**THE DEVELOPMENT OF EFFECTIVE SCHOOL**
MANAGEMENT INDICATORS IN EASTERN REGION OF THAILAND

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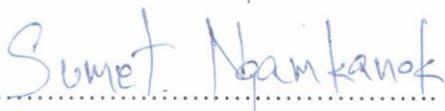
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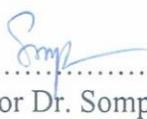
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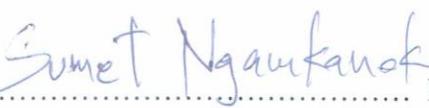
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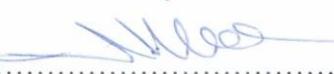
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The purposes of this research were 1) To construct the indicators of effective school management, 2) To validate the construct validity of the measurement model of factor analysis indicators. The population of this research was teachers in Office of Primary Education Area in eastern region of Thailand. By using a stratified random sampling technique, the sample size of this research was 849 teachers; 400 respondents for Exploratory Factor Analysis (EFA) and 449 respondents for Confirmatory Factor Analysis (CFA). The research instrument was a questionnaire in order to validate the hypothesized model.

EFA result show that there are five underlying factors presented in this model consisted of 1) Academic administration (ACA) has five observed variables, 2) Monitoring, evaluation and supervision (MON) has 11 observed variables, 3) The efficiency of school administrators (EFF) has four observed variables, 4) Curriculum development (CUR) has six observed variables, and 5) Teacher training (TRA) has 10 observed variables. The Eigen value range from .52 to .83. The component of effective schools management indicators in eastern region of Thailand has more than 1 Eigen value for every value. The percentage of variance between 3.65 and 40.90 and the cumulative percentage of variance explain the variance of all five elements at 55.88 percent.

CFA results, the model fits with the empirical data. The Chi-square equals to 461.42 with a p-value of .10 and a degree of freedom of 424, RMSEA = .014. The factors loading of second order arrange from highest to lowest are as follow; TRA = .86, MON = .78, CUR and ACA = .76 and EFF = .60. The factor loading of first order is positive ranged from .53 to .83.

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CHAPTER 1
INTRODUCTION

Background of the study

From the government under the leadership of Prayut Chan-ocha, Prime Minister has an order regarding Eastern Economic Corridor: EEC on 17 January 2017 and the cabinet passed a resolution on 18 July 2017. In addition, the cabinet passed a resolution on 18 July 2017 to approve the strategy to support human resources support. Eastern Development Zone (2017-2021) and the Ministry of Education (SRT) have ordered the committee on the integration of education in the east and the development of education in the EEC area by the steering committee with the Education Minister (Thira Kiat Charoensethasilp) is the chairman and the steering committee with the Education Minister. (Surachet Chaiwong) is the president.

What is clearly seen in the education management is that the MOF has approved the educational development plan in the eastern region special development area for five years (2017-2021) by placing four main goals in educational management including 1) Learners have language skills using technology have new industry knowledge able to create innovation and have a good quality of life. 2) Administrators, teachers and educational personnel have new industry knowledge and have the potential to manage learning coupled with the practice from real situations or simulations. 3) Educational institutions are teaching resources for developing workforce. 4) Networks in all sectors, both domestic and international, are involved in educational management.

The development of management science is the gathering of knowledge regarding the principles of management: However, the application method may not work as desired on account of administration being a human-related task. Human beings are complex and vary according to their environment. It can be difficult to accurately predict human behavior. Therefore, it is imperative that continue to practice these principles of management, to help obtain the methods and techniques that are found in practice. Management with knowledge of management science is of great importance to apply this knowledge, as managers who hold insight regarding

management and management application, can lead the organization toward success (Putapumipitack & Kanyamon, 2011).

Numerous national and international studies in educational sociology have indicated that although family background plays a significant role in a student's academic performance, some intra-school factors could minimize the effect of social origin, promoting efficacy and fairness in the provision of school management (Brooke & Soares, 2008; Sammons, 2008).

Sammons (2008) conducted an extensive survey on results of research for school management from several countries in this area. The author synthesized eleven key efficacy factors that should be considered together, that is, in various possible associations between them: professional leadership; shared goals and visions; learning environment; concentration in teaching and learning; teaching and clear objectives; high expectations; positive incentives; monitoring progress; student rights and responsibilities; homeschool partnership; and learning-oriented settings. The author draws attention to questions regarding the context where these characteristics were identified, noting that these studies are not directly transferable to other contexts.

In the field of national educational research, this discussion is more recent. Alves and Franco (2008) have analyzed the context and research progresses on school effectiveness in Brazil and presented a review of national literature on this subject. Based on this survey, the authors summarize internal school factors associated with effectiveness addressed by national studies: school resources; school organization and management; academic climate; teacher training and salary; pedagogical emphasis. From this survey, significant clues about the positive effects of the first three factors on students' academic development have been found in national studies. The authors (Alves and Franco, 2008) cite, specifically, the research conducted on Brazilian schools that points out the perception of the principal's leadership and dedication as a feature directly associated with school effectiveness.

Promjai (2013) investigate develop of a management model for the administration of small sized-schools under the Office of Loei Educational Service Areas. The research findings revealed as follows: 1) The main problem of small sized school administration was the academic administration and small sized schools should be cooperative in workload administration. 2) The school management model was

found that the appropriate model was a small sized school collaborative administration center. This administrative center was established for two small sized schools or more to co-work on the management for three workloads: 2.1) academic workload concerning syllabus, instructional activities, supervision and following up and assessment and evaluation. 2.2) personal workloads concerning personnel allocation and development, and 2.3) general affair workloads concerning correspondence and secretariat work. The center was run by the executive committee who were officially appointed by the authorization of the Educational Service Area Office. According to the virtue of the B.E. 2547.

Educational Service Area Office Standard (2017) of the Bureau of Monitoring and Evaluation of Basic Education Management Office of the Basic Education Commission The Ministry of Education has determined that effective management and education standards consist of five indicators, namely 1) Academic administration 2) Budget management 3) Personnel management 4) Management general administration and 5) Monitoring evaluation and supervision of effective educational management.

SMART School (Office of Educational Strategy, 2016) The Bureau of Education has designated as a guide, or standard quality assessment guidelines Schools under Bangkok that each school must solve the problem of how to manage the elements, indicators and issue in order to evaluate the quality standards their schools passed the four level assessment criteria to SMART School consist of five indicators, namely 1) The efficiency of school administrators 2) Academic administration 3) Budget management 4) Personnel management and 5) Management general administration.

For studying effective school management indicators in Thailand, there are many studies found that the effective educational management indicator consists of 1) Academic, 2) Budget, 3) Personnel management, 4) General administration, 5) Monitoring, evaluation and supervision, 6) The efficiency of school administrators, 7) Professional development, 8) Curriculum development, 9) Teacher training, 10) Educational experimentation, 11) Clear operational philosophy, 12) Conducive learning environment, 13) Networking, 14) Parent participation and school, 15) Classroom instruction, 16) School community, 17) Learning organization,

18) Students are responsible, 19) Expectations for students and 20) Organization.

From the study of the school management and effective school management the researcher found that the indicators obtained from the research are large and repetitive. Therefore interested in developing and create a new model of effective school management indicators in eastern region of Thailand for a brief, accurate and complete so that can be used to cover all of the target points.

Research question

This research aims to development of effective schools management indicators in eastern region of Thailand. The objectives of the research are as follows.

1. What are the components and indicators of ESM.?

2. What are the quality of ESM indicator?

3. The measurement model of ESM indicator fit to the empirical data?

Research objectives

1. To construct indicators of ESM and excusive their quality.

2. To validate the construct validity of the measurement model of ESM indicators.

Conceptual framework

This conceptual framework for this thesis consists of the following steps. Analytical explanations, literary criticism, use of secondary data by studying and collecting data from relevant documents and research, including searching information from various electronic databases and identifying factors This is the reason for developing effective management indicators. (Regional Education Standards Bureau, 2017) component as the following: 1) Academic administration, 2) General administration, 3) Monitoring, evaluation and supervision, 4) The efficiency of school administrators, 5) Curriculum development and 6) Teacher training affects the management of effective. The study variables consist of the following 36 indicator.

Component 1: Academic administration

Component 2: General administration

Component 3: Monitoring, evaluation and supervision

Component 4: The efficiency of school administrators

Component 5: Curriculum development

Component 6: Teacher training

	1. Development of local curriculum framework.
	2. Promotion of curriculum development.
	3. The learning process is focused on learners.
Academic	4. Production, supply and development of learning media
administration	5. Measure, evaluate and apply.
	6. Develop, support, supervise, monitor and monitor.
	7. Research and apply.
	8. The development of student activities and care systems.
	9. Coordinating the promotion of individuals, families, NGOs, community organizations, NGOs, local government organizations. Professional organizations, institutes, religions, establishments and social institutions.

General administration
1. Development of information systems and networks.
2. Student census and student admissions
3. Site supervision utilities and environment
4. Development of operational standards.
5. Establishment of an internal control system.
6. Welfare teacher welfare and educational personnel
7. Raising resources for education

Monitoring, evaluation & supervision
1. Monitoring, checking, and evaluating the system.
2. Monitoring, evaluation and supervision of academic
3. Monitoring, evaluation of educational budget
4. Monitoring, evaluation of personnel management.
5. Monitoring and evaluation of general administration.
6. Implementing policies.

The efficiency of school administrators
1. Executives have leadership and good governance.
2. Support, supervise, monitor, procure, use, maintain, educational information technology.
3. Professional principal.
4. Leadership capacity, integrity, and managerial skills could encourage students to excel.

Curriculum development
1. Designed its own curriculum for teaching and learning.
2. Published its curriculum for teaching and learnin
3. The school has collaborated with other institutions on curriculum for teaching and learning.
4. Instructional develop standards-aligned units of instruction for each subject and grade.
5. Units of instruction include standards-based objectives
6. Objectives are leveled to target learning.

Teacher training
1. Solidly provided mentorship to student teachers.
2. There are special programs established to assist student teachers during their field experience.
3. Professional teachers.
4. Teacher reliable and effective teachers.

Management of effective

Figure 1 Research framework

Scope of the study

The researcher had determined scope of the study about the development for management indicators of effective as the following:

Participants

The population of this research was teachers in Office of Primary Education Area in eastern region of Thailand. By using a stratified random sampling technique, the sample size of this research were 849 teachers; 400 respondents for Exploratory Factor Analysis (EFA) and 449 respondents for Confirmatory Factor Analysis (CFA).

Content

This study is a research paper. Literary review analytical description uses secondary data by studying and compiling data from relevant documents and research, as well as searching data from various electronic databases and identifying factors. This is the reason for the development for management indicators of effective.

The study variables consisted of management of effective and effective management and education standards (County Office of Education, 2017) component as the following: 1) Academic administration, 2) General administration, 3) Monitoring, evaluation and supervision, 4) The efficiency of school administrators 5) Curriculum development and 6) Teacher training.

Definition of terms

1. Effective school management refer to driving policies into effective practices affecting the quality of educational management that is needed to occur to learners in basic education levels in the educational service area. There are five components as follows:

1.1 Academic administration component refer to educational management that affects the quality of learners by developing a local curriculum framework promote the development of school curriculum in accordance with early childhood education program core curriculum for basic education local curriculum framework and the needs of educational institutions organize the learning process that focuses on learners, with production, media development, learning tools of students to keep up with changes, measures, evaluations and results for improvement in quality

development, supervision, monitoring and quality inspection in accordance with the quality assurance system, conducting research, promoting research and bringing results research to develop academic work develop student development activities and support systems for students including coordination encourage local communities and society to participate in educational management is a network and learning source for development quality as well as driving the policy into practice fully and continuously.

1.1.1 Develop a local curriculum framework that is consistent with the target, local focus and local education plan 2017-2036.

1.1.2 Promote the development of school curriculum in accordance with the early childhood education curriculum Basic Education Core Curriculum Local curriculum framework and the needs of educational institutions.

1.1.3 Encourage educational institutions to organize learning processes that focus on learners.

1.1.4 Encourage and support educational institutions to produce, procure and develop media tools, various learning tools for learners to keep pace with changes.

1.1.5 Promote, support, measure, evaluate and apply the results in improving the quality of educational management of the educational area.

1.1.6 Develop, promote, support, supervise, monitor and monitor the quality of education in accordance with the educational quality assurance system.

1.1.7 Conduct research; promote research and applying research results to develop academic work.

1.1.8 Encourage and support educational institutions to develop student development activities and support systems for students.

1.1.9 Coordinating and encouraging individuals, families, private organizations, community organizations, private organizations, local administrative organizations professional organizations, religious institutions, enterprises and other social institutions participate in educational management including being a network and learning resource to improve the quality of education.

1.2 General administration component refer to coordinate, promote, support other administrative tasks with the development of information systems and networks preparing the student census and accepting students building care utilities

and environment development of operational standards, the establishment of internal control systems welfare of teachers and educational personnel mobilization of resources for education.

1.2.1 Development of information systems and networks.

1.2.2 Student census and student admissions.

1.2.3 Site supervision utilities and environment.

1.2.4 Development of operational standards.

1.2.5 Establishment of an internal control system.

1.2.6 Welfare teacher welfare and educational personnel.

1.2.7 Raising resources for education.

1.3 Monitoring, evaluation and supervision component refer to implementing policies into practice encourage the committee to improve and develop which is a mechanism to achieve the goal in order to continually use the development results.

1.3.1 The system of monitoring.

1.3.2 Supervision of academic education management.

1.3.3 Supervision of budget education management.

1.3.4 Supervision of educational management in personnel management.

1.3.5 Supervision of general administration.

1.3.6 Implementing policies into practice.

1.4 The efficiency of school administrators component refer to executives have leadership and good governance, support, supervise, monitor, procure, use, maintain, educational information technology for management and service management. Professional principal, integrity, and managerial skills could encourage students to excel.

1.5 Curriculum development component refer to teaching and learning management with other institutions, setting up standardized teaching units for each subject including setting objectives and criteria for learning standards to set learning goals for students.

1.6 Teacher training component refer to the school supports and organizes special programs to help teachers to learn a new knowledge. Pushing teachers to

upgrade to become professionals and effective, able to realize the expectations of the principal and parents.

2. Effective school refer to both an educational movement which examines school-based factors which positively influence learning outcomes in schools.

3. Effective refers to creating results for success and achieving objectives.

Different:

Effective: Adequate to accomplish a purpose; producing the intended or expected result.

Efficient: Performing or functioning in the best possible manner with the least waste of time and effort.

	Inefficient	Efficient
Effective	Pursuing right goals, but inefficient (costs are high)	Pursuing right goals and efficient (high-ROI, cost-efficient)
Ineffective	Pursuing wrong goals and inefficient (not producing enough and are expensive)	Pursuing wrong goals but is efficient (not producing enough but low-cost)

Pursuit of Appropriate Goals / Doing Right Things

Use of Resources / Doing Things Right

Figure 2 Efficiency vs. effectiveness is with the 2×2

Source: Insightsquared (2013, para, 5)

CHAPTER 2
LITERATURE REVIEW

This chapter presents relevant studies to serve as a backdrop and guide for the readers and researcher for effective schools management indicators in eastern region of Thailand. The subject included four different focal sections, as shown in following topics:

    1. Educational world class

    2. Indicator development

    3. Indicators of effective school

    4. Factor analysis

    5. Related research

Educational world class

The origin of the development of educational management as a field of study began in the United States in the early part of the twentieth century. Development in the United Kingdom came as late as the 1960's. Educational management, as the name implies, operates in educational organizations or institutions.

There is no single accepted definition of educational management as its development observed in several disciplines or fields like business, industry, political science, economics, administration and law. So while defining the meaning of the term educational management can be said that, Educational management is a complex human enterprise in which different resources are brought together and made available to achieve and to accomplish the desire and expected goals or objectives.

It is being mainly a human endeavor should be properly planned without emphasizing the rigid application of mechanical and physical principles. It is fundamentally a social organization where inter human relationships must play.

A major role. For success of educational management, there must be adequate freedom and flexibility on the one hand and necessary discipline and decorum on the other hand in the educational institution.

Thus management of education or educational management implies the practical measures for ensuring the system to work for achieving the goals or objectives of an educational institution. So educational management operates in educational organizations or institutions.

There is no single accepted definition of educational management as its development has drawn heavily on several disciplines like economics, sociology and political science. But some specialists in this area have propounded their views in the form of giving their definitions on educational management which are given below (Kashyap, 2019).

Educational management, also sometimes known as educational administration, is commonly associated with elementary and secondary schools as well as institutes of higher learning like colleges and universities. Educational management professionals can also be found working in governmental agencies, private companies, and not-for-profit organizations. Those working in educational management might act as policy-makers, researchers, or consultants to help evaluate and develop ways to enrich and enhance the educational system at all levels. Most educational management professionals have earned at least a master's degree and many are licensed teachers or principals. Educational management is the theory and practice of the organization and administration of existing educational establishments and systems (Bagrinovskiy & Bendikov, 2010). Management implies an orderly way of thinking. It describes in operator terms what is to be done, how it is to be done and how we know when have done. Management is not a mystique. It is a method of operation. Go management should result in an orderly integration of education and society. School management, as a body of educational doctrines, comprises a number of principles and precepts relating primarily to the technique of classroom procedure and derives largely from the practice of successful teachers. The writers in the field have interpreted these principles and precepts in various ways, usually with reference to longer and more fundamental principles of psychology, sociology and ethics (Carter & Cunningham, 2009).

The concept of management

The concept of management overlaps with other similar terms, leadership and administration. Management is famous and used for instance in Great Britain,

Europe as well as Africa, on the other hand, the term administration is preferred in The United States, Canada, and Australia. The concept of leadership is of tremendous interest in most countries in the developed World at the present times. Management refers to the set of actions and tasks in relevance to application of the highest order of organization and effectiveness to use resources within to achieve the objectives of the organization (Sapre, 2002). Educational management may even be considered a (logy) by itself when it comes to the management of educational organizations (Bush, 2003). In essence, educational management is all about factual application of management principles in education fields. In the words of Mr. Gerald Ngugi Kimani it is plain as observe that educational administration and management are two applied fields of study (Kimani, 2011).

Educational management is an applied field of management. One can therefore deduce that educational management refers to the application of theory and practice of management to the field of education or educational Institutions. Educational administration is a process of acquiring and allocating resources for the achievement of predetermined educational goals.

Definitions of educational management

The concept of leadership is of tremendous interest in most countries in the developed world at the present times. Management refers to the set of actions and tasks in relevance to application of the highest order of organization and effectiveness to use resources within to achieve the objectives of the organization (Sapre, 2002). Educational management may even be considered a (logy) by itself when it comes to the management of educational organizations (Bush, 2003). In essence, educational management is all about factual application of management principles in education fields. In the words of Kimani (2011) it is plain as observe that educational administration and management are two applied fields of study.

Monore (2002) School management, as a body of educational doctrine, comprises a number of principles and precepts relating primarily to the technique of classroom procedure and derived largely from the practice of successful teachers. The writers in this field have interpreted these principles and precepts in various ways, usually by reference to larger and more fundamental principles of psychology, sociology and ethics.

Thus educational management is a comprehensive effort dealing with the educational practices. It is the dynamic side of education. It deals with educational institutions-right from the schools and colleges to the secretariat. It is concerned with both human and material resources. The human elements include: 1) Children 2) Parents 3) Teachers and 4) Other employees in general.

Gerry and Thomas (1978) The process of planning, organizing, directing and controlling the activities of an institution by utilizing human and material resources so as to effectively and efficiently accomplish functions of teaching, extension work and research. Theory and practice of the organization and administration of existing educational establishments and systems.

Binary University of Management Entrepreneurship (2018) Management in education consists the process of planning, organizing, directing and controlling the activities of an institution by using to the optimum human, material and financial resources so as to effectively and efficiently accomplish the function of teaching, extension work and research. The MSc in Education Management provides opportunities for academic and professional development that encourages intellectual engagement, reflection and debate

In the light of above discussion it is clear to visualize that educational management is a comprehensive effort intended to achieve some specific educational objectives. It deals with the educational practices, whereas educational philosophy sets the goals, educational psychology explains the principles, educational administration tells how to achieve educational objectives and principles. It is the dynamic side of education.

It deals with educational institutions right from the schools and colleges to the secretariat. It is concerned with both human and material resources which are essential. Because the degree of success of the educational management of any educational programs depends upon the degree of co-ordination and organization of these resources.

Functions of educational management

Fayol (1917) in his original work, administration industrielle et generale; prevoyance, organisation, commandement, coordination, controle, five primary functions were identified says about:

1. Planning

2. Organizing

3. Staffing

4. Directing

5. Controlling

Principles of management

1. Division of work - In practice, employees are specialized in different areas and they have different skills. Different levels of expertise can be distinguished within the knowledge areas (from generalist to specialist). Personal and professional developments support this. According to Fayol specialization promotes efficiency of the workforce and increases productivity. In addition, the specialization of the workforce increases their accuracy and speed. This management principle of the 14 principles of management is applicable to both technical and managerial activities.

2. Authority - Fayol, the accompanying power or authority gives the management the right to give orders to the subordinates, 14 principles of Fayol.

3. Discipline - This third principle of the 14 principles of management is about obedience. It is often a part of the core values of a mission and vision in the form of good conduct and respectful interactions 14 principles of management.

4. Unity of command - Every employee should receive orders from only one superior or behalf of the superior.

5. Unity of direction - Each group of organizational activities that have the same objective should be directed by one manager using one plan for achievement of one common goal.

6. Subordination of Individual Interest - The interests of any one employee or group of employees should not take precedence over the interests of the organization as a whole.

7. Remuneration - All Workers must be paid a fair wage for their services.

8. Centralisation and decentralization - Centralisation refers to the degree to which subordinates are involved in decision making.

9. Scalar chain - The line of authority from top management to the lowest ranks represents the scalar chain. Communications should follow this chain.

10. Order - This principle is concerned with systematic arrangement of men, machine, material etc. There should be a specific place for every employee in an organization.

11. Equity - Managers should be kind and fair to their subordinates.

12. Stability of tenure of personnel - High employee turnover is inefficient. Management should provide orderly personnel planning and ensure that replacements are available to fill vacancies.

13. Initiative - Employees who are allowed to originate and carry out plans will exert high levels of effort.

14. Esprit de corps - Promoting team spirit will build harmony and unity within the organization.

Fayol came up with his theories almost a century ago many of his principles are still represented in contemporary management theories (Peaucelle & Guthrie, 2012).

Functions of management

Management has been described as a social process involving responsibility for economical and effective planning and regulation of operation of an enterprise in the fulfillment of given purposes. It is a dynamic process consisting of various elements and activities. These activities are different from operative functions like marketing, finance, purchase etc. Rather these activities are common to each and every manger irrespective of his level or status.

Different experts have classified functions of management. There are four fundamental functions of management i.e. planning, organizing, actuating and controlling.

Fayol, to manage is to forecast and plan, to organize, to command, and to control. Whereas Luther Gullick has given a keyword' POSDCORB' where P for Planning, O for Organizing, S for Staffing, D for Directing, Co for Co-ordination, R for reporting and B for Budgeting. But the most widely accepted are functions of management given by KOONTZ and O'DONNEL i.e. planning, organizing, staffing, directing and controlling.

For theoretical purposes, it may be convenient to separate the function of management but practically these functions are overlapping in nature i.e. they are

highly inseparable. Each function blends into the other and each affects the performance of others.

In 1976, Koontz and O'Donnell (1976) published an essay management: A systems and contingency analysis of managerial functions. They felt the previous studies have been effective in describing the functions, but believed the division should be more detailed. Koontz and O'Donnell believed there to be five key functions of management:

1. Planning

2. Organizing

3. Staffing

4. Directing

5. Controlling
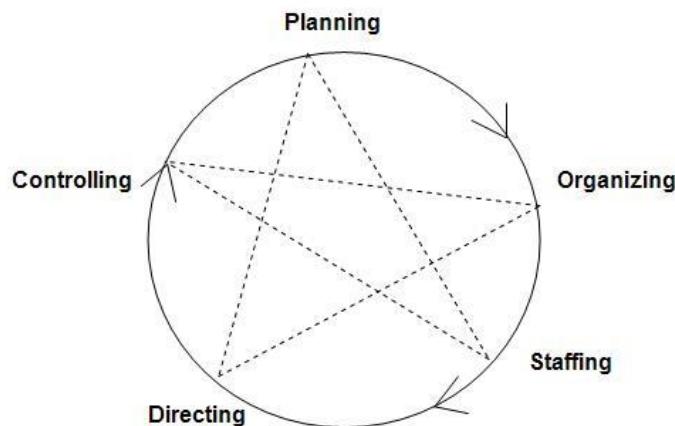
Figure 3 Another way to illustrate efficiency vs. effectiveness

Source: Managementstudyguide (2015, para, 13)

1. Planning

It is the basic function of management. It deals with chalking out a future course of action and deciding in advance the most appropriate course of actions for achievement of pre-determined goals. Planning is deciding in advance-what to do, when to do and how to do. It bridges the gap from where we are and where we want to be. A plan is a future course of actions. It is an exercise in problem solving and decision making. Planning is determination of courses of action to achieve desired

goals. Thus, planning is a systematic thinking about ways and means for accomplishment of pre-determined goals. Planning is necessary to ensure proper utilization of human and non-human resources. It is all pervasive, it is an intellectual activity and it also helps in avoiding confusion, uncertainties, risks, wastages etc.

Anastasia (2017) the first managerial function involves planning. The function is about creating a detailed plan towards achieving a specific organizational objective. When you are planning, you are identifying the tasks, which are required to achieve the desired goals, outlining how the tasks should be performed, and identifying when and by whom they must be performed. The focus of planning is about achieving the objectives and it does require knowledge of the organization's objectives and vision. You will need to look both at the short and long term success of the organization as part of the plan.

As you might realize, planning is on on-going function. Management will regularly have to plan the future tasks and adjust the plans based on the organizational situation and the achievement of previous goals. Furthermore, it requires the whole organization to work together as the different departments or team plans need to link to each other and align with the organizational objective. Fayol called the function the most difficult to achieve. You need a lot of knowledge and flexibility in order to plan activities effectively.

Why is planning essential?

Why is planning important? Planning provides the organization a better sense of what it wants to achieve and how it can achieve this. You essentially have more focus when you plan for things. Think what would happen if you went into a big job interview without any planning.

You might be OK, but you wouldn't be able to focus on the details and it might take time for you conduct your answers. But if you plan for the interview, you know exactly the points you want to make, you have enough knowledge to respond to specific questions about the company and so on.

In effect, planning ensures the proper utilization of the available resources and the ability to understand how these should be used in order to achieve the goal. In the example of the interview, the planning helps you take advantage of information

on company websites, research interview questions and to then use this information to outline example answers.

A key part of planning is also the vital role it plays in reducing risks. When management plans for the tasks ahead, they are looking at the situation and detailing the possible pitfalls ahead. As with your interview, the risk of not knowing anything about the company or giving an incoherent answer is higher than if you had planned your answers a little.

How to plan?

Planning is an intellectual activity that doesn't always require a lot of visible labor and effort, as much of it is about thinking creatively about the issue at hand. When you need to come engage in planning, you should focus on the following steps:

Gain knowledge of the issue: You need to understand the organizational objectives, the different components they involve, and the available resources you and the team have. You also need to be knowledgeable of the topic at hand. In terms of increasing sales, you need to have an understanding of how the sales industry works and what different methods can effectively boost company sales.

Look into the future: The function is about understanding the short and long term objectives the organization wants to achieve. You need to consider not just these different elements, but also be able to make predictions about the future conditions for achieving these. Perhaps you have noticed changes in customer behavior due to the downturn in the economy. When you are planning, you need to take into account these little nuances.

Determine the objectives: Once you are aware of the organizational objective, the resources available, and the future outlook to achieving the objectives, you need to identify the specific processes and detailed goals that are required to achieve the bigger goal. You might want to create a marketing campaign to increase sales, which requires the team to conduct market research and to come up with ideas. The more detailed objectives and processes you can set, the better the plan is.

Create flexible structures: However, you're planning needs to be flexible and take into account things don't always go according to plan. Your management plan must take into account the other departments and their specific organizational

goals. Perhaps the financial team has to cut down costs for the sales team and you need to be aware of the impact this would have on your new marketing campaign.

