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The Policy Model of Development for Educational Management in Education Sandbox Areas in Thailand

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Abstract

This research aimed to analyze factors influencing educational management in education sandbox areas using confirmatory factor analysis (CFA), and to develop an educational management model. This study employed a mixed research methodology, involving both quantitative and qualitative methods with a total of 1,892 participants by random sampling method in Education Sandbox Areas. The study samples included members of the Policy Committee, the Provincial Education Sandbox Innovation Areas Committee, administrators, teachers, students, and parents, selected through purposive sampling. Data were collected using questionnaires and semi-structured interviews. The model indices included Chi-square statistical values, Index (GFI), Index (AGFI), Index (CFI), Index (NFI), Index (NNFI), and (RMSEA). The findings highlight six key components: personnel development, environmental management, budgeting, administration, learning management, and participatory networks. Effective educational leaders require a comprehensive understanding of educational management frameworks within innovative education settings. Furthermore, personnel and environmental development emphasize continuous professional development for teachers to adapt to respond to the societal demands. Educational institutions benefit from the strategic utilization of locally available resources to develop teaching and learning materials in alignment with their operational capacity. This approach facilitates the efficient allocation of resources and promotes cost-effective budget management within the educational sector.

Keywords: *The Policy Model of Development, Sandbox Innovation Areas, Educational Sandbox Areas, Educational Management.*

Introduction

Equitable and quality education is one of the key challenges in improving the quality of learning [1, 2]. The Educational Innovation Area Act B.E. 2562 was promulgated to advance basic education management, a critical foundation for cultivating proficient Thai citizens, which this legislation aims to foster inquisitiveness, creativity, effective communication, and the capacity to collaborate with diverse individuals. Furthermore, it seeks to ensure that learners are well-informed and possess vocational skills aligned with their aptitudes [3]. Through collaborative efforts involving the government, local administrative bodies, the private sector, and civil society [4], the Act strives to enhance the quality and efficiency of basic education while mitigating educational disparities. To achieve these objectives, the establishment of educational innovation areas or Education Sandbox Areas is deemed necessary. These areas serve as platforms for reforming educational administration and management, thereby promoting the development of educational innovations [5]. This initiative pioneers the decentralization of authority and autonomy to educational agencies and basic education institutions, facilitating improvements in

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quality, efficiency, and equity [6-8]. Additionally, it aims to disseminate innovative teaching methodologies and best practices to other educational institutions.

Education Sandbox Areas, designated for experimental educational innovations, function as specialized educational zones that encourage intersectoral collaboration in educational management [9, 10]. These areas foster the creation of educational innovations and learning paradigms that address the quality of education for learners [11]. Aligned with the spirit of the Constitution of the Kingdom of Thailand B.E. 2560 (2017), Section 54, the Ministry of Education has initiated the establishment of pilot educational innovation areas. These areas, distributed across six regions and encompassing eight provinces—Satun, Rayong, Sisaket, Chiang Mai, Kanchanaburi, Narathiwat, Yala, and Pattani—introduce novel educational management models [12]. This initiative tests the decentralization of administrative authority from the central government to provincial levels, featuring autonomous management systems and mechanisms [13-15]. It empowers educational institutions with academic, personnel, and general administrative autonomy and accountability for educational quality [16]. This approach facilitates the development of learner competencies congruent with individual potential, regional contexts, and national imperatives. The overarching objectives include:

(1) enhancing student learning outcomes in the three domains of attitude, essential skills, and knowledge within the educational innovation areas, and extending these benefits nationwide [17]; (2) reducing educational quality disparities by improving the academic performance of underachieving and underprivileged students [18, 19]; (3) developing provincial-level educational administration innovations and disseminating educational innovations in policy, pedagogy, and school administration to national educational policies and other regions, covering aspects such as curriculum, textbooks, learning resources, assessment, institutional evaluation, personnel, and finance [20]; (4) fostering collaboration among governmental bodies, local administrative organizations, the private sector, and civil society in educational management, development, and dissemination of educational innovations. Educational innovation areas serve as a mechanism to alleviate educational disparities, tailoring educational management to local conditions and granting autonomy in curriculum, pedagogy, and institutional administration [21, 22]. This flexibility, aligned with local challenges, is intended to elevate the national education system, thereby laying a robust foundation for developing competent Thai citizens.

However, evaluations of the operational and administrative efficacy of educational innovation areas in the eight pilot provinces have identified critical educational challenges that impede academic achievement. These include: (1) the need for enhanced integration among agencies involved in teaching and learning, such as curriculum development, instructional materials, assessment, and educational administration, particularly in personnel and financial management; (2) the difficulty in translating policy into practical implementation; and (3) the uneven distribution of academic achievement, with excellence concentrated in specific institutions or regions. Addressing these issues is imperative to elevate national educational standards, thereby enhancing human capital competitiveness on a global scale. Furthermore, an investigation into the educational management strategies of pilot schools within the Chiang Mai Educational Innovation Area, conducted by the Academic, Research, and Evaluation Subcommittee of the Chiang Mai Educational Innovation Area Steering Committee [23, 24], revealed several challenges in developing educational innovations. These include: ambiguities in competency based curriculum development, which is often conflated with educational innovation [25, 26]; limitations in the decentralization and autonomy granted to educational agencies and pilot schools [27, 28]; the dynamic nature of operational procedures at the school [29], district, and

steering committee levels; inadequate goal clarity; insufficient budgetary allocation; restrictive regulations on per capita subsidy expenditures; and textbook procurement practices that do not facilitate the development of learner competencies as defined by pilot schools [30, 31].

Moreover, many administrators and teachers lack a thorough understanding of the Educational Innovation Area Act and proficiency in developing competency-based curricula, designing effective learning experiences, and implementing appropriate assessment methodologies [32, 33]. Teachers predominantly adhere to subject-specific learning indicators [34]. Learners also face challenges related to ethnicity, language, and religion, which hinder effective communication and pedagogy [35]. Additionally, technological resources and equipment are deficient [36]. Given that these conditions are observed in a single pilot province, it is reasonable to expect variations in educational management challenges across other pilot regions. Therefore, there is a need for an effective educational management paradigm for educational innovation areas.

