiple stakeholders in the assessment of STEM education activities, while also defining the limits of their participation: assessing the extent to which expected learning outcomes have been attained remains the professional responsibility of teachers.

+ Implementation conditions (degree of influence: establishes a framework, with provision dependent on the school). Two-session school days, the introduction of Informatics and Technology as compulsory subjects from

grade 3, and schools' autonomy in developing their education plans [5], [6] establish the time framework and mechanisms for implementing STEM education. However, specialized facilities, equipment, and learning materials depend on each school's capacity to mobilize community resources.

1.3.1.2. Participating stakeholders and their competencies in STEM education activities for primary school students under a participatory approach

a) The need to implement STEM education activities in primary schools under a participatory approach

Implementing STEM education activities under a participatory approach can be said to expand educational spaces and strengthen the links between schools, families, and society, connecting knowledge with local practical contexts and students' everyday lives.

b) Levels of stakeholder participation in the management of STEM education activities

Lead level: The principal leads management by approving plans, coordinating resources, and assuming ultimate responsibility for curriculum implementation outcomes. Subject teams and teachers lead professional work by defining objectives, content, methods, and assessment aligned with expected learning outcomes. These stakeholders participate fully in all four stages: Plan–Do–Check–Act.

Co-design and co-implementation level: Students propose ideas, undertake tasks, and engage in self-assessment and peer assessment; the Young Pioneers organization and school clubs also participate. Their participation is concentrated primarily in implementation (Do) and monitoring and evaluation (Check).

Consultation and support level: Parents, businesses, production establishments, higher education institutions, and communities contribute feedback on plans (Plan); provide practical contexts, learning materials, experts, and experiential learning environments (Do); provide feedback and comments on products (Check); and suggest improvements (Act). Their participation does not replace schools' professional responsibility for ensuring the attainment of expected learning outcomes.

c) Participating stakeholders and their competencies

- Competencies of stakeholders participating in STEM education activities for primary school students:

(1) Teachers' competencies

+ Competency in understanding STEM education and interdisciplinary integrated teaching

+ Competency in designing STEM themes and lessons

+ Competency in organizing active learning formats

+ Competency in building connections and coordinating participation

+ Competency in assessing the development of students' personal qualities and competencies

(2) Primary school students' competencies

+ Competency in identifying and solving problems

+ Competency in practical work and design thinking

+ Competency in collaboration and multilateral communication

+ Competency in autonomy and critical thinking

(3) Parents' competencies

+ Competency in understanding the objectives and significance of STEM education

+ Competency in creating a supportive home learning environment

+ Competency in collaborating with teachers and the school

(4) Competencies of community stakeholders and the wider community

+ Competency in providing advice and connections to practice (for experts, artisans, and businesses)

+ Competency in contributing educational support

+ Competency in collaborating with the school to organize STEM education activities

+ Competency in participating in assessment

1.3.2. STEM education activities in primary schools under a participatory approach

1.3.2.1. Objectives of STEM education activities for primary school students under a participatory approach

+ Developing primary school students' capacity for integrated and interdisciplinary thinking.

+ Promoting students' active participation in learning.

+ Strengthening the role of parents and communities in STEM education activities.

1.3.2.2. Content, methods, and organizational formats of STEM education activities for primary school students under a participatory approach

STEM education activities in primary schools under a participatory approach are organized by aligning competency development objectives, interdisciplinary integrated content, active teaching methods, diverse organizational formats, and mechanisms for collaboration among multiple stakeholders. Under the guidance in Official Dispatch No. 909/BGDĐT-GDTH, STEM education activities are implemented in three basic formats: STEM lessons, STEM experiential activities, and introductory scientific and engineering research.

1.3.2.3. Assessment of the outcomes of STEM education activities for primary school students under a participatory approach

- Assessment tools include observation, learning journals, competency assessment forms, rubrics, and assessment of learning products. These tools not

only help quantify the level of attainment but also capture students' thinking and actions at each stage of learning.

- Assessment formats: teacher assessment; student self-assessment; peer assessment among students; and assessment by relevant stakeholders.