2. Organizing

It is the process of bringing together physical, financial and human resources and developing productive relationship amongst them for achievement of organizational goals. Fayol, to organize a business is to provide it with everything useful or its functioning i.e. raw material, tools, capital and personnel's. To organize a business involves determining and providing human and non-human resources to the organizational structure. Organizing as a process involves:

- Identification of activities.
- Classification of grouping of activities.
- Assignment of duties.
- Delegation of authority and creation of responsibility.
- Coordinating authority and responsibility relationships.

Anastasia (2017) the next function of management follows planning and it is about organizing. It's about using the plan to bring together the physical, financial and other available resources and use them to achieve the organizational goal. If your task were to increase sales, you would look at the plan and determine how to divide the resources you have in order to put your plan in place.

The marketing campaign would be handed out the Becky and you would provide them with the financial resources available and needed to give birth to the campaign. You would also need to ensure the team has access to the customer files in order to utilize vital information. You'd then direct Danny and his team to calculate the possible reductions you can make, help them have the resources to determine which products are best to discount and so on.

You'd use the above plan and information about the resources you have or which you need, and arrange the resources to the right tasks. As the example shows, this can be about arranging the finances, ensuring the right equipment is used and appointing the personnel to the specific tasks.

Your objective as the manager is to provide your team or department the resources it needs to turn the plan into reality. The organizing function is about the overall structure of the specific managerial level. You are creating the foundations to

everyday operations by organizing the resources. This function is closely linked to the hierarchy of management.

Depending on your management level, you will have different responsibilities and resources to organize. The top-level managers need to organize the teams below them, while the lower-level managers will be partly taking orders for effective organizing from the managers above. Organizing is a vital part of ensuring the company can function effectively and it concerns the day-to-day activities.

Why is organizing essential?

While it might be difficult to work without a plan, it can be impossible for an organization to function without organizing. The function is vital because it ensures there is structure to the operations. You are aware of the resources and you ensure they are used in a manner that best helps the company to achieve its targets.

In terms of finances, organizing can guarantee you don't waste money on functions that don't provide the right results. If you don't organize the right persons to do the right jobs, you might damage productivity. If you know Sarah is talented in accounting, you don't want to put her in charge of marketing. By organizing the resources, you ensure operational efficiency and structure. The company's day doesn't start in chaos, with people trying to figure out what they are supposed to do. Organizing puts the plan in action.

Without organizing, resources wouldn't necessarily work towards the operational goals. While you might have the team still doing tasks, the tasks might not be the correct ones for the situation. Consider you are a manager of a team in a cafe. When you organize the team to perform the tasks required to boost coffee sales, you have each person working towards the goal. Jerry might be greeting customers and telling them about the new coffee flavor, while Dina and Jack are working to make the sale and the coffee as quickly as possible.

If you hadn't organized them, you might end up with a situation where Jerry is wiping the floors (although they are clean) and Dina is working alone at the counter.

How to organize?

When done efficiently, organizing tends to follow the pattern and steps outlined below:

Identify activities and classify them: The step is straightforward enough because you already have a plan. Your objective is to identify the different roles, processes, and activities required to achieve the objectives. These would be the roles for the team members, the different tasks each role would need to perform and the specific processes the tasks would include.

Assign the duties and resources: Once you've identified the above, you would begin organizing the resources. You would assign the specific tasks for the persons you feel are the most qualified and provide the resources to the processes, which most need them.

Delegate authority and create responsibilities: Managers shouldn't behave like dictators. Although the power is concentrated to your as the manager, it doesn't mean you should have all the authority. In order the get the marketing campaign working properly, you might want to ensure the person in charge of the team has the authority to make decisions. You need devolution of responsibility, as it can ensure the plan works efficiently.

Co-ordinate authority and responsibilities: As well as delegating authority, you also need to co-ordinate it to match the overall functionality of the organization and the structure of the objectives. For example, you might want two people to share the responsibility of organizing the price reductions, with each having the ability to respond to supplier queries. Furthermore, if you have other managers above you, it's important to co-ordinate the authority to ensure the functionality doesn't suffer as a result of different plans.

3. Staffing

It is the function of manning the organization structure and keeping it manned. Staffing has assumed greater importance in the recent years due to advancement of technology, increase in size of business, complexity of human behavior etc. The main purpose to staffing is to put right man on right job i.e. square pegs in square holes and round pegs in round holes. Kootz and O'Donell, Managerial function of staffing involves manning the organization structure through proper and effective selection, appraisal and development of personnel to fill the roles designed the structure. Staffing involves:

- Manpower Planning (estimating man power in terms of searching, choose the person and giving the right place).

- Recruitment, selection & placement.

- Training & development.

- Remuneration.

- Performance appraisal.

- Promotions & transfer.

Anastasia (2017) the staffing function is an increasingly important function of management, although it is sometimes left out when the core functions are discussed. It can be seen closely related to organizing, with both focused on ensuring the resources are directed to the right processes and tasks. For staffing, the focus is on people and their labor in relation to the organizational objectives.

The function aims to ensure the organization always has the right people in the right positions and the organizational structure isn't hindered by lack or excess of personnel. You would essentially be looking at the tasks ahead of you and determining who should do what and if you have the right manpower to achieve the objectives you want.

In terms of hitting your sales targets, you would need to analyze if the current staff is capable of performing the tasks and whether you have enough employees to ensure the integrity of the organization. You might find the marketing team to be too small and consider hiring a temporary or even full-time worker.

The reason staffing is included as a separate function and why it's a crucial part of management is due to the changing nature of the workforce and the organization. Today's companies are much more complex in terms of where and when they operate-companies aren't confined between national boundaries anymore. Technology has also had a huge impact on company structures, requiring new positions and destroying others.

Whereas your car sales company might have mainly relied on face-to-face sales in the past, today you might also do business online, which would mean you need people for IT-specific roles and perhaps fewer salespersons. Management has also become more focused on the human behavioral aspect of leadership. Finding the right company fit, ensuring employees are satisfied, and guaranteeing emotional

wellbeing as well as physical work safety has emphasized the importance of staffing as a function.

Why is staffing essential?

As the above showed, staffing's importance as a core function of management has increased in the past few decades. But having the right amount of staff and the right people doing the required roles isn't just crucial because of changing technology of enhanced focus on complex human behavior. Staffing is essential to guarantee the operational functionality of the organization.

If you don't have the right amount of people working in your organization, you make achieving organizational goals harder. You might either be in a situation where you can't increase the sales, as you don't have the manpower to respond to company queries. On the other hand, you might be wasting resources by having too many employees with not enough tasks to perform. The numbers do matter.

Staffing also guarantees the staff you have is qualified to perform the tasks and that they are adequately supported in those roles. This will further deepen the organizational efficiency, since people are motivated and qualified to work towards the common objective. You can't hire a plumber if you are hoping to fix the roof. Furthermore, even the most qualified of employees need the occasional help and support. The staffing function helps create these development opportunities.

How to staff?

Koontz and O'Donell, staffing involves manning the organization structure through proper and effective selection, appraisal and development of personnel to fill the roles designed on the structure. It consists of a number of separate functions, which are:

Manpower planning: You need to stay on top of staffing, as manpower requirements can change from season to season. Planning would see you make estimations of the number of employees you need, searching for the right kind of employees, and hiring the perfect employees to the roles in front of you.

Recruitment, selection and placement: Another key function is the actual recruitment process, with its various steps.

Training and development: Staffing also includes the creation of structures, which ensure the employees are always on top of the latest skills in the position and the industry. You should also consider training programs in terms of succession, as you need to ensure the next generation of managers and leaders is coming through your organization.

Remuneration: A big part of the function is the financial aspect. Staff remuneration is keys in terms of attracting the right talent without damaging the organization's finances. If you aren't offering a competitive remuneration package, the applicants will go to your competitors.

Performance appraisal: You must also create structures of feedback within the organization. Feedback can play a crucial role in motivating and developing employees; with the reward structures ensuring good behavior is supported and noticed.

Promotions and transfers of roles: Related to the above two points, promotions are essential for staffing operations. You can reward and motivate the staff by offering enough opportunities to climb up the career ladder. Creating structures for role transfers and promotions also ensure the talent and knowledge you've attracted doesn't leave elsewhere.

4. Directing

It is that part of managerial function which actuates the organizational methods to work efficiently for achievement of organizational purposes. It is considered life-spark of the enterprise which sets it in motion the action of people because planning, organizing and staffing are the mere preparations for doing the work. Direction is that inert-personnel aspect of management which deals directly with influencing, guiding, supervising, motivating sub-ordinate for the achievement of organizational goals. Direction has following elements:

- Supervision - implies overseeing the work of subordinates by their superiors. It is the act of watching and directing work and workers.

- Motivation - means inspiring, stimulating or encouraging the sub-ordinates with zeal to work. Positive, negative, monetary, non-monetary incentives may be used for this purpose.

- Leadership - may be defined as a process by which manager guides and influences the work of subordinates in desired direction.

- Communications - is the process of passing information, experience, opinion etc. from one person to another. It is a bridge of understanding.

Anastasia (2017) the fourth function is known as directing, sometimes also referred to as the influencing or the leading function of management. Directing is about the actuation of the methods to work efficiently to achieve the set organizational objectives. The function goes beyond organizing the employees to their specific roles and involves ensuring they are able to perform the tasks through variety of means. Directing in essence is looking after productivity and ensuring productivity is going up instead of decreasing.

The function delves deeper inside human interaction, making the manager motivate, communicate and inspire his or her personnel. At this stage, you are meeting and connecting with your employees to find out how the tasks are going. You would talk to them about the new marketing program, get their feedback on the project and spend time inspiring them with new ideas. The directing function is all about the day-to-day interaction between the management and the staff.

The function of directing has strong links to things such as leadership. A good manager will be able to inspire the workforce to work towards the goals not because they have to do it, but because they are driven to achieve these objectives. The manager's role is not just about ensuring the workplace has the right resources and employees know what they are doing; it's also important to create an environment of friendship. The manager wants to be someone who can encourage and motivate the personnel and not fear them into submission. With proper directing, you are able to set in motion the processes you've prepared with the above three functions.
Why is directing essential?

Directing has an important role in an organization as it helps strengthen the operational capability of the organization. It does so by ensuring the different parts of the organization are working better. Directing is a bridge between the operational needs and the human requirements of its employees. You essentially create a link between the necessity of turning in a profit, with the need of keeping employees

motivated and interested. Since directing aims to improve productivity, you are strengthening how well the organization succeeds.

Research has pointed out how important human-focused management is in today's organization. When objectives are approached from a human perspective that aims to ensure people's opinions are listened to, the goals are met faster than in task-oriented environments. The management's ability to listen to the workforce, support and inspire them will boost the productivity and profitability of the organization.

If you listen to your team's concerns and perhaps provide them inspiration with quotes, films or the occasional days out of the office, you can refresh their resolve to achieve the goal. If you just throw a blank paper in front of them and tell them to write a story, they are less likely to remain interested.

How to direct?

You can direct and lead your team by utilizing four key methods based on the findings of human behavioral studies. These are:

Supervision: You need to oversee the work your employees are doing. The method requires watching and monitoring the performance, but also supporting and guiding the employees when things are not going as planned. You could use evaluation reports, examine the quality of work, and be present during certain parts, such as team meetings or when the person is talking to clients. In terms of support, you want to discuss the work and how it's moving along. You also want to provide materials that can help the employee perform better.

Communication: Directing is built around effective communication. As a manager, you need to create an environment that supports different communication methods from passing information to exchanging opinions. The important thing is to ensure these different communication channels are not just between manager and subordinate, but also between employees and different management levels.

Motivation: As mentioned above, big part of directing is about inspiring and motivating your employees. You need them to get behind the objectives to ensure there is enthusiasm to achieve the goals. Motivating as a manager includes positive and negative feedback, provision of ideas and the opportunities to develop skills

further. Directing might also have an element of monetary or non-monetary incentives, such as the introduction of bonuses.

Leadership: Managers must essentially act more like leaders when directing the workforce. This means that you need to occasionally motivate and inspire by setting an example, instead of simply telling the subordinates what they need to do. You want to get hands on with the work and be part of the process of achieving the objectives. Although managers and leaders tend to differ, leadership skills are something a good manager should keep in mind.

The function might seem rather complex and getting it right might be harder than any of the other functions of management. You should watch the video of Jim White, professor emeritus at North Lake College, explaining directing as a function and giving his take on what he thinks are the three key elements of directing: leading, motivating and communicating.

5. Controlling

It implies measurement of accomplishment against the standards and correction of deviation if any to ensure achievement of organizational goals. The purpose of controlling is to ensure that everything occurs in conformities with the standards. An efficient system of control helps to predict deviations before they actually occur. Theo Haimann, controlling is the process of checking whether or not proper progress is being made towards the objectives and goals and acting if necessary, to correct any deviation. Koontz and O'Donell controlling is the measurement and correction of performance activities of subordinates in order to make sure that the enterprise objectives and plans desired to obtain them as being accomplished. Therefore controlling has following steps:

- Establishment of standard performance.
- Measurement of actual performance.
- Comparison of actual performance with the standards and finding out deviation if any.
- Corrective action.

Anastasia (2017) the final function of management is controlling. The function ensures the other four functions are followed correctly and the flow of work is moving the organization towards the objectives it has set itself.

Theo Haimann (1962) has put it, controlling is the process of checking whether or not proper progress is being made towards the objectives and goals and acting if necessary, correct any deviation.

The control function, from the French controller, is used in the sense that manager must receive feedback about a process in order to make necessary adjustments and must analyze the deviations. Lately scholars of management combined the commanding and coordinating function into one leading function.

Controlling requires you to examine the objectives in a measurable manner. You essentially need to set standards, which guarantee you know exactly what you want to achieve and what counts as success or failure. But controlling is also function that due to the set of standards will ensure you have the ability to correct behaviors when they deviate from the standards. In essence, controlling is about quality monitoring. You are looking at the processes and ensuring they achieve the right things for the organization.

Why is controlling essential?

Controlling's most important function is the risk-reduction ability. Since you are essentially monitoring the performance of the team and comparing it against the objectives you've set, you can react to problems more easily. Instead of realizing at the end of the month that you've missed your sales target by a huge margin, you can keep an eye on the situation during the process.

If you notice the marketing campaign, for example, is not producing any new customers or leading to increased sales, you can re-tweak it to better attract customers. With the re-tweak, you might be able to change the campaign's attractiveness and recover the situation. This could end up guaranteeing you meet the sales target at the end of the month.

Even if you miss the target, you might not miss it by as much and you've at least had the chance of correcting the situation. With controlling, you are reducing the risk of failure and the impact of failing to meet your objectives. As mentioned, even if you happen to fail, you're prepared for it and you can start analyzing the reasons behind it immediately.

In the business world, measuring performance can be the difference between the successful and the failing companies. Think about a start-up. If the

management doesn't have a set of standards to measure its performance against, they don't have any idea what success or failure looks like. Even when they have a set of objectives and they know whether they met them or not, they don't have any more information to go by.

Let's say they want to earn $100,000 in the first three months. Without standards and proper control, after three months all they know is whether they earned it or not. They won't know the why. Was the success down to the product? Did the marketing help? How much did their social media strategy push sales? Was it all about the saving mechanisms they put in place? In the end, understanding the reasons behind success or failure will help the business perform better.

How to control?

For controlling to be effective, you need to take the four steps of this specific function of management:

Establish standards of performance: You first need to establish the standards of performance you are aiming for. These must be set with the organizational objectives in mind. You look at the objectives and the plan you have set, creating a set of measurements that would tell you are on the right path. For example, let's say you want the manufacturing team to make 10 more shoes every day to boost productivity. Your first measurement would be the team creating 10 shoes, but you could include other factors to the set of standards. You might look to reduce the downtime by ensuring problems are fixed within 30 minutes and add a new person in the chain to fasten the process by 10 minutes.

Measure the actual performance: Once you've set the standards and you've set the new processes in motion, you can start monitoring the actual performance. The monitoring process will depend on your standards and the ease of measurement. Part of the process can be performance reviews, actual quantifiable data and so on. The key is to start collecting the information from the start.

Compare the actual performance with the expected standards: As you receive performance data, you can start comparing it with the standards you've set. The comparison helps you to identify the problem areas or notice patterns that are actually working more efficiently.

Take corrective action: With the data you've collected and the information you have about performance, you can take any necessary corrective action. If the recovery team is not repairing the machinery quickly enough, you can look deeper into it and find ways to boost the performance. On the other hand, you might notice the team is producing more shoes than you expected, which could help you revise your objectives.

Indicator development

The indicator development process has steps similar to the steps in the process of measuring variables but there are more steps in relation to combining variables into indicators and checking the quality of the developed indicators. Steps in the process of developing indicators that scholars have similar characteristics there are differences in some steps (Blank, 1993; Johnstone, 1981; Burstein, Oakes, & Guiton, 1992; Nardo et al., 2005). Important step in the development of the six-stage indicator is the determination of the objectives of the indicator development. Defining an indicator data gathering indicator creation Indicator quality inspection and report presentation the details of each step are as follows:

Objectives

The first step in the development of the indicator is to determine the purpose of the indicator development. The assessor must determine in advance what indicators to be developed and how to use the indicators. The key objective in developing indicators is to develop and check the quality indicators that have been developed. To be used with the indicators developed for different uses there are different characteristics such as indicators developed to assess the quality of education. Should be a criteria-based type indicator to assess the progress of operations should be criteria-based type indicator to assess the progress of operations. Should be a type of identification based on and indicators for classification of education systems in many countries should be indicators of group-based types will develop indicators to use, do what and how useful is the operation determining the objective of developing a clear indicator will result in high quality indicators, and is beneficial for the desired purpose

Definition of indicator

After determining the objectives of the indicator development the first important task in the indicator development process is to define the indicator definition because the definitions of the given indicators will guide the methods that must be used in the next step of the indicator development process because the indicator refers to an element consisting of sub-variables together to display information or the characteristics of what is needed to indicate Therefore, in the process of defining this indicator In addition to defining definitions in the same manner as the definition of general research variables. The assessor must also determine what indicators contain sub-variables and include sub-variables as indicators. Burstein, Oakes and Guiton separates the definition of the indicator into two parts. The first part is to define the conceptual framework or creating a concept (Conceptualization) is to give meaning to the characteristics of things that need to be identified by determining the form or conceptual model of things that need to indicate before that there are components separated into a number of dimensions and that each dimension consists of a concept. The second part is separated into sections. Sub is the development of component variables or development of component measures and building and defining metrics (Construction and scaling). Definition in this section is the definition of operating variables, sub-variables according to the concept model and determining how to combine sub-variables into indicators.

From the definition of the indicator assessors will the structural relationship model of the indicator due to the relationship model. The structure of the indicator is the structure that describes what the indicator consists of. How are sub-variables related to indicators? And each sub-variable has different weight, what is the significance of the indicator? Therefore, defining the indicator definition consists of three detailed specifications. The first is the component or component variables of the indicator. The assessor relies on knowledge from the theory, and experience studying related sub-variables (Relate) and relevant (Relevant) with indicators and deciding to select those sub-variables how many sub-variables are used what type sub-variables are used in the development? The second indicator is the combination method. Sub-variables and decide how to combine sub-variables to get an indicator which generally can be done in two types, including sub-variables with addition and

multiplication. The third part is weighting. Sub-variables are included as indicators. The assessor must determine the weight instead of the importance of each sub-variable in the creation of an indicator and may assign all sub-variables to have the same weight or different.

Determining all three details for defining the indicator, Johnstone explains that it can be done in three ways. Each method is appropriate for the situation, and there are ways to develop different indicators as follows:

1. Developing indicators using pragmatic definition.

Operational definition is a definition used in cases where data about the sub-parameters associated with the indicator are collected. Already has a database or have already created variables from many sub-variables the assessor's only use judgment to select variables from the existing database and develop indicators by determining how to combine sub-variables, and determine the weight, importance of sub-variables the method of defining an indicator of this method relies on the decision and experience of the assessor only. Which may cause a biased definition, because there is no theoretical reference or checking the relationship between variables, therefore is the definition that has the most weakness compared to other definitions and rarely used.

2. Development of indicators using theoretical definition.

Theoretical definition it is the time when the assessors use the theory to support the decision of the researchers, and use the researcher's judgment less than other definitions an indicator using theoretical definitions can be done in two ways. The first is the theory and research papers are all fundamentally supported since the assignment of sub-variables determining how to combine sub-variables and weight determination of sub-variables which may use models or formulas to create indicators according to which all developers have developed, and research papers as a basis for frequent variable selection and determining how to combine sub-variables only in the process of determining the weight of each sub-variable Is the use of expert opinions or experts in decision making this method is used in cases where no one has already defined the formula or the indicator model.

3. Developing indicators using empirical definition.

Empirical definition is a definition that is similar to the theoretical definition because it defines what the indicator consists of, and formulating the method of combining variables to get an indicator with the theory academic papers or basic research but the weighting of each variable that will be combined in the development of the indicator does not rely on the direct theory. But based on empirical data analysis this definition is appropriate, and is popularly used today

When considering the methods of defining the three indicators of Johnstone's mentioned above, compared with the method of defining two methods used in general research, it can be seen that Johnstone's emphasizes the theory of abstract level definition. Or defining a structure with the theory and research papers as the basis for definition the method of defining the three indicators, especially two methods, Johnstone's back, all must have a theoretical basis. Therefore it can be said that the definition of all methods in the determination of sub-variables and determining how to combine variables into the structure definition according to the whole theory as for the classification, the method of definition is only divided by using criteria to determine whether the sub-variable weight will use the theory. Or empirical data only in conclusion, the empirical definition is comparable to the theoretical definition. Differ in determining the weight of sub-variables in the first method in the latter method using empirical data.

In the number of methods for defining the three indicators of Johnstone's methods described above empirical definition method is the most popular method the notable issue of determining the empirical definition are weight determination of that sub-variable. In fact, it is not the definition of the study of documents and theories. But is conducting research using empirical data and when comparing empirical definitions that require research to define with research that analyzes the linear structural relationship model or a linear structure model or LISREL model can be seen that there is a consistent method due to the empirical definition of the indicator, there are two important tasks.

The first part is to define the relationship structure model that the indicator consists of what sub-variables and how, with the theory as the basis for support.

The model is a measurement model that shows the relationship between sub-variables which are observed variables and indicators which are latent variables.

The second task is to determine the weight, importance of sub-variables from empirical data by research. This part of the work is a research that uses the LISREL model analysis. That is, researchers have to collect data including various sub-variables according to the model developed, and then analyzed to obtain the weight value of the sub-variable that will be used to create the indicator the most commonly used analytical method is factor analysis. It is used when the theory supports strong, strong models, and can check the validity of the model by considering the consistency between the theoretical model and the data when found that the model is straight therefore, the equation shows the relationship between the variable and the weight value. The significance of the sub-variable is to create a latent variable (Wiraschai, 2008)

Indicators of effective school

Indicators are used at different levels of the education system for different purposes. At the national level, they provide a means of evaluating how well the system is performing in particular areas of policy interest, for example: education and learning outcomes, student engagement and participation, family and community engagement, and resourcing. This information is supplemented by a range of demographic and contextual data (Ministry of Education, 2015) and by ERO's national reports on education issue and effective education practice. The selection of an indicator depends on the purpose for which it is to be used. Indicators that are used primarily for accountability purposes typically demand quantitative measures such as scores or ratings. On their own, quantitative data cannot reflect the complexity of a school and its community and they are unlikely to have much effect on school improvement. When used for improvement purposes, indicators generally demand qualitative data. Using them effectively requires a deep understanding of change theory, iterative use of evidence, and the continuing development of evaluative capacity (Earl, 2014).

Indicators of effective practice school: center on innovation and improvement complete list is for continuous school improvement italicized indicators

are for rapid school improvement from handbook on restructuring and substantial school improvement school community indicators from the mega system: deciding, learning, and connecting. See these sources for explication and underlying research (www.centerii.org).

1. Leadership and decision - making

A. Team structure

Effective practice: Establish a team structure with specific duties and time for instructional planning.

Indicators of effective practice

1. A team structure is officially incorporated into the school improvement plan and school governance policy.

2. All teams have written statements of purpose and by-laws for their operation.

3. All teams operate with work plans for the year and specific work products to produce.

4. All teams prepare agendas for their meetings.

5. All teams maintain official minutes of their meetings.

6. The principal maintains a file of the agendas, work products, and minutes of all teams.

7. A leadership team consisting of the principal, teachers who lead the instructional teams, and other key professional staff meets regularly (twice a month or more for an hour each meeting).

8. The leadership team serves as a conduit of communication to the faculty and staff.

9. The leadership team shares in decisions of real substance pertaining to curriculum, instruction, and professional development.

10. The school's leadership team regularly looks at school performance data and aggregated classroom observation data and uses those data to make decisions about school improvement and professional development needs.

11. Teachers are organized into grade-level, grade-level cluster, or subject-area instructional teams.

12. Instructional teams meet regularly (twice a month or more for 45 minutes each meeting) to conduct business.

13. Instructional teams meet for blocks of time (four to six hour blocks, once a month; whole days before and after the school year) sufficient to develop and refine units of instruction and review student learning data.

14. A school community council consisting of the principal, parent facilitator, social worker or counselor, and parents oversees family-school relationships and the curriculum of the home.

15. A majority of the members of the school community council are parents of currently enrolled students and are not also employees of the school.

16. The school community council meets regularly (twice a month for an hour each meeting).

B. Principal's role

Effective practice: Focus the principal's role on building leadership capacity, achieving learning goals, and improving instruction.

Indicators of effective practice

1. The principal makes sure everyone understands the school's mission, clear goals (short term and long term), and their roles in meeting the goals.

2. The principal develops the leadership capacity of others in the school.

3. The principal communicates the likelihood of success based on the plan and hard work.

4. The principal models and communicates the expectation of improved student learning through commitment, discipline, and careful implementation of sound practices.

5. The principal participates actively with the school's teams.

6. The principal keeps a focus on instructional improvement and student learning outcomes.

7. The principal monitors curriculum and classroom instruction regularly.

8. The principal spends at least 50% of his/ her time working directly with teachers to improve instruction, including classroom observations.

9. The principal challenges, supports, and monitors the correction of unsound teaching practices.

10. The principal celebrates individual, team, and school successes, especially related to student learning outcomes.

11. The principal provides incentives for teacher and student accomplishment.

12. The principal personally engages parents and the community in the improvement process.

13. The principal offers frequent opportunities for staff and parents to voice constructive critique of the school's progress and suggestions for improvement.

2. Professional development

Effective practice: Align classroom observations with evaluation criteria and professional development.

Indicators of effective practice

2.1 The principal compiles reports from classroom observations, showing aggregate areas of strength and areas that need improvement without revealing the identity of individual teachers.

2.2 The leadership team reviews the principal's summary reports of classroom observations and takes them into account in planning professional development.

2.3 Professional development for teachers includes observations by the principal related to indicators of effective teaching and classroom management.

2.4 Professional development for teachers includes observations by peers related to indicators of effective teaching and classroom management.

2.5 Professional development for teachers includes self-assessment related to indicators of effective teaching and classroom management.

2.6 Teachers are required to make individual professional development plans based on classroom observations.

2.7 Professional development of individual teachers includes an emphasis on indicators of effective teaching.

2.8 Professional development for the whole faculty includes assessment of strengths and areas in need of improvement from classroom observations of indicators of effective teaching.

2.9 Teacher evaluation examines the same indicators used in professional development.

2.10 The principal plans opportunities for teachers to share their strengths with other teachers.

3. Parents and learning

Effective practice: Help parents to help their children meet standards.

Indicators of effective practice

3.1 Parent policies, activities, and programs cultivate the curriculum of the home.

3.2 Parents receive regular, jargon-free communication about learning standards, their children's progress, and the parents' role in their children's school success.

3.3 Parents receive practical guidance to maintain regular and supportive verbal interaction with their children.

3.4 Parents receive practical guidance to maintain daily conversations with their children about their school experiences and progress.

3.5 Parents receive practical guidance to establish a quiet place for children's studying at home and consistent discipline for studying at home.

3.6 Parents receive practical guidance to encourage their children's regular reading habits at home.

3.7 Parents receive practical guidance to model and encourage respectful and responsible behaviors.

3.8 Parents are given opportunities to meet with each other to share their child-rearing concerns and successes.

3.9 Parents are given opportunities to meet with teachers to discuss both their children's progress in school and their children's home-based study and reading habits.