This study endeavors to synthesize a suitable educational management model by analyzing the subsystems within these areas, thereby establishing linkages between objectives and subsystems that impact teaching and learning outcomes. Once synthesized, this model will be implemented to enhance educational achievement. The researcher employs developmental evaluation to assess the model's efficacy, ensuring that educational quality improvement aligns with the needs and contexts of educational institutions. The primary objective is to identify factors influencing the creation of educational models in educational innovation areas, to synthesize policy models for educational management, and to apply policy recommendations to achieve targeted educational outcomes. This study aims to conduct a confirmatory factor analysis to identify key factors influencing educational management in educational innovation areas. It will develop a tailored management model and propose policy recommendations to enhance educational practices and support sustainable development in these areas.

Materials and Methods

Theoretical Framework

This research framework is designed to investigate the confirmatory factor structure of elements influencing educational management within educational innovation areas.
A comprehensive literature review concerning educational management in innovative educational institutions, focusing on administrators, teachers, and educational personnel, has been conducted By integrating these theoretical perspectives, it becomes evident that the structural relationships within educational management and the development of a policy model influence in education Sandbox (Figure1).

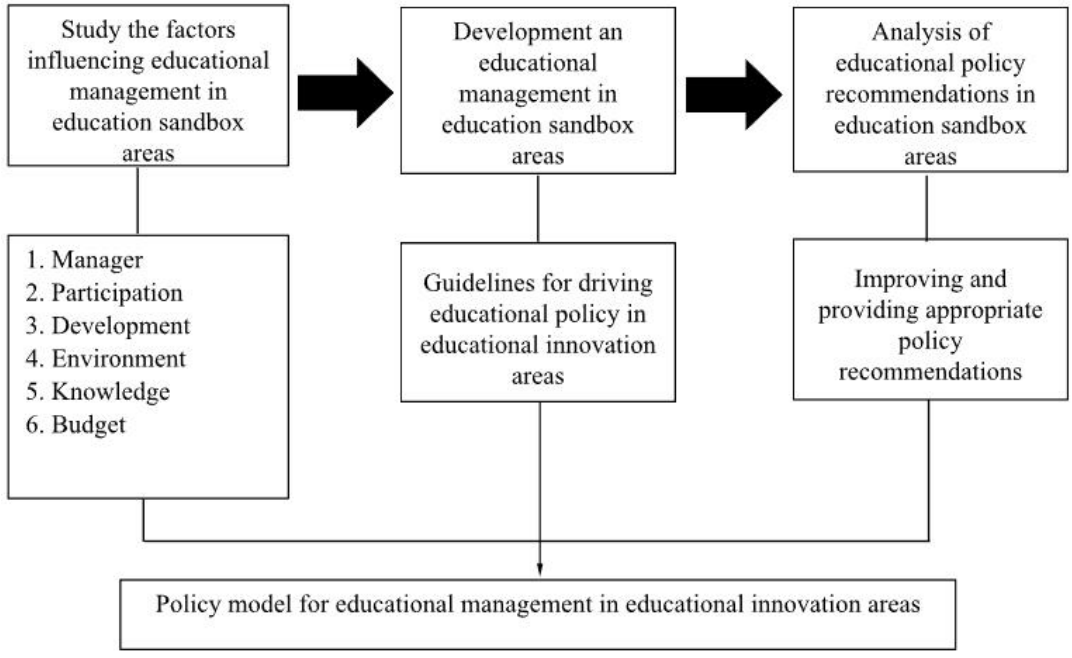


Figure 1. Conceptual Framework

Participants

The population consists of members of the Educational Innovation Area Policy Committee, provincial-level Educational Innovation Area Steering Committees, parents, administrators, teachers, and students, totaling 324,328 individuals from 273 pilot schools in the educational innovation areas (data as of January 27, 2020). The research sample was selected using purposive sampling, comprising 1,892 individuals. This includes 4 members of the Educational Innovation Area Policy Committee, 32 members of provincial-level Educational Innovation Area Steering Committees, 64 administrators from pilot schools in the educational innovation areas, 256 teachers from pilot schools, 256 parent/community representatives, and 1,280 students.

Research Instrument

The research instrument employed in this phase is a questionnaire designed to gather opinions from representatives of the provincial-level Educational Innovation Area Steering Committees, administrators, teachers, parents, and students, totaling 1,892 participants. The questionnaire consists of three versions: Version 1 for provincial-level Educational Innovation Area Steering Committee members, administrators, and teachers; Version 2 for parents; and Version 3 for students. The questions are based on the six domains of the research framework: Manager, Participation, Development, Environment, Knowledge, and Budget. Each version comprises three sections: Section 1 collects demographic information using a checklist format; Section 2 assesses opinions on factors influencing education in educational innovation areas using a five-

point rating scale (Likert scale). To ensure reliability, the questionnaire was pilot tested (try-out) with 30 individuals from a school not included in the main sample. The reliability of the questionnaire was assessed using Cronbach's alpha coefficient, yielding a value of 0.89. Based on the pilot test results, the questionnaire was refined into its final version for use with the research sample.

Data Collection

Data collection was conducted using Google Forms based on the questionnaire items. Formal letters requesting cooperation were sent to the provincial education offices in the eight target provinces: Chiang Mai, Sisaket, Kanchanaburi, Rayong, Satun, Pattani, Yala, and Narathiwat. Online meetings were held with research assistants in the provincial education offices to ensure consistent data collection procedures. Appointments were scheduled with administrators, teachers, students, and parents from the sample schools to complete the online questionnaire via Google Forms.

