

Current Situation of Steam Education Management in Kindergartens in Hac Thanh Ward, Thanh Hoa Province

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Abstract: This study aims to assess the current state of STEAM education management in preschools in Hac Thanh ward, Thanh Hoa province, from a functional management approach. The survey was conducted with 42 administrators from 9 of 16 preschools, using a 5-point Likert scale and descriptive statistics. The results show that management functions achieved a moderately good level; planning received the highest score, while monitoring and supervision received the lowest. STEAM activities have been integrated into various forms of children's education, but limitations remain in teacher capacity, learning materials, project-based organisation, and process evaluation. The study identifies management bottlenecks and proposes improvements to enhance the effectiveness of STEAM education in preschools.

Keywords: Management; Educational management; STEAM education; preschool education; Hac Thanh ward, Thanh Hoa province

1. Problem Statement

STEAM education is recognised as an important direction in innovation in early childhood education, contributing to the development of children's abilities to explore, think logically, be creative, and solve problems through experiential activities (Honey et al., 2014; Yakman & Lee, 2012). In the context of implementing the early childhood education program based on a child-centred approach, STEAM education is integrated into various types of children's educational activities, including learning, play, outdoor, experiential, and daily-life activities (Ministry of Education and Training, 2018).

Practical experience in preschools in Hac Thanh ward, Thanh Hoa province, shows that STEAM education activities have received initial attention and are being implemented. However, the level of implementation is inconsistent across schools; in management, there is still a gap between planning and implementation; and training in teachers' capacity to design and organise STEAM educational activities is limited. The STEAM environment and learning materials do not meet the requirements for organising open activities, and the inspection and evaluation work has not received sufficient attention. These limitations reflect bottlenecks in implementing management functions, directly affecting the quality of STEAM education at the preschool level (Nguyen Thi My Loc, 2012).

In this context, studying the current state of STEAM education management in preschools in Hac Thanh ward using a functional management approach is of practical significance, providing a scientific and practical basis for proposing appropriate management measures and contributing to improving the effectiveness of STEAM education activities in preschools.

2. Theoretical basis of STEAM education management in preschools

2.1 STEAM Education

STEAM education in preschool is an interdisciplinary educational approach that integrates the fields of Science, Technology, Engineering, Arts, and Mathematics to solve practical problems through experience and creative thinking (Zollman, 2012; Honey et al., 2014).

In preschool education, this is not about teaching individual subjects but about organising activities that build on children's natural curiosity, fostering critical thinking, problem-solving, and a spirit of cooperation during the golden period of brain development (OECD, 2019). The unique characteristic of preschool STEAM lies in its gentle integration into the national curriculum through playful activities and projects closely related to everyday life (Ministry of Education and Training, 2018).

2.2 Managing STEAM educational activities in preschools

Managing STEAM educational activities in preschools is an organised, purposeful process within preschool management, shaping the constituent elements of these activities to achieve the goal of developing children's competencies (Nguyen Thi My Loc, 2012). Management here encompasses coordinating a system of resources, including personnel, curriculum, physical environment, and social relationships inside and outside the school. The core objective of management is to create an educational ecosystem that encourages children to

freely explore and acquire knowledge under the guidance of teachers, in line with the direction of educational innovation in the context of the 4.0 industrial revolution (Ministry of Education and Training, 2017).

2.3 Content of STEAM education management activities in preschools

2.3.1 Planning STEAM educational activities in preschools

Planning plays a guiding role in defining the goals, content, and process of integrating STEAM into the preschool education program, in accordance with the school's conditions and local characteristics (Ministry of Education and Training, 2018). The plan is built on integrating STEAM into children's core activities: purposeful learning activities, play activities (corners, outdoors), experiential and exploratory activities, and daily routines. The plan clearly defines the STEAM theme and links the project to real-world situations, ensuring connections across different developmental areas. The plan also specifies the process of organising activities according to the discovery and design cycle, anticipates implementation conditions and learning materials, and identifies resources, a training roadmap for the teaching staff, and conditions for organising activities to enhance teachers' capacity.