3.10 Parent involvement policies, classroom visit policies, and homework policies are clear, constructive, and frequently communicated to parents and teachers.

3.11 The faculty, students, and parents regularly discuss the school's Compact that outlines key expectations of students, parents, and teachers.

3.12 The student report card shows the student's progress in meeting learning standards.

3.13 The student report card provides parents an opportunity to report on the student's home-based studying and reading habits.

4. Curriculum, assessment, and instructional planning

A. Aligned instruction

Effective practice: Engage teachers in aligning instruction with standards and benchmarks.

Indicators of effective practice

1. Instructional teams develop standards-aligned units of instruction for each subject and grade level.

2. Units of instruction include standards-based objectives and criteria for mastery.

3. Objectives are leveled to target learning to each student's demonstrated prior mastery based on multiple points of data (e.g., unit tests and student work).

B. Classroom assessment

Effective practice: Engage teachers in assessing and monitoring student mastery.

Indicators of effective practice

1. Units of instruction include pre-/ post-tests to assess student mastery of standards-based objectives.

2. Unit pre-tests and post-tests are administered to all students in the grade level and subject covered by the unit of instruction.

3. Unit pre-test and post-test results are reviewed by the instructional team.

4. Teachers individualize instruction based on pre-test results to provide support for some students and enhanced learning opportunities for others.

5. Teachers re-teach based on post-test results.

C. Differentiated instruction

Effective practice: Engage teachers in differentiating and aligning learning activities.

Indicators of effective practice

1. Units of instruction include specific learning activities aligned to objectives.

2. Instructional teams develop materials for their standards-aligned learning activities and share the materials among themselves.

3. Materials for standards-aligned learning activities are well-organized, labeled, and stored for convenient use by teachers.

D. Periodic assessment

Effective practice: Assess student learning frequently with standards-based assessments.

Indicators of effective practice

1. The school tests every student annually with the same standardized test in basic subject areas so that each student's year-to-year progress can be tracked.

2. The school tests each student at least three times each year to determine progress toward standards-based objectives.

3. Teachers receive timely reports of results from standardized and objectives-based tests.

4. The school maintains a central database that includes each student's test scores, placement information, demographic information, attendance, data, behavior indicators, and other variables useful to teachers.

5. Teams and teachers receive timely reports from the central database to assist in making decisions about each student's placement and instruction.

6. Yearly learning goals are set for the school by the leadership team utilizing student learning data.

7. The leadership team monitors school-level student learning data.

8. Instructional teams use student learning data to assess strengths and weaknesses of the curriculum and instructional strategies.

9. Instructional teams use student learning data to plan instruction.

10. Instructional teams use student learning data to identify students in need of instructional support or enhancement.

11. Instructional teams review the results of unit pre-/ post-tests to make decisions about the curriculum and instructional plans and to red flag students in need

of intervention (both students in need of tutoring or extra help and students needing enhanced learning opportunities because of early mastery of objectives).

5. Classroom instruction

A. Instructional preparation and delivery

Effective practice: Expect and monitor sound instruction in a variety of modes.

Indicators of effective practice

Instruction — preparation

1. All teachers are guided by a document that aligns standards, curriculum, instruction, and assessment.

2. All teachers develop weekly lesson plans based on aligned units of instruction.

3. All teachers use objectives-based pre-tests.

4. All teachers use objectives-based post-tests.

5. All teachers maintain a record of each student's mastery of specific learning objectives.

6. All teachers test frequently using a variety of evaluation methods and maintain a record of the results.

7. All teachers differentiate assignments (individualize instruction) in response to individual student performance on pre-tests and other methods of assessment.

Instruction — teacher – directed — introduction

1. All teachers review the previous lesson.

2. All teachers clearly state the lesson's topic, theme, and objectives.

3. All teachers stimulate interest in the topics.

4. All teachers use modeling, demonstration, and graphics.

Instruction — teacher – directed — presentation

1. All teachers proceed in small steps at a rapid pace.

2. All teachers explain directly and thoroughly.

3. All teachers maintain eye contact.

4. All teachers speak with expression and use a variety of vocal tones.

5. All teachers use prompting/ cueing.

Instruction — teacher – directed — summary and confirmation

1. All teachers re-teach when necessary.

2. All teachers review with drilling/ class recitation.

3. All teachers review with questioning.

4. All teachers summarize key concepts.

Instruction — interaction

1. All teachers re-teach following questioning.

2. All teachers use open-ended questioning and encourage elaboration.

3. All teachers' re-direct student questions.

4. All teachers encourage peer interaction.

5. All teachers encourage students to paraphrase, summarize, and relate.

6. All teachers encourage students to check their own comprehension.

7. All teachers verbally praise students.

Instruction — student - directed (Group or individual)

1. All teachers travel to all areas in which students are working.

2. All teachers meet with students to facilitate mastery of objectives.

3. All teachers encourage students to help each other with their work.

4. All teachers interact instructionally with students (explaining, checking, giving feedback).

5. All teachers interact managerially with students (reinforcing rules, procedures).

6. All teachers interact socially with students (noticing and attending to an ill student, asking about the six. weekend, inquiring about the family).

7. All teachers verbally praise students.

Instruction computer based

1. Students are engaged and on task.

2. Students are comfortable with the program and its navigation.

3. All teachers travel about the room to assist students.

4. All teachers have documentation of the computer program's alignment with standards-based objectives.

5. All teachers maintain a record of student mastery of standards-based objectives.

6. All teachers assess student mastery in ways other than those provided by the computer program.

B. Homework practices and communication with parents

Effective practice: Expect and monitor sound homework practices and communication with parents.

Indicators of effective practice

1. All teachers maintain a file of communication with parents.

2. All teachers regularly assign homework (four or more days a week).

3. All teachers check, mark, and return homework.

4. All teachers include comments on checked homework.

5. All teachers count homework toward the student's report card grade.

6. All teachers systematically report to parents the student's mastery of specific standards-based objectives.

C. Classroom management

Effective practice: Expect and monitor sound classroom management.

Indicators of effective practice

1. When waiting for assistance from the teacher, students are occupied with curriculum-related activities provided by the teacher.

2. Transitions between instructional modes are brief and orderly.

3. Students maintain eye contact and are attentive.

4. Students raise hands or otherwise signal before speaking.

5. All teachers use a variety of instructional modes.

6. All teachers maintain well-organized student learning materials in the classroom.

7. All teachers display completed student work in the classroom.

8. All teachers display classroom rules and procedures in the classroom.

9. All teachers correct students who do not follow classroom rules and procedures.

10. All teachers reinforce classroom rules and procedures by positively teaching them.

11. All teachers conduct an occasional "behavior check"

12. All teachers engage all students (e.g., encourage silent students to participate).

6. School community

A. Purpose, policies, and practices

Effective practice: Define the purpose, policies, and practices of the school community.

Indicators of effective practice

1. The school's homework policy requires homework at all grade levels.

2. The school's homework policy makes homework a part of the student's report card grade.

3. The school's homework policy stresses the importance of checking, marking, and promptly returning homework.

4. The school's mission statement, compact, and homework policy are included in the school improvement plan.

5. The school recognizes the accomplishments of teams (e. g., teacher teams, and school councils).

6. The school regularly and clearly communicates with parents about its expectations of them and the importance of the curriculum of the home.

7. The school maintains a program of home visits by teachers, staff, and/or trained community members.

8. The school's mission statement is distinct, clear, and focused on student learning.

9. The school's compact outlines the responsibilities/ expectations of teachers, parents, and students.

10. The school's compact includes responsibilities/ expectations of parents drawn from the curriculum of the home.

11. The school's compact is annually distributed to teachers, school personnel, parents, and students.

12. The school's homework policy provides guidelines for the amount of daily study time at home by grade level.

13. The school celebrates its accomplishments.

14. The school recognizes the individual accomplishments of teachers.

B. Communication

Effective practice: Provide two-way, school-home communication linked to learning.

Indicators of effective practice

1. The school's compact, homework policy, and learning standards are routinely reviewed and discussed at faculty meetings.

2. The school's compact, homework policy, and learning standards are routinely reviewed and discussed at open houses and parent-teacher conferences.

3. Parent-teacher conferences are held at least twice a year and include students at least once a year.

4. The "ongoing conversation" between school personnel and parents is candid, supportive, and flows in both directions.

5. Teachers regularly make "interactive" assignments that encourage parent-child interaction relative to school learning.

6. The school maintains a program of home gatherings, with groups of parents meeting in a home with a teacher.

7. Teachers are familiar with the curriculum of the home and discuss it with parents.

8. Parents are familiar with the curriculum of the home and discuss it with teachers.

C. Education

Effective practice: Educate parents to support their children's learning and teachers to work with parents.

Indicators of effective practice

1. Parent education programs include some multi-session group experiences with specific agendas.

2. Professional development programs for teachers include assistance in working effectively with parents.

3. Parent education programs are led by trained parent leaders.

4. The school offers parent education programs focused on building skills relative to the curriculum of the home.

D. Connection

Effective practice: Connect members of the school community to support student learning.

Indicators of effective practice

1. The school provides "intergenerational associations" in which students of different ages are brought together to learn.

2. The school provides "intergenerational associations" in which parents or community volunteers assist in the classroom.

3. The school provides opportunities for parents to get to know each other and discuss the curriculum of the home.

4. The school's policies encourage parents to visit classrooms.

5. The school has a parent-friendly document that outlines the rules for parent visits to classrooms.

6. The school sponsors all-school events that include parents, students, and teachers and focus on aspects of student learning.

7. All-school events include parent-child interactive activities.

8. Office and support staff members are trained to make the school a "welcoming place" for parents.

Factor analysis

Factor Analysis (FA) is an exploratory technique applied to a set of observed variables that seeks to find underlying factors (subsets of variables) from which the observed variables were generated. For example, an individual's response to the questions on a college entrance test is influenced by underlying variables such as intelligence, years in school, age, emotional state on the day of the test, amount of practice taking tests, and so on. The answers to the questions are the observed variables. The underlying, influential variables are the factors.

Factor analysis is carried out on the correlation matrix of the observed variables. A factor is a weighted average of the original variables. The factor analyst hopes to find a few factors from which the original correlation matrix may be generated.

Usually the goal of factor analysis is to aid data interpretation. The factor analyst hopes to identify each factor as representing a specific theoretical factor. Therefore, many of the reports from factor analysis are designed to aid in the interpretation of the factors.

Another goal of factor analysis is to reduce the number of variables. The analyst hopes to reduce the interpretation of a 200-question test to the study of four or five factors. One of the most subtle tasks in factor analysis is determining the appropriate number of factors.

Factor analysis has an infinite number of solutions. If a solution contains two factors, these may be rotated to form a new solution that does just as good a job at reproducing the correlation matrix. Hence, one of the biggest complaints of factor analysis is that the solution is not unique. Two researchers can find two different sets of factors that are interpreted quite differently yet fit the original data equally well (Tabachnick, 1989).

Basic idea of factor analysis as a data reduction method

Combining two variables into a single factor, you can summarize the correlation between two variables in a scatterplot. A regression line can then be fitted that represents the best summary of the linear relationship between the variables. If we could define a variable that would approximate the regression line in such a plot, then that variable would capture most of the essence of the two items. Subjects' single scores on that new factor, represented by the regression line, could then be used in future data analyses to represent that essence of the two items. In a sense we have reduced the two variables to one factor. Note that the new factor is actually a linear combination of the two variables.

Principal components analysis, the example described above, combining two correlated variables into one factor, illustrates the basic idea of factor analysis, or of principal components analysis to be precise (we will return to this later). If we extend the two-variable example to multiple variables, then the computations become more involved, but the basic principle of expressing two or more variables by a single factor remains the same.

Extracting principal components, we do not want to go into the details about the computational aspects of principal components analysis here, which can be found

elsewhere (references were provided at the beginning of this section). However, basically, the extraction of principal components amounts to a variance maximizing (varimax) rotation of the original variable space. For example, in a scatterplot we can think of the regression line as the original X axis, rotated so that it approximates the regression line. This type of rotation is called variance maximizing because the criterion for (goal of) the rotation is to maximize the variance (variability) of the new variable (factor), while minimizing the variance around the new variable.

Generalizing to the case of multiple variables, when there are more than two variables, we can think of them as defining a space, just as two variables defined a plane. Thus, when we have three variables, we could plot a three dimensional scatterplot, and, again we could fit a plane through the data. With more than three variables it becomes impossible to illustrate the points in a scatterplot. However the logic of rotating the axes so as to maximize the variance of the new factor remains the same.

Multiple orthogonal factors. After we have found the line on which the variance is maximal, there remains some variability around this line. In principal components analysis, after the first factor has been extracted, that is, after the first line has been drawn through the data, we continue and define another line that maximizes the remaining variability, and so on. In this manner, consecutive factors are extracted. Because each consecutive factor is defined to maximize the variability that is not captured by the preceding factor, consecutive factors are independent of each other. Put another way, consecutive factors are uncorrelated or orthogonal to each other.

How many factors to extract? Remember that, so far, we are considering principal components analysis as a data reduction method, that is, as a method for reducing the number of variables. The question then is, how many factors do we want to extract? Note that as we extract consecutive factors, they account for less and less variability. The decision of when to stop extracting factors basically depends on when there is only very little "random" variability left. The nature of this decision is arbitrary; however, various guidelines have been developed, and they are reviewed in reviewing the results of a principal components analysis under eigenvalues and the number of factors problem.

Reviewing the results of a principal components analysis. Without further ado, let us now look at some of the standard results from a principal components analysis. To reiterate, we are extracting factors that account for less and less variance. To simplify matters, you usually start with the correlation matrix, where the variances of all variables are equal to 1.0. Therefore, the total variance in that matrix is equal to the number of variables. For example, if we have 10 variables each with a variance of one then the total variability that can potentially be extracted is equal to 10 times one. Suppose that in the satisfaction study introduced earlier we included 10 items to measure different aspects of satisfaction at home and at work. The variance accounted for by successive factors would be summarized as follows:

Eigenvalues

In the second column (eigenvalue) above, we find the variance on the new factors that were successively extracted. In the third column, these values are expressed as a percent of the total variance (in this example, 10). As we can see, factor one account for 61 percent of the variance, factor two for 18 percent, and so on. As expected, the sum of the eigenvalues is equal to the number of variables. The third column contains the cumulative variance extracted. The variances extracted by the factors are called the eigenvalues. This name derives from the computational issues involved.

Eigen values and the number of factors problem

Now that we have a measure of how much variance each successive factor extracts, we can return to the question of how many factors to retain. As mentioned earlier, by its nature this is an arbitrary decision. However, there are some guidelines that are commonly used, and that, in practice, seem to yield the best results.

The Kaiser criterion. First, we can retain only factors with Eigen values greater than one. In essence this is like saying that, unless a factor extracts at least as much as the equivalent of one original variable, we drop it. This criterion was proposed by Kaiser (1960), and is probably the one most widely used. In our example above, using this criterion, we would retain two factors (principal components).

The scree test. A graphical method is the scree test first proposed by Cattell (1966). We can plot the eigenvalues shown above in a simple line plot. Cattell suggests to find the place where the smooth decrease of eigenvalues appears to level

off to the right of the plot. To the right of this point, presumably, you find only "factorial scree" - "scree" is the geological term referring to the debris which collects on the lower part of a rocky slope. According to this criterion, we would probably retain two or three factors in our example.

Which criterion to use. Both criteria have been studied in detail (Browne, 1968; Cattell & Jaspers, 1967; Hakstian, Rogers, & Cattell, 1982; Linn, 1968; Tucker, Koopman & Linn, 1969). Theoretically, you can evaluate those criteria by generating random data based on a particular number of factors. You can then see whether the number of factors is accurately detected by those criteria. Using this general technique, the first method (Kaiser criterion) sometimes retains too many factors, while the second technique (scree test) sometimes retains too few; however, both do quite well under normal conditions, that is, when there are relatively few factors and many cases. In practice, an additional important aspect is the extent to which a solution is interpretable. Therefore, you usually examine several solutions with more or fewer factors, and choose the one that makes the best "sense." We will discuss this issue in the context of factor rotations below.

Principal factors analysis

Before we continue to examine the different aspects of the typical output from a principal components analysis, let us now introduce principal factors analysis. Let us return to our satisfaction questionnaire example to conceive of another "mental model" for factor analysis. We can think of subjects' responses as being dependent on two components. First, there are some underlying common factors, such as the "satisfaction-with-hobbies" factor we looked at before. Each item measures some part of this common aspect of satisfaction. Second, each item also captures a unique aspect of satisfaction that is not addressed by any other item.

Communalities. If this model is correct, then we should not expect that the factors will extract all variance from our items; rather, only that proportion that is due to the common factors and shared by several items. In the language of factor analysis, the proportion of variance of a particular item that is due to common factors (shared with other items) is called communality. Therefore, an additional task facing us when applying this model is to estimate the communalities for each variable, that is, the proportion of variance that each item has in common with other items. The proportion

of variance that is unique to each item is then the respective item's total variance minus the communality. A common starting point is to use the squared multiple correlation of an item with all other items as an estimate of the communality (refer to multiple regression for details about multiple regression). Some authors have suggested various iterative "post-solution improvements" to the initial multiple regression communality estimate; for example, the so-called MINRES method (minimum residual factor method; Harman & Jones, 1966) will try various modifications to the factor loadings with the goal to minimize the residual (unexplained) sums of squares.

Principal factors vs. principal components. The defining characteristic then that distinguishes between the two factors analytic models is that in principal components analysis we assume that all variability in an item should be used in the analysis, while in principal factors analysis we only use the variability in an item that it has in common with the other items. A detailed discussion of the pros and cons of each approach is beyond the scope of this introduction (refer to the general references provided in principal components and factor analysis - introductory overview). In most cases, these two methods usually yield very similar results. However, principal components analysis is often preferred as a method for data reduction, while principal factors analysis is often preferred when the goal of the analysis is to detect structure (see factor analysis as a classification method).

Factor analysis as a classification method

Let us now return to the interpretation of the standard results from a factor analysis. We will henceforth use the term factor analysis generically to encompass both principal components and principal factors analysis. Let us assume that we are at the point in our analysis where we basically know how many factors to extract. We may now want to know the meaning of the factors, that is, whether and how we can interpret them in a meaningful manner. To illustrate how this can be accomplished, let us work "backwards," that is, begin with a meaningful structure and then see how it is reflected in the results of a factor analysis. Let us return to our satisfaction example; shown below is the correlation matrix for items pertaining to satisfaction at work and items pertaining to satisfaction at home.

The work satisfaction items are highly correlated amongst themselves, and the home satisfaction items are highly inter-correlated amongst themselves. The correlation across these two types of items (work satisfaction items with home satisfaction items) is comparatively small. It thus seems that there are two relatively independent factors reflected in the correlation matrix, one related to satisfaction at work, the other related to satisfaction at home.

Factor loadings

Let us now perform a principal components analysis and look at the two-factor solution. Specifically, let us look at the correlations between the variables and the two factors (or "new" variables), as they are extracted by default; these correlations are also called factor loadings.

Apparently, the first factor is generally more highly correlated with the variables than the second factor. This is to be expected because, as previously described, these factors are extracted successively and will account for less and less variance overall.

Rotating the factor structure

We could plot the factor loadings shown above in a scatterplot. In that plot, each variable is represented as a point. In this plot we could rotate the axes in any direction without changing the relative locations of the points to each other; however, the actual coordinates of the points, that is, the factor loadings would of course change. In this example, if you produce the plot it will be evident that if we were to rotate the axes by about 45 degrees we might attain a clear pattern of loadings identifying the work satisfaction items and the home satisfaction items.

Rotational strategies. There are various rotational strategies that have been proposed. The goal of all of these strategies is to obtain a clear pattern of loadings, that is, factors that are somehow clearly marked by high loadings for some variables and low loadings for others. This general pattern is also sometimes referred to as simple structure (a more formalized definition can be found in most standard textbooks). Typical rotational strategies are varimax, quartimax, and equamax.

We have described the idea of the varimax rotation before (see extracting principal components), and it can be applied to this problem as well. As before, we want to find a rotation that maximizes the variance on the new axes; put another

way, we want to obtain a pattern of loadings on each factor that is as diverse as possible, lending itself to easier interpretation. Below is the table of rotated factor loadings.

Interpreting the factor structure. Now the pattern is much clearer. As expected, the first factor is marked by high loadings on the work satisfaction items, the second factor is marked by high loadings on the home satisfaction items. We would thus conclude that satisfaction, as measured by our questionnaire, is composed of those two aspects; hence we have arrived at a classification of the variables.

Consider another example, this time with four additional Hobby/ Misc variables added to our earlier example. In the plot of factor loadings above, 10 variables were reduced to three specific factors, a work factor, a home factor and a hobby/ misc. factor. Note that factor loadings for each factor are spread out over the values of the other two factors but are high for its own values. For example, the factor loadings for the hobby/ misc variables (in green) have both high and low "work" and "home" values, but all four of these variables have high factor loadings on the "hobby/ misc" factor.

Oblique factors. Some authors (Cattell & Khanna, 1977; Harman, 1977; Jennrich & Sampson, 1966; Clarkson & Jennrich, 1988) have discussed in some detail the concept of oblique (non-orthogonal) factors, in order to achieve more interpretable simple structure. Specifically, computational strategies have been developed to rotate factors so as to best represent "clusters" of variables, without the constraint of orthogonality of factors. However, the oblique factors produced by such rotations are often not easily interpreted. To return to the example discussed above, suppose we would have included in the satisfaction questionnaire above four items that measured other, "miscellaneous" types of satisfaction. Let us assume that people' responses to those items were affected about equally by their satisfaction at home (factor one) and at work (factor two). An oblique rotation will likely produce two correlated factors with less-than-obvious meaning, that is, with many cross-loadings.

Hierarchical factor analysis. Instead of computing loadings for often difficult to interpret oblique factors, you can use a strategy first proposed by Thomson (1951) and Schmid and Leiman (1957), which has been elaborated and popularized in the

detailed discussions by Wherry (1959, 1975, 1984). In this strategy, you first identify clusters of items and rotate axes through those clusters; next the correlations between those (oblique) factors is computed, and that correlation matrix of oblique factors is further factor-analyzed to yield a set of orthogonal factors that divide the variability in the items into that due to shared or common variance (secondary factors), and unique variance due to the clusters of similar variables (items) in the analysis (primary factors). To return to the example above, such a hierarchical analysis might yield the following factor loadings:

Careful examination of these loadings would lead to the following conclusions:

1. There is a general (secondary) satisfaction factor that likely affects all types of satisfaction measured by the 10 items;

2. There appear to be two primary unique areas of satisfaction that can best be described as satisfaction with work and satisfaction with home life.

Wherry (1984) discusses in great detail examples of such hierarchical analyses, and how meaningful and interpretable secondary factors can be derived.

Confirmatory factor analysis. Over the past 15 years, so-called confirmatory methods have become increasingly popular (Joreskog & Sorbom, 1979). In general, you can specify a priori, a pattern of factor loadings for a particular number of orthogonal or oblique factors, and then test whether the observed correlation matrix can be reproduced given these specifications. Confirmatory factor analyses can be performed via Structural Equation Modeling (SEPATH).

Miscellaneous other issue and statistics

Factor scores. We can estimate the actual values of individual cases (observations) for the factors. These factor scores are particularly useful when you want to perform further analyses involving the factors that you have identified in the factor analysis.

Reproduced and residual correlations. An additional check for the appropriateness of the respective number of factors that were extracted is to compute the correlation matrix that would result if those were indeed the only factors. That matrix is called the reproduced correlation matrix. To see how this matrix deviates from the observed correlation matrix, you can compute the difference

between the two; that matrix is called the matrix of residual correlations. The residual matrix may point to "misfits," that is, to particular correlation coefficients that cannot be reproduced appropriately by the current number of factors.

Matrix Ill-Conditioning. If, in the correlation matrix there are variables that are 100% redundant, then the inverse of the matrix cannot be computed. For example, if a variable is the sum of two other variables selected for the analysis, then the correlation matrix of those variables cannot be inverted, and the factor analysis can basically not be performed. In practice this happens when you are attempting to factor analyze a set of highly inter-correlated variables, as it, for example, sometimes occurs in correlational research with questionnaires. Then you can artificially lower all correlations in the correlation matrix by adding a small constant to the diagonal of the matrix, and then re-standardizing it. This procedure will usually yield a matrix that now can be inverted and thus factor-analyzed; moreover, the factor patterns should not be affected by this procedure. However, note that the resulting estimates are not exact.

Factor analysis is a method for modeling observed variables, and their covariance structure, in terms of a smaller number of underlying unobservable (latent) factors. The factors typically are viewed as broad concepts or ideas that may describe an observed phenomenon. For example, a basic desire of obtaining a certain social level might explain most consumption behavior. These unobserved factors are more interesting to the social scientist than the observed quantitative measurements.

Factor analysis is generally an exploratory/ descriptive method that requires many subjective judgments. It is a widely used tool and often controversial because the models, methods, and subjectivity are so flexible that debates about interpretations can occur (Statsoft, 2019)

How many factors

Several methods have been proposed for determining the number of factors that should be kept for further analysis. Several of these methods will now be discussed. However, remember that important information about possible outliers and linear dependencies may be determined from the factors associated with the relatively small eigenvalues, so these should be investigated as well.

Kaiser (1960) proposed dropping factors whose eigenvalues are less than one since these provide less information than is provided by a single variable.

Jolliffe (1973) feels that Kaiser's criterion is too large. He suggests using a cutoff on the eigenvalues of 0.70 when correlation matrices are analyzed. Other authors note that if the largest eigenvalue is close to one, then holding to a cutoff of one may cause useful factors to be dropped. However, if the largest factors are several times larger than one, then those near one may be reasonably dropped.

Cattell (1966) documented the scree graph, which will be described later in this chapter. Studying this chart is probably the most popular method for determining the number of factors, but it is subjective, causing different people to analyze the same data with different results.

Another criterion is to preset a certain percentage of the variation that must be accounted for and then keep enough factors so that this variation is achieved. Usually, however, this cutoff percentage is used as a lower limit. That is, if the designated number of factors do not account for at least 50% of the variance, then the whole analysis is aborted.

Theoretical introduction

1. Factor analysis is a collection of methods used to examine how underlying constructs influence the responses on a number of measured variables.

2. There are basically two types of factor analysis: Exploratory and confirmatory.

2.1 Exploratory Factor Analysis (EFA) attempts to discover the nature of the constructs influencing a set of responses.

2.2 Confirmatory Factor Analysis (CFA) tests whether a specified set of constructs is influencing responses in a predicted way.

3. Both types of factor analyses are based on the common factor model, illustrated in Figure 4. This model proposes that each observed response (measure 1 through measure 5) is influenced partially by underlying common factors (factor 1 and factor 2) and partially by underlying unique factors (E1 through E5). The strength of the link between each factor and each measure varies, such that a given factor influences some measures more than others. This is the same basic model as is used for LISREL analyses.
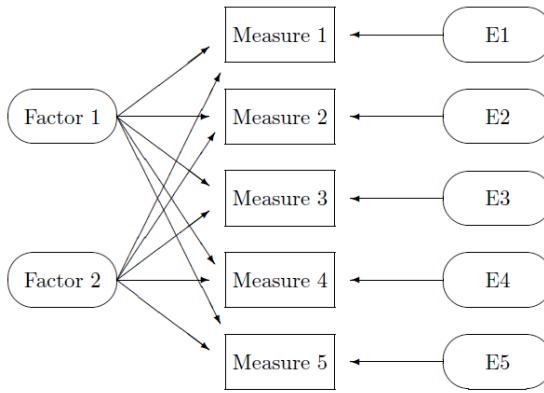
Figure 4 The common factor model (Source: DeCoster, 1998)

4. Factor analyses are performed by examining the pattern of correlations (or covariance) between the observed measures. Measures that are highly correlated (either positively or negatively) are likely influenced by the same factors, while those that are relatively uncorrelated are likely influenced by different factors.

Exploratory factor analysis

Objectives

1. The primary objectives of an EFA are to determine

    1.1 The number of common factors influencing a set of measures.

    2.2 The strength of the relationship between each factor and each observed measure.

2. Some common uses of EFA are to

    2.1 Identify the nature of the constructs underlying responses in a specific content area.

    2.2 Determine what sets of items/ hang together in a questionnaire.

    2.3 Demonstrate the dimensionality of a measurement scale. Researchers often wish to develop scales that respond to a single characteristic.