Selection Process

Phase 1: Study the factors influencing educational management in education sandbox areas

Employ a mixed-methods research design to investigate the confirmatory factor structure of elements influencing educational management within educational innovation areas. The study will encompass six factors: 1) Manager, 2) Participation, 3) Development, 4) Environment, 5) Knowledge, and 6) Budget. The research scope is limited to the educational innovation areas established during the initial phase in 2019, comprising eight provinces: 1. Sisaket Educational Innovation Area (Northeastern Region), 2. Rayong Educational Innovation Area (Eastern Region), 3. Satun Educational Innovation Area (Southern Region), 4. Chiang Mai Educational Innovation Area (Northern Region), 5. Kanchanaburi Educational Innovation Area (Central Region), and 6. Southern Border Provinces Educational Innovation Area (Pattani, Yala, Narathiwat), which has been subsequently divided into three distinct provincial innovation areas. The research process will be conducted in fix step:

Step 1: A comprehensive review of literature and research of educational innovation areas. This includes an analysis of relevant theories and concepts related to educational management in educational institutions, encompassing administrative Manager, Development, budgetary management, Participation, Environment, and Knowledge. The outcomes of this review will be synthesized to develop a preliminary framework for educational management within educational innovation areas, which will serve as the foundation for the research design.

Step 2: Conduct semi-structured interviews with administrators or representatives from pilot schools in the eight pilot educational innovation areas. The data obtained from these in-depth interviews and focus group discussions will be analyzed and synthesized to identify six key domains of administrative management, which will be used to develop the research instruments.

Step 3: Administering questionnaires to assess perceptions regarding the factors influencing educational management within educational innovation areas. The questionnaire, developed based on the findings from Phase 2, will be distributed to policy committee members of the educational innovation areas/provincial steering committees, educational administrators/school administrators, teachers and educational personnel, and students, to explore their perspectives on the essential components of effective educational management.

Step 4: Compiling and analyzing the data obtained from Phase 3 using factor analysis, specifically confirmatory factor analysis (CFA).

Step 5: Conduct semi-structured interviews with educational administrators in pilot schools within the pilot provinces, utilizing the validated factors obtained from the CFA.

Phase2: Development an educational management in education sandbox areas model

To synthesize the development of an educational management model for educational innovation areas, a qualitative research approach was employed. Factors influencing educational management identified in Phase 1 were synthesized with interview data from experts involved in educational development in the pilot provinces, including provincial-level Educational Innovation Area Steering Committee members, school administrators, and teachers. The suitability, feasibility, and utility of the educational management model were evaluated through expert review by five specialists.

Analysis of educational policy recommendations in education sandbox areas

To formulate policy recommendations for educational management in educational innovation areas, a qualitative research approach was used. Data were collected through semi-structured interviews and focus group discussions. Based on the findings, appropriate policy recommendations were developed to drive educational management policies in educational innovation areas.

Data Analysis

The data were collected using a five-point rating scale and were analyzed to calculate means ($\bar{x}$) and standard deviations (S.D.). Mean values were compared with established criteria based on the Likert scale for interpretation. Confirmatory factor analysis (CFA) was conducted to evaluate model fit. Model fit indices used in the analysis included Chi-square (x^2), relative chi-square (x^2/df), Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Comparative Fit Index (CFI), Normed Fit Index (NFI), Non-Normed Fit Index (NNFI), and Root Mean Square Error of Approximation (RMSEA).

Results

Confirmatory Factor Analysis for Determinants Influencing Educational Management in Educational Sandbox Areas

This study explored the management components in educational sandbox areas revealed that all components had mean scores at a high level 3.84+0.73 (Mean±SD). The three highest-ranking components, in descending order of mean scores, were budget and development (3.89±0.81), followed by Director and environment (3.86±0.74), and knowledge (3.83±0.82) (Table 1). The details of the variables within each component in Table 1 can be explained as follows:

Director: This component consists of 8 variables

Direc 1: Represents the establish strategies and operational plans to drive educational management.

Direc 2: Represents the coordinate with public and private sector partners to drive educational management in the area.

Direc 3: Represents the promote the development of the quality and potential of teachers and educational personnel.

Direc 4: Represents the promotion, support, and monitoring of education management in the area.

Direc 5: Represents the provide opportunities for teachers, educational personnel, and relevant stakeholders to participate in setting the vision, strategies, and goals of educational management in the area.

Direc 6: Represents the possess leadership qualities that involve proactive thinking, action, and the development of new innovations.

Direc 7: Represents the transfer administrators, teachers, and educational personnel within educational institutions in the educational innovation zone.

Direc 8: Represents the adaptation of the core basic education curriculum for use in educational innovation area schools, ensuring diversity and alignment with student abilities, aptitudes, interests, and context.

Participation: This component consists of 8 variables that influence it:

Part 1: Represents the provision of opportunities for stakeholders to participate in defining the vision, strategies, and goals of education management in the area.

Part 2: Represents the building of relationships with parents, the community, and society to participate in developing the quality of education management in the area.

Part 3: Represents the creation of networks and the linking of educational innovations for knowledge exchange and dissemination to other schools.

Part 4: Represents the participation of public and private sector stakeholders in defining key student competencies that align with the needs and context of the area.

Part 5: Represents the joint definition of strategies and measures for education management in the innovation area.

Part 6: Represents the joint consideration of budget support for the operation of educational innovation areas.

Part 7: Represents the joint definition of content and curriculums for the educational development of the innovation area.

Development: This component consists of 5 variables that influence it:

Dvlp1: Represents the development of quality and potential for teachers and educational personnel.

Dvlp2: Represents the conducting of study visits to model agencies/schools.

Dvlp3: Represents the promotion of designing student learning assessments to measure educational achievement in the educational innovation area.

Dvlp4: Represents the promotion of monitoring and evaluating schools in the educational innovation area.

Dvlp5: Represents the promotion of self-directed learning and learning from various sources.

Environment: This component consists of 9 variables that influence it:

Envr1: Represents the creation of a work environment that promotes the work of teachers and educational personnel in the area.

Envr2: Represents the provision of learning exchange corners and creative work resulting from bold thinking and self-directed action, leading to educational innovations that benefit learners.

Envr3: Represents the provision of a flexible environment that can be adapted as needed, conducive to the creation of innovations by teachers and educational personnel.

Envr4: Represents the promotion of creating a working environment that is a learning organization.