1.3.2.4. Conditions for implementing STEM education activities for primary school students under a participatory approach

The conditions for implementing STEM education activities in primary schools under a participatory approach thus form an integrated system comprising facilities, learning materials, the cultural environment, and information infrastructure. These conditions are mutually supportive and together determine the quality of STEM activities organized in schools.

1.3.3. Developing a process for organizing STEM education activities in primary schools under a participatory approach

1.3.3.1. Principles for developing a process for organizing STEM activities for primary school students under a participatory approach

- Promoting students' active engagement: Students are placed at the center of knowledge construction, while teachers provide guidance, support, and direction.

- Aligning participation with competencies: The assignment of lead and coordinating roles must correspond to the specific competencies of each stakeholder group.

- Enhancing students' experiential and practical learning: Stakeholders within and outside the school need to be involved to strengthen practical relevance and field-based experiences.

- Incorporating adjustment and improvement into the steps: Activities follow a closed-loop sequence, with feedback from multiple perspectives enabling flexible adjustment of the education plan.

1.3.3.2. The process for organizing STEM education activities for primary school students under a participatory approach and the roles of stakeholders in STEM education activities

Step 1: Identifying practical problems and generating STEM ideas.

Step 2: Developing STEM objectives and research questions.

Step 3: Forming learning groups and assigning tasks.

Step 4: Exploring knowledge and developing STEM skills.

Step 5: Designing, testing, and refining STEM products.

Step 6: Presenting products and organizing feedback and critical discussion.

Step 7: Evaluating, reflecting on experience, and disseminating outcomes.

1.4. Management of STEM education activities for primary school students under a participatory approach

The dissertation adopts the PDCA quality management cycle, comprising planning (Plan), implementation (Do), monitoring and evaluation (Check), and adjustment and improvement (Act).

1.4.1. Roles of management actors in organizing STEM education activities for primary school students under a participatory approach

The principal: As the management actor with overall responsibility for the school's educational activities, the principal provides strategic direction and organizes and coordinates resources to ensure that STEM education activities are implemented systematically and effectively.

- Teachers: As those directly responsible for organizing and implementing STEM education activities in teaching and educating students, teachers organize, guide, and support students as they explore, design, and carry out learning projects.

1.4.2. Planning STEM education activities for primary school students under a participatory approach (Plan)

Planning is the first stage of the management cycle and provides direction for the entire process of organizing STEM education activities in the school.

1.4.3. Implementation of STEM education activities for primary school students under a participatory approach (Do)

Once the plan has been approved, the school implements STEM education activities in its teaching and educational practice.

1.4.4. Monitoring and evaluation of STEM education activities for primary school students under a participatory approach (Check)

Within the management cycle, monitoring and evaluation are an important stage for determining the extent to which the plan has been implemented and the established STEM education objectives have been achieved, while providing the feedback needed to adjust and improve activities in subsequent cycles.

1.4.5. Adjustment and improvement of STEM education activities for primary school students under a participatory approach (Act)

Adjustment and improvement constitute the final stage of the PDCA cycle in the management of STEM education activities in primary schools under a participatory approach. This stage aims to address limitations, build on achievements, and enhance the quality of activities in the next cycle.

1.5. Factors influencing the management of STEM education activities for primary school students under a participatory approach

1.5.1. Government, ministerial, and education-sector policies and the legal framework for STEM education

1.5.2. Digital transformation trends and the local socioeconomic context

1.5.3. The principal's management competencies

1.5.4. Teachers' awareness and competencies

1.5.5. School facilities and financial resources

1.5.6. Consensus and levels of participation among parents and community stakeholders

1.5.7. The school education plan

CHAPTER 1 CONCLUSION

Based on an analysis of the theoretical aspects of STEM education activities and the characteristics of their organization in primary schools, the dissertation has developed a theoretical framework for managing STEM education activities through the PDCA cycle. Within this framework, the principal is the central management actor, responsible for coordinating, mobilizing, and facilitating collaboration among participating stakeholders, while ensuring alignment among educational objectives, curriculum content, organizational methods, and educational resources.