    2.4 Determine what features are most important when classifying a group of items.

    2.5 Generate/ factor scores representing values of the underlying constructs for use in other analyses.

Performing EFA

There are seven basic steps to performing an EFA:

1. Collect measurements. You need to measure your variables on the same (or matched) experimental units.

2. Obtain the correlation matrix. You need to obtain the correlations (or covariance) between each of your variables.

3. Select the number of factors for inclusion. Sometimes you have a specific hypothesis that will determine the number factors you will include, while other times you simply want your final model to account for as much of the covariance in your data with as few factors as possible. If you have k measures, then you can at most extract k factors. There are a number of methods to determine the "optimal" number of factors by examining your data. The Kaiser criterion states that you should use a number of factors equal to the number of the eigenvalues of the correlation matrix that are greater than one. The "scree test" states that you should plot the eigenvalues of the correlation matrix in descending order, and then use a number of factors equal to the number of eigenvalues that occur prior to the last major drop in eigenvalue magnitude.

4. Extract your initial set of factors. You must submit your correlations or covariance into a computer program to extract your factors. This step is too complex to reasonably be done by hand. There are a number of different extraction methods, including maximum likelihood, principal component, and principal axis extraction. The best method is generally maximum likelihood extraction, unless you seriously lack multivariate normality in your measures.

5. Rotate your factors to a final solution. For any given set of correlations and number of factors there are actually an infinite number of ways that you can define your factors and still account for the same amount of covariance in your measures. Some of these definitions, however, are easier to interpret theoretically than others. By rotating your factors you attempt to find a factor solution that is equal to that obtained in the initial extraction but which has the simplest interpretation. There are many different types of rotation, but they all try make your factors each highly responsive to a small subset of your items (as opposed to being moderately responsive to a broad set). There are two major categories of rotations, orthogonal

rotations, which produce uncorrelated factors, and oblique rotations, which produce correlated factors. The best orthogonal rotation is widely believed to be varimax. Oblique rotations are less distinguishable, with the three most commonly used being direct quartimin, promax, and Harris-Kaiser orthoblique.

6. Interpret your factor structure. Each of your measures will be linearly related to each of your factors. The strength of this relationship is contained in the respective factor loading, produced by your rotation. This loading can be interpreted as a standardized regression coefficient, regressing the factor on the measures.

You define a factor by considering the possible theoretical constructs that could be responsible for the observed pattern of positive and negative loadings. To ease interpretation you have the option of multiplying all of the loadings for a given factor by-one. This essentially reverses the scale of the factor, allowing you, for example, to turn an "unfriendliness" factor into a "friendliness" factor.

7. Construct factor scores for further analysis. If you wish to perform additional analyses using the factors as variables you will need to construct factor scores. The score for a given factor is a linear combination of all of the measures, weighted by the corresponding factor loading. Sometimes factor scores are idealized, assigning a value of one to strongly positive loadings, a value of-one to strongly negative loadings, and a value of 0 to intermediate loadings. These factor scores can then be used in analyses just like any other variable, although you should remember that they will be strongly collinear with the measures used to generate them.

Factor analysis vs. principal component analysis

1. Exploratory factor analysis is often confused with principal component analysis (PCA), a similar statistical procedure. However, there are significant differences between the two: EFA and PCA will provide somewhat different results when applied to the same data.

2. The purpose of PCA is to derive a relatively small number of components that can account for the variability found in a relatively large number of measures. This procedure, called data reduction, is typically performed when a researcher does not want to include all of the original measures in analyses but still wants to work with the information that they contain.

3. Differences between EFA and PCA arise from the fact that the two are based on different models. An illustration of the PCA model is provided in Figure 5. The first difference is that the direction of influence is reversed: EFA assumes that the measured responses are based on the underlying factors while in PCA the principal components are based on the measured responses. The second difference is that EFA assumes that the variance in the measured variables can be decomposed into that accounted for by common factors and that accounted for by unique factors. The principal components are defined simply as linear combinations of the measurements, and so will contain both common and unique variance.

4. In summary, you should use EFA when you are interested in making statements about the factors that are responsible for a set of observed responses, and you should use PCA when you are simply interested in performing data reduction.
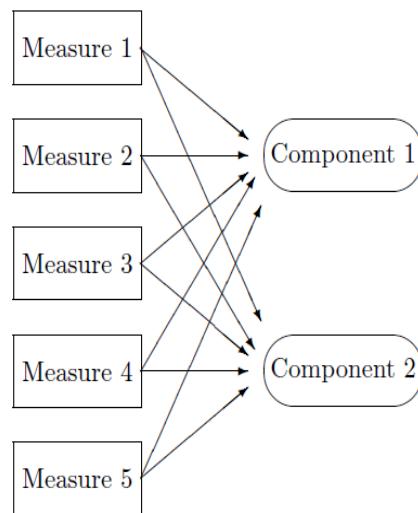
Figure 5 The model for principal components analysis (Source: DeCoster, 1998)

Miscellaneous notes on EFA

1. To have acceptable reliability in your parameter estimates it is best to have data from at least 10 subjects for every measured variable in the model. This number should be increased if you expect that the influence of the common factors is relatively weak. You should also have measurements from at least three variables for every factor that you want to include in your model.

2. You should endeavor to have a wide variety of measurements for your EFA. The more accurately that your selection of measurements properly represents the/ population of measurements that could be taken, the more generality you will have in your findings.

3. The procedures used to measure the fit of a model in CFA (described below) can also be used to test the fit of an EFA model. These tests reject the null hypothesis when the model does not fit, so you must be cautious interpreting the results. Even a very accurate model will generate a significant lack of fit statistic if the sample size is large.

4. EFA can be performed in SAS using proc factor. Principal component analysis can be performed in SAS using proc princomp, while it can be performed in SPSS using analyze/ data reduction/ factor analysis menu selection. EFA cannot actually be performed in SPSS (despite the name of menu item used to perform PCA). You can, however, simply use component scores for the same purposes as you would typically use for EFA.

Confirmatory Factor Analysis

Objectives

1. The primary objective of a CFA is to determine the ability of a predefined factor model to fit an observed set of data.

2. Some common uses of CFA are to

2.1 Establish the validity of a single factor model.

2.2 Compare the ability of two different models to account for the same set of data.

2.3 Test the significance of a specific factor loading.

2.4 Test the relationship between two or more factor loadings.

2.5 Test whether a set of factors are correlated or uncorrelated.

2.6 Assess the convergent and discriminant validity of a set of measures.

Performing CFA

There are six basic steps to performing a CFA:

1. Define the factor model. The first thing you need to do is to precisely define the model you wish to test. This involves selecting the number of factors, and defining the nature of the loadings between the factors and the measures.

These loadings can be fixed at zero, fixed at another constant value, allowed to vary freely, or be allowed to vary under specified constraints (such as being equal to another loading in the model).

2. Collect measurements. You need to measure your variables on the same (or matched) experimental units.

3. Obtain the correlation matrix. You need to obtain the correlations (or covariance) between each of your variables.

4. Fit the model to the data. You will need to choose a method to obtain the estimates of factor loadings that were free to vary. The most common model-fitting procedure is maximum likelihood estimation, which should probably be used unless your measures seriously lack multivariate normality. In this case you might wish to try using asymptotically distribution free estimation.

5. Evaluate model adequacy. When the factor model is fit to the data, the factor loadings are chosen to minimize the discrepancy between the correlation matrix implied by the model and the actual observed matrix. The amount of discrepancy after the best parameters are chosen can be used as a measure of how consistent the model is with the data.

The most commonly used test of model adequacy is the x^2 *goodness-of-fit* test. The null hypothesis for this test is that the model adequately accounts for the data, while the alternative is that there is a significant amount of discrepancy. Unfortunately, this test is highly sensitive to the size of your sample, such that tests involving large sample will generally lead to a rejection of the null hypothesis, even when the factor model is appropriate. Other statistics such as the Tucker-Lewis index, compare the fit of the proposed model to that of a null model. These statistics have been shown to be much less sensitive to sample size.

6. Compare with other models. If you want to compare two models, one of which is a reduced form of the other, you can just examine the difference between their x^2 statistics, which will also have an approximately x^2 distribution. Almost all tests of individual factor loadings can be made as comparisons of full and reduced factor models. In cases where you are not examining full and reduced models you can compare the Root mean square error of approximation (RMSEA), which is an estimate of discrepancy per degree of freedom in the model.

Miscellaneous notes on CFA

1. CFA has strong links to structural equation modeling, a relatively nonstandard area of statistics. It is much more difficult to perform a CFA than it is to perform an EFA.

2. A CFA requires a larger sample size than an EFA, basically because the CFA produces inferential statistics. The exact sample size necessary will vary heavily with the number of measures and factors in the model, but you can expect to require around 200 subjects for a standard model.

3. As in EFA, you should have at least three measures for each factor in your model. Unlike EFA, however, you should choose measures that are strongly associated with the factors in your model (rather than those that would be a random sample of potential measures).

4. CFA can be performed in SAS using proc calis, but cannot be performed in SPSS. However, SPSS does produce another software package called AMOS which will perform CFA. CFA are also commonly analyzed using LISREL.

Combining exploratory and confirmatory factor analyses

1. In general, you want to use EFA if you do not have strong theory about the constructs underlying responses to your measures and CFA if you do.

2. It is reasonable to use an EFA to generate a theory about the constructs underlying your measures and then follow this up with a CFA, but this must be done using separate data sets. You are merely fitting the data (and not testing theoretical constructs) if you directly put the results of an EFA directly into a CFA on the same data. An acceptable procedure is to perform an EFA on one half of your data, and then test the generality of the extracted factors with a CFA on the second half of the data.

3. If you perform a CFA and get a significant lack of fit, it is perfectly acceptable to follow this up with an EFA to try to locate inconsistencies between the data and your model. However, you should test any modifications you decide to make to your model on new data.

Factor analysis is a statistical method used to find a small set of unobserved variables (also called latent variables, or factors) which can account for the covariance among a larger set of observed variables (also called manifest variables). A factor is an unobservable variable that is assumed to influence observed variables. Scores on

multiple tests may be indicators of intelligence (Spearman, 1904); political liberties and popular sovereignty may measure the quality of a country's democracy (Bollen, 1980); or issue emphases in election manifestos may signify a political party's underlying ideology (Gabel & Huber, 2000). Factor analysis is also used to assess the reliability and validity of measurement scales (Carmines & Zeller, 1979).

Principle component analysis also reduces the number of variables, but it differs from principle factor analysis (Brown, 2006, p. 22). A factor (unobserved latent variable) is assumed to exert causal influence on observed variables, while the underlying causal relationship is reversed in principle component analysis; observed variables are linear combinations of latent variables in factor analysis, while principle components are (weighted) linear combinations of observed variables (Hatcher, 1994, pp. 9-10; p. 69). Principle components account for total variance, while factors account for the common variance (as opposed to unique variance) of a total variance (Brown, 2006, p. 22; Hatcher, 1994, p. 69).

In fact, CFA is a special case of the structural equation model (ESM), also known as the covariance structure (McDonald, 1978) or the linear structural relationship (LISREL) model (Joreskog & Sorbom, 2004). ESM consists of two components: a measurement model linking a set of observed variables to a usually smaller set of latent variables and a structural model linking the latent variables through a series of recursive and non-recursive relationships.

Model specification and path diagram

It is common to display confirmatory factor models as path diagrams in which squares represent observed variables and circles represent the latent variables, has two latent variables ξ_1 and ξ_2 in circles that are manifested by six observed variables x_1 through x_6 in squares. Single-headed arrows are used to imply a direction of assumed causal influence, and double-headed arrows represent covariance between two latent variables. Latent variables "Cause" the observed variables, as shown by the single-headed arrows pointing away from the circles and towards the manifest variables.

Table 1 Notation for confirmatory factor analysis

Name	Symbol	Matrix form	Description
Ksi	ξ		Latent variable
x	x	X	x x X Observed variable
Lambda	λ	Λ	Lambda λ Λ factor loading
Phi	ϕ	ϕ	Factor variance and covariance
Theta delta	δ	Θ	Error variance and covariance

(Source: Insightsquared, 2013)

The circles labeled ξ (ksi) represent latent variables or (common) factors. A factor can point to more than one observed variable; in Figure 6, ξ_1 causes three observed variables x_1 through x_3 and ξ_2 influences x_3 through x_6. The two ξ_i are expected to covary, as represented by ϕ_{21} on the two-headed arrow. Factor loadings are represented by λ_{ij}; $\lambda_3 1$ is, for example, the effect (regression slope) of ξ_1 on x_3. The squared factor loading $\lambda^2{}_{ij}$ is referred to as a communality representing the proportion of variance in the ith observed variable that is explained by the jth latent variable (Brown, 2006, p. 61). The circles labeled δ_i (delta) represent unique factors, Because they affect only a single observed variable. The δ_i in-corporate all the variance in each xi, such as measurement error, which is not captured by the common factors. Finally, error in the measurement of x_3 is expected to correlate to some extent with measurement error of x_6, as represented by δ_6 3.20 Table 1 summarizes CFA notation discussed so far.
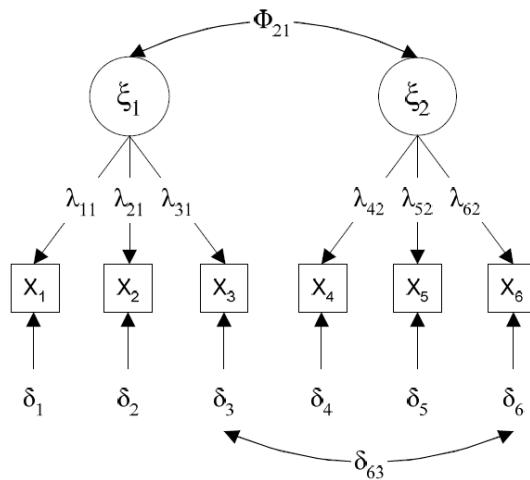
Figure 6 Path diagram of a confirmatory factor model (Source: Insightsquared, 2013)

When observed and latent variables are mean centered to have deviations from their means, the confirmatory factor model can be summarized by the equation

$$X = \Lambda\xi + \delta$$

In which X is the vector of observed variables, Λ (lambda) is the matrix of factor loadings connecting the ξ_i to the x_i, ξ is the vector of common factors, and δ is the vector of unique factors. It is assumed that the error terms have a mean of zero, $E(\delta) = 0$, and that the common and unique factors are uncorrelated, $E(\xi\delta') = 0$. Equation 1 can be rewritten as:

$$X_1 = \lambda_{11}\xi_1 + \delta_1 \quad X_2 = \lambda_{21}\xi_1 + \delta_2 \quad X_3 = \lambda_{31}\xi_1 + \delta_3$$
$$X_4 = \lambda_{41}\xi_1 + \delta_4 \quad X_5 = \lambda_{51}\xi_1 + \delta_5 \quad X_6 = \lambda_{61}\xi_1 + \delta_6$$

Here the similarities with regression analysis are evident. Each xi is a linear function of one or more common factors plus an error term (There is no intercept since the variables are mean centered). The primary difference between these factor equations and regression analysis is that the ξ_i are unobserved in CFA. Consequently, estimation proceeds in a manner distinct from the conventional approach of regressing each x on the ξ_i.

Identification

One essential step in CFA is determining whether the specified model is identified. If the number of the unknown parameters to be estimated is smaller than the number of pieces of information provided, the model is under identified. For example, the equation $10 = 2x + 3y$ is not identified because it has two unknowns but only one piece of information (one equation). That is, an infinite number of values for x and y could make the equation true; the equation is not solvable. To make it just identified, another independent equation should be provided; for example, adding $3 = x + y$ ends up with $x = -1$ and $y = 4$. Provision of more than one independent equation will make it over identified.

In CFA, a model is identified if all of the unknown parameters can be rewritten in terms of the variances and covariance of the x variables. Unknown parameters of the CFA are $\phi 21$, six λ_{ij}, six δ_i, and $\delta 63$. Information provided is variances and covariance of observed variables including σ_{11}, σ_{21}, σ_{22}, σ_{31}, ... σ_{66}.

σ_{11}

σ_{21} σ_{22}

σ_{31} σ_{32} σ_{33}

σ_{41} σ_{42} σ_{43} σ_{44}

σ_{51} σ_{52} σ_{53} σ_{54} σ_{55}

σ_{61} σ_{62} σ_{63} σ_{64} σ_{65} σ_{66}

The number of input information is $21 = 6 (6+1)/ 2 = p (p+1)/ 2$, where p is the number of observed variables. Degrees of freedom are $7 = 21$ (knowns) -14 (unknowns); this CFA is over identified.

Without introducing some constraints any confirmatory factor model is not identified. The problem lies in the fact that the latent variables are unobserved and hence their scales are unknown. To identify the model, it therefore becomes necessary to set the metric of the latent variables in some manner. The two most common constraints are to set either the variance of the latent variable or one of its factor loadings to one.

Related research

Gaziel (1996) the purpose of this study was to examine perceptions of school effectiveness among parents, students, teachers and principals, and differences in their perceptions across school levels (primary vs. secondary) and types (religious state vs. non-religious state). Finally, the results were compared with school effectiveness indicators in the literature. A sample of all categories of subject in eight Israeli schools were interviewed (n=64). The analysis reveals that parents stressed school outputs, teachers stressed their skills and teaching processes, students emphasized both inputs and outcomes, and principal's chiefly inputs. Religious schools gave more weight than others to values. These findings are broadly in line with the literature, but any comprehensive analysis of school effectiveness demands reference to all aspects of the concept.

Edward and Neil (2006) in spite of continuing investigations, researchers have yet to satisfy practitioners, policy-makers and the international research community about production of a defensible collection of important indicators for gauging school effectiveness. The research project described in this article had four major purposes: 1) To investigate and compare the perceptions of principals, teachers and area superintendents about the overall effectiveness of schools and effectiveness on specific dimensions, 2) To assess and compare the perceptions of these educators about the importance of the specific dimensions for overall effectiveness, 3) To assess the association between principals' perceptions of effectiveness on, and importance, of these dimensions, and 4) To probe school-level differences about the two types of organizations. Perceptual data were obtained from elementary and junior high school principals throughout Alberta, Canada, as well as from teachers and area superintendents in one major city. Schools were rated as most effective in maintaining an appropriate school climate, while the most important dimensions involved climate (elementary), and morale, climate and acknowledging achievements (junior high). Factor analysis produced eight underlying indicators, but it also demonstrated the complexity of the effectiveness construct. Comparisons of effectiveness and importance highlighted some important but least effective areas, such as encouraging academic success and maximizing staff satisfaction. Practical and research implications are elucidated.

Magama (2006 cited in Garba, 2017) reported from a study that discipline the third factor of the managerial principles is probably the most difficult and unpleasant part of any educator's job. It is often a part of the core values of any organization and shows the extent of effectiveness of management. It reflects the base of good conduct and respectful interactions in the organization. In the study, pointed out that communication a vital aspect of the managerial principles help to stoke discipline. It stated that 'when instructors effectively communicate rules, set high expectations and provided frequent feedback, the need for discipline will likely be infrequent and that the approach taken for disciplinary action often determines its effectiveness.

Hartzell (2006) from a study of the managerial principles reported that equity was linked with the essence of effectiveness of administration. In practice, employees are specialized in different areas and they have different skills. Different levels of expertise can be distinguished within the knowledge areas (from generalist to specialist). This is the actual practice in educating with different fields of specialization which clearly supports the first principle of division of work by Fayol (Vliet, 2009). Getting goals accomplished requires authority and responsibility which Fayol opined gives the management the right to give orders to the subordinates. Such authority must come from one source at a time which denote the 'Unity of command' and the subordinates must deliver the same activities that can be linked to the same objectives such that there will be unity of direction in order to subordinate the individual interest to that of the organization. For such subordination of the individual's interest, the employee should be adequately compensated which Fayol calla remuneration (Bedeian, 2002). For effectiveness, there is need for centralization of decision making process in the organization. This aspect of the principles is often criticized because of the need to devolve power for effectiveness and inclusiveness in the organization and tended to contradict the principles of division of work and specialization. This is supported by the hierarchy of authority which allows each employee to have direct contact with his or her immediate superior in the hierarchy. It stokes order in the organization with equal treatment for the respective individuals in their hierarchies. The satisfaction of the employee should be seen to be vital by provision of employment stability which Fayol refer to as Stability of Tenure of

personnel. For advancing such individual interest, Fayol argued that room must be provided for initiative which could be sources of strength for the organization and last of the principles is the need for feeling of involvement and recognition by all Esprit de Corps' which contributes to the development of the culture and creates an atmosphere of mutual trust and understanding among the employees in the organization (Hodge, 2002).

Educational Service Area Office Standard (2017) of the Bureau of Monitoring and Evaluation of Basic Education Management Office of the Basic Education Commission The Ministry of Education has determined that effective management and education standards consist of five indicators, namely 1) Academic administration, 2) Budget management, 3) Personnel management, 4) Management general administration and 5) Monitoring evaluation and supervision of effective educational management.

SMART School (Office of Educational Strategy, 2016) The Bureau of Education has designated as a guide, or standard quality assessment guidelines Schools under Bangkok that each school must solve the problem of how to manage the elements, indicators and issue in order to evaluate the quality standards their schools passed the four level assessment criteria to SMART School consist of five indicators, namely 1) The efficiency of school administrators, 2) Academic administration, 3) Budget management, 4) Personnel management and 5) Management general administration.

The International Association of Laboratory Schools (IALS) awards an annual special recognition during the spring conference acknowledging an outstanding laboratory/ university affiliated school that holds a current membership. The criterion for recognition is based on the five principles of laboratory schools. There are 26 possible points and the award will be given to the school with the highest score. (IALS, 2016) consist of five indicators, namely 1) Academic, 2) Professional development, 3) Curriculum development, 4) Teacher training and 5) Educational experimentation.

An effective school is a school that can, in measured student achievement terms, demonstrate the joint presence of quality and equity. Said another way, an Effective School is a school that can, in measured student achievement terms and

reflective of its learning for all mission, demonstrate high overall levels of achievement and no gaps in the distribution of that achievement across major subsets of the student population (McLaughlin, 2005) consist of eight indicators, namely 1) Professional leadership of the principal, 2) Reliable and professional teachers, 3) Clear operational philosophy, 4) Conducive learning environment, 5) Good organizational networking, 6) Well-oriented curriculum, 7) Evaluation and 8) Active parent participation in school activities.

School evaluation indicators: Effective practice for improvement and learner success, effective school evaluation: How to do and use evaluation for improvement and internal evaluation: Good practice provide tools for leading the development of conditions that are essential for increasing internal accountability. This will require a collective commitment to improving learning outcomes for all students, as well as a commitment to strengthening professional capital in schools and across the system. (The Center on Innovation and Improvement, 2012) consist of six indicators, namely 1) Leadership and decision-making, 2) Professional development II, 3) Parents and learning, 4) Curriculum, assessment, and instructional planning, 5) Classroom instruction and 6) School community.

Tangkaow (2013) A development of effectiveness indicators of high-competitive secondary schools under the office of basic education commission. The purposes of this research were to develop effectiveness indicators for high competitive secondary schools under the Office of Basic Education Commission and to test Goodness of Fit Index (GFI) of effectiveness indicators with empirical data. A group of 548 teachers from 182 high competitive secondary schools were selected by means of multi-stage sampling technique to participate in this study. The data were collected by rating-scale questionnaire and analyzed by descriptive statistics through SPSS for Windows, confirmatory factor analysis through LISREL and focus group discussion. The results of this research revealed that: There were eight composite indicators with 118 indicators of school effectiveness of the high-competitive secondary schools as follows: 1) Learning organization (19 indicators) 2) Learning and teaching (31 indicators) 3) Student responsibility (6 indicators) 4) Professional administrator (24 indicators) 5) Clear goals and high expectations (7 indicators) 6) School climate (7 indicators) 7) Participations (9 indicators) and 8) Organization

(15 indicators). The result of the structural validity test of the model of school effectiveness showed the empirical data Chi-Square (x^2) = 578.29, df = 213, p = .0000, RMSEA = .056, GFI = .93, AGFI = .87 which meant the model was significantly consistent with the empirical data at .05 level. The result of the focus group discussion found that the validity tested structural model was consistent with the empirical data.

Phahamak (2018) Causal relationship of effectiveness of small-sized schools under the Office of Basic Education commission. This research aimed to develop and examine the consistency, with the empirical data, of causal relationship of effectiveness of small-sized schools under the Office of Basic Education Commission. The research was divided into two phases. Firstly, based on literature review, the researcher wrote a causal relationship model. The model was developed further by assistance of seven experts through an ESMi-structural interview. Secondly, the model of effectiveness of small-sized schools under the Office of Basic Education Commission was examined for its consistency. The data were gained from 402 school administrators, using five rating scale questionnaires. The data analysis was conducted with statistical tools such as percentile, mean, standard deviation and path analysis by LISREL analysis. The findings revealed that the model showing causal relationship of the effectiveness of small-sized schools under the Office of Basic Education Commission consisted of four factors; administrators' leadership, teachers' competency, policy implementation, and management. Schools in the high O-net score group and the low o-net score group had the consistency of the model with empirical data statistically significantly at the level of .01. That is, administrators' leadership and policy implementation had a direct influence on the effectiveness of small-sized schools. In addition, the policy implementation and administrators' leadership affected teachers' competency while the teachers' competency had indirect influence to the effectiveness of small-sized schools through management.

Discussion of Educational Management Indicators of Research Effectiveness as follows:

The education management indicators of effectiveness the researcher found that 1) Educational Service Area Office Standard (2017) 2) SMART School (Office of Educational Strategy, 2016) 3) Laboratory school award (IALS, 2016) 4) Excellent/

effective school (McLaughlin, 2005) and 5) Effective practice school (The Center on Innovation and Improvement, 2012) and research 1) Effectiveness indicator (Taengkhao, 2013) and 2) Effectiveness (Phahamak, 2018) consist of 18 indicators, namely 1) Academic, 2) Budget, 3) Personnel management, 4) General administration, 5) Monitoring, evaluation and supervision, 6) The efficiency of school administrators, 7) Professional development, 8) Curriculum development, 9) Teacher training, 10) Educational experimentation, 11) Clear operational philosophy, 12) Conducive learning environment, 13) Networking, 14) Parent participation and school, 15) Classroom instruction, 16) School community, 17) Learning organization, 18) Students are responsible, 19) Expectations for students, and 20) Organization. Therefore, the researcher therefore synthesizes such indicators consist of six indicators, namely 1) Academic, 2) General administration, 3) Monitoring, evaluation and supervision, 4) The efficiency of school administrators, 5) Curriculum development and 6) Teacher training (Table 2 to 3).