Envr5: Represents the efficient school communication systems that can access and gather information from internal and external sources.

Envr6: Represents the readiness of buildings, facilities, media, materials, equipment, and learning resources in the area.

Envr7: Represents the availability of modern digital media and technology that align with student needs.

Envr8: Represents the production and development of modern and sufficient media, materials, equipment, and technology.

Envr9: Represents the mobilization of media resources, materials, and equipment to support innovation development.

Knowledge: This component consists of 5 variables that influence it:

Knwl1: Represents the exchange of knowledge to be used as a common guideline in the area.

Knwl2: Represents the organization of activities for the exchange of learning and education management experiences in the area.

Knwl3: Represents the presence of a work culture that encourages bold thinking and new actions.

Knwl4: Represents the production of teaching materials, documents, and suitable and modern textbooks.

Knwl5: Represents the innovation and exchange of knowledge on education management that meets or aligns with the needs of learners and the context of the area.

Budget: This component consists of 9 variables that influence it:

Bdget1: Represents the preparation of budget requests according to established rules, regulations, and procedures.

Bdget2: Represents the allocation of budgets that align with educational management driving plans/projects.

Bdget3: Represents the establishment of a committee to consider the allocation of education management budgets in the area.

Bdget4: Represents the provision of budgetary support for the development of educational innovations that align with the context of the area.

Bdget5: Represents budget utilization according to the defined plans/projects.

Bdget6: Represents the review of budget utilization plans and the summarization of budget disbursement results.

Bdget7: Represents the establishment of an internal education quality assurance system within educational institutions.

Bdget8: Represents the credit transfer of student learning outcomes and educational qualifications between pilot schools and other schools as determined by the policy committee.

Factor	$\underline{X}$	$S.D.$	Meaning
1. Director	3.86	0.74	High
Direc1	3.79	0.87	High
Direc2	3.88	0.90	High
Direc3	3.98	0.95	High
Direc4	3.92	0.89	High
Direc5	3.92	0.91	High
Direc6	3.86	1.01	High
Direc7	3.76	1.00	High
Direc8	3.81	0.91	High
2. Participation	3.71	0.85	High
Part1	3.77	0.94	High
Part2	3.69	1.04	High
Part3	3.74	0.92	High
Part4	3.64	1.02	High
Part5	3.75	0.94	High
Part6	3.65	1.04	High
Part7	3.70	1.07	High
3. Development	3.89	0.81	High
Dvlp1	3.93	0.98	High
Dvlp2	3.93	1.00	High
Dvlp3	3.86	0.91	High
Dvlp4	3.89	0.93	High
Dvlp5	3.87	0.96	High
4. Environment	3.86	0.82	High
Envr1	3.86	0.82	High
Envr2	3.88	0.95	High
Envr3	3.88	0.96	High
Envr4	3.96	1.02	High
Envr5	3.86	0.97	High
Envr6	3.82	1.00	High
Envr7	3.89	0.97	High
Envr8	3.87	0.95	High
5. Knowledge	3.83	0.82	High
Knwl1	3.80	0.96	High
Knwl2	3.86	0.95	High

Knwl3	3.83	0.95	High
Knwl4	3.82	0.95	High
Knwl5	3.85	0.93	High
6. Budget	3.86	0.82	High
Bdget1	3.86	0.82	High
Bdget2	3.88	0.95	High
Bdget3	3.88	0.96	High
Bdget4	3.96	1.02	High
Bdget5	3.86	0.97	High
Bdget6	3.82	1.00	High
Bdget7	3.89	0.97	High
Bdget8	3.87	0.95	High

Table 1. Descriptive Statistics of Educational Management Components in Educational Innovation Areas: Overall and by Domain

Component-Specific Analysis

Director

All observed variables within the Director component had mean scores at a high level. The top three highest-ranking observed variables, in descending order, were: the promote the development of the quality and potential of teachers and educational personnel (3.98±0.95); promoting, supporting, and monitoring education management in the area (3.92±0.89), and providing opportunities for teachers, educational personnel, and relevant stakeholders to participate in defining the vision, strategies, and goals of education management in the area (3.92±0.91) and exhibiting Director characteristics that initiate thought, action, and the development of innovations (3.86±1.01). The observed variable with the lowest mean score, though still at a high level, was the transfer of administrators, teachers, and educational personnel within educational innovation area schools (3.76±1.00).

Participation

All observed variables within the Participation component had mean scores at a high level. The top three highest-ranking observed variables, in descending order, were: providing opportunities for stakeholders to participate in defining the vision, strategies, and goals of education management in the area (3.77±0.94); jointly defining strategies and measures for education management in the innovation area (3.75±0.94); and creating networks and linking educational innovations for knowledge exchange and dissemination to other schools (3.74±1.02). The observed variable with the lowest mean score, though still at a high level, was the allocation of budgetary support for public service development projects (4.70±0.46).

Development

All observed variables within the Development component had mean scores at a high level. The top three highest-ranking observed variables, in descending order, were: developing the quality and potential of teachers and educational personnel (3.93±0.98); and conducting study visits to model agencies/schools (3.93±1.00); promoting the monitoring and evaluation of schools in the innovation area (3.89±0.93); and promoting self-directed learning and learning from various sources (3.87±0.96). The observed variable with the lowest mean score, though still at a high

level, was promoting the design of student learning assessments to measure educational achievement in the educational innovation area (3.86±0.91).

Environment

All observed variables within the Environment component had mean scores at a high level. The top three highest-ranking observed variables, in descending order, were: creating a flexible environment that can be adapted as needed, conducive to the creation of innovations by teachers and educational personnel (3.96±1.02); the readiness of buildings, facilities, media, materials, equipment, and learning resources in the area (3.89±0.97); and provision of learning exchange corners and creative work resulting from bold thinking and self-directed action, leading to educational innovations that benefit learners (3.88±0.95) and the provision of a flexible environment that can be adapted as needed, conducive to the creation of innovations by teachers and educational personnel (3.88±0.96). The observed variable with the lowest mean score, though still at a high level, was the mobilization of media resources, materials, and equipment to support innovation development (3.73±0.97).