CHAPTER 2: THE PRACTICE OF MANAGING STEM EDUCATION ACTIVITIES FOR PRIMARY SCHOOL STUDENTS IN HUNG YEN PROVINCE UNDER A PARTICIPATORY APPROACH

2.1. International experience in STEM education activities and the management of STEM education activities for students under a participatory approach

2.1.1. The United States (the Americas)

The United States is a leading country in developing STEM education through a systemic approach closely aligned with its strategies for human resource development and national competitiveness.

2.1.2. Finland (Europe)

Finland is regarded as having an advanced education system in which STEM education is deeply integrated into the general education curriculum rather than implemented as a separate field.

2.1.3. Israel (the Middle East)

Israel has a highly developed science and technology sector and is known as a “start-up nation” with one of the world’s most dynamic innovation ecosystems [92].

2.1.4. Australia (Oceania)

Australia implements STEM education within a clearly defined national policy framework aligned with human resource development goals in the context of the knowledge economy and technological transformation.

2.1.5. Japan (East Asia)

Japan has a high level of scientific and technological development, with strengths in fields such as robotics, artificial intelligence, and nanotechnology.

2.1.6. Singapore (Southeast Asia)

Singapore implements STEM education within a national development strategy based on knowledge and innovation, with an emphasis on preparing human resources capable of adapting rapidly to scientific and technological change and global competition [42, 73].

2.1.7. Lessons for managing STEM education for primary school students

- A shift in the management model is needed, from centralized administrative management to ecosystem governance. As the responsible manager, the principal supports and promotes teachers' creativity rather than controlling them, and teachers are empowered to be creative.

- International experience also indicates that STEM education should begin in preschool and primary school through simple projects that focus on stimulating curiosity rather than academic knowledge.

2.2. Overview of the economy, culture, and education of Hung Yen Province

In terms of business structure, the province has a total of 23,284 businesses (Hung Yen: 14,037; Thai Binh: 9,247).

The province has 104 communes/wards; 43,031 educational managers, teachers, and staff; 257,682 primary school students; 197 primary schools; 255 combined primary and lower secondary schools; and 8 schools spanning the primary, lower secondary, and upper secondary levels.

2.3. Overview of the survey design and implementation

2.3.3. Survey participants

Survey participants were selected from 20 primary schools in Hung Yen Province through purposive sampling, while ensuring representation in terms of geographical area and the extent of STEM education implementation.

Table 2.3. Survey participant statistics

No.	Category	Number	Percentage (%)
1	School managers (principals, vice principals, subject team leaders, and deputy subject team leaders)	150	16.7
2	Teachers and staff	550	61.1
3	Community stakeholders (businesses, production facilities, universities, and related organizations, etc.)	80	8.9
4	Parents	120	13.3
Total		**900**	**100**

2.3.4. Survey timing

The pilot survey was conducted in August 2024 to assess the clarity of the questions and the preliminary reliability of the scales. The questionnaire was revised on the basis of the pilot survey results. The main survey was conducted in January 2025. Pilot survey data were excluded from the analysis of the current situation.

2.3.5. Survey methods

The survey combined questionnaires with in-depth interviews.

2.3.7. Data processing

- Quantitative analysis: Data collected in the survey of the current situation were updated and processed using SPSS statistical software, version 20.0.

2.3.8. Testing scale reliability

The set of scales measuring management under the PDCA cycle (planning, implementation, monitoring and evaluation, and adjustment) also demonstrated high reliability (α ranging from 0.888 to 0.910), indicating that the scale structure was consistent with the quality management model.

2.4. Current status of STEM education activities for primary school students in Hung Yen Province under a participatory approach

2.4.1. Educational managers' and teachers' awareness of the importance of STEM education for primary school students in Hung Yen under a participatory approach

The overall mean score for the full sample was 4.53, classified as "very important"; the overall standard deviation of 0.54 indicates limited dispersion, reflecting relatively consistent perceptions and judgments among educational managers and teachers.