Table 2 Educational management indicators of effectiveness schools

Research/ Indicator	Educational service area (2017)	SMART School (2016)	IALS (2016)	Excellent/ effective school (2005)	Effective practice school (2012)	Effectiveness indicator (2013)	Effectiveness (2018)
Academic	√	√	√			√	
Budget	√	√					
Personnel management	√	√					
General administration	√	√					√
Monitoring, evaluation and supervision	√			√	√		√
The efficiency of school administrators		√		√	√	√	√
Professional development			√		√		
Curriculum development			√	√	√		
Teacher training			√	√			√
Clear operational philosophy				√			
Conducive learning environment				√		√	
Networking				√			
Parent participation & school				√	√		
Classroom instruction					√	√	
Learning organization						√	
Students are responsible						√	
Expectations for students						√	
Organization						√	

Table 3 Synthesis results educational management indicators of effectiveness schools

Research/ Indicator	Educational service area (2017)	SMART School (2016)	IALS (2016)	Excellent/ effective school (2005)	Effective practice school (2012)	Effectiveness indicator (2013)	Effectiveness (2018)
Academic	√	√	√			√	
General administration	√	√					√
Monitoring, evaluation and supervision	√			√	√		√
The efficiency of school administrators		√		√	√	√	√
Curriculum development			√	√	√		
Teacher training			√	√			√

According to Table 3, found that educational management indicators of effectiveness 1) Academic administration accordance with Educational Service Area Office Standard (Office of Educational Service Area, 2017), SMART School (Manual for Quality Assessment of Schools under the Bangkok Metropolitan Administration, 2016), Laboratory school award (IALS was formerly NALS, 2016) Excellent/ effective school (The educative importance of ethos. British Educational Studies, 2005) and Effectiveness (Causal relationship of effectiveness of small-sized schools under the office of basic education commission, 2013). 2) General administration in accordance with Educational Service Area Office Standard (Office of Educational Service Area, 2017), SMART School (Manual for Quality Assessment of Schools under the Bangkok Metropolitan Administration, 2016) and Effectiveness (Causal relationship of effectiveness of small-sized schools under the office of basic education commission, 2018). 3) Monitoring, evaluation and supervision in accordance with Educational Service Area Office Standard (Office of Educational Service Area, 2017),

Excellent/ effective school (The educative importance of ethos. British Educational Studies, 2005), Effective practice school (The resources below may be of interest to you, 2012) and Effectiveness (Causal relationship of effectiveness of small-sized schools under the office of basic education commission, 2018). 4) The efficiency of school administrators in accordance with SMART school (Manual for Quality Assessment of Schools under the Bangkok Metropolitan Administration, 2016), Excellent/ effective school (The educative importance of ethos. British Educational Studies, 2005), Effective practice school (The resources below may be of interest to you, 2012), Effectiveness indicator (A development of effectiveness indicators of high-competitive secondary schools under the Office of Basic Education Commission, 2013) and Effectiveness (Causal relationship of effectiveness of small-sized schools under the office of basic education commission, 2018). 5) Curriculum development in accordance with laboratory school award (IALS was formerly NALS, 2016), Excellent/ effective school (The educative importance of ethos. British Educational Studies, 2005) and Effective practice school (The resources below may be of interest to you, 2012) and 6) Teacher training in accordance with laboratory school award (IALS was formerly NALS, 2016), Excellent/ effective school (The educative importance of ethos, British Educational Studies, 2005) and Effectiveness (Causal relationship of effectiveness of small-sized schools under the office of basic education commission, 2018).

CHAPTER 3
RESEARCH METHODOLOGY

This study is focused on the development for educational management indicators of effectiveness schools in eastern region of Thailand. In order to formulate and test with the LISREL programs, it is important to determine those factors which are grouped into five phases as follow:

1. Population and sample
2. Research instruments
3. Validity and reliability of research instruments
4. Data collection and procedures
5. Data analysis

Population and sample

The population of this research was teachers in Office of Primary Education Area in eastern region of Thailand. By using a stratified random sampling technique, the sample size of this research were 849 teachers; 400 respondents for Exploratory Factor Analysis (EFA) and 449 respondents for Confirmatory Factor Analysis (CFA).

Table 4 Number of population

Eastern region	Areas	Schools	Teachers	Sample
Chantaburi Province	1	83	1,278	60
	2	106	1,481	60
Chachoengsao Province	1	138	1,953	60
	2	149	1,867	60
Chonburi Province	1	82	1,743	63
	2	112	1,642	63
	3	81	1,989	63
Trad Province	Province	111	1,460	60
Prachinburi Province	1	121	1,285	60
	2	113	1,139	60
Rayong Province	1	115	2,557	60
	2	87	1,151	60
Srakaew Province	1	145	1,867	60
	2	118	1,620	60
Total	14	1,561	23,032	849

(Source: Thailand Quality Award, 2018)

Research instruments

The research instrument used to collect data in this research was a questionnaire to evoke for test the educational management indicators of effectiveness schools in eastern region of Thailand. The procedures of the research instrument construction were as follows:

1. The researcher constructed the research questions in this research based on a conceptual framework, which was adapted from models and research concerning for educational management indicators of effectiveness schools in eastern region of Thailand. The questionnaire covered entire factors, which consisted of six elements and 36 indicators of effective schools management indicators in eastern region of Thailand. In order to elicit data about the mentioned factors, relevant authors, studies and literature were used to develop the items. The questionnaire was composed two

sections and utilized a combination of a five-point Likert scale and check list questionnaires. The quantitative instrument was composed a total of 36 indicators around factors known to educational management indicators of effectiveness schools. The details of each section are as follows:

The questionnaire contained 36 indicators within the six components/ aspects: Academic, General administration, Monitoring evaluation and supervision, The efficiency of school administrators, Curriculum development and Teacher training a set of these 36 questions five-point Likert scale on factors that educational management indicators of effectiveness schools in eastern region of Thailand as follows:

1. Academic - This part analyzes nine indicators including the implementation of development of local curriculum framework. Promotion of curriculum development. The learning process is focused on learners. Production, supply and development of learning media tools. Measure, evaluate and apply. Develop, support, supervise, monitor and monitor. Research and apply. The development of student activities and care systems. Coordinating the promotion of individuals, families, NGOs, community organizations, NGOs, local government organizations and professional organizations, institutes, religions, establishments and social institutions. The questionnaire was five rating scale from 1 - 5 by which strongly disagree to strongly agree.

2. General administration - General administration-This part analyzes seven indicators including the implementation of development of information systems and networks. Student census and student admissions. Site supervision utilities and environment. Development of operational standards. Establishment of an internal control system. Welfare teacher welfare and educational personnel and raising resources for education. The questionnaire was five rating scale from 1 - 5 by which strongly disagree to strongly agree.

3. Monitoring, evaluation and supervision - This part analyzes six indicators including the implementation of the system of monitoring. Supervision of academic education management. Supervision of budget education management. Supervision of educational management in personnel management. Supervision of general

administration and implementing policies into practice. The questionnaire was five rating scale from 1 - 5 by which strongly disagree to strongly agree.

4. The efficiency of school administrators-This part analyzes four indicators including the implementation of executives have leadership and good governance. Executives support, supervise, monitor, procure, use, maintain, educational information technology for management and service management. A qualified and professional principal and leadership capacity, integrity, and managerial skills could encourage students to excel. The questionnaire was five rating scale from 1 - 5 by which strongly disagree to strongly agree.

5. Curriculum development - This part analyzes six indicators including the implementation of the school designed its own curriculum for teaching and learning. The school published its curriculum for teaching and learning. The school has collaborated with other institutions on curriculum for teaching and learning. Instructional teams develop standards-aligned units of instruction for each subject and grade. Units of instruction include standards-based objectives and criteria for mastery. And objectives are leveled to target learning to each student's demonstrated prior mastery based on multiple three points of data. The questionnaire was five rating scale from 1 - 5 by which strongly disagree to strongly agree.

6. Teacher training - This part analyzes four indicators including the implementation of the school solidly provided mentorship to student teachers. There are special programs established to assist student teachers during their field experience. Reliable and professional teachers and teacher reliable and effective teachers are able to realize the expectations of the school principal and parents. The questionnaire was five rating scale from 1 - 5 by which strongly disagree to strongly agree.

It should be noted that a five-rating scale was incorporated in the instrument to be used by the respondents to rate the extent to which they thought the factors educational management indicators of effectiveness schools in eastern region of Thailand.

Table 5 The number of effective schools management indicators in eastern region of
Thailand

Indicators of effectiveness schools	Question No.	Total questions
Academic	1.1-1.9	9
General administration	2.1-2.7	7
Monitoring, evaluation and supervision	3.1-3.6	6
The efficiency of school administrators	4.1-4.4	4
Curriculum development	5.1-5.6	6
Teacher training	6.1-6.4	4
Total	-	36

2. In the stage of finding content and construct validity of the questionnaire,
a panel of five experts (Appendix C) was requested to evaluate the research
instrument. In particular, a group of experts evaluated the questionnaire item-by-item
in order to single out pointless questions and suggest new areas for inquiry.
The revised version of the questionnaire reflected improvements suggested by
participant experts and was consequently revised for the next version. In addition,
the index of item objective congruence Item-Objective Congruence Index (*IOC*)
technique was also applied for the research's content validity.

3. The research instrument was included a tryout on educational
management indicators of effectiveness schools in eastern region of Thailand. Thus,
the tryout study was conducted with teachers. These participants have been selected
from educational administration department to be representative of the sample of the
population concerning feasibility and approach. Furthermore, the instrument was
tested for reliability using the Cronbach alpha statistic.

Validity and reliability of research instrument

1. Content validity

It was specified that the research instrument used in this research was a self-administered questionnaire. It is necessary to ensure that participants understand all of the questions in the research instrument. This is usually called the content validity of the instrument (Nunnally, 1978). The instrument in considered to have content validity if it provides clear and understandable questions and covers the concepts of the research (Zigmund, 1997). For this research, the instrument was firstly reviewed by a major advisor and the committee. Furthermore, Soonthorndhai (2006 cited in Kanthawongs, 2007) suggested that at least three experts should evaluate the content validity. However, the content validity of this research was assessed by asking five experts. These experts were asked to assess the usability of the instrument, the clarity of the items, and readability of the questions. These experts reviewed the measures by assessing the ability of items to accurately represent common theory and practice. Feedback obtained from the experts was used to revise the measurement.

The researcher formed a validity panel of five experts. Those five experts were selected based on the positions they held and also their professional experience. The name list of expert panel was shown in Appendix B.

A panel was arranged to evaluate the questionnaire item-by-item in order to single out pointless questions and suggest new areas for inquiry. Therefore, a panel of experts was asked to rate each item utilizing the research's *IOC* with three types of scores (+1, 0, -1) as follows:

Positive one (+1) was certain that the item met the content and research objectives.

Zero (0) was not certain whether the item met the content and research objectives.

Negative one (-1) was certain that the item did not meet the content and nor the research objectives.

The items with negative *IOC* points were eliminated from the questionnaire. The items with .00 to .49 points were eliminated or revised, while the items with more than .50 points were considered as valid (Soonthorndhai, 2006 cited in Kanthawongs, 2007).

Suggestions received from the panel of experts found that very item is more valuable .60 in addition; members of the audit committee were asked to comment on the clarity and readability of the program. The researcher made changes to the questionnaire based on the recommendations of the validator. The revised survey reflects the improvements proposed by the participants' experts. All active results of the questionnaire are considered complete by all five experts that the *IOC* range .60 to 1.00.

2. Reliability

Using experts to ensure the validity of an instrument can give consistent results of accurately by measuring what it is supposed to measure and is said to be reliable (Fraenkel & Wallen, 2003). Therefore, a tryout study was used in an initial screening procedure. Prior to administering the survey measures to administrators' direct, head of learning and teachers or educational personnel teachers involved of schools that received the IQA AWARD (Thailand Quality Award, 2018) from the Office of the Basic Education Commission Primary Education Area, Year 2018, Eastern Region, 14 districts, a tryout study was conducted with 30 personnel of the overall population.

The tryout study was designed to examine the face validity and readability of the questionnaire, to determine the length of time needed to complete the questionnaire, and to identify any problems or confusing aspects of the questionnaire (Landry, 2003). Furthermore, the reliability of an instrument refers to the consistency, stability, and precision of test scores over time and populations (Gall, Borg & Gall, 1996). In order to check the appropriateness of items, the reliability of scales were examined using Cronbach's Alpha. The Cronbach Alpha Coefficient was used to measure the internal consistency and stability, which has an important use as a measure of the reliability of instrument (Cronbach, 1951). The reliability analysis was conducted for each group of factors and for each factor to confirm the internal consistency among the items. The test for each scale was checked to see if the deletion of any item would increase the reliability of the scale by at least .05 suggested if Cronbach's Alpha were judged against the value of alpha = .70 and considered acceptable (Kaplan & Saccuzzo, 1997).

The tryout study of administrators' direct, head of learning and teachers or educational personnel teachers showed that the Cronbach Alpha Coefficient was ranged .76 to .86. It was confirmed that the instrument used in this research is reliable (Haladyna, 2002). After careful development and proofreading, the instrument was administered to the sample.

Data collection procedures

The research instruments were collected. The process of collecting data is as follows:

Part 1: provide an effective management questionnaire with sufficient number of sample. The researcher was asked to provide the data for the research.

Part 2: storage between February 2018 and March 2019, about 10 people per parameter consisted of educational administration, educational manager and teachers or educational personnel. The first group was used for the exploratory factor analysis. The second group used for the confirmatory factor analyzes.

Part 3: the questionnaires were administered to 849 teachers.

Part 4: the scores obtained were analyzed for statistical significance and the research report.

Data analysis

Once the research period was complete and all of the completed questionnaires were received from the respondents, the researcher analyzed the data. The data were analyzed using descriptive statistics such as frequencies, percentages, means, standard deviation, skewness, kurtosis, and coefficient of variance. In this research the five point Likert scale was incorporated in the instrument, the range of the rating scale and their meanings are as follows:

5   =   strongly agree on the effectiveness schools.

4   =   agree on the effectiveness schools.

3   =   neither agree nor disagree on the effectiveness schools.

2   =   disagree on the effectiveness schools.

1   =   strongly disagree on the effectiveness schools.

4.50 to 5.00 defined as factor was considered a highest impact on the effectiveness schools.

3.50 to 4.49 defined as factor was considered a high impact on the effectiveness schools.

2.50 to 3.49 defined as factor was considered a moderate impact on the effectiveness schools.

1.50 to 2.49 defined as factor was considered a low impact on the effectiveness schools.

1.00 to 1.49 defined as factor was considered a lowest impact on the effectiveness schools.

The components of ESM were explored and grouped by using exploratory factor analysis. Then the researcher confirmed these components by using confirmatory factor analysis.

The hypothesized models were tested using confirmatory factor analysis. The CFA analyses were conducted using LISREL programs for validate the construct validity of the measurement model of ESM indicators. (Joreskog & Sorbom, 1993). Since the PRELIS procedure was used to create a matrix system file to be used as a data source for LISREL, for compare Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). Apply the correlation matrix described above to the second order assay factor analysis. Using LISREL to validate structural integrity. Considering the consistency between the hypothetical and the empirical models. Randomly split the sample into two groups: group one, number 400, analysis of EFA, named "EFA GROUP" and group two, number 449, perform analysis of CFA named "CFA GROUP" are as follows:

1. The insignificant Chi-square (x^2) is p-value higher than .05 ($p>.05$).

2. The relative Chi-square (df) should not exceed 2.00.

3. The Kaiser-Meyer-Olkin is the measure of sampling adequacy, which varies between 0 and 1. The values closer to 1 are better and the value of .60 is the suggested minimum. The Bartlett's Test of Sphericity is the test for null hypothesis that the correlation matrix has an identity matrix. Taking this into consideration, these tests provide the minimum standard to proceed for Factor Analysis.

6. Comparative fit index (CFI) is defined as the ratio of improvement in non-centrality when moving from the null to a considered model, to the non-centrality of the null model (Raykov & Marcoulides, 2006). The comparative or relative fit refers to a situation where two or more models are compared to see which one provides the best fit to the data. The null-hypothesis models or one of the models that is totally independent is a poor fit (Diamantopoulos & Siguaw, 2000). Values of CFI range from 0 to 1, and values close to 1 are considered likely to be indicative of a reasonably well-fitting model (Raykov & Marcoulides, 2006). In addition, values above .90 are considered to indicate a good fit (Diamantopoulos & Siguaw, 2000).

7. Goodness of Fit Index (GFI); Acceptable level 0 (no fit) to 1 (perfect fit). Interpretation value close to .90 or .95 reflect a good fit (Schumacker & Lomax, 2010, p. 76).

8. Root mean Squared Error of Approximation (RMSEA); Acceptable level .05 to .08. Interpretation value of .05 to .08 indicate close fit (Schumacker & Lomax, 2010, p. 76).

7. Standard Residuals (SR) for the Chi-square (x^2) value is considered the standard error less than two indicates that the model is consistent with the empirical data.

Based on the test, it could be concluded that the result is close to zero, which represents an adequate fit to the empirical data.

Table 6 Model fit indices of the measurement model

Indices	Model fit indices	Criteria	Conclusion
1. χ^2	0.624	-	-
2. df	2.000	-	-
3. p	.734	$p > .05$	Fit
4. χ^2/df	.310	$\chi^2/df < 2.00$	Fit
5. RMSEA	.000	RMSEA < .05	Fit
6. NFI	.997	NFI > .90	Fit
7. NNFI	.998	NNFI > .90	Fit
8. CFI	.996	CFI > .90	Fit
9. RMR	.019	RMR < .05	Fit
10. SRMR	.019	SRMR < .05	Fit
11. GFI	.998	GFI > .90	Fit
12. AGFI	.996	AGFI > .90	Fit

CHAPTER 4
RESULTS

The main purpose of this research was to construct and validate a measurement model for educational management indicators of effectiveness schools in eastern region of Thailand. To accomplish the purposes of this research, the following questions were proposed: What is an educational management indicators of effectiveness schools in eastern region of Thailand, and what is the relationship with educational management indicators of effectiveness schools in eastern region of Thailand, and what is the LISREL to validate measurement model?. The study findings are presented as follows:

Section 1: Results of exploratory factor analysis

Section 2: Results of confirmatory factor analysis

Descriptive and statistics, empirical data from theoretical literature review Presenting data analysis using LISREL 8.52 program for factor analysis, latent variables (Chapter 2).

Statistical abbreviations:

n	defined as	Sample size
Min	defined as	Minimum opinion
Max	defined as	Maximum opinion
$\bar{X}$	defined as	Average/ Arithmetic mean
SD	defined as	Standard Deviation
x^2	defined as	Chi-Square
df	defined as	Degree of freedom
$p\text{-}value$	defined as	Probability value
b	defined as	Factor loading
SE	defined as	Standardized estimates
FS	defined as	Factor scores regressions
t	defined as	Difference between two sets of observations is zero.
R^2	defined as	The squared multiple correlation coefficients

CFI	defined as	Comparative Fit Index
GFI	defined as	Goodness of Fit Index
RMSEA	defined as	Root Mean Square Error of Approximation
Range	defined as	All the output values of a function
Sk	defined as	Skewness
Kur	defined as	Kurtosis

The abbreviations for Confirmatory Factor Analysis (CFA)

1. MME   defined as   educational management of effectiveness schools include:

1.1 ACA   defined as   Academic administration include: (ACA1-ACA5)

1.1.1 ACA1   defined as   Development of local curriculum framework.

1.1.2 ACA2   defined as   Promotion of curriculum development.

1.1.3 ACA3   defined as   The learning process is focused on learners.

1.1.4 ACA4   defined as   Production, supply and development of learning media tools.

1.1.5 ACA5   defined as   The development of student activities and care systems.

1.2 MON   defined as   Monitoring, evaluation and supervision (MON1-MON11) include:

1.2.1 MON1   defined as   Measure, evaluate and apply.

1.2.2 MON2   defined as   Develop, support, supervise, monitor and monitor.

1.2.3 MON3   defined as   Research and apply.

1.2.4 MON4   defined as   Development of operational standards.

1.2.5 MON5   defined as   Establishment of an internal control system.

1.2.6 MON6   defined as   Monitoring, checking, and evaluating the system.

1.2.7 MON7   defined as   Monitoring, evaluation and supervision of academic education management.

1.2.8 MON8   defined as   Monitoring, evaluation of educational budget management.

1.2.9 MON9   defined as   Monitoring, evaluation of personnel management.

1.2.10 MON10   defined as   Monitoring and evaluation of general administration.

1.2.11 MON11   defined as   Implementing policies.

1.3 EFF   defined as   The efficiency of school administrators (EFF1-EFF4) including:

1.3.1 EFF1 defined as   Executives have leadership and good governance.

1.3.2 EFF2 defined as   Support, supervise, monitor, procure, use, maintain, educational information technology.

1.3.3 EFF3 defined as   Professional principal.

1.3.4 EFF4 defined as   Leadership capacity, integrity, and managerial skills could encourage students to excel.

1.4 CUR   defined as   Curriculum development (CUR1-CUR6) including:

1.4.1 CUR1 defined as   Designed its own curriculum for teaching and learning.

1.4.2 CUR2 defined as   Published its curriculum for teaching and learning.

1.4.3 CUR3 defined as   The school has collaborated with other institutions on curriculum for teaching and learning.

1.4.4 CUR4 defined as   Instructional develop standards-aligned units of instruction for each subject and grade.

1.4.5 CUR5 defined as   Units of instruction include standards-based objectives and criteria for mastery.

1.4.6 CUR6 defined as   Objectives are leveled to target learning.

1.5 TRA   defined as   Teacher training (TRA1-TRA10) including:

1.5.1 TRA1   defined as   Coordinating the promotion of individuals, families, NGOs, community organizations, NGOs, local government organizations. Professional organizations, institutes, religions, establishments and social institutions.

        1.5.2 TRA2 defined as Development of information systems and networks.

        1.5.3 TRA3 defined as Student census and student admissions.

        1.5.4 TRA4 defined as Site supervision utilities and environment.

        1.5.5 TRA5 defined as Welfare teacher welfare and educational personnel.

        1.5.6 TRA6 defined as Raising resources for education.

        1.5.7 TRA7 defined as Solidly provided mentorship to student teachers.

        1.5.8 TRA8 defined as There are special programs established to assist student teachers during their field experience.

        1.5.9 TRA9 defined as Professional teachers.

        1.5.10 TRA10 defined as Teacher reliable and effective teachers.

Section 1: Results of exploratory factor analysis

        The results of the study of component and effective schools management indicators in eastern region of Thailand, analyzed by a sample of 849 people by the questionnaire of effective schools management indicators in eastern region of Thailand, 36 indicators. Exploratory Factor Analysis (EFA).

        The researcher conducted an examination of statistical assumption, analyzing the components in each of the main components. And consider the relationship between the indicators by the statistical values to be considered based on the recommendations of Hair et al (2010, p. 115), namely Bartlett's test of sphericity and The Kaiser-Mayer-Olkin Measure of Sampling Adequacy (KMO) the results in the table below:

Table 7 Results of the initial agreement, the appropriateness of the overall correlation
matrix with KMO and Bartlett's Test of Sphericity

KMO and Bartlett's Test		.870
Measure of Sampling Adequacy (MSA)		
Bartlett's Test of Sphericity	Approx. Chi-Square	1533.170
	df	10
	Sig.	.000

Based on the results of this analysis, the Kaiser-Meyer-Olkin index is equal
to .87, so it can be concluded that the information contained is appropriate to use the
composition analysis technique. Then consider together with Bartlett's Test of
Sphericity statistics to show that the correlation matrix between variables is
significantly different from the identity matrix. Based on Bartlett's Test of Sphericity
analysis, the value is 1533.17 ($p<.000$). Shows that the relationship between variables
is very appropriate to be used in the analysis of confirmed elements

Factor extraction the researcher used the method of Principal Component
Analysis (PCA), effect of factor extraction of effective school management indicators
in eastern region of Thailand. The results of variance extraction for 36 indicators
show in table 8.

Table 8 Composition, variance, percentage of variance and percentage of cumulative
variance of the indicators of effective schools management in eastern region
of Thailand

Component	Eigen value	% of variance	Cumulative %
1	14.72	40.90	40.90
2	2.11	5.87	46.78
3	1.58	4.41	51.19
4	1.45	4.03	55.22
5	1.31	3.65	55.88
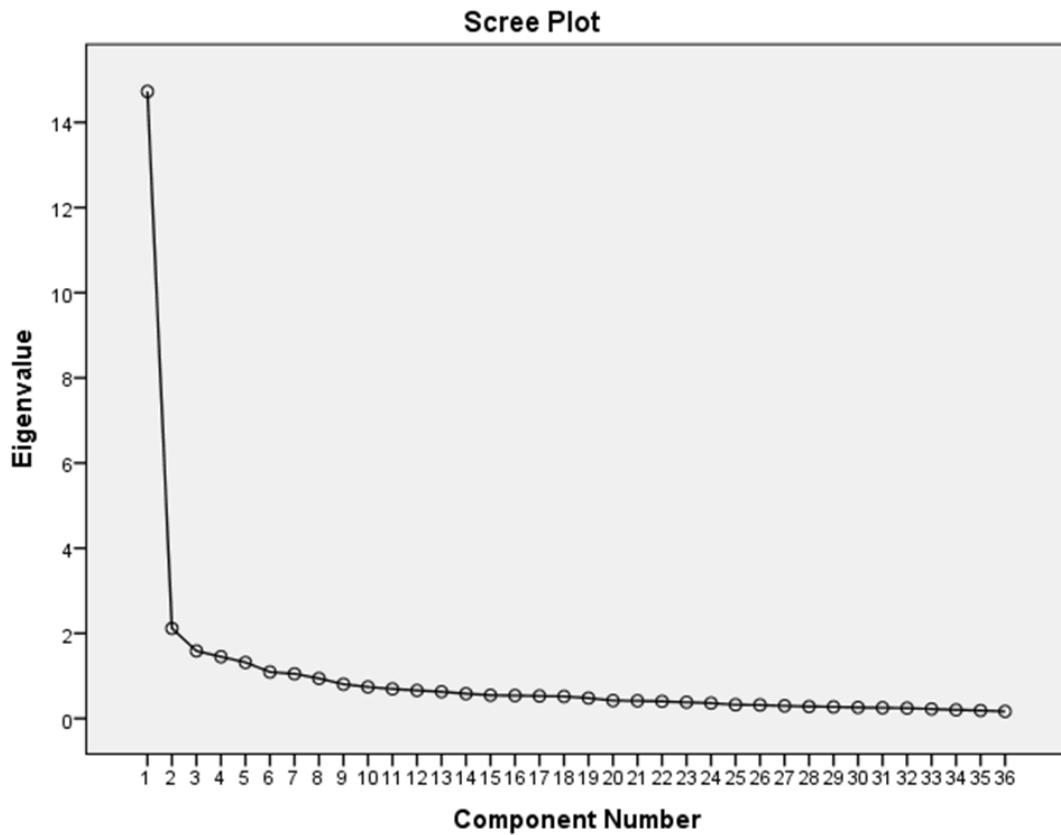
Figure 7 The Eigen value of each element

        According to Table 8 and Figure 7 show that the component of effective schools management indicators in eastern region of Thailand has more than 1 Eigen value for every value. The percentage of variance between 3.65 and 40.90 and the cumulative percentage of variance explain the variance of all five elements at 55.88 percent.

        From the factor extraction of component is equal to five components. The researcher performs oblique rotation with the promax rotation.

Table 9 Components and number of questions of effective schools management
        indicators in eastern region of Thailand after the rotation

No.	Component	indicators	Number of indicators (Article)
1	ACA	1-4, 8	5
2	MON	5-7, 13-14, 17-22	11
3	EFF	23-26	4
4	CUR	27-32	6
5	TRA	9-12, 15-16, 33-36	10

According to Table 9 The components of questions of effective schools management indicators in eastern region of Thailand after oblique rotation with promax method has 36 indicators, when extracting the component, five components, and when oblique rotation, found that first component has five indicators, namely ACA included indicator 1-4, and 8. The second component has 11 indicators, namely MON included indicator 5-7, 13-14, and 17-22. The third component has four indicators, namely EFF included indicator 23-26. The fourth component has six indicators, namely CUR included indicator 27-32. The fifth component has 10 indicators, namely TRA included indicator 9-12, 15-16, and 33-36.

First component has five indicators, the factor loading ranged from 0.54 to 0.75

The second component has 11 indicators, the factor loading ranged from 0.59 to 0.84.

The third component has four indicators, the factor loading ranged from 0.64 to 0.77.

The fourth component has six indicators, the factor loading ranged from 0.54 to 0.90.

The fifth component has 10 indicators, the factor loading ranged from 0.46 to 0.75.