2.3.2 Organising and implementing STEAM education activities

Implementation is the stage in which managers put planned resources into practice through personnel assignments and the establishment of an educational environment. The educational space is arranged openly and flexibly, ensuring that learning materials are diverse, safe, and easily accessible. STEAM educational activities for children are organised around active learning models, typically the 5E model and the engineering design process (Crawley et al., 2014), creating conditions for children to explore, experiment, and develop problem-solving skills.

2.3.3 Directing the implementation of STEAM education activities

Guidance is the process of direct intervention by the school, guiding teachers in implementing educational goals and methods to improve teachers' capacity to organise STEAM activities (Nguyen Thi My Loc, 2012).

The content focuses on guiding activity design, managing the learning process, and using open-ended questions to develop children's thinking skills. Support is provided through professional development sessions, classroom observation and activity analysis, and career mentoring. The emphasis is on shifting from traditional teaching methods to organising exploratory, experiential learning activities.

2.3.4 Monitoring and evaluating the results of STEAM education activities

Testing and evaluation are the final stages of the management cycle, carried out using a process-oriented assessment approach that focuses on children's participation, thinking, and interaction during the activity (Harden & Laidlaw, 2012).

The assessment criteria system includes cognitive abilities, collaborative skills, and learning attitudes, collected through observation, checklists, and learning records. Assessment results serve as the basis for adjusting the plan, content, and methods of organising educational activities.

3. Current status of STEAM education management in preschools in Hac Thanh ward, Thanh Hoa province

3.1 Sampling and Data Processing Methods

3.1.1 Sample Selection

The study sample was selected using purposive sampling combined with a school-based coverage approach. The survey was conducted in 9 out of 16 preschools in Hac Thanh ward, Thanh Hoa province, ensuring representativeness of different educational organisational conditions. A total of 42 management staff, including principals, vice-principals, and heads of subject departments, participated in the survey. This group directly manages STEAM education activities, ensuring the relevance and reliability of the data.

3.1.2 Data Processing Methods

Data were collected using a 5-point Likert-scale questionnaire (1–5), with the following scoring conventions: Very Good = 5; Good = 4; Average = 3; Poor = 2; Very Poor = 1. The data were coded and processed using descriptive statistics, including frequencies, means (\bar{X}), and standard deviations (SD). The mean reflects the level of performance; the standard deviation reflects the dispersion of opinions. The contents were ranked using \bar{X} in SPSS 20.0 to identify the strengths and weaknesses of each management function. Simultaneously, average scores were calculated by functional group (planning, organising, directing, controlling) to compare performance levels and identify bottlenecks in the management cycle. The results

directly support the analysis of the current situation and the proposal of management measures for STEAM education activities.

3.2 Results of the assessment of the current state of STEAM education management in preschools in Hac Thanh ward, Thanh Hoa province

A survey of 42 management staff, including principals, vice-principals, and heads of subject departments, yielded the following results:

Table 1: Current status of the STEAM education activity plan development

TT	Review content	Very good	Good	Medium	Not good	Very bad	\bar{X}	SD	Rank
1	Survey of STEAM needs and competencies of teachers	3	12	18	8	1	3.19	0.92	5
2	Analysis of implementation conditions	4	14	17	6	1	3.33	0.93	3
3	Identifying appropriate STEAM educational goals for children.	6	18	15	3	0	3.64	0.82	1
4	Develop a STEAM plan by theme/project.	3	13	18	7	1	3.24	0.91	4
5	Integrating STEAM into the school year's educational plan.	4	15	17	6	0	3.40	0.86	2
6	Expected resources and conditions for implementation	2	11	19	8	2	3.07	0.92	7
7	STEAM Teacher Training Plan	3	12	18	8	1	3.19	0.92	5

Source: Author's survey results, 2026

The overall average score for the STEAM educational activity plan development group was 3.30, with a standard deviation of 0.90, reflecting a moderately good level of STEAM educational activity plan development, not yet reaching a good level. The content “Identifying *STEAM educational goals appropriate for children* “ achieved the highest score, with $\bar{X} = 3.64$, $SD = 0.82$, indicating that administrators have a relatively clear understanding of the requirements for organising STEAM education appropriate to the developmental characteristics of preschool children. The content “Integrating STEAM into the annual educational plan “ ranked second with $\bar{X} = 3.40$, $SD = 0.86$, indicating that STEAM has been included in the educational plan, but the level of integration still leans towards a general orientation.