2.4.2. Levels of involvement and competencies of stakeholders participating in STEM education activities for primary school students in Hung Yen Province

The results in Table 2.7 show that the competencies of stakeholders participating in STEM education activities for primary school students in Hung Yen Province received an overall mean score of 3.22, classified as "average."

2.4.3. Achievement of the objectives of STEM education activities for primary school students in Hung Yen Province under a participatory approach

In both groups, the two highest-rated objectives were "developing primary school students' integrated, interdisciplinary thinking, critical thinking, and problem-solving competencies" and "promoting students' active participation in the learning process." The mean scores for these two criteria across the full sample were 3.71 and 3.68, respectively, both classified as "good."

2.4.4. Implementation of STEM education content, methods, and organizational formats for primary school students in Hung Yen Province under a participatory approach

The results in Table 2.9 show that the use of methods for organizing STEM education activities in primary schools in Hung Yen Province under a participatory approach received an overall mean score of 3.56, classified as "frequently."

The results in Table 2.10 show that the implementation of different organizational formats for STEM education activities in primary schools in Hung Yen Province under a participatory approach received an overall mean score of 3.30, classified as "occasionally."

The results in Table 2.11 show that the implementation of STEM education content in primary schools in Hung Yen Province under a participatory approach received an overall mean score of 3.59, classified as "frequently."

2.4.5. Implementation of outcome assessment in STEM education activities for primary school students in Hung Yen Province under a participatory approach

The lowest-rated item was "the participation of multiple parties in assessment," with a score of 2.87; this is the clearest indicator of limitations in applying the participatory approach to assessment.

2.4.6. Conditions for organizing STEM education activities for primary school students in Hung Yen Province under a participatory approach

The results in Table 2.13 show that the provision of conditions for implementing STEM education activities in primary schools in Hung Yen Province under a participatory approach received an overall mean score of 3.40, classified as "average," approaching "good."

2.5. Implementation of the process and stakeholder roles in STEM education activities for primary school students in Hung Yen Province under a participatory approach

The best-implemented step in both groups was forming groups, assigning tasks, and discussing solutions, with an overall mean score of 3.65, classified as "good."

However, implementation tended to decline from the step involving product design, testing, and refinement onward. Product design and refinement received a score of only 3.25; testing, measurement, and design adjustment received 3.15; and evaluation and dissemination received the lowest score, at 2.85.

2.6. Current status of the management of STEM education activities for primary school students in Hung Yen Province under a participatory approach

2.6.1. Planning STEM education activities in primary schools in Hung Yen Province under a participatory approach

The lowest-rated item was engaging parents and the community in planning, with a score of only 2.86.

2.6.2. Organizing the implementation of STEM education activities for primary school students in Hung Yen Province under a participatory approach

The two lowest-rated items were effective collaboration with parents in organizing STEM activities, at 3.08, and establishing connections with community stakeholders in STEM implementation, at 2.84.

2.6.3. Monitoring and evaluation of STEM education activities for primary school students in Hung Yen Province under a participatory approach

The use of diverse evaluation tools received a score of 3.02; the systematic collection and analysis of evaluation data received 2.99.

2.6.4. Adjustment and improvement of STEM education activities for primary school students in Hung Yen Province under a participatory approach

The two lowest-rated items were strengthening resource mobilization and broadening stakeholder participation, at 2.90, and exchanging and sharing effective STEM models within school clusters, at 2.86.

2.6.5. Participation of parents and community stakeholders in managing STEM education activities for primary school students in Hung Yen Province

The lowest-rated item was participation in the assessment of students' STEM learning outcomes, with a mean score of 2.67 across the full sample; the community stakeholder group scored only 2.56, classified as "infrequently."

2.7. Extent of the influence of factors on the management of STEM education activities for primary school students in Hung Yen Province

The overall mean score for the full sample was 4.08, classified as "influential"; the overall standard deviation of 0.67 indicates limited dispersion and relatively consistent evaluations, showing that the two groups' judgments were similar.

The highest-rated factor was the principal's management competencies, with an overall mean score of 4.23, classified as "very influential."

The next highest-rated factors were teachers' awareness and competencies, at 4.17, and physical facilities and financial conditions, at 4.14.