Table 10 The factor loading of the five components

Indicator	Loading				
	1	2	3	4	5
ACA1	.31				
ACA2	.38				
ACA3	.66				
ACA4	.75				
ACA5	.58				
MON1		.51			
MON2		.74			
MON3		.80			
MON4		.34			
MON5		.46			
MON6		.64			
MON7		.98			
MON8		.84			
MON9		.84			
MON10		.72			
MON11		.51			
EFF1			.81		
EFF2			.51		
EFF3			.89		
EFF4			.77		
CUR1				.74	
CUR2				.48	
CUR3				.58	
CUR4				.79	
CUR5				.76	
CUR6				.77	
TRA1					.36
TRA2					.55
TRA3					.64
TRA4					.67
TRA5					.54
TRA6					.45
TRA7					.61
TRA8					.82
TRA9					.50
TRA10					.42

Descriptive statistics of observed variables

Table 11 Basic information of the observed variables 36 variables

n = 449	Min	Max	$\bar{X}$	SD	SKE	KUR
Academic administration (ACA)						
ACA1	2	5	4.30	.61	-.61	.06
ACA2	2	5	4.44	.61	-.92	.21
ACA3	3	5	4.62	.54	-1.20	.35
ACA4	1	5	4.61	.53	-1.41	.41
ACA5	1	5	4.45	.59	-.61	-.68
Monitoring, evaluation and supervision (MON)						
MON1	1	5	4.42	.62	-1.09	1.48
MON2	1	5	4.26	.69	-.58	.13
MON3	3	5	4.06	.78	-.85	.43
MON4	1	5	4.37	.63	-.70	-.03
MON5	3	5	4.33	.63	-.74	.05
MON6	2	5	4.42	.62	-.59	-.43
MON7	3	5	4.08	.75	-.54	-.62
MON8	2	5	4.24	.69	-.55	-.21
MON9	2	5	4.23	.65	-.45	-.28
MON10	3	5	4.14	.69	-.53	-.15
MON11	1	5	4.20	.68	-1.69	1.96
The efficiency of school administrators (EFF)						
EFF1	2	5	4.70	.51	-1.35	.83
EFF2	2	5	4.47	.64	-1.18	.78
EFF3	3	5	4.63	.55	-.73	.23
EFF4	2	5	4.55	.60	-.53	.56
Curriculum development (CUR)						
CUR1	2	5	4.17	.69	-.73	.23
CUR2	2	5	3.92	.76	-.42	-.40
CUR3	3	5	4.09	.74	-.49	-.23
CUR4	1	5	4.33	.63	-.73	1.26
CUR5	3	5	4.34	.62	-.56	-.61
CUR6	2	5	4.27	.62	-.57	-.19
Teacher training (TRA)						
TRA1	2	5	4.27	.63	-.64	-.53
TRA2	1	5	4.31	.62	-.76	.52
TRA3	1	5	4.28	.64	-.67	-.34
TRA4	2	5	4.46	.57	-.71	.27
TRA5	2	5	4.44	.62	-1.09	1.84
TRA6	2	5	4.26	.65	-.86	.29
TRA7	2	5	4.31	.66	-.61	.06
TRA8	1	5	4.19	.74	-.92	.21
TRA9	1	5	4.37	.63	-1.20	.35
TRA10	2	5	4.38	.64	-1.41	.41

From Table 11 Descriptive statistics of the observed variables. For educational management indicators of effectiveness schools in eastern region of Thailand, there were five items where the total means score of all the items were highest. The highest mean score is revealed from item EFF1, executives have leadership and good governance ($\bar{X} = 4.70$, $SD = .51$). The second highest was EFF3, professional principal ($\bar{X} = 4.63$, $SD = .55$). The third highest was ACA3, the learning process is focused on learners ($\bar{X} = 4.62$, $SD = .54$). The lowest mean score, however, was item CUR2, published its curriculum for teaching and learning ($\bar{X} = 3.92$, $SD = .76$).

When considering skewness or asymmetry of the distribution in the overall picture, it was found that the variable is distributed in a skewed manner. (Negative skewness) indicates that the data of most variables has a higher than average score. With a skew between -.42 to -1.69 and kurtosis or the height of the distribution, it is found that the variable is between -.68 to 1.96. It can be seen that the skewness and kudos of the data are between -2 to 2, indicating that the data has a Normality (Tabachnick & Fidell, 2007). Therefore, it is appropriate to analyze the confirmed elements.

Assumption examination of Exploratory Factor Analysis

Table 12 The correlation coefficient between latent variables in a causal model for educational management indicators of effectiveness schools in eastern region of Thailand

Variable	ACA1	ACA2	ACA3	ACA4	ACA5	MON1	MON2	MON3	MON4	MON5	MON6	MON7	MON8	MON9	MON10	MON11	EFF1	EFF2	EFF3	EFF4	CUR1	CUR2	CUR3	CUR4	CUR5	CUR6	TRA1	TRA2	TRA3	TRA4	TRA5	TRA6	TRA7	TRA8	TRA9	TRA10
ACA1	1.00																																			
ACA2	0.59**	1.00																																		
ACA3	0.41**	0.50**	1.00																																	
ACA4	0.32**	0.36**	0.42**	1.00																																
ACA5	0.44**	0.48**	0.47**	0.50**	1.00																															
MON1	0.45**	0.46**	0.44**	0.42**	0.58**	1.00																														
MON2	0.34**	0.34**	0.33**	0.31**	0.42**	0.53**	1.00																													
MON3	0.32**	0.36**	0.46**	0.40**	0.45**	0.45**	0.46**	1.00																												
MON4	0.31**	0.31**	0.26**	0.29**	0.32**	0.40**	0.43**	0.45**	1.00																											
MON5	0.31**	0.30**	0.33**	0.33**	0.34**	0.44**	0.38**	0.46**	0.41**	1.00																										
MON6	0.28**	0.30**	0.34**	0.28**	0.40**	0.43**	0.45**	0.46**	0.45**	0.49**	1.00																									
MON7	0.28**	0.35**	0.34**	0.31**	0.38**	0.35**	0.29**	0.42**	0.32**	0.45**	0.54**	1.00																								
MON8	0.35**	0.41**	0.42**	0.37**	0.50**	0.52**	0.44**	0.46**	0.40**	0.41**	0.54**	0.49**	1.00																							
MON9	0.35**	0.41**	0.36**	0.37**	0.49**	0.55**	0.45**	0.47**	0.42**	0.46**	0.52**	0.47**	0.63**	1.00																						
MON10	0.23**	0.20**	0.25**	0.25**	0.25**	0.32**	0.26**	0.37**	0.38**	0.34**	0.35**	0.41**	0.36**	0.38**	1.00																					
MON11	0.16**	0.18**	0.21**	0.24**	0.28**	0.30**	0.33**	0.32**	0.35**	0.29**	0.38**	0.32**	0.36**	0.41**	0.49**	1.00																				
EFF1	0.35**	0.38**	0.41**	0.29**	0.53**	0.51**	0.47**	0.50**	0.42**	0.44**	0.49**	0.44**	0.52**	0.55**	0.41**	0.39**	1.00																			
EFF2	0.29**	0.31**	0.29**	0.23**	0.42**	0.49**	0.49**	0.41**	0.38**	0.42**	0.44**	0.37**	0.48**	0.54**	0.39**	0.39**	0.65**	1.00																		
EFF3	0.31**	0.33**	0.35**	0.30**	0.47**	0.49**	0.41**	0.51**	0.43**	0.46**	0.47**	0.41**	0.46**	0.55**	0.51**	0.43**	0.61**	0.63**	1.00																	
EFF4	0.36**	0.34**	0.32**	0.30**	0.50**	0.54**	0.47**	0.46**	0.45**	0.39**	0.48**	0.38**	0.55**	0.59**	0.42**	0.43**	0.66**	0.68**	0.69**	1.00																
CUR1	0.31**	0.32**	0.30**	0.29**	0.47**	0.50**	0.44**	0.46**	0.44**	0.43**	0.53**	0.40**	0.51**	0.61**	0.43**	0.47**	0.64**	0.62**	0.67**	0.80**	1.00															
CUR2	0.26**	0.26**	0.29**	0.31**	0.42**	0.44**	0.50**	0.44**	0.39**	0.32**	0.46**	0.33**	0.45**	0.51**	0.34**	0.43**	0.55**	0.52**	0.53**	0.56**	0.58**	1.00														
CUR3	0.22**	0.34**	0.39**	0.24**	0.32**	0.26**	0.20**	0.38**	0.27**	0.29**	0.32**	0.32**	0.39**	0.35**	0.33**	0.25**	0.39**	0.31**	0.36**	0.35**0.31**	0.30**	1.00														
CUR4	0.32**	0.30**	0.33**	0.31**	0.41**	0.37**	0.26**	0.31**	0.35**	0.44**	0.38**	0.37**	0.40**	0.38**	0.32**	0.34**	0.44**	0.27**	0.40**	0.41**	0.39**	0.33**	0.46**	1.00												
CUR5	0.23**	0.27**	0.32**	0.26**	0.32**	0.30**	0.23**	0.38**	0.29**	0.38**	0.33**	0.35**	0.34**	0.31**	0.30**	0.26**	0.33**	0.27**	0.42**	0.36**	0.34**	0.25**	0.55**	0.58**	1.00											
CUR6	0.17**	0.29**	0.36**	0.25**	0.31**	0.33**	0.28**	0.38**	0.32**	0.30**	0.37**	0.35**	0.41**	0.40**	0.34**	0.34**	0.37**	0.33**	0.40**	0.45**	0.42**	0.34**	0.55**	0.49**	0.62**	1.00										
TRA1	0.29**	0.33**	0.31**	0.27**	0.40**	0.36**	0.36**	0.38**	0.36**	0.29**	0.37**	0.29**	0.34**	0.38**	0.32**	0.35**	0.39**	0.37**	0.42**	0.40**	0.40**	0.43**	0.31**	0.36**	0.29**	0.37**	1.00									
TRA2	0.26**	0.21**	0.22**	0.24**	0.34**	0.35**	0.39**	0.31**	0.33**	0.26**	0.40**	0.27**	0.27**	0.38**	0.34**	0.45**	0.37**	0.34**	0.35**	0.40**	0.42**	0.45**	0.17**	0.34**	0.18**	0.31**	0.58**	1.00								
TRA3	0.17**	0.22**	0.24**	0.22**	0.25**	0.26**	0.40**	0.35**	0.44**	0.35**	0.45**	0.31**	0.35**	0.41**	0.39**	0.41**	0.41**	0.41**	0.39**	0.46**	0.50**	0.45**	0.26**	0.31**	0.29**	0.43**	0.47**	0.60**	1.00							
TRA4	0.24**	0.36**	0.39**	0.35**	0.44**	0.39**	0.41**	0.40**	0.42**	0.32**	0.45**	0.39**	0.41**	0.52**	0.38**	0.40**	0.48**	0.43**	0.52**	0.56**	0.54**	0.54**	0.37**	0.38**	0.35**	0.46**	0.54**	0.49**	0.57**	1.00						
TRA5	0.28**	0.29**	0.38**	0.26**	0.37**	0.35**	0.32**	0.37**	0.34**	0.30**	0.41**	0.42**	0.39**	0.49**	0.38**	0.36**	0.42**	0.40**	0.47**	0.52**	0.52**	0.48**	0.36**	0.36**	0.31**	0.42**	0.51**	0.48**	0.48**	0.66**	1.00					
TRA6	0.27**	0.31**	0.33**	0.27**	0.34**	0.30**	0.31**	0.36**	0.34**	0.32**	0.40**	0.42**	0.38**	0.46**	0.37**	0.38**	0.42**	0.38**	0.41**	0.51**	0.49**	0.50**	0.35**	0.33**	0.30**	0.40**	0.50**	0.48**	0.51**	0.62**	0.77**	1.00				
TRA7	0.16**	0.26**	0.28**	0.25**	0.29**	0.33**	0.36**	0.44**	0.40**	0.35**	0.38**	0.34**	0.40**	0.45**	0.43**	0.43**	0.39**	0.37**	0.45**	0.43**	0.46**	0.44**	0.37**	0.39**	0.41**	0.51**	0.42**	0.41**	0.50**	0.48**	0.46**	0.48**	1.00			
TRA8	0.12**	0.18**	0.16**	0.28**	0.18**	0.16**	0.37**	0.28**	0.30**	0.23**	0.37**	0.29**	0.29**	0.33**	0.33**	0.39**	0.25**	0.27**	0.33**	0.32**	0.37**	0.36**	0.24**	0.28**	0.28**	0.39**	0.33**	0.46**	0.49**	0.44**	0.43**	0.43**	0.54**	1.00		
TRA9	0.19**	0.25**	0.31**	0.25**	0.32**	0.30**	0.32**	0.37**	0.27**	0.26**	0.33**	0.34**	0.36**	0.40**	0.30**	0.30**	0.36**	0.33**	0.41**	0.35**	0.36**	0.35**	0.40**	0.31**	0.41**	0.43**	0.39**	0.36**	0.38**	0.41**	0.42**	0.41**	0.49**	0.43**	1.00	
TRA10	0.31**	0.32**	0.30**	0.23**	0.42**	0.39**	0.37**	0.40**	0.31**	0.26**	0.34**	0.35**	0.39**	0.45**	0.30**	0.31**	0.44**	0.39**	0.47**	0.48**	0.49**	0.38**	0.36**	0.31**	0.36**	0.37**	0.33**	0.30**	0.29**	0.38**	0.45**	0.44**	0.43**	0.39**	0.69**	1.00
$\bar{X}$	4.40	4.53	4.67	4.61	4.51	4.53	4.41	4.09	4.49	4.40	4.42	4.31	4.40	4.32	4.27	4.27	4.74	4.57	4.68	4.59	4.30	3.96	4.12	4.39	4.31	4.30	4.36	4.45	4.29	4.51	4.46	4.31	4.39	4.21	4.49	4.47
SD	.03	.02	.24	.02	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.02	.02	.02	.02	.03	.04	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.04	.03	.03

Table 12 shows the correlation coefficient between observed in educational management indicators of effectiveness schools in eastern region of Thailand; Pearson's correlation coefficient analysis it was found that all 36 sub-factors were positively related. The highest correlation coefficient is the correlation between Teacher reliable and effective teachers (TRA10) and Professional teachers (TRA9), with correlation coefficient equal to .69 and the highest correlation coefficient is the correlation between Leadership capacity, integrity, and managerial skills could encourage students to excel (EFF4) and Professional principal (EFF3), with correlation coefficient equal to .69. In contrast, the lowest correlation coefficient is the correlation between there are special programs established to assist student teachers during their field experience (TRA8) and Development of local curriculum framework (ACA1), with correlation coefficient equal to .12.

Section 2: Result of confirmatory factory analysis

The component of academic administration (ACA)

Analysis of survey factors should begin with checking the coefficients. Relationship of observed variables whether there is a relationship or not the correlation coefficient should be greater than .50 and enter 1 (Vanichbancha, 2013) because the variables in this study are large, which is difficult to consider the relationship. The researcher therefore used the KMO test (Kaiser-Meyer-Olkin) and Bartlett's Test of Sphericity to examine the results in the table below:

Table 13 Results of the initial agreement, the appropriateness of the overall correlation matrix with KMO and Bartlett's Test of Sphericity

KMO and Bartlett's Test		.738
Measure of Sampling Adequacy (MSA)		
Bartlett's Test of Sphericity	Approx. Chi-Square	5133.025
	df	10
	Sig.	.000

Based on the results of this analysis, the Kaiser-Meyer-Olkin index is equal to .74, so it can be concluded that the information contained is appropriate to use the composition analysis technique. Then consider together with Bartlett's Test of Sphericity statistics to show that the correlation matrix between variables is

significantly different from the identity matrix. Based on Bartlett's Test of Sphericity analysis, the value is 1533.02 ($p<.000$), shows that the relationship between variables is very appropriate to be used in the analysis of confirmed elements.

Correlation matrix

Table 14 The correlation coefficient between the observed in academic administration

Variables	ACA1	ACA2	ACA3	ACA4	ACA5
ACA1	1				
ACA2	.59**	1			
ACA3	.41**	.50**	1		
ACA4	.32**	.36**	.42**	1	
ACA5	.32**	.36**	.46**	.40**	1
$\bar{X}$	4.40	4.53	4.67	4.61	4.51
SD	.03	.02	.24	.02	.03

** $p<.01$

Table 14 shows the correlation coefficient between observed in academic administration (ACA); Development of local curriculum framework (ACA1). Promotion of curriculum development (ACA2). The learning process is focused on learners' academic administration (ACA3). Production, supply and development of learning media tools academic administration (ACA4). The development of student activities and care systems academic administration (ACA5). It found that the correlation coefficient between latent variables ranged from .32 to .59

Pearson's correlation coefficient analysis it was found that all five sub-factors were positively related. The consistency of the model with empirical data statistically significantly at the level of .01, which is highly significant. The highest correlation coefficient is the correlation between promotion of curriculum development (ACA2) and development of local curriculum framework (ACA1), with correlation coefficient equal to .57. In contrast, the lowest correlation coefficient is the correlation between production, supply and development of learning media tools (ACA4) and development of local curriculum framework (ACA1), with correlation coefficient equal to .32.
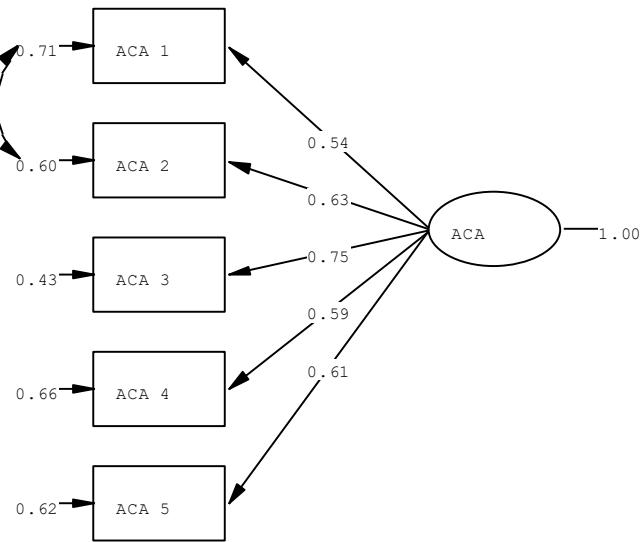
Chi-Square=3.92, df=4, P-value=0.41760, RMSEA=0.000

Figure 8 A measurement model of academic administration

Figure 8 represent the result of a confirmatory factor analysis of academic administration characteristics factors, which reveal that the model is congruent with the empirical data and the Chi-Square (x^2) results equal to 3.92; p = .42 with the degree of freedom at 4. Whereas the Root mean square error of approximation (RMSEA) equals .000. Based on the test, it could be concluded that the result is very close to zero which represents an adequate fit to the empirical data. Comparative Fit Index (CFI) equal 1.00 which is higher .95 and Goodness of Fit Index (GFI) equal 1.00 show that the model is consistent with empirical data.

Table 15 The results of the confirmatory factor analysis for model of academic
administration

Factors	x^2	SD	B	SE	FS	t	R^2
1. Development of local curriculum framework.	4.30	.61	.54**	.05	.11	10.51	.29
2. Promotion of curriculum development.	4.44	.61	.63**	.05	.20	12.73	.40
3. The learning process is focused on learners.	4.62	.54	.75**	.05	.41	15.53	.57
4. Production, supply and development of learning media tools.	4.61	.53	.59**	.05	.21	11.76	.34
5. The development of student activities and care systems.	4.45	.59	.61**	.05	.23	12.42	.38

Construct reliability (ρ_c) = .68

Average variance extracted (ρ_v) = .54

**p<.01

Table 15 The factor loading of the five indicator elements is positive ranged
from .54 to .75 and the squared multiple correlation coefficients (R^2) equal .29 to .57
show that these indicators are an important indicator of all five sub-elements.
The ACA1-ACA5 indicator is an important indicator of academic administration
(ACA) components.

The component of monitoring, evaluation and supervision (MON)

Table 16 Results of the initial agreement, the appropriateness of the overall

correlation matrix with KMO and Bartlett's Test of Sphericity

KMO and Bartlett's Test		.927
Measure of Sampling Adequacy (MSA)		
Bartlett's Test of Sphericity	Approx. Chi-Square	2638.846
	df	55
	Sig.	.000

Based on the results of this analysis, the Kaiser-Meyer-Olkin index is equal to .93, so it can be concluded that the information contained is appropriate to use the composition analysis technique. Then consider together with Bartlett's Test of Sphericity statistics to show that the correlation matrix between variables is significantly different from the identity matrix. Based on Bartlett's Test of Sphericity analysis, the value is 2638.85 ($p<.000$). Shows that the relationship between variables is very appropriate to be used in the analysis of confirmed elements.

Table 17 The correlation coefficient between the observed in monitoring, evaluation and supervision

Variable	MON1	MON2	MON3	MON4	MON5	MON6	MON7	MON8	MON9	MON10	MON11
MON1	1										
MON2	.42**	1									
MON3	.58**	.52**	1								
MON4	.50**	.44**	.52**	1							
MON5	.49**	.45**	.55**	.63**	1						
MON6	.53**	.47**	.51**	.52**	.55**	1					
MON7	.42**	.49**	.49**	.48**	.54**	.65**	1				
MON8	.47**	.41**	.49**	.46**	.54**	.60**	.63**	1			
MON9	.50**	.47**	.54**	.55**	.59**	.66**	.68**	.69**	1		
MON10	.47**	.44**	.50**	.51**	.61**	.63**	.62**	.67**	.80**	1	
MON11	.42**	.50**	.44**	.45**	.51**	.55**	.52**	.53**	.56**	.58**	1
$\bar{X}$	4.53	4.41	4.09	4.49	4.40	4.42	4.31	4.40	4.32	4.27	4.27
SD	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03

** $p<.01$

Table 17 shows the correlation coefficient between observed in monitoring, evaluation and supervision (MON); Measure, evaluate and apply (MON1). Develop, support, supervise, monitor and monitor (MON2). Research and apply (MON3). Development of operational standards (MON4). Establishment of an internal control system (MON5). Monitoring, checking, and evaluating the system (MON6). Monitoring, evaluation and supervision of academic education management (MON7). Monitoring, evaluation of educational budget management (MON8). Monitoring, evaluation of personnel management (MON9). Monitoring and evaluation of general administration (MON10). Implementing policies (MON11). It found that the correlation coefficient between latent variables ranged from .42 to .80.

Pearson's correlation coefficient analysis it was found that all 11 sub-factors were positively related. The highest correlation coefficient is the correlation between monitoring and evaluation of general administration (MON10) and monitoring, evaluation of personnel management (MON9), with correlation coefficient equal to .80. In contrast, the lowest correlation coefficient is the correlation between measures, evaluate and apply (MON1) and develop, support, supervise, monitor and monitor (MON2), with correlation coefficient equal to .42.
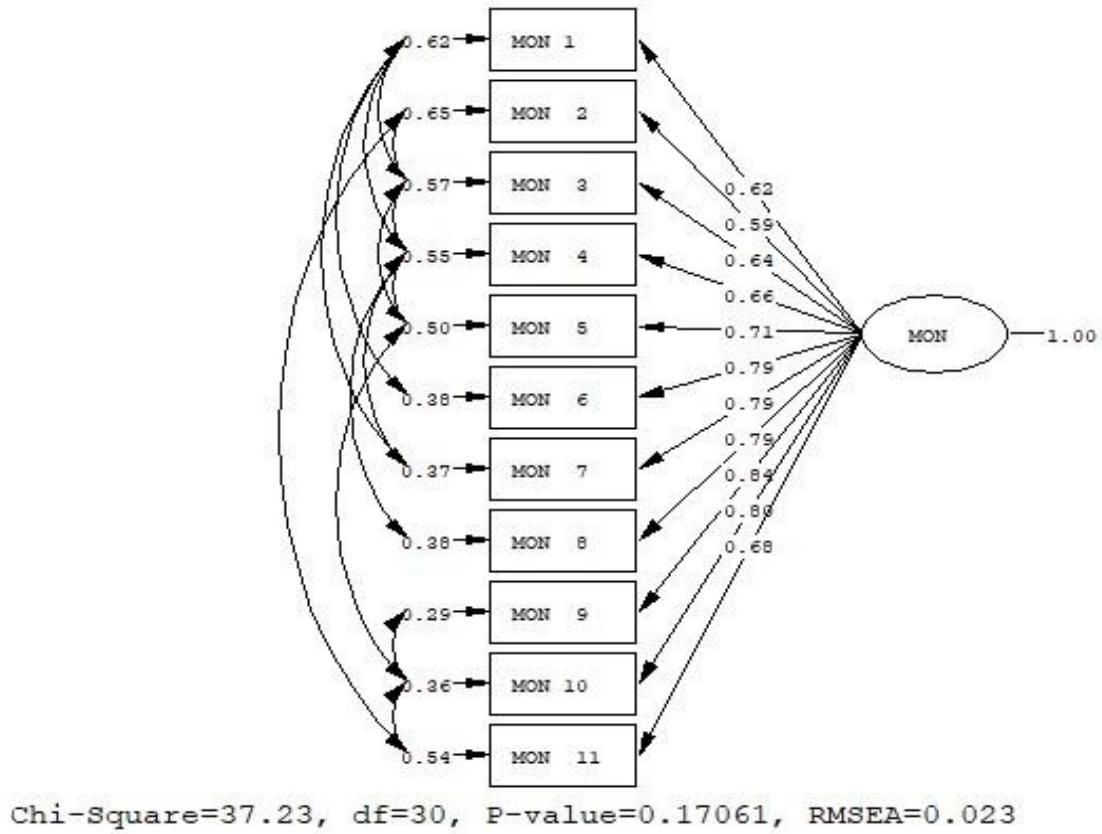
Figure 9 A measurement model of monitoring, evaluation and supervision

Figure 9 represent the result of a confirmatory factor analysis of monitoring, evaluation and supervision characteristics factors, which reveal that the model is congruent with the empirical data and the Chi-Square (x^2) results equal to 37.23; $p = .17$ with the degree of freedom at 30. Whereas the Root mean square error of approximation (RMSEA) equals .023. Based on the test, it could be concluded that the result is very close to zero which represents an adequate fit to the empirical data. Comparative Fit Index (CFI) equal 1.00 which is higher .95 and Goodness of Fit Index (GFI) equal .99, show that the model is consistent with empirical data.

Based on the test, it could be concluded that the result is close to zero, which represents an adequate fit to the empirical data.

Table 18 The results of the confirmatory factor analysis for model of monitoring,
     evaluation and supervision

Factors	x^2	SD	B	SE	FS	t	R^2
1. Measure, evaluate and apply.	4.42	.62	.62**	.04	.07	13.72	.38
2. Develop, support, supervise, monitor and monitor.	4.26	.70	.59**	.04	.05	13.21	.35
3. Research and apply.	4.06	.78	.64**	.04	.04	14.77	.42
4. Development of operational standards.	4.37	.63	.66**	.04	.10	15.07	.44
5. Establishment of an internal control system.	4.33	.63	.71**	.04	.07	16.66	.50
6. Monitoring, checking, and evaluating the system.	4.42	.62	.79**	.04	.16	19.55	.62
7. Monitoring, evaluation and supervision of academic education management.	4.08	.75	.79**	.04	.19	19.65	.63
8. Monitoring, evaluation of educational budget management.	4.24	.69	.79**	.04	.18	19.45	.62
9. Monitoring, evaluation of personnel management.	4.23	.65	.84**	.04	.19	21.55	.71
10. Monitoring and evaluation of general administration.	4.14	.69	.80**	.04	.09	19.75	.64
11. Implementing policies.	4.20	.68	.68**	.04	.08	15.71	.46

Construct reliability (ρ_c) = .90

Average variance extracted (ρ_v) = .67

**$p<.01$

Table 18 The factor loading of the 11 indicator elements is positive ranged from .59 to .84 and the squared multiple correlation coefficients (R^2) equal .35 to .71 show that these indicators are an important indicator of all 11 sub-elements. The MON1-MON11 indicator is an important indicator of Monitoring, evaluation and supervision (MON) components.

The component of efficiency of school administrators (EFF)

Table 19 Results of the initial agreement, the appropriateness of the overall
correlation matrix with KMO and Bartlett's Test of Sphericity

KMO and Bartlett's Test		.818
Measure of Sampling Adequacy (MSA)		
Bartlett's Test of Sphericity	Approx. Chi-Square	735.637
	df	6
	Sig.	.000

Based on the results of this analysis, the Kaiser-Meyer-Olkin index is equal to .82, so it can be concluded that the information contained is appropriate to use the composition analysis technique. Then consider together with Bartlett's Test of Sphericity statistics to show that the correlation matrix between variables is significantly different from the identity matrix. Based on Bartlett's Test of Sphericity analysis, the value is 735.64 ($p<.000$). Shows that the relationship between variables is very appropriate to be used in the analysis of confirmed elements.

Table 20 The correlation coefficient between the observed in efficiency of school
administrators

Variables	EFF1	EFF2	EFF3	EFF4
EFF1	1			
EFF2	.46**	1		
EFF3	.55**	.58**	1	
EFF4	.55**	.49**	.62**	1
$\bar{X}$	4.74	4.57	4.68	4.59
SD	.02	.02	.02	.02

** $p<.01$

   Table 20 shows the correlation coefficient between observed in efficiency of
school administrators (EFF); Executives have leadership and good governance
(EFF1). Support, supervise, monitor, procure, use, maintain, educational information
technology (EFF2). Professional principal (EFF3). Leadership capacity, integrity, and
managerial skills could encourage students to excel (EFF4). It found that the
correlation coefficient between latent variables ranged from .46 to -.62.