The areas with low scores include “Expected resources and implementation conditions” ($\bar{X} = 3.07$) and “STEAM teacher training plan” ($\bar{X} = 3.19$). This result indicates a management bottleneck: the plan has objectives and direction, but it is not closely linked to the assessment of teachers' competencies, learning materials, facilities, and the training roadmap. The standard deviation of the areas ranges from 0.82 to 0.93, indicating that administrators' perceptions are relatively dispersed and reflecting unevenness among preschools in Hac Thanh ward in their capacity to develop STEAM plans.

Table 2: Current status of STEAM education activities

TT	Review content	Very good	Good	Medium	Not good	Very bad	\bar{X}	SD	Rank
1	Organise teacher training according to plan.	3	13	18	7	1	3.24	0.91	3
2	Organise professional development activities on STEAM.	4	15	16	6	1	3.36	0.93	1
3	Building and utilising an operational bank/STEAM project	2	10	19	9	2	3.02	0.92	7
4	Flexible STEAM activity scheduling	3	14	17	7	1	3.26	0.91	2
5	Organise STEAM activities using an experiential learning process.	3	12	18	8	1	3.19	0.92	4
6	Mobilize parental participation	2	11	18	9	2	3.05	0.94	6
7	Mobilising resources and learning materials to support STEAM	2	12	18	8	2	3.10	0.93	5

Source: Author's survey results, 2026

Average score assessing the current state of STEAM education implementation: 3.17 (SD = 0.92), lower than the planning group. This indicates that the gap between planning and implementation remains significant. The content “Organising professional development activities on STEAM” received the highest score ($\bar{X} = 3.36$), indicating that schools have begun to incorporate STEAM into professional development activities. “Flexible scheduling of STEAM activities” ranked second with $\bar{X} = 3.26$, indicating that school administrators have made adjustments to allocate time for children’s experiential activities.

The lowest score was for “Building and utilising STEAM activity/project banks,” with $\bar{X} = 3.02$. This is a significant management limitation, as early childhood STEAM education cannot be effectively implemented without a system of model activities, small projects tailored to age groups, themes, and classroom conditions. The two areas of “Mobilising parental participation” and “Mobilising resources and learning materials for STEAM” also had low scores, $\bar{X} = 3.05$ and $\bar{X} = 3.10$, respectively. This result indicates that STEAM activities in preschools in Hac Thanh ward still rely primarily on the school’s internal efforts and fail to effectively leverage available materials, expertise, and experience, as well as family and community participation.

Table 3: Current status of directing the implementation of STEAM education activities.

TT	Review content	Very good	Good	Medium	Not good	Very bad	\bar{X}	SD	Rank
1	Guidelines for integrating STEAM into educational activities	4	16	16	5	1	3.40	0.91	1
2	Directing the use of STEAM learning environments and materials	3	14	17	7	1	3.26	0.91	3
3	Supporting teachers in handling situations during activities	2	12	18	9	1	3.12	0.89	4
4	Adjust the STEAM plan during implementation	2	11	18	9	2	3.05	0.94	5
5	Orienting towards innovation in methods of organising activities	3	14	18	6	1	3.29	0.89	2
6	Coordinating forces within the STEAM education organisation	2	10	18	10	2	3.00	0.94	6

Source: Author's survey results, 2026

The overall average score was 3.19, SD = 0.92. The results show that the leadership function was given attention, but the quality of leadership did not delve deeply into how it handled specific pedagogical situations in STEAM. The content “Guidance on integrating STEAM into educational activities” achieved the highest score, with $\bar{X} = 3.40$, indicating that school administrators correctly understood that STEAM in preschool needs to be integrated into learning, play, outdoor activities, and experiential activities, as well as children’s daily routines. “Orientation for innovation in activity organisation methods” achieved a mean of $\bar{X} = 3.29$, indicating that the school has shifted from demonstration teaching to organising activities that involve exploration, experimentation, and cooperation.