2.8. Overall evaluation of the management of STEM education activities for primary school students in Hung Yen Province under a participatory approach

The findings show that STEM education activities have been implemented for primary school students in Hung Yen Province, but implementation remains uneven and the participatory approach has not yet been applied in depth.

*** Key issues informing the proposed management solutions**

- There is no management mechanism defining lead and coordinating roles among stakeholders.

This provides the basis for proposing a solution to develop and implement a mechanism for managing STEM education activities under a participatory approach (Solution 3.2.1).

- Educational managers' competencies in managing STEM education activities under a participatory approach do not yet meet the requirements.

This provides the basis for proposing a solution to provide educational managers with professional development in competencies for managing STEM education activities under a participatory approach (Solution 3.2.2).

- Collaboration among schools, families, and the community is not yet stable and is largely limited to resource support.

This provides the basis for proposing a solution to organize collaboration among schools, families, and the community (Solution 3.2.3).

- Physical facilities, equipment, and learning resources do not adequately support the practical work and testing steps.

This provides the basis for proposing a solution to direct the development of creative spaces for STEM education activities (Solution 3.2.4).

- Monitoring and evaluation are not yet systematic, are primarily undertaken by teachers, and have not yet become a basis for improvement.

This provides the basis for proposing a solution to organize collaboration among multiple stakeholders in the evaluation of STEM education activities (Solution 3.2.5).

Accordingly, the system of solutions in Chapter 3 takes the development of a management mechanism as its foundation and the strengthening of educational managers' competencies through professional development as a condition for implementation, and operates through the PDCA cycle.

CHAPTER 2 CONCLUSION

The limitations center on engaging parents, the community, and businesses in planning, implementation, evaluation, and improvement; physical facilities and learning resources; competencies for collaboration among stakeholders; and management mechanisms and the use of data for quality improvement.

CHAPTER 3: SOLUTIONS FOR THE MANAGEMENT OF STEM EDUCATION ACTIVITIES FOR STUDENTS IN PRIMARY SCHOOLS IN HUNG YEN PROVINCE UNDER A PARTICIPATORY APPROACH

3.1. Principles for proposing solutions

3.1.1. Principle of ensuring goal orientation

3.1.2. Principle of ensuring a participatory approach

3.1.3. Principle of ensuring a systematic and coordinated approach

3.1.4. Principle of ensuring practical relevance

3.1.5. Principle of ensuring effectiveness and continuous improvement

3.2. Solutions for the management of STEM education activities for students in primary schools in Hung Yen Province under a participatory approach

3.2.1. Developing and implementing a mechanism for managing STEM education activities for students in primary schools in Hung Yen Province under a participatory approach

3.2.1.1. Objectives of the solution

The immediate objectives of this solution are to overcome an overly administrative approach to management, narrow the gap between awareness and management practice, and improve the effectiveness of organizing STEM education activities.

3.2.1.2. Content of the solution

Develop, issue, and implement a mechanism for managing STEM education activities under a participatory approach at the school level. This mechanism is operationalized through internal management regulations, a coordination structure, collaboration procedures, feedback channels, and arrangements for monitoring and evaluation.

3.2.1.3. Implementation procedures

Step 1. Survey and evaluate the current situation and identify the basis for developing the regulations.

Step 2. Establish a drafting committee and prepare draft regulations.

Step 3. Conduct consultations and review the draft.

Step 4. Collect feedback on the management mechanism through representative types of STEM activities.

Step 5. Issue the regulations and organize their dissemination and implementation.

Step 6. Monitor and supervise implementation and apply a cycle of continuous improvement to the regulations.

3.2.1.4. Conditions for implementation

- The regulations are developed democratically, with input from the school's faculty council, subject teams, the Parents' Representative Board, and partners; they are made available to all relevant stakeholders from the beginning of the school year.

- The school has a designated unit to coordinate STEM education activities, with its membership and responsibilities assigned in writing.