   Pearson's correlation coefficient analysis it was found that all four
sub-factors were positively related. The consistency of the model with empirical data
statistically significantly at the level of .01, which is highly significant. The highest
correlation coefficient is the correlation between leadership capacity, integrity, and
managerial skills could encourage students to excel (EFF4) and Professional principal
(EFF3), with correlation coefficient equal to .62. In contrast, the lowest correlation
coefficient is the correlation between Support, supervise, monitor, procure, use,
maintain, educational information technology (EFF2) and executives have leadership
and good governance (EFF1), with correlation coefficient equal to .46.
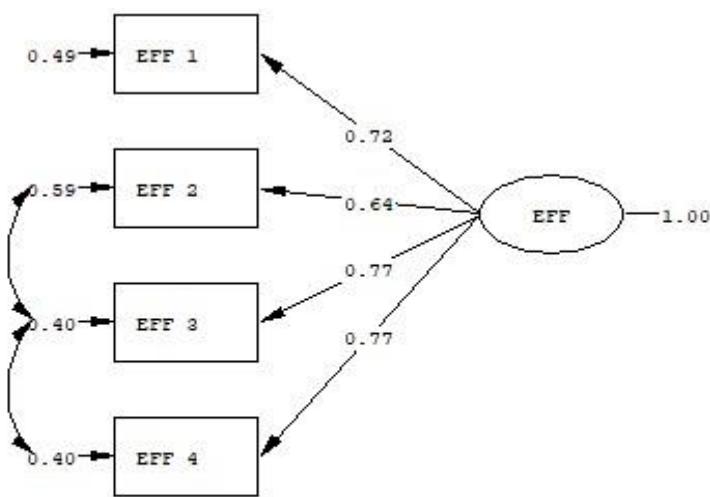
Chi-Square=0.00, df=0, P-value=1.00000, RMSEA=0.000

Figure 10 A measurement model of the efficiency of school administrators

Figure 10 represent the result of a confirmatory factor analysis of the efficiency of school administrators characteristics factors, which reveal that the model is congruent with the empirical data and the Chi-Square (x^2) results equal to .00; $p = 1.00$ with the degree of freedom at 0. Whereas the Root mean square error of approximation (RMSEA) equals .000. Based on the test, it could be concluded that the result is very close to zero which represents an adequate fit to the empirical data. Comparative Fit Index (CFI) equal 1.00 which is higher .95 and Goodness of Fit Index (GFI) equal 1.00, show that the model is consistent with empirical data.

Based on the test, it could be concluded that the result is close to zero, which represents an adequate fit to the empirical data.

Table 21 The results of the confirmatory factor analysis for model of the efficiency
of school administrators

Factors	x^2	SD	B	SE	FS	t	R^2
1. Executives have leadership and good governance.	4.70	.51	.72**	.05	.28	14.26	.51
2. Support, supervise, monitor, procure, use, maintain, educational information technology.	4.47	.64	.64**	.05	.16	12.91	.41
3. Professional principal.	4.63	.55	.77**	.05	.31	13.72	.60
4. Leadership capacity, integrity, and managerial skills could encourage students to excel.	4.55	.60	.77**	.05	.34	15.24	.60

Construct reliability (ρ_c) = .84

Average variance extracted (ρ_v) = .75

**$p<.01$

Table 21 The factor loading of the four indicator elements is positive ranged
from .64 to .77 and the squared multiple correlation coefficients (R^2) equal .41 to .60
show that these indicators are an important indicator of all four sub-elements.
The EFF1-EFF4 indicator is an important indicator of the efficiency of school
administrators (EFF) components.

The component of curriculum development (CUR)

Table 22 Results of the initial agreement, the appropriateness of the overall
correlation matrix with KMO and Bartlett's Test of Sphericity

KMO and Bartlett's Test		.829
Measure of Sampling Adequacy (MSA)		
Bartlett's Test of Sphericity	Approx. Chi-Square	1236.292
	df	15
	Sig.	.000

Based on the results of this analysis, the Kaiser-Meyer-Olkin index is equal
to .83, so it can be concluded that the information contained is appropriate to use the
composition analysis technique. Then consider together with Bartlett's Test of
Sphericity statistics to show that the correlation matrix between variables is
significantly different from the identity matrix. Based on Bartlett's Test of Sphericity
analysis, the value is 1236.29 ($p<.000$). Show that the relationship between variables
is very appropriate to be used in the analysis of confirmed elements.

Table 23 The correlation coefficient between the observed in curriculum development

Variables	CUR1	CUR2	CUR3	CUR4	CUR5	CUR6
CUR1	1					
CUR2	.57**	1				
CUR3	.47**	.60**	1			
CUR4	.53**	.49**	.57**	1		
CUR5	.51**	.48**	.48**	.66**	1	
CUR6	.50**	.48**	.51**	.62**	.77**	1
$\bar{X}$	4.30	3.96	4.12	4.39	4.3	4.30
SD	.03	.03	.03	.03	.03	.03

** $p<.01$

Table 23 shows the correlation coefficient between observed in curriculum development (CUR); Designed its own curriculum for teaching and learning (CUR1). Published its curriculum for teaching and learning (CUR2). The school has collaborated with other institutions on curriculum for teaching and learning (CUR3). Instructional develop standards-aligned units of instruction for each subject and grade (CUR4). Units of instruction include standards-based objectives and criteria for mastery (CUR5). Objectives are leveled to target learning (CUR6). It found that the correlation coefficient between latent variables ranged from .47 to .77.

Pearson's correlation coefficient analysis it was found that all six sub-factors were positively related. The consistency of the model with empirical data statistically significantly at the level of .01, which is highly significant. The highest correlation coefficient is the correlation between objectives are leveled to target learning (CUR6) and Units of instruction include standards-based objectives and criteria for mastery (CUR5), with correlation coefficient equal to .77. In contrast, the lowest correlation coefficient is the correlation between the school had collaborated with other institutions on curriculum for teaching and learning (CUR3) and designed its own curriculum for teaching and learning (CUR1), with correlation coefficient equal to .47.
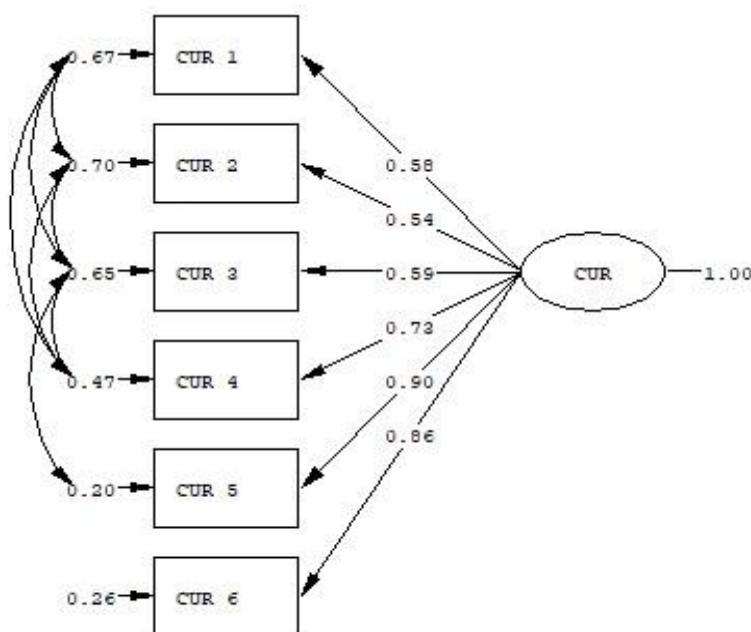
Chi-Square=1.21, df=2, P-value=0.54652, RMSEA=0.000

Figure 11 A measurement model of curriculum development

      Figure 11 represent the result of a confirmatory factor analysis of curriculum development characteristics factors, which reveal that the model is congruent with the empirical data and the Chi-Square (x^2) results equal to 1.21; $p = .55$ with the degree of freedom at .61. Whereas the Root mean square error of approximation (RMSEA) equals .000. Based on the test, it could be concluded that the result is very close to zero which represents an adequate fit to the empirical data. Comparative Fit Index (CFI) equal 1.00 which is higher .95 and Goodness of Fit Index (GFI) equal 1.00 show that the model is consistent with empirical data.

      Based on the test, it could be concluded that the result is close to zero, which represents an adequate fit to the empirical data.

Table 24 The results of the confirmatory factor analysis for model of curriculum
   development

Factors	x^2	SD	B	SE	FS	t	R^2
1. Designed its own curriculum for teaching and learning.	4.17	.69	.58**	.05	.05	12.61	.33
2. Published its curriculum for teaching and learning.	3.92	.76	.54**	.05	.00	11.75	.30
3. The school has collaborated with other institutions on curriculum for teaching and learning.	4.09	.75	.59**	.05	.01	12.20	.35
4. Instructional develop standards-aligned units of instruction for each subject and grade.	4.33	.63	.73**	.05	.12	17.01	.53
5. Units of instruction include standards-based objectives and criteria for mastery.	4.34	.62	.90**	.05	.49	22.76	.80
6. Objectives are leveled to target learning.	4.27	.62	.86**	.05	.34	21.46	.74

Construct reliability (ρ_c) = .85

Average variance extracted (ρ_v) = .69

**p<.01

   Table 24 The factor loading of the six indicator elements is positive ranged
from .54 to .90 and the squared multiple correlation coefficients (R^2) equal .30 to .80
show that these indicators are an important indicator of all six sub-elements.
The CUR-CUR6 indicator is an important indicator of curriculum development
(CUR) components.

The component of teacher training (TRA)

Table 25 Results of the initial agreement, the appropriateness of the overall
correlation matrix with KMO and Bartlett's Test of Sphericity

KMO and Bartlett's Test		
Measure of Sampling Adequacy (MSA)		.894
Bartlett's Test of Sphericity	Approx. Chi-Square	1474.944
	df	45
	Sig.	.000

Based on the results of this analysis, the Kaiser-Meyer-Olkin index is equal
to .99, so it can be concluded that the information contained is appropriate to use the
composition analysis technique. Then consider together with Bartlett's Test of
Sphericity statistics to show that the correlation matrix between variables is
significantly different from the identity matrix. Based on Bartlett's Test of Sphericity
analysis, the value is 1474.94 ($p<.000$). Shows that the relationship between variables
is very appropriate to be used in the analysis of confirmed elements.

Table 26 The correlation coefficient between the observed in teacher training

Variable	TRA1	TRA2	TRA3	TRA4	TRA5	TRA6	TRA7	TRA8	TRA9	TRA10
TRA1	1									
TRA2	.41**	1								
TRA3	.45**	.49**	1							
TRA4	.32**	.45**	.54**	1						
TRA5	.38**	.34**	.35**	.41**	1					
TRA6	.35**	.29**	.38**	.31**	.48**	1				
TRA7	.40**	.35**	.38**	.34**	.43**	.43**	1			
TRA8	.30**	.23**	.37**	.29**	.33**	.39**	.54**	1		
TRA9	.27**	.26**	.33**	.34**	.30**	.30**	.49**	.43**	1	
TRA10	.31**	.26**	.34**	.35**	.30**	.30**	.43**	.39**	.69**	1
$\bar{X}$	4.36	4.45	4.29	4.51	4.46	4.31	4.39	4.21	4.49	4.47
SD	.03	.03	.03	.03	.03	.03	.03	.04	.03	.03

** *p<.01*

Table 26 shows the correlation coefficient between observed in teacher training (TRA); Coordinating the promotion of individuals, families, NGOs, community organizations, NGOs, local government organizations. Professional organizations, institutes, religions, establishments and social institutions (TRA1). Development of information systems and networks (TRA2). Student census and student admissions (TRA3). Site supervision utilities and environment (TRA4). Welfare teacher welfare and educational personnel (TRA5). Raising resources for education (TRA6). Solidly provided mentorship to student teachers (TRA7). There are special programs established to assist student teachers during their field experience (TRA8). Professional teachers (TRA9). Teacher reliable and effective teachers (TRA10). It found that the correlation coefficient between latent variables ranged from .23 to .69

Pearson's correlation coefficient analysis it was found that all 11 sub-factors were positively related. The highest correlation coefficient is the correlation between Teacher reliable and effective teachers (TRA10) and Professional teachers (TRA9), with correlation coefficient equal to .69. In contrast, the lowest correlation coefficient is the correlation between There are special programs established to assist student teachers during their field experience (TRA8) and Development of information systems and networks (TRA2), with correlation coefficient equal to .23.

Chi-Square=37.05, df=21, P-value=0.01662, RMSEA=0.041
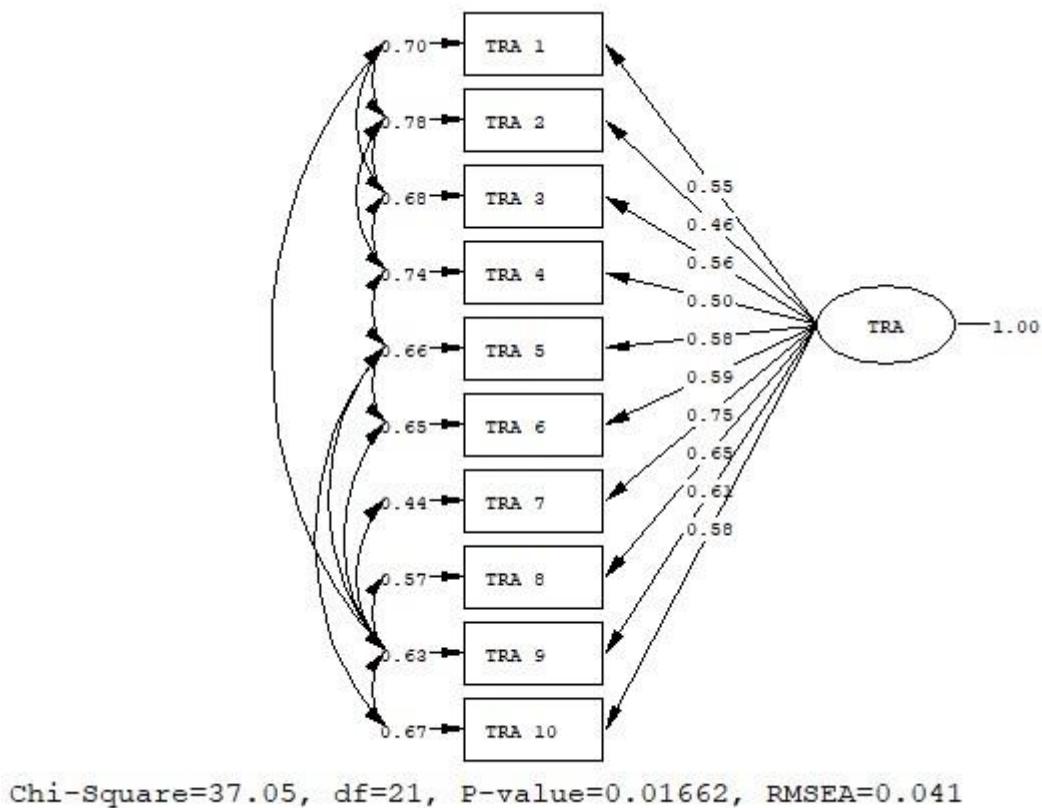
Figure 12 A measurement model of the efficiency of teacher training

Figure 12 represent the result of a confirmatory factor analysis of curriculum development characteristics factors, which reveal that the model is congruent with the empirical data and the Chi-Square (x^2) results equal to 37.05; p = .017 with the degree of freedom at 1.76. Whereas the Root mean square error of approximation (RMSEA) equals .041. Based on the test, it could be concluded that the result is very close to zero which represents an adequate fit to the empirical data. Comparative Fit Index (CFI) equal .99 which is higher .95 and Goodness of Fit Index (GFI) equal .98 show that the model is consistent with empirical data.

Based on the test, it could be concluded that the result is close to zero, which represents an adequate fit to the empirical data.

Table 27 The results of the confirmatory factor analysis for model of teacher
        training

Factors	x^2	SD	B	SE	FS	t	R^2
1. Coordinating the promotion of individuals, families, NGOs, community organizations, NGOs, local government organizations. Professional organizations, institutes, religions, establishments and social institutions.	4.27	.63	.55**	.05	.07	11.31	.30
2. Development of information systems and networks.	4.31	.62	.46**	.05	.05	9.21	.21
3. Student census and student admissions.	4.28	.64	.56**	.05	.04	11.66	.32
4. Site supervision utilities and environment.	4.46	.57	.50**	.05	.10	10.28	.26
5. Welfare teacher welfare and educational personnel.	4.44	.62	.58**	.05	.07	11.8	.34
6. Raising resources for education.	4.26	.65	.59**	.05	.16	12.33	.35
7. Solidly provided mentorship to student teachers.	4.31	.66	.75**	.05	.19	16.59	.56
8. There are special programs established to assist student teachers during their field experience.	4.19	.74	.65**	.05	.18	14.03	.43
9. Professional teachers.	4.37	.63	.61**	.05	.19	10.16	.37
10. Teacher reliable and effective teachers.	4.38	.64	.58**	.05	.09	11.95	.33

Construct reliability (ρ_c) = .90

Average variance extracted (ρ_v) = .67

**$p<.01$

Table 27 The factor loading of the 10 indicator elements is positive ranged from .46 to .75 and the squared multiple correlation coefficients (R^2) equal .21 to .56 show that these indicators are an important indicator of all 10 sub-elements. The TRA1-TRA10 indicator is an important indicator of Teacher training (TRA) components.

The component of effective schools management indicators in eastern region of Thailand

Table 28 Results of the initial agreement, the appropriateness of the overall correlation matrix with KMO and Bartlett's Test of Sphericity

KMO and Bartlett's Test		.949
Measure of Sampling Adequacy (MSA)		
Bartlett's Test of Sphericity	Approx. Chi-Square	8635.320
	df	630
	Sig.	.000

Based on the results of this analysis, the Kaiser-Meyer-Olkin index is equal to .95, so it can be concluded that the information contained is appropriate to use the composition analysis technique. Then consider together with Bartlett's Test of Sphericity statistics to show that the correlation matrix between variables is significantly different from the identity matrix. Based on Bartlett's Test of Sphericity analysis, the value is 8635.32 ($p < .000$). Shows that the relationship between variables is very appropriate to be used in the analysis of confirmed elements.

Table 29 Second order Confirmatory Factor Analysis (CFA) results of effective
schools management indicators in eastern region of Thailand

Factors	$\bar{X}$	SD	B	SE	FS	t	R^2
First order							
1	4.30	.61	.55**	-	.11	-	.29
2	4.44	.61	.59**	.05	.20	11.07	.40
3	4.62	.54	.58**	.06	.41	9.25	.57
4	4.61	.53	.54**	.07	.21	8.16	.34
5	4.45	.59	.64**	-	.23	-	.38
6	4.42	.62	.67**	.05	.07	14.30	.38
7	4.26	.70	.64**	.05	.05	12.05	.35
8	4.06	.78	.78**	.08	.04	9.55	.42
9	4.37	.63	.60**	-	.10	-	.44
10	4.33	.63	.57**	.05	.07	10.31	.50
11	4.42	.62	.67**	.06	.16	11.73	.62
12	4.08	.75	.58**	.06	.19	10.51	.63
13	4.24	.69	.69**	.05	.18	13.23	.62
14	4.23	.65	.75**	.05	.19	13.79	.71
15	4.14	.69	.56**	.05	.09	10.28	.64
16	4.20	.68	.57**	.05	.08	10.37	.46
17	4.70	.51	.77**	.05	.28	14.21	.51
18	4.47	.64	.71**	.05	.16	13.13	.41
19	4.63	.55	.76**	.05	.31	13.87	.60
20	4.55	.60	.80**	.05	.34	14.52	.60
21	4.17	.69	.79**	.06	.05	14.23	.33
22	3.92	.76	.70**	.05	.00	13.11	.30
23	4.09	.75	.73**	-	.01	-	.35
24	4.33	.63	.80**	.06	.12	12.91	.53
25	4.34	.62	.73**	.06	.49	11.85	.80
26	4.27	.62	.83**	.06	.34	14.18	.74
27	4.27	.63	.67**	-	.07	-	.30
28	4.31	.62	.64**	.05	.05	13.81	.21
29	4.28	.64	.70**	.05	.04	12.80	.32
30	4.46	.57	.81**	.06	.10	14.43	.26
31	4.44	.62	.74**	.05	.07	13.48	.34
32	4.26	.65	.73**	.05	.16	13.69	.35
33	4.31	.66	.66**	.06	.19	11.68	.56
34	4.19	.74	.53**	.05	.18	9.90	.43
35	4.37	.63	.55**	.05	.19	10.20	.37
36	4.38	.64	.63**	.06	.09	11.13	.33
Second order							
ACA	3.92	.43	.76**	.08	.23	9.70	.79
MON	37.23	.44	.78**	-	.11	-	.83
EFF	.00	.56	.60**	-	.27	-	.49
CUR	1.21	.42	.76**	.06	.17	11.47	.79
TRA	37.05	.49	.86**	.08	.10	11.00	1.02

Table 29 The factor loading of the five indicator component is positive ranged from .42 to .56 and the squared multiple correlation coefficients (R^2) equal .49 to 1.02 show that these indicators are an important indicator of models for educational management indicators of effectiveness schools in eastern region of Thailand
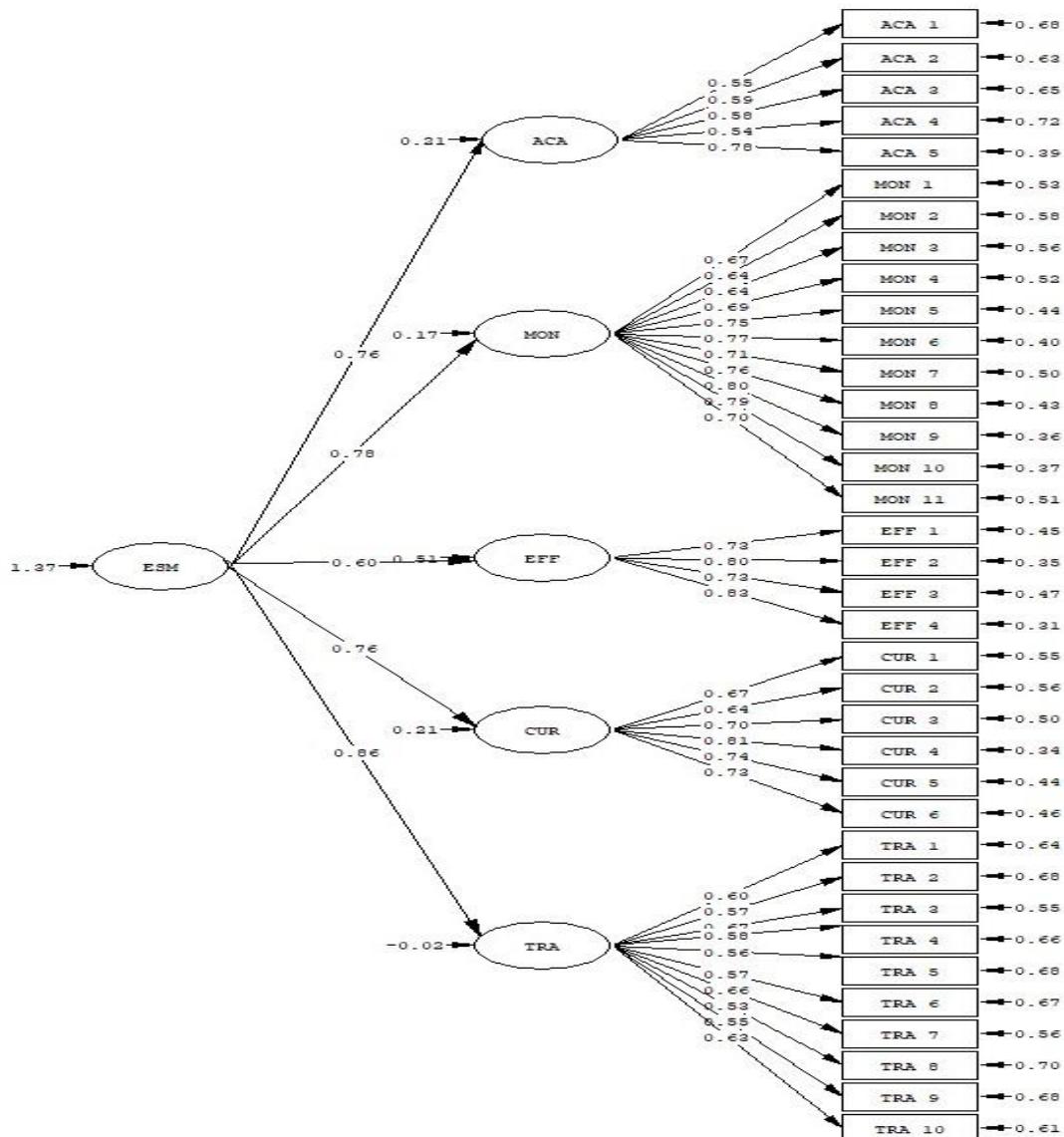
Chi-Square=461.42, df=424, P-value=0.10170, RMSEA=0.014

Figure 13 The parsimonious model of factor affecting for educational management indicators of effectiveness schools in eastern region of Thailand

Figure 13 represent the result of a confirmatory factor analysis of curriculum development characteristics factors, which reveal that the model is congruent with the empirical data and the Chi-Square (x^2) results equal to 461.42; $p = .10$ with the degree of freedom at 424. Whereas the Root mean square error of approximation (RMSEA) equals .014. Based on the test, it could be concluded that the result is very close to zero which represents an adequate fit to the empirical data. Comparative Fit Index (CFI) equal 1.00 which is higher .95 and Goodness of Fit Index (GFI) equal 1.00 show that the model is consistent with empirical data.

Based on the test, it could be concluded that the result is close to zero, which represents an adequate fit to the empirical data.

Figure 14 Model of effective schools management indicators in eastern region of

Thailand after the rotation

CHAPTER 5
CONCLUSION AND DISCUSSION

The purpose of this study was: 1) to construct indicators of ESM and excusive their quality, 2) to validate the construct validity of the measurement model of ESM indicators.

The population of this research was teachers in Office of Primary Education Area in eastern region of Thailand. By using a stratified random sampling technique, the sample size of this research were 849 teachers; 400 respondents for Exploratory Factor Analysis (EFA) and 449 respondents for Confirmatory Factor Analysis (CFA).

The research instruments comprised of one questionnaire, measured with an *IOC* value ranging from .60 to 1.00 and the reliability ranging from .76 to .86. The data was analyzed by using descriptive statistics and a hypothesized model, which was tested by structural equation model (ESM). The ESM analyses were conducted using likelihood estimates derived from covariance matrices and the likelihood ratio of the chi-square (x^2) to test the statistics and evaluate the goodness of fit. The findings revealed that the parsimonious model fitted satisfactorily to the empirical data.

The conceptual framework for this study was developed from the integration of five significant factors, as follow:

1. Academic administration (ACA) has five observed variables, including: 1) Development of local curriculum framework, 2) Promotion of curriculum development, 3) The learning process is focused on learners, 4) Production, supply and development of learning media tools, 5) The development of student activities and care systems.

2. Monitoring, evaluation and supervision (MON) has 11 observed variables, including: 1) Measure, evaluate and apply, 2) Develop, support, supervise, monitor and monitor, 3) Research and apply, 4) Development of operational standards, 5) Establishment of an internal control system, 6) Monitoring, checking, and evaluating the system, 7) Monitoring, evaluation and supervision of academic education management, 8) Monitoring, evaluation of educational budget management,

9) Monitoring, evaluation of personnel management, 10) Monitoring and evaluation of general administration, 11) Implementing policies.