Knowledge

All observed variables within the Knowledge component had mean scores at a high level. The top three highest-ranking observed variables, in descending order, were: organizing activities for the exchange of learning and education management experiences in the area (3.86±0.95); innovating and exchanging knowledge on education management that meets or aligns with the needs of learners and the context of the area (3.85±0.93); and having a work culture that encourages bold thinking and new actions (3.83±0.95). The observed variable with the lowest mean score, though still at a high level, was the exchange of knowledge to be used as a common guideline in the area (3.80±0.96).

Budget

All observed variables within the budgetary resource component had mean scores at a high level. The top three highest-ranking observed variables, in descending order, were: budget utilization according to the defined plans/projects (3.99±1.00); reviewing budget utilization plans, and summarizing budget disbursement results (3.92±0.95); and credit transfer of student learning outcomes and educational qualifications between pilot schools and other schools as determined by the policy committee (3.90±0.95). The observed variable with the lowest mean score, though still at a high level, was providing budgetary support for the development of educational innovations that align with the context of the area (3.81±0.97).

The results of the confirmatory factor analysis of educational management factors in educational innovation areas yielded the following model fit indices:

$$x^2 = 1166.147 \;\; df = 599 \;\; \frac{x^2}{df} = 1.95 \; p = 0.001 \;\; RMSEA = 0.022 \;\; CFI = 0.993$$

NFI=0.985 NNFI=0.989

The model fit indices met the established criteria: the Chi-square/df ratio was less than 2, the CFI, NFI, and NNFI indices were greater than 0.90, and the RMSEA index was less than 0.05. Therefore, the research model was deemed to be consistent with the empirical data, as depicted in Figure 2.

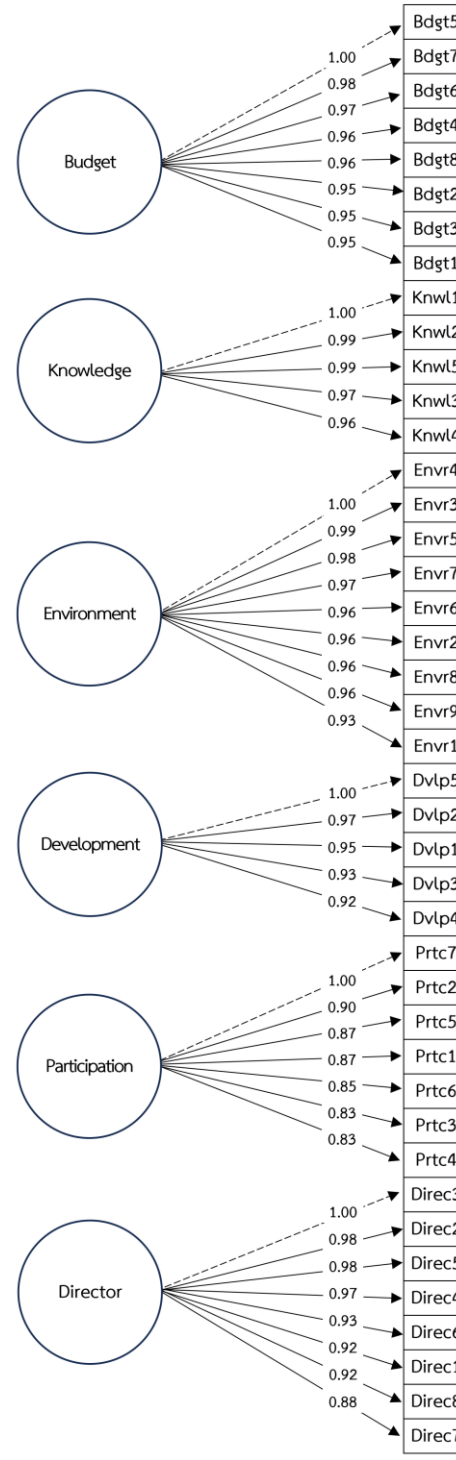


Figure 2. Observed Variables of Each of the Six Components

All 42 variables of the educational management components in educational innovation areas exhibited a significant positive correlation at the .01 level ($p < .01$). The observed variables with the highest correlation were the review of budget utilization plans and the summarization of budget disbursement results (Bdget6) and the establishment of an internal education quality assurance system (Bdget7), with a correlation coefficient of 0.75. Conversely, the observed variables with the lowest correlation were the display of Director characteristics that initiate thought, action, and the development of innovations (Direc6) and the participation of public and private sector stakeholders in defining key student competencies that align with the needs and context of the area (Part4), with a correlation coefficient of 0.31. Notably, the correlation coefficients for all pairs of observed variables were no less than 0.30.

The results of the confirmatory factor analysis of educational management factors in educational innovation areas yielded the following model fit indices:

$$x^2 = 1186.555 \quad df = 600 \quad \frac{x^2}{df} = 1.98 \; p = 0.001 \quad RMSEA = 0.023$$

CFI=0.992 NFI=0.985 NNFI=0.989

The model fit indices met the established criteria: the Chi-square/df ratio was less than 2, the CFI, NFI, and NNFI indices were greater than 0.90, and the RMSEA index was less than 0.05. Therefore, the research model was deemed to consistent with the empirical data, as depicted in Figure 3.