3.2.2. Organizing professional development in competencies for managing STEM education activities under a participatory approach for managers in primary schools in Hung Yen Province

3.2.2.1. Objectives of the solution

This solution addresses a limitation identified in Chapter 2: staff responsible for managing STEM education activities in Hung Yen are highly aware of the importance of coordinating stakeholders in organizing STEM education activities, but implementation remains limited and community resources have not been fully utilized.

3.2.2.2. Content of the solution

Competency in coordinating multiple stakeholders: This competency is reflected in the ability to establish and manage collaborative relationships between the school and teachers, students, parents, businesses, training institutions, scientific organizations, and the local community.

Competency in co-designing and implementing STEM education activities for students under a participatory approach: Principals and subject team leaders need professional development in organizing the co-design of the objectives, content, formats, and procedures of STEM activities, ensuring that students are central participants in experiential activities, STEM clubs, learning projects, and introductory scientific research.

Competency in collecting and analyzing feedback data: School managers need to be equipped with the skills to collect, analyze, and use feedback data from teachers, students, parents, and community partners.

3.2.2.3. Implementation procedures

Training activities focus on developing practical competencies for leading and coordinating participation through scenario-based practice, such as engaging businesses in a STEM festival, resolving conflicts between professional requirements and actual conditions, and designing two-way feedback mechanisms for managing STEM activities.

3.2.2.4. Conditions for implementation

- Trainers are knowledgeable about both STEM education and Educational Management, and professional development materials are linked to real management situations in primary schools in the province.

- School managers have a need for professional development, are committed to participating, and are allocated time for activities integrated into continuing professional development and professional meetings within school clusters.

3.2.3. Organizing collaboration among schools, families, and communities in organizing STEM education activities for primary school students in Hung Yen Province

3.2.3.1. Objectives of the solution

This solution aims to extend STEM learning spaces beyond the classroom, enabling students to gain practical experience, develop creativity and problem-solving skills, and become familiar with STEM environments outside school.

3.2.3.2. Content of the solution

Develop a list of partners to jointly implement STEM activities in line with the socioeconomic characteristics of Hung Yen Province.

Mobilize community resources in accordance with legal provisions and local conditions.

3.2.3.3. Implementation procedures

Collaboration agreements must clearly specify objectives, areas of collaboration, responsibilities, and feedback and evaluation mechanisms.

Organize activities with clearly defined roles. Students play a central role in designing, testing, and presenting products. Teachers provide guidance, coordination, and assessment. Parents, businesses, and communities provide support, critical feedback, and professional input.

3.2.3.4. Conditions for implementation

- The mobilization, receipt, and use of contributions and sponsorship from parents, organizations, and individuals comply with regulations and adhere to the principles of voluntariness, openness, and transparency [22].

- Collaboration with each partner is established through a written agreement clearly specifying its content, responsibilities, and requirements for ensuring student safety.

- The school has staff members and teachers designated as coordination contacts; commune authorities provide support and facilitate links between the school and local businesses, production establishments, and craft villages.

3.2.4. Directing the development of creative STEM education spaces in primary schools in Hung Yen Province

3.2.4.1. Objectives of the solution

This solution aims to establish and manage STEM education spaces in primary schools in Hung Yen Province in ways appropriate to socioeconomic conditions, local characteristics, and the schools' existing facilities.

3.2.4.2. Content of the solution

Organize STEM spaces using a flexible model with functional areas aligned with the activity process, including areas for discussion, hands-on practice, experiential learning, and display.

3.2.4.3. Implementation procedures

The principal selects an organizational arrangement appropriate to the school's conditions. Schools with adequate facilities establish a shared STEM room, whereas schools facing resource constraints adopt a flexible model for STEM spaces in existing classrooms, libraries, or special-purpose rooms. This approach reflects the uneven availability of space, equipment, and investment resources among primary schools in Hung Yen.

3.2.4.4. Conditions for implementation

- The school has the autonomy to arrange and renovate existing spaces; the development of STEM spaces is included in its annual facilities investment plan.

- Funding comes from a combination of budget allocations, lawful sponsorship, and educational support services in accordance with provincial regulations [22], with priority given to shared equipment and recycled materials.