However, “Coordination of forces in STEAM education organisations” only achieved $\bar{X} = 3.00$, ranking the lowest. “Adjusting STEAM plans during implementation” achieved $\bar{X} = 3.05$. These two indicators suggest that leadership activities remain heavily focused on initial guidance, lacking flexibility in management, on-site support, and mobilisation of external resources. In preschool practice, children need a rich material environment, appropriate adult support, and diverse experiential situations; therefore, limitations in coordinating forces and adjusting plans reduce the dynamism of STEAM activities.

Table 4: Current status of inspection and monitoring of STEAM education activities

TT	Review content	Very good	Good	Medium	Not good	Very bad	\bar{X}	SD	Rank
1	Develop criteria for evaluating STEAM activities.	1	10	18	11	2	2.93	0.89	4
2	Review the implementation of the STEAM plan.	3	14	18	6	1	3.29	0.89	1
3	Assessing teachers' organisational skills	2	12	19	8	1	3.14	0.87	2
4	Assessing children's participation	1	9	18	11	3	2.86	0.93	5

	and experiences.								
5	Gather feedback from teachers and parents.	1	8	17	13	3	2.79	0.92	6
6	Use the test results to adjust operations.	2	11	18	9	2	3.05	0.94	3

Source: Author's survey results, 2026

The overall average score for monitoring and supervising STEAM education activities was 3.01, SD = 0.91, the lowest among the four management functions. This result shows that monitoring and supervision are the weakest link in the management of STEAM education activities at preschools in Hac Thanh ward. The content "Monitoring the implementation of the STEAM plan" achieved the highest score, $\bar{X} = 3.29$, indicating that the school has been monitoring the plan's progress and implementation. However, the indicators for evaluating deeper quality were low: "Collecting feedback from teachers and parents" achieved $\bar{X} = 2.79$; "Evaluating children's participation and experiences" achieved $\bar{X} = 2.86$; "Developing criteria for evaluating STEAM activities" achieved $\bar{X} = 2.93$. This difference is significant; low scores in the evaluation criteria group, process evaluation, and parent feedback indicate that the testing system lacks sufficient data to support operational improvement.

Table 5: Summary of the level of implementation of STEAM education activity management contents

TT	Management functions	Number of items	X together	Common SD	Rank
1	Develop a plan.	7	3.30	0.90	1
2	Directing implementation	6	3.19	0.92	2
3	Implementation	7	3.17	0.92	3
4	Inspection and monitoring	6	3.01	0.91	4

Source: Author's survey results, 2026

The overall results show that all four management areas are at an "average to good" level, with none achieving an *excellent* rating. Planning received the highest score, but this advantage has not been translated into organisation, *direction*, and *monitoring*. *Monitoring and supervision* remain low, reflecting the incompleteness of the management cycle: planning, organisation, and direction are in place, but feedback data and improvement mechanisms are weak. This is a common characteristic in the early stages of STEAM implementation in preschools.

4. Conclusion and Recommendations

From the results of this practical research, it can be seen that the outstanding strengths in managing STEAM education activities in primary schools in Hac Thanh ward, Thanh Hoa province, lie in defining objectives, integrating them into the annual school plan, guiding their integration, and organising professional development activities. This shows that school administrators have taken the right approach; STEAM has been integrated into educational activities for preschool children. The limitations focus on operational aspects such as resource *planning*, *STEAM project banks*, *parent mobilisation*, *coordination*, *evaluation of children's experiences*, and *use of feedback* to improve activities.

The above results point to four management bottlenecks that need priority attention: teachers' capacity has not been adequately trained to meet practical needs; the STEAM learning environment and materials are not sufficiently open and diverse; the integration of STEAM projects lacks a stable and operational database; and assessment is not firmly based on children's experiences and parental feedback. This provides a direct scientific basis for proposing management measures. Based on the theoretical framework and practical research results, the author proposes the following measures:

(1) Training the capacity to design and organise STEAM educational activities for preschool teachers in Hac Thanh ward, Thanh Hoa province.