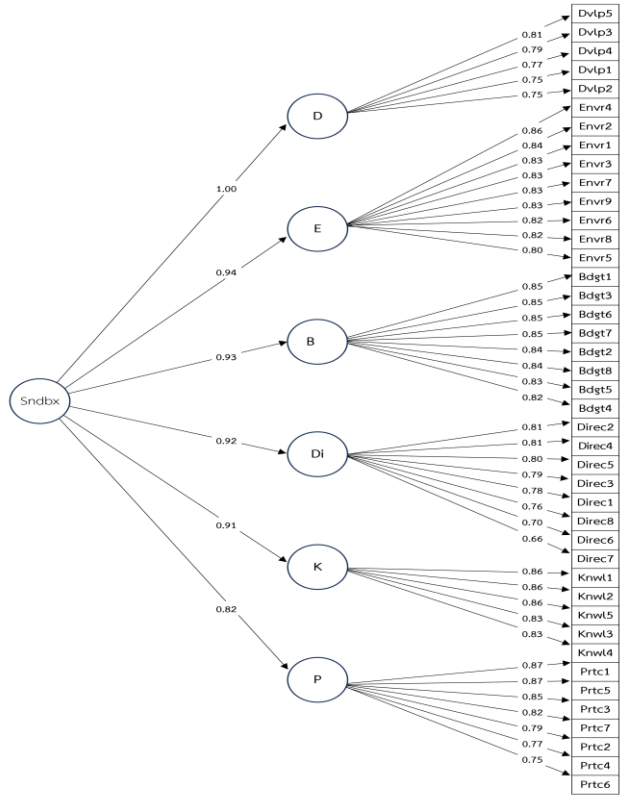


Figure 3. Factors and Components of Educational Management in Educational Innovation Areas

The results of the confirmatory factor analysis indicated that all six-factor components were consistent with the empirical data on educational management in educational innovation areas. The components were confirmed and ranked in descending order of factor loadings as follows: 1) Development had a factor loading of 0.99 and a Coefficient of Determination of 0.99, 2) Environment had a factor loading of 0.94 and a Coefficient of Determination of 0.88, 3) Budget had a factor loading of 0.93 and a Coefficient of Determination of 0.86, 4) Manager had a factor loading of 0.92 and a Coefficient of Determination of 0.85, 5) Knowledge had a factor loading of 0.91 and a Coefficient of Determination of 0.83, and 6) Participation had a factor loading of 0.82 and a Coefficient of Determination of 0.67 (Table 2). Therefore, in developing an educational management model for educational innovation areas, the researcher utilized all six component domains to develop a policy model for educational management in educational innovation areas.

Component	Component Weight (b)	Coefficient of Determination (R^2)
Development	0.99	0.99
Environment	0.94	0.88
Budget	0.93	0.86
Manager	0.92	0.85
Knowledge	0.91	0.83
Participation	0.82	0.67

Table 2. Confirmatory Factor Analysis of Factors Influencing Educational Management in Educational Sandbox areas

Analysis of the Development of an Educational Management Model in Educational Innovation Areas

Based on the confirmatory factor analysis and synthesis of educational management in educational innovation areas to drive educational policies, which were derived from interviews with the Educational Innovation Area Policy Committee/Educational Innovation Area Steering Committee, school administrators, teachers, and parents, as well as the operational outcomes of pilot schools in the Chiang Mai Educational Innovation Area (Mae Khue Wittaya School) and Satun Province (Ban Kota School), a policy model for educational management in educational innovation areas was concluded and analyzed (Figure 4). The results showed following

Development

- Promote self-directed learning and learning from various sources.
- Promote the design of student learning assessments to measure educational achievement in the educational innovation area.
- Promote the monitoring and evaluation of schools in the educational innovation area.
- Develop the quality and potential of teachers and educational personnel.
- Conduct study visits to model agencies/schools.

Environment

- Promote the creation of a work environment that is a learning organization.
- Provide learning exchange corners and creative work resulting from bold thinking and self-directed action, leading to educational innovations that benefit learners.
- Create a work environment that promotes the work of teachers and educational personnel in the area.
- Provide a flexible environment that can be adapted as needed, conducive to the creation of innovations by teachers and educational personnel.
- Ensure modern digital media and technology that align with student needs.
- Mobilize media resources, materials, and equipment to support innovation development.

Budget

- Prepare budget requests according to established rules, regulations, and procedures.
- Establish a committee to consider the allocation of education management budgets in the area.
- Review budget utilization plans and summarize budget disbursement results.
- Establish an internal education quality assurance system within educational institutions.

Director

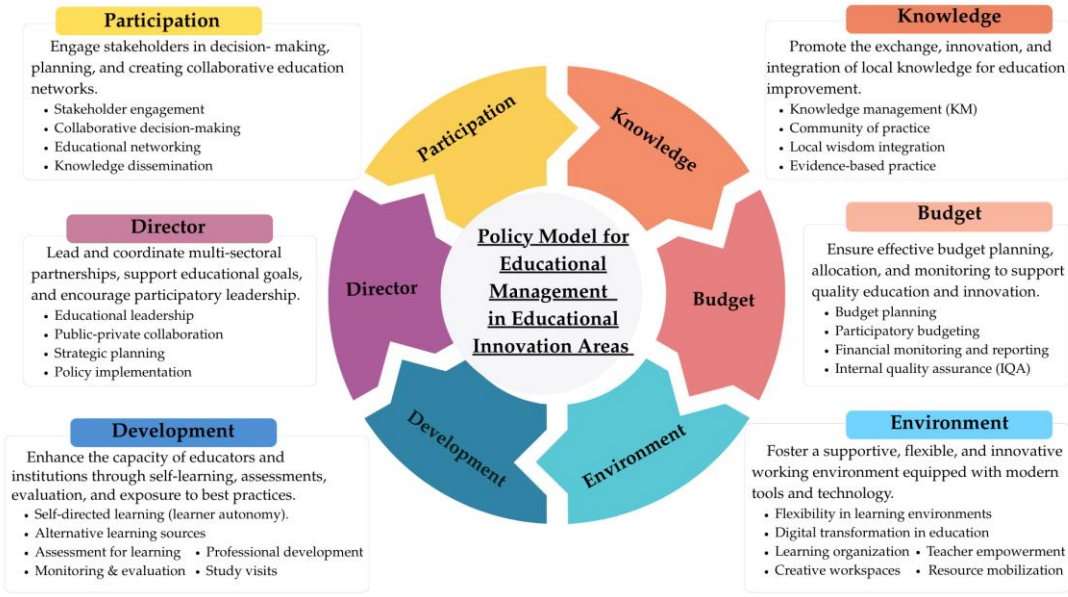
- Coordinate public and private sector partnerships to drive education management in the area.
- Promote, support, and monitor education management in the area.
- Provide opportunities for teachers, educational personnel, and stakeholders to participate in defining the vision, strategies, and goals of education management in the area.