- STEM spaces meet safety requirements for electricity, fire prevention, and tool use, and have designated personnel and usage schedules.

- Teachers have the competencies to use existing spaces and equipment to organize STEM education activities.

3.2.5. Organizing collaboration among multiple stakeholders in evaluating STEM education activities for primary school students in Hung Yen Province

3.2.5.1. Objectives of the solution

This solution aims to design a system for monitoring, evaluating, and improving STEM education activities for primary school students in Hung Yen Province. It clearly defines the principal's leading role in directing and supervising activities and using evaluation results, and engages teachers, parents, and community stakeholders in providing organized feedback. The system is intended to ensure quality control, timely adjustment, and continuous improvement of STEM education activities through the PDCA cycle in the context of public primary schools in Hung Yen Province.

3.2.5.2. Content of the solution

The principal leads the design of a system for monitoring and evaluating STEM education activities under a participatory approach, based on two-way feedback channels, a multidimensional evaluation system, and data-processing procedures that support improvement.

3.2.5.3. Implementation procedures

The principal establishes an evaluation unit or team within the school comprising representatives of the school leadership, subject team leaders, key teachers, and representatives of collaborating stakeholders when necessary. This unit collects, synthesizes, and analyzes evaluation information in

accordance with consistent procedures. Data are collected through periodic surveys using questionnaires, checklists, and digital tools.

On this basis, the principal decides how to adjust plans, organizational methods, learning materials, forms of collaboration, and arrangements for mobilizing resources. Feedback is provided openly, is evidence-based, and is linked to the specific responsibilities of each unit.

3.2.5.4. Conditions for implementation

- The school has a consistent set of evaluation criteria and tools, including product assessment scales, observation forms, student self-assessment forms, and feedback forms for parents and partners, that are simple and easy for people outside the education sector to use.

- A system is in place for storing evidence and digital data, with specified times for data collection and analysis.

3.3. Relationships among the solutions

Overall, the relationships among the solutions follow a systems logic: the management mechanism provides the foundation; management competencies are a condition for implementation; collaboration among multiple stakeholders and STEM spaces provide the implementation environment; and monitoring and evaluation serve as tools for adjustment and developmental feedback.

3.4. Conducting the appraisal survey

3.4.1. Purpose of the appraisal survey

Assess the level of agreement among educational managers on the feasibility and effectiveness of the 05 proposed solutions. Identify the correlation between effectiveness and feasibility to determine priorities for implementation.

3.4.2. Participants and sample for the appraisal survey

To ensure representativeness and objectivity and to focus on stakeholders who regularly and directly participate in STEM education activities for students and in managing these activities, the author surveyed a sample of 62 participants: principals, vice principals, subject team leaders, teachers, and representatives of parents and community stakeholders. They were drawn from primary schools representing 3 types of areas in Hung Yen Province: urban, rural, and industrial areas.

3.4.3. Methods and tools for the appraisal survey

A questionnaire was used with a 5-point Likert scale: 4.21–5.00: Highly feasible/Highly effective; 3.41–4.20: Feasible/Effective; 2.61–3.40: Average; 1.81–2.60: Slightly feasible/Slightly effective; 1.00–1.80: Not feasible/Not effective.

Table 3.2. Appraisal of the feasibility and effectiveness of solutions for managing STEM education activities under a participatory approach in primary schools in Hung Yen Province

No.	Solutions	Feasibility Mean (n=62)	SD	Rank	Effectiveness Mean (n=62)	SD	Rank
1	Developing and implementing a mechanism for managing STEM education activities for students in primary schools in Hung Yen Province under a participatory approach	4.32	0.57	1	4.38	0.55	1
2	Organizing professional development in competencies for managing STEM education activities under a participatory approach for managers in primary schools in Hung Yen Province	4.28	0.60	2	4.34	0.58	2
3	Organizing collaboration among schools, families, and communities in STEM education activities for primary school students in Hung Yen Province	4.06	0.67	3	4.19	0.61	3
4	Directing the development of creative STEM education spaces in primary schools in Hung Yen Province	3.92	0.74	5	4.11	0.66	5
5	Organizing collaboration among multiple stakeholders in evaluating STEM education activities for primary school students in Hung Yen Province	4.00	0.69	4	4.16	0.63	4
Overall mean score		**4.12**	**0.65**		**4.24**	**0.61**	

The results in the table show that all proposed solutions were rated highly in terms of feasibility and effectiveness.