The training aims to develop teachers' capacity to organise STEAM activities in a practical, professional manner. The training content focuses on the 5E model for activity design and technical design processes, ensuring that teachers master the organisational structure of activities suited to preschool children's characteristics. Training planning is based on surveys of teachers' needs and practical abilities. Implementation is carried out through professional development sessions based on lesson study, thematic workshops, and classroom practice. Assessment focuses on the ability to design, manage, and adjust STEAM activities in practice. Assessment results are used to adjust the training content and format to ensure its relevance and effectiveness.

(2) Building an open STEAM education environment in preschools in Hac Thanh ward, Thanh Hoa province

The aim is to establish an educational environment that fosters active exploration and creativity in children. This environment focuses on defining the spatial structure of STEAM learning within the classroom, in outdoor experiential areas, and in a system of learning materials suited to the school's conditions. Implementation follows the principles of openness and flexibility, ensuring diverse, safe, and easily accessible learning materials, and adjusting the spatial layout to meet the requirements of STEAM education.

(3) Develop an integrated STEAM education plan.

Measures are in place to ensure that STEAM is implemented as an integrated approach across educational activities. Educational plans are developed as projects linked to themes and children's experiences, ensuring connections between different developmental areas. A project bank is built to suit the age group and local conditions.

(4) Strengthening coordination between schools, families and communities in organising STEAM education activities.

The measures aim to mobilise social resources and expand the learning environment for children. Coordinated planning helps to clearly define the content, form, and roles of relevant stakeholders. Implementation is carried out through communication activities, experiential learning, and the mobilisation of learning materials from families and the community.

5. Conclusion

The study clarified the current state of STEAM education management across 9 of 16 preschools in Hac Thanh ward, Thanh Hoa province, using a functional management approach. The results showed that all management aspects achieved a “fairly good” level ($\bar{X} = 3.01-3.30$), indicating that, although STEAM has been implemented, a synchronised management system has not yet been established.

Strengths lie in defining objectives, integrating educational plans, and directing the integration of STEAM into children's activities. This confirms that management awareness has shifted towards an integrated approach suited to the specific characteristics of early childhood education. Limitations are evident in the operational aspects of the management cycle. Planning is not closely linked to the staff's resources and capabilities. The implementation lacks a stable STEAM activity bank and a learning materials system. Guidance has not focused on supporting practical application and flexible management in organising activities. Monitoring and supervision are the weakest link, failing to shift from checking implementation to evaluating the children's experiences and development.

The aforementioned management bottlenecks provide a direct scientific basis for proposing measures to develop staff capacity, improve the educational environment, build integrated STEAM plans, and strengthen coordination among educational forces.

References

- [1]. Ministry of Education and Training. (2018). *Preschool education program*. Hanoi: Vietnam Education Publishing House.
- [2]. Crawley, E.F., Malmqvist, J., Östlund, S., & Brodeur, D.R. (2014). *Rethinking engineering education: The CDIO approach* (2nd ed.). Cham: Springer.
- [3]. Harden, R.M., & Laidlaw, J.M. (2012). *Essential skills for a medical teacher*. Edinburgh: Elsevier.
- [4]. Honey, M., Pearson, G., & Schweingruber, H. (2014). *STEM integration in K-12 education: Status, prospects, and an agenda for research*. Washington, DC: National Academies Press.
- [5]. Ministry of Education and Training. (2017). *Directive No. 16/CT-TTg on strengthening capacity to access the Fourth Industrial Revolution*. Hanoi.
- [6]. Nguyen Thi My Loc. (2012). *Educational Management: Some Theoretical and Practical Issues*. Hanoi: Hanoi National University Publishing House.
- [7]. OECD. (2019). *Educating 21st-century children: Emotional well-being in the digital age*. Paris: OECD Publishing.
- [8]. Yakman, G., & Lee, H. (2012). Exploring the exemplary STEAM education in the US as a practical educational framework for Korea. *Journal of the Korean Association for Science Education*, 32(6), 1072–1086.
- [9]. Zollman, A. (2012). Learning for STEM literacy: STEM literacy for learning. *School Science and Mathematics*, 112(1), 12–19.