Knowledge

- Organize activities for the exchange of learning and education management experiences in the area.
- Innovate and exchange knowledge on education management that meets or aligns with the needs of learners and the context of the area.
- Exchange knowledge to be used as a common guideline in the area.

Participation

- Provide opportunities for stakeholders to participate in defining the vision, strategies, and goals of education management in the area.
- Jointly define strategies and measures for education management in the innovation area.
- Create networks and link educational innovations for knowledge exchange and dissemination to other schools.



Discussion

Educational management within the context of educational sandbox areas can be conceptualized through six core components: Development, Environment, Budget, Manager, Knowledge, and Participation. It is essential that school administrators possess the requisite knowledge and understanding to effectively manage educational sandbox areas [37, 38]. This enables them to lead education in a contextually appropriate manner, providing clear direction and practical guidance to teachers [39]. Additionally, it is crucial to develop teachers and educational personnel with the skills necessary to manage teaching and learning within the framework of an educational sandbox area [40]. By fostering appropriate competencies, educators will be better equipped to address the dynamic nature of these environments [41].

Learners should be motivated to develop key learning skills and creativity, applying their knowledge in real-world contexts to cultivate life skills that are vital for personal and professional success [42]. Creating a supportive environment for learning within the constraints of available budgets is essential [43]. This requires not only the establishment of robust internal and external networks but also the promotion of collaboration across all sectors involved in the management of educational sandbox area schools [44]. Sufficient resources must be allocated to support the development of student quality, while simultaneously motivating educational personnel to innovate and improve educational practices [45]. Furthermore, facilitating platforms for knowledge exchange between schools can foster the sharing of effective teaching methods and encourage collaborative development of educational innovations [46]. Building confidence among administrators, teachers, learners, and stakeholders is vital, ensuring that the management of educational sandbox areas contributes meaningfully to student development and aligns with both the needs of the learners and the specific context of the sandbox area.

Recommendations for Policy and Practice

The synthesized policy model for educational management in educational sandbox areas, which incorporates all six components, should be adopted to guide the management of education within these environments, ensuring that local contexts and defined outcomes are appropriately addressed. Future legislation, such as the Educational Sandbox Area Act, should integrate the recommendations from all six components. School administrators must possess not only an indepth understanding of educational sandbox areas but also the ability to apply this knowledge effectively in practice. Creating a motivating environment for administrators, teachers, and educational staff is crucial to encourage ongoing innovation and development within schools.

Consisting of 6 important proposals: 1) To decentralize authority in order to foster greater community and local participation in educational management. 2) To establish an area based evaluation system for the purpose of developing a more diverse measurement and evaluation framework. 3) To promote and develop teachers and educational personnel to possess competencies in innovative learning management. 4) To promote the utilization of technology as a tool in both learning management and educational administration. 5) To cultivate leaders with vision and the courage necessary to implement change. and 6) To promote mechanisms for the removal of regulatory obstacles that impede the implementation of educational management within educational innovation zones.

Additionally, special budgets should be allocated to pilot schools within educational sandbox areas, providing them with the autonomy and flexibility to design and implement innovative educational strategies.

4.2 Implication of the thesis

This thesis synthesizes valuable bodies of knowledge and proposes a well-defined framework for advancing educational policy development within educational innovation area. The research findings identify six crucial dimensions: personnel development, environment, budget allocation, administrative leadership, knowledge management, and stakeholder engagement. These dimensions are intended to guide the collaborative development of educational innovation areas in conjunction with stakeholders at both the policy and local levels. Furthermore, this thesis aspires to promote educational management models within this area that are contextually relevant and adaptable to the unique circumstances of each developing area. The overarching objective is to generate tangible and impactful outcomes across all regions of the nation, aligning with the stipulations outlined in the Educational Innovation area Act B.E. 2562 (2019). Ultimately, this is anticipated to address contemporary educational demands and foster sustainable national progress.

Future Research

Future research will explore additional factors influencing educational management within sandbox areas, such as stakeholder attitudes toward curricula, teaching methods, and learning assessments. Studies on successful models of educational management in sandbox areas can provide practical insights into effective strategies, contributing to the ongoing development of educational practices within these distinctive environments.

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References

Alcaraz, S., C.C. M., and P. and Arnaiz-Sánchez, Inclusion and the availability of educational resources – capturing stakeholder voices. Educational Research, 2024. 66(3): p. 263-278.

Kyriakides, L., et al., Improving quality and equity in schools in socially disadvantaged areas. Educational Research, 2019. 61(3): p. 274-301.

State, O.o.t.C.o., The Educational Innovation Area Act B.E. 2562. Government Gazette, 2019. 136(Part 22A): p. 1–14.

Dervin, F. and A.J. Liddicoat, Introduction: Linguistics for intercultural education, in Linguistics for Intercultural Education, D. Fred and J.L. Anthony, Editors. 2013, John Benjamins Publishing Company. p. 1-25.

Dervin, F. and K. and Hahl, Developing a Portfolio of Intercultural Competences in Teacher Education: The Case of a Finnish International Programme. Scandinavian Journal of Educational Research, 2015. 59(1): p. 95-109.

Lawless, B. and Y.-W. and Chen, Developing a Method of Critical Thematic Analysis for Qualitative Communication Inquiry. Howard Journal of Communications, 2019. 30(1): p. 92-106.

Santoro, N., Teaching in culturally diverse contexts: what knowledge about 'self' and 'others' do teachers need? Journal of Education for Teaching, 2009. 35(1): p. 33-45.

Skourdoumbis, A., Articulations of teaching practice: a case study of teachers and "general capabilities". Asia Pacific Education Review, 2016. 17(4): p. 545-554.

Bush, T., J. Bolam, and L. Bell, Educational management: Redefining theory, policy and practice. 1999.

English, F.W., The postmodern challenge to the theory and practice of educational administration. 2003: Charles C Thomas Publisher.