3.5. Pilot trial of Solution 2: Organizing professional development in competencies for managing STEM education activities under a participatory approach for managers in primary schools in Hung Yen Province

3.5.1. Purpose and participants of the pilot trial

+ The author selected a pilot-trial sample of 32 school managers and subject team leaders from 04 primary schools.

+ Experimental group: 16 participants (implementation of the professional development solution).

+ Control group: 16 participants (professional meetings conducted in the traditional manner).

- Pilot-trial period: From April 2025 through the end of August 2025.

- Pilot-trial sites: Yên Mỹ I, Trung Hòa, Vĩnh Khúc, and Nguyễn Văn Linh primary schools.

3.5.2. Content of the pilot trial

Professional development activities were implemented to develop 03 core competency groups among principals and subject team leaders: coordinating multiple stakeholders; co-designing activities under a participatory approach; and collecting and analyzing feedback data.

3.5.3. Results of pilot-trial data analysis

3.5.3.1. Comparison of baseline competencies (before the pilot trial)

The results show Sig. (p) > 0.05, indicating no statistically significant difference between the two groups before the pilot trial.

3.5.3.2. Results after the pilot trial

To evaluate the post-trial results, the dissertation used a competency assessment test scored on a 100-point scale, yielding the following results:

Table 3.6. Management competency assessment scores after the pilot trial

Group	Part A (30 points)	Part B (40 points)	Part C (30 points)	Total (100 points)	Rating
Control (n=16)	21.2	25.6	19.8	66.6	Satisfactory
Experimental (n=16)	24.8	32.5	25.6	82.9	Good
Difference	+3.6	+6.9	+5.8	**+16.3**	

The post-trial assessment results show that the experimental group's competencies in managing STEM education activities under a participatory approach improved markedly compared with those of the control group.

3.5.4. Overall evaluation results after the pilot trial of the solution

Competency in coordinating multiple stakeholders increased substantially, as reflected in the ability to establish collaboration mechanisms and mobilize resources in practice.

CHAPTER 3 CONCLUSIONS

The system of 05 solutions was developed in a coordinated manner to address the entire management cycle and establish an open management mechanism involving stakeholders within and outside the school.

CONCLUSIONS AND RECOMMENDATIONS

1. Conclusions

The dissertation has established a theoretical framework for managing STEM education activities under a participatory approach in primary schools, clarifying the structure of these activities, the implementation process, stakeholders' competencies and roles, and the areas of management within the context of implementing the General Education Curriculum at the primary level.

The survey results show that STEM education has begun to be implemented in primary schools in Hung Yen Province, but significant limitations remain in collaboration mechanisms, organizational competencies, and the use of community resources.

On this foundation, the dissertation proposes a coordinated system of 05 management solutions, emphasizing the establishment of collaboration mechanisms and the development of school managers' competencies in building connections.

2. Recommendations

2.1. For the Hung Yen Department of Education and Training

Issue a guidance framework for managing STEM education activities under a participatory approach to be applied consistently throughout the province, clearly defining the structure of management components under the PDCA cycle and standardizing stakeholders' roles.

2.2. For commune-level Divisions of Culture and Social Affairs

Perform an intersectoral coordination role in supporting schools to implement STEM education, ensuring links between education and local socioeconomic development.

2.3. For primary schools

Principals design and operate a system for managing STEM education activities according to the PDCA cycle, ensuring oversight of the entire process from planning to improvement.

Establish a system for evaluating STEM activities based on clear criteria, combining assessment of processes, products, and students' competencies. Formalize collaboration mechanisms with parents and community stakeholders to ensure participation that is appropriate to their roles, responsible, and subject to oversight.

2.4. For parents and community stakeholders

Participate in STEM education by co-creating learning environments and providing resources and practical contexts.

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