Aithal, P.S. and A.K. Maiya, Innovations in higher education industry–Shaping the future. International Journal of Case Studies in Business, IT, and Education (IJCSBE), 2023. 7(4): p. 283-311.

Wannapairo, S., and Sompong Palachai., Driving Educational Sandbox Innovation by Areas-Based Approaches. Interdisciplinary Academic and Research Journal 3, 2023. 6: p. 367-84.

McGinn, N. and T. Welsh, Decentralization of education: why, when, what and how? 1999.

Sabir, B.Y., et al., Administrative decentralization: The transfer of competency from the Ministry of Education to General Directorates. International Journal of Rural Development, Environment and Health Research, 2021. 5(3): p. 1-13.

Wang, S., et al., Decentralized autonomous organizations: Concept, model, and applications. IEEE

Transactions on Computational Social Systems, 2019. 6(5): p. 870-878.
Lee, M.H. and S. Gopinathan, Centralized decentralization of higher education in Singapore, in Centralization and decentralization: Educational reforms and changing governance in Chinese societies. 2004, Springer. p. 117-136.
Dawson, P. and C. Andriopoulos, Managing change, creativity and innovation. 2017.
Connell, F.A., et al., Ecological Analysis of Teen Birth Rates: Association with Community Income and Income Inequality. 2001.
Gold, R., et al., Ecological analysis of teen birth rates: association with community income and income inequality. Maternal and child health journal, 2001. 5: p. 161-167.
Yinfu, Y., Concepts and policy innovations in the national education plan. Chinese Education & Society, 2017. 50(3): p. 142-161.
Agranoff, R. and M. McGuire, Collaborative public management: New strategies for local governments. 2003: Georgetown University Press.
Bingham, L.B., The next generation of administrative law: building the legal infrastructure for collaborative governance. Wis. L. Rev., 2010: p. 297.
Howlett, M., Administrative styles and the Iimits of administrative reform: A neo-institutional analysis of administrative culture. Canadian Public Administration, 2003. 46(4): p. 471-494.
Kantajai, W., The Community-Based Institutional Administration Model to Promote Students' Career Skills in Chiang Mai Education Sandbox, Thailand. Higher Education Studies, 2022. 12(4): p. 66-79.
Al Maktoum, S.B. and A.M. Al Kaabi, Exploring teachers' experiences within the teacher evaluation process: A qualitative multi-case study. Cogent Education, 2024. 11(1): p. 2287931.
Clément, P., The introduction of competence-based education into the compulsory school curriculum in France (2002–2017): Hybridity and polysemy as conditions for change, in Contextualizing Global Flows of Competency-Based Education. 2023, Routledge. p. 35-50.
De Grauwe, A., et al., Does decentralization lead to school improvement? Findings and lessons from research in West-Africa. Journal of Education for International Development, 2005. 1(1): p. 1-15.
Mok, K.-H., Centralization and decentralization: Educational reforms and changing governance in Chinese societies. Vol. 13. 2013: Springer Science & Business Media.
Cepeda, G. and D. Vera, Dynamic capabilities and operational capabilities: A knowledge management perspective. Journal of business research, 2007. 60(5): p. 426-437.
Bruns, B., D. Filmer, and H.A. Patrinos, Making schools work: New evidence on accountability reforms. 2011: World Bank Publications.
Mbuqe, B., Procurement of learner teacher support materials in East London District public secondary schools. Education. Master of Pretoria: University of South Africa, 2020.
Nombo, U., Competency-based curriculum in the teachers colleges: The challenges. European Journal of Alternative Education Studies, 2022. 7(1).
Parson, L., B. Childs, and P. Elzie, Using competency-based curriculum design to create a health professions education certificate program the meets the needs of students, administrators, faculty, and patients. Health Professions Education, 2018. 4(3): p. 207-217.
Knievel, I., A.M. Lindmeier, and A. Heinze, Beyond knowledge: Measuring primary teachers' subject-specific competences in and for teaching mathematics with items based on video vignettes. International Journal of Science and Mathematics Education, 2015. 13: p. 309-329.
Valdés, G., The teaching of minority languages as academic subjects: Pedagogical and theoretical challenges. The Modern Language Journal, 1995. 79(3): p. 299-328.
Stewart, M.R. and E.G. Carayannis, Dystechnia: a model of technology deficiency and implications for entrepreneurial opportunity. Journal of Innovation and entrepreneurship, 2013. 2: p. 1-36.

Al-Janabi, S. and I. Al-Shourbaji, A study of cyber security awareness in educational environment in the middle east. Journal of Information & Knowledge Management, 2016. 15(01): p. 1650007.
Allen, H.J., Regulatory sandboxes. Geo. Wash. L. Rev., 2019. 87: p. 579.
Glynn, S. and T.R. Koballa, The contextual teaching and learning instructional approach. Exemplary science: Best practices in professional development, 2005. 75: p. 84.
Mangkhang, C., et al., Area-Based Learning Approach to the Competency Development of Social Studies Pre-Service Teachers in the Chiangmai Education Sandbox Area, Thailand. Journal of Education and e-Learning Research, 2021. 8(3): p. 264-271.
Caena, F. and C. Redecker, Aligning teacher competence frameworks to 21st century challenges: The case for the European Digital Competence Framework for Educators (Digcompedu). European journal of education, 2019. 54(3): p. 356-369.
Slavkin, M.L., Authentic learning: How learning about the brain can shape the development of students. 2004: R&l Education.
Barr, M.J. and G.S. McClellan, Budgets and financial management in higher education. 2018: John Wiley & Sons.
Kezar, A., Redesigning for Collaboration within Higher Education Institutions: An Exploration into the Developmental Process. Research in Higher Education, 2005. 46(7): p. 831-860.
Dahri, N.A., et al., Investigating the motivating factors that influence the adoption of blended learning for teachers' professional development. Heliyon, 2024. 10(15): p. e34900.
Zamiri, M. and A. Esmaeili, Methods and Technologies for Supporting Knowledge Sharing within Learning Communities: A Systematic Literature Review. Administrative Sciences, 2024. 14(1): p. 17