3. The efficiency of school administrators (EFF) has four observed variables, including: 1) Executives have leadership and good governance, 2) Support, supervise, monitor, procure, use, maintain, educational information technology, 3) Professional principal, 4) Leadership capacity, integrity, and managerial skills could encourage students to excel,

4. Curriculum development (CUR) has six observed variables, including: 1) Designed its own curriculum for teaching and learning, 2) Published its curriculum for teaching and learning, 3) The school has collaborated with other institutions on curriculum for teaching and learning, 4) Instructional develop standards-aligned units of instruction for each subject and grade, 5) Units of instruction include standards-based objectives and criteria for mastery, 6) Objectives are leveled to target learning,

5. Teacher training (TRA) has 10 observed variables, including: 1) Coordinating the promotion of individuals, families, NGOs, community organizations, NGOs, local government organizations. Professional organizations, institutes, religions, establishments and social institutions, 2) Development of information systems and networks, 3) Student census and student admissions. 4) Site supervision utilities and environment, 5) Welfare teacher welfare and educational personnel, 6) Raising resources for education, 7) Solidly provided mentorship to student teachers, 8) There are special programs established to assist student teachers during their field experience, 9) Professional teachers, 10) Teacher reliable and effective teachers,

Conclusions

The development for educational management indicators of effectiveness schools in eastern region of Thailand can be concluded as follows:

Analytical results for educational management indicators of effectiveness schools in eastern region of Thailand, conclusions as follows:

1. Academic administration (ACA) has five observed variables. The factor loading of the five indicator elements is positive ranged from .54 to .75 shows that

every element has an acceptable weight composition (>.03). The first three highest elements were the learning process is focused on learners (.75), promotion of curriculum development (.63), and the development of student activities and care systems (.61) respectively.

2. Monitoring, evaluation and supervision (MON) has 11 observed variables. The factor loading of the 11 indicator elements is positive ranged from .59 to .84 show that every element has an acceptable weight composition (>.03). The first three highest elements were monitoring, evaluation of personnel management (.84), monitoring and evaluation of general administration (.80), monitoring, checking, and evaluating the system (.79), monitoring, evaluation and supervision of academic education management (.79), monitoring, evaluation of educational budget management (.79) respectively.

3. The efficiency of school administrators (EFF) has four observed variables. The factor loading of the four indicator elements is positive ranged from .64 to .77 show that every element has an acceptable weight composition (>.03). The first three highest elements were professional principal (.77), leadership capacity, integrity, and managerial skills could encourage students to excel (.77), executives have leadership and good governance (.72) respectively.

4. Curriculum development (CUR) has six observed variables. The factor loading of the six indicator elements is positive ranged from .54 to .90 show that every element has an acceptable weight composition (>.03). The first three highest elements were units of instruction include standards-based objectives and criteria for mastery (.90), objectives are leveled to target learning (.86), instructional develop standards-aligned units of instruction for each subject and grade (.73) respectively.

5. Teacher training (TRA) has 10 observed variables. The factor loading of the 10 indicator elements is positive ranged from .46 to .75 show that every element has an acceptable weight composition (>.03). The first three highest elements were solidly provided mentorship to student teachers (.75), there are special programs established to assist student teachers during their field experience (.65), professional teachers equal (.61) respectively.

6. According to educational management indicators of effectiveness schools in eastern region of Thailand, there were five items where the total mean score of all

the items were high. The highest mean score is revealed from item no. one, Academic administration (ACA) ($\bar{X}$ = 4.55; SD = .43). The second highest was Curriculum development (CUR) ($\bar{X}$ = 4.53; SD = .42). The third highest was Monitoring, evaluation and supervision (MON) ($\bar{X}$ = 4.39; SD = .44). The lowest mean score, however, was item no. five, Teacher training (TRA) ($\bar{X}$ = 4.30; SD = .49) and the Skewness value between -0.34 to -1.08 with the Kurtosis value between -.24 to 1.65.

Represent the result of a confirmatory factor analysis of educational management indicators of effectiveness schools in eastern region of Thailand, which reveal that the model is congruent with the empirical data and the Chi-Square (x^2) results equal to 461.42; p = .10 with the degree of freedom at 424. Whereas the Root mean square error of approximation (RMSEA) equals .014. Based on the test, it could be concluded that the result is very close to zero which represents an adequate fit to the empirical data. The factor loading of the 36 indicator elements is positive ranged from .31 to .72.

Analysis of the relationship between the indicators in each element and examining the appropriateness of the data before analyzing the components. It was found that the correlation coefficients of the indicators in each component showed that all indicators were positively correlated with statistical significance at the level of .01, high and low relationships with correlation coefficients between .31 to .72.

Bartlett's test of Sphericity is equal to 1533.17 (p<.000), indicating that the correlation matrix is significantly different from the identity matrix. The analysis results correspond to the index value. Kaiser-Meyer-Olkin (KMO), which is equal to .87, which is a value approaching one, indicating that various indicators are related and appropriate

Based on the test, it could be concluded that the result is close to zero, which represents an adequate fit to the empirical data.

Analyzed the correlation coefficient between the observed variables in LISREL programs

Considering the Pearson's Product Moment Correlation coefficient, the correlation matrix between the observed variables to examine the basic agreement of structural equation model analysis. It could be concluded that all five indicators 36 observed variables were positively related. The consistency of the model with

empirical data statistically significantly at the level of .01, which is highly significant. The correlation coefficient between the observed in educational management indicators of effectiveness schools in eastern region of Thailand; Pearson's correlation coefficient analysis it was found that all 36 sub-factors were positively related. The highest correlation coefficient is the correlation between Teacher reliable and effective teachers (TRA10) and Professional teachers (TRA9), with correlation coefficient equal to .69 and the highest correlation coefficient is the correlation between Leadership capacity, integrity, and managerial skills could encourage students to excel (EFF4) and Professional principal (EFF3), with correlation coefficient equal to .69. In contrast, the lowest correlation coefficient is the correlation between there are special programs established to assist student teachers during their field experience (TRA8) and Development of local curriculum framework (ACA1), with correlation coefficient equal to .12.

The analytical results of Bartlett's test are congruent with the index value of Kaiser-Meyer-Olkin (KMO), which is close to one.

However, the most significant indicators are The highest correlation coefficient is the correlation between and Professional teachers (TRA9), with correlation coefficient equal to .69 and the highest correlation coefficient is the correlation between Leadership capacity, integrity, and managerial skills could encourage students to excel (EFF4) and Professional principal (EFF3), with correlation coefficient equal to .69.

Discussions

The findings revealed that educational management indicators of effectiveness schools in eastern region of Thailand were a significantly better fit to the empirical data. Below are the regression weights for the model of factors starting with factors that directly impact academic administration, followed by the remaining four factors, which impact effectiveness schools.

1. Academic administration had a significant direct effect on effectiveness schools with a value of .75 and a *p*-value at .05 shows that the learning process is focused on learners. It is important to effectiveness schools, accordance with National Education Act (1999). At the heart of this National Education Act (1999) is a move

toward student-centered learning and a student-centered classroom. Specifically, section 24 of the education act outlines what must be done to improve education performance: 1) Arranging learning in line with the students' interests, aptitudes and individual differences, 2) Training students in thinking abilities, especially critical thinking, 3) Organizing learning activities that draw from authentic experiences, and 4) Promoting situations where learners and teachers learn together. In addition to addressing these key issues of education reform in Thailand, indeed in international education, we also focus our attention and resources on the goal of promoting Thai teachers to reach their potential as skilled teachers using teaching methods that engage their students with the result that students love to learn through self-discovery. The findings match by Westbrook et al (2013, p. 31). Have conceptualized "effective" pedagogy as those teaching and learning activities which make some observable change in students, leading to greater engagement and understanding and/ or a measureable impact on student learning" (p. 8). The term effectiveness requires context such as assessment, pedagogy, or leadership to make the abstract notion of effective something concrete, less tacit and tangible, hence the need to link effectiveness with a context such as teaching. Indeed, the notion of making some observable change in students leading to greater engagement and understanding and/ or a measureable impact on students is an important underpinning of effectiveness in any educational context. Starrett (2015) "effective teacher provides students with positive outcomes-both socially and academically".

2. Monitoring, evaluation and supervision had a significant direct effect on effectiveness schools with a value of .84 and a p-value at .05, show that the monitoring, evaluation of personnel management. An important to effectiveness schools, accordance with effective managers see to it that assignments and projects are monitored continually. Monitoring well means consistently measuring performance and providing ongoing feedback to employees and work groups on their progress toward reaching their goals. Regulatory requirements for monitoring performance include conducting progress reviews with employees where their performance is compared against their elements and standards. Ongoing monitoring provides the supervisor the opportunity to check how well employees are meeting predetermined standards and to make changes to unrealistic or problematic standards.

And by monitoring continually, supervisors can identify unacceptable performance at any time during the appraisal period and provide assistance to address such performance rather than wait until the end of the period when summary rating levels are assigned (OPM's divisions, 2019). Human resources for health (HRH) monitoring and evaluation (M&E) plan is a fundamental component of national efforts to strengthen the health workforce. The purpose of a national M&E plan for HRH is to guide the measurement of and monitor progress in the implementation of a country's HRH strategic and/or operational plan. Monitoring and evaluation are both critical to assessing programmatic progress toward national goals, objectives, and targets. M&E can measure progress, identify areas for improvement, explain why a strategy is or is not working, and suggest corrective strategies. Monitoring is an ongoing process that provides routine information on whether a program is making progress toward its objectives. Monitoring is the continuous measurement of the knowledge, behaviors, and/ or skills that an intervention or program is attempting to influence, measured through the tracking of changes in program inputs, activities, and outputs overtime (Measurement, Learning & Evaluation Project 2013). Evaluation is a systematic approach to attributing changes in specific outcomes to program inputs and activities (Measurement, Learning & Evaluation Project 2013). For example, an HRH evaluation might use interviews and observations of client-provider interactions to assess health worker performance following the introduction of supportive supervision. Such an evaluation might find that health workers 'fulfillment of standard tasks on a checklist improved by 25% as a result of the program's introduction of a supervisory scheme. The findings match the findings by Cuttance (2006) this article discusses the management of quality in education systems. Indicator systems are discussed in the section that follows and the relationship between indicators, development and accountability is addressed in the context of the strategic management of improvement in school systems. A system of indicators developed to monitor the effectiveness of practice is then discussed. The final sections of the paper discuss these indicators in serving a dual purpose of school development and quality management. These indicators were developed to continuously monitor and review the quality of the education provided for students. Information from the

monitoring of the effectiveness of school practice and functioning is discussed in the final section.

       3. The efficiency of school administrators had a significant direct effect on effectiveness schools with a value of .90 and a p-value at .05, two items include:

       3.1 The efficiency of school administrators had a significant direct effect on effectiveness schools, show that the professional principal. Is important to effectiveness schools, accordance with Lezotte (2009, p. 3, cited in Zufiaurre & Wilkinson, 2014) further, involving teachers in decision-making and appreciating their contributions in administrative processes seem to contribute to morale and job satisfaction of the teaching staff. Therefore, the participant appeared to monitor students' progress frequently. The findings match the findings by Büyükgöze (2016) the results of the present study showed that participative leadership, seeking subordinates' motivation and satisfaction, and concerning students' needs are essentials in school administration.

       3.2 The efficiency of school administrators had a significant direct effect on effectiveness schools, show that the leadership capacity, integrity, and managerial skills could encourage students to excel, it is important to effectiveness schools. The findings match the findings by Muhammad Faizal (2011) study found that school leaders particularly principals significantly related to the effectiveness of an effective school practices. This means that the principals an important role to improve their school performance.

       4. Curriculum development had a significant direct effect on student achievements with a value of .90 and a p-value at .05 show that the units of instruction include standards-based objectives and criteria for mastery. Is important to effectiveness schools, accordance with David and Terry (2004) knowing what to teach and providing adequate time to teach are essential for effective instruction. Teachers and administrators must balance issue of increasing curricular demands with limited instructional time. The findings match the findings by

       5. Teacher training had a significant direct effect on student achievements with a value of .75 and a p-value at .05, show that the teacher training. It is important to effectiveness schools, accordance with Leithwood (2006) the school principal leadership must be equipped with academic spirit in order to determine student

outcomes and also play the role of coordinator to assist students and teachers in teaching and learning activities. The findings match the findings by Barber and Mourshed (2007) proposed that "the quality of an education system cannot exceed the quality of its teachers", therefore "the only way to improve outcomes is to improve instruction" (p.13). They also claim that "achieving a universal high outcome is only possible by putting in place mechanisms to ensure that schools deliver high-quality instruction to every child" (p. 40). Accepting these views, the logical next step is to develop a system to oversee mechanisms and focus on instruction and teachers who are the front line people who can change student outcomes directly and daily (Starrett, 2015). The challenges are obvious. The correct oversight mechanism(s) and the people implementing the oversight need to be doing this effectively. Teachers need to be coached, involved, and partners in the quest for effectiveness. The need to identify effective pedagogy is the next hurdle.

From the results of this study, all five basic factors are systematically related. The improvement for educational management indicators of effectiveness schools in eastern region of Thailand should be carried out at the same time as the proposed approach in the factors that influence effectiveness schools.

Recommendations

Recommendations for Practices

Based on the results of this study, all five basic factors are systematically related. The improvement for educational management indicators of effective schools in eastern region of Thailand should be carried out at the same time, particularly in teacher training. Teachers with high satisfactory instructing have a tendency to do and find out more about their own skills, pushing out the limitations of their acquisition knowledge of and teaching, looking for the new materials and ways to teach. However, in order to obtain their maximum potential, ongoing professional improvement must be implemented in their schedules. In addition to all the traditional teaching skills, teachers also have a lot to gain from experiencing training on digital educational solutions. It's also very important to keep in mind that not all teachers will be immediately comfortable with using the technology and hardware behind educational platforms. In order to achieve educational excellence, it's important to

ensure that teacher's training program includes sufficient coverage of how to get the best from technology devices in general, and specifically eLearning software.

In term of monitoring, evaluation of personnel management, the efficiency of school administrators are professional principal and leadership capacity, integrity, and managerial skills could encourage students to excel. Effective monitoring and evaluation can satisfactory be executed via report keeping and desirable reporting systems, to help discover out whether the school resources are being spent in accordance to design or not. This additionally helps in figuring out if the teaching approach in the school is bringing to the desired educational results. Any school management team will have better capacity to mastering and improve from past experiences, improve planning, and better allocation of resources if they put the best monitoring and evaluation practices. Adequate monitoring and evaluation systems cam enhance the performance of both the teachers and the students. Through the use of technology, the school management, and the teachers can access data that can be used to guides on how to improve the performance of the students. The teachers can do an assessment and the behavior of the student to identify the areas where the student is failing. It is by that; teachers can align their teaching skills accordingly to improve student performance.

Recommendations for Future Research

The results of this dissertation are the products of a quantitative research method. As a consequence, the statistics were only able to slightly skim the surface of the factors contributing to the effectiveness of a school. For this reason, further research should utilize a mixed research method to confirm the findings of the quantitative research. Mixed research method consists of in-depth interviews and questionnaires to determine the appropriateness of the model. As this type of research is a combination of statistics and focuses on the comprehension of underlying emotions and opinions, the research will be able to better develop hypotheses and trends from the sample.

There should be a study of the educational management indicators of effectiveness schools of private educational institutions. And study in any another region of Thailand etc.

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APPENDICES

APPENDIX A

RESEARCH DOCUMENTS

แบบรายงานผลการพิจารณาจริยธรรมการวิจัย
คณะศึกษาศาสตร์ มหาวิทยาลัยบูรพา

๑. ชื่อวิทยานิพนธ์

ชื่อเรื่องวิทยานิพนธ์ (ภาษาไทย)   การพัฒนาตัวบ่งชี้การบริหารจัดการศึกษาที่มีประสิทธิผล
สำหรับโรงเรียนในภาคตะวันออกของประเทศไทย

ชื่อเรื่องวิทยานิพนธ์ (ภาษาอังกฤษ)   THE DEVELOPMENT FOR EDUCATIONAL MANAGEMENT
INDICATORS OF EFFECTIVENESS SCHOOLS IN EASTERN REGION OF THAILAND

๒. **ชื่อนิสิต**   นางสาวนภชนก ฐานวาณิชกุล   **หลักสูตร** ปรัชญาดุษฎีบัณฑิต (English Program)
รหัสประจำตัว   ๕๕๘๒๐๐๕๐ **สาขาวิชา** การบริหารการศึกษา   **คณะศึกษาศาสตร์**
☐ ภาคปกติ   ☐ ภาคพิเศษ

๓. ผลการพิจารณาของคณะกรรมการจริยธรรมการวิจัย:

คณะกรรมการจริยธรรมการวิจัย ได้พิจารณารายละเอียดงานนิพนธ์/วิทยานิพนธ์/ดุษฎีนิพนธ์เรื่องดังกล่าว
ข้างต้นแล้วในประเด็นที่เกี่ยวกับ

๑) การเคารพในศักดิ์ศรี และสิทธิของมนุษย์ที่ใช้เป็นตัวอย่างการวิจัย

๒) วิธีการอย่างเหมาะสมในการได้รับความยินยอมจากกลุ่มตัวอย่างก่อนเข้าร่วมโครงการวิจัย
(Informed consent) รวมทั้งการปกป้องสิทธิประโยชน์และรักษาความลับของกลุ่มตัวอย่างในการวิจัย

๓) การดำเนินการวิจัยอย่างเหมาะสม เพื่อไม่ก่อความเสียหายต่อสิ่งที่ศึกษาวิจัยไม่ว่าจะเป็น
สิ่งที่มีชีวิตหรือไม่มีชีวิต

คณะกรรมการจริยธรรมการวิจัย มีมติเห็นชอบ ดังนี้

(✓) รับรองโครงการวิจัย

(   ) ไม่รับรอง

๔. วันที่ให้การอนุมัติ:..............๒๒..............เดือน กุมภาพันธ์ พ.ศ. ๒๕๖๒

(ลงชื่อ)   สฎายุ ธีระวณิชตระกูล
(รองศาสตราจารย์ ดร.สฎายุ ธีระวณิชตระกูล)
คณบดีคณะศึกษาศาสตร์
ประธานคณะกรรมการพิจารณาจริยธรรมการวิจัย

ใบอนุญาตเก็บข้อมูลเพื่อการวิจัย

        อนุญาตให้ นางสาวนภชนก ฐานวาณิชกุล นิสิตหลักสูตรปรัชญาดุษฎีบัณฑิต สาขาวิชาการบริหาร
การศึกษา คณะศึกษาศาสตร์ มหาวิทยาลัยบูรพา ขณะนี้อยู่ระหว่างการทำดุษฎีนิพนธ์ เรื่อง "การพัฒนา
ตัวบ่งชี้การบริหารจัดการการศึกษาที่มีประสิทธิผลสำหรับโรงเรียนในภาคตะวันออกของประเทศไทย"
โดยมี รองศาสตราจารย์ ดร.สุเมธ งามกนก เป็นประธานกรรมการควบคุมดุษฎีนิพนธ์ เพื่อให้การวิจัยดังกล่าว
เป็นไปด้วยความเรียบร้อยและมีประสิทธิภาพ คณะศึกษาศาสตร์ จึงมีความประสงค์ขออนุญาตเก็บข้อมูล
กับบุคลากรที่อยู่ในกำกับของท่านเพื่อเป็นส่วนหนึ่งในงานวิจัยของนิสิตดังกล่าว

    ☑ อนุญาต
    ☐ ไม่อนุญาต

ลงนาม ....
      (นายอัมพร พินะสา)
ผู้ช่วยเลขาธิการคณะกรรมการการศึกษาขั้นพื้นฐาน ปฏิบัติราชการแทน
ตำแหน่ง..เลขาธิการคณะกรรมการการศึกษาขั้นพื้นฐาน................
วันที่.............๑ ๓ ก.พ. ๒๕๖๒.....................
        ประทับตราสถาบัน (ถ้ามี)

ที่ ศธ ๖๒๑๘/๐๓๙๔

คณะศึกษาศาสตร์ มหาวิทยาลัยบูรพา
ต.แสนสุข อ.เมือง จ.ชลบุรี ๒๐๑๓๑

๑๑ กุมภาพันธ์ ๒๕๖๒

เรื่อง   ขออนุญาตเก็บข้อมูลเพื่อการวิจัย

เรียน   เลขาธิการคณะกรรมการการศึกษาขั้นพื้นฐาน

             ด้วย นางสาวนภชนก ฐานวาณิชกุล ระดับบัณฑิตศึกษา หลักสูตรปรัชญาดุษฎีบัณฑิต สาขาวิชา
การบริหารการศึกษา คณะศึกษาศาสตร์ มหาวิทยาลัยบูรพา ได้รับอนุมัติให้ทำดุษฎีนิพนธ์ เรื่อง "การพัฒนา
ตัวบ่งชี้การบริหารจัดการการศึกษาที่มีประสิทธิผลสำหรับโรงเรียนในภาคตะวันออกของประเทศไทย"
ในความควบคุมดูแลของ รองศาสตราจารย์ ดร.สุเมธ งามกนก ประธานกรรมการควบคุมดุษฎีนิพนธ์
ขณะนี้อยู่ระหว่างการดำเนินการทำดุษฎีนิพนธ์ ในการนี้ เพื่อให้การทำวิทยานิพนธ์ดังกล่าวเป็นไป
ด้วยความเรียบร้อยและมีประสิทธิภาพ คณะศึกษาศาสตร์ จึงมีความประสงค์ขออนุญาตเก็บข้อมูล
กับบุคลากรที่อยู่ในกำกับของท่านเพื่อเป็นส่วนหนึ่งในงานวิจัยของนิสิตดังกล่าว

             ทั้งนี้ เพื่อนำไปประกอบการขออนุมัติการพิจารณาจริยธรรมการวิจัย คณะศึกษาศาสตร์
มหาวิทยาลัยบูรพา

             จึงเรียนมาเพื่อโปรดพิจารณา

ขอแสดงความนับถือ

(ผู้ช่วยศาสตราจารย์ ดร.เชษฐ์ ศิริสวัสดิ์)
รองคณบดีฝ่ายวิชาการ ปฏิบัติการแทน
คณบดีคณะศึกษาศาสตร์ ปฏิบัติการแทน
ผู้ปฏิบัติหน้าที่อธิการบดีมหาวิทยาลัยบูรพา

สำนักงานคณบดี คณะศึกษาศาสตร์
โทรศัพท์ ๐-๓๘๑๐-๒๒๒ ต่อ ๒๐๐๖
โทรสาร ๐-๓๘๓๙-๑๐๔๓

ที่ ศธ ๐๔๐๐๑/วอว๔

เรียน เลขาธิการ กพฐ.

ด้วย มหาวิทยาลัยบูรพา ขออนุญาตเก็บข้อมูลเพื่อการวิจัย
กับบุคลากรในสถาบันการศึกษาที่อยู่ในสังกัด เรื่อง การพัฒนา
ตัวบ่งชี้การบริหารจัดการการศึกษาที่มีประสิทธิผลสำหรับโรงเรียน
ในภาคตะวันออกของประเทศไทย

จึงเรียนมาเพื่อโปรดทราบและพิจารณา

๑. อนุญาต
๒. ลงนามในใบอนุญาตเก็บข้อมูลเพื่อการวิจัยที่แนบ
มาพร้อมนี้ หรือ
๓. สั่งการอื่นใดตามที่เห็นสมควร

(นายสุรศักดิ์ อินศรีไกร)
ผู้อำนวยการสำนักอำนวยการ
รักษาการในตำแหน่งที่ปรึกษาด้านนโยบายและแผน
๑ ๒ ก.พ. ๒๕๖๒

อนุญาต
ลงนามแล้ว

(นายอัมพร พินะสา)
ผู้ช่วยเลขาธิการคณะกรรมการการศึกษาขั้นพื้นฐาน ปฏิบัติราชการแทน
เลขาธิการคณะกรรมการการศึกษาขั้นพื้นฐาน
๑ ๓ ก.พ. ๒๕๖๒

APPENDIX B

EXPERT PANELS

1. Assistant Professor Dr. Prayoon Imsawasd

      Head of Educational Administration Department

      Faculty of Education, Burapha University

2. Dr. Anchan Khunnakaew

      School Director

      Wattanadaroonwit School

3. Dr. Chetpreeya Khamsathain

      School Director

      Banmabklood School

4. Dr. Pakkanat Sompongtam

      Instructor, Educational Administration Department

      Faculty of Education, Burapha University

5. Dr. Denchai Prabjandee

      Principle of International Education Programs (IEP)

      Piboonbumpen Demonstration School Burapha University

APPENDIX C

RELIABILITY OF RESEARCH INSTRUMENTS

Table: Reliability of research instruments

Variables (Factors)	Reliability
Academic	0.864
General administration	0.860
Monitoring, evaluation and supervision	0.860
The efficiency of school administrators	0.763
Curriculum development	0.865
Teacher training	0.780

1. Academic administration (ACA) has 5 observed variables, including:

1.1 Development of local curriculum framework.

1.2 Promotion of curriculum development.

1.3 The learning process is focused on learners.

1.4 Production, supply and development of learning media tools.

1.5 The development of student activities and care systems.

2. Monitoring, evaluation and supervision (MON) has 11 observed variables, including:

2.1 Measure, evaluate and apply.

2.2 Develop, support, supervise, monitor and monitor.

2.3 Research and apply.

2.4 Development of operational standards.

2.5 Establishment of an internal control system.

2.6 Monitoring, checking, and evaluating the system.

2.7 Monitoring, evaluation and supervision of academic education management.

2.8 Monitoring, evaluation of educational budget management.

2.9 Monitoring, evaluation of personnel management.

2.10 Monitoring and evaluation of general administration.

2.11 Implementing policies.

3. The efficiency of school administrators (EFF) has 4 observed variables, including:

3.1 Executives have leadership and good governance.

3.2 Support, supervise, monitor, procure, use, maintain, educational information technology.

3.3 Professional principal.

3.4 Leadership capacity, integrity, and managerial skills could encourage students to excel.

4. Curriculum development (CUR) has 6 observed variables, including:

4.1 Designed its own curriculum for teaching and learning.

4.2 Published its curriculum for teaching and learning.

2.3 The school has collaborated with other institutions on curriculum for teaching and learning.

2.4 Instructional develop standards-aligned units of instruction for each subject and grade.

4.5 Units of instruction include standards-based objectives and criteria for mastery.

4.6 Objectives are leveled to target learning.

5. Teacher training (TRA) has 10 observed variables, including:

5.1 Coordinating the promotion of individuals, families, NGOs, community organizations, NGOs, local government organizations. Professional organizations, institutes, religions, establishments and social institutions.

5.2 Development of information systems and networks.

5.3 Student census and student admissions.

5.4 Site supervision utilities and environment.

5.5 Welfare teacher welfare and educational personnel.

5.6 Raising resources for education.

5.7 Solidly provided mentorship to student teachers.

5.8 There are special programs established to assist student teachers during their field experience.

5.9 Professional teachers.

5.10 Teacher reliable and effective teachers.

APPENDIX D

RESEARCH QUESTIONNAIRE

EDUCATIONAL MANAGEMENT OF EFFECTIVENESS SCHOOLS FACTORS QUESTIONNAIRE

Instructions

The factors for educational management of effectiveness schools in eastern region of Thailand.

Please read each statement below carefully and check (√) the number that corresponds to your opinion. It should be noted that there is no incorrect answer to these questions.

5	=	strongly agree on the effectiveness schools.
4	=	agree on the effectiveness schools.
3	=	neither agree nor disagree on the effectiveness schools.
2	=	disagree on the effectiveness schools.
1	=	strongly disagree on the effectiveness schools.

No.	Content	Opinion				
		5	4	3	2	1
1. Academic: In my school…						
1.1	Develop a local curriculum framework that is consistent with the target, local focus and local education plan 2017-2036.					
1.2	Promote the development of school curriculum in accordance with the early childhood education curriculum Basic Education Core Curriculum Local curriculum framework and the needs of educational institutions.					
1.3	Encourage educational institutions to organize learning processes that focus on learners.					

No.	Content	Opinion				
		5	4	3	2	1
1. Academic: In my school…						
1.4	Encourage and support educational institutions to produce, procure and develop media tools, various learning tools for learners to keep pace with changes.					
1.5	Promote, support, measure, evaluate and apply the results in improving the quality of educational management of the educational area.					
1.6	Develop, promote, support, supervise, monitor and monitor the quality of education in accordance with the educational quality assurance system.					
1.7	Conduct research, promote research and applying research results to develop academic work.					
1.8	Encourage and support educational institutions to develop student development activities and support systems for students.					
1.9	Coordinating and encouraging individuals, families, private organizations, community organizations, private organizations, local administrative organizations professional organizations, religious institutions, enterprises and other social institutions participate in educational management including being a network and learning resource to improve the quality of education.					
2. General administration: In my school…						
2.1	Development of information systems and networks.					
2.2	Student census and student admissions.					
2.3	Site supervision utilities and environment.					

No.	Content	Opinion				
		5	4	3	2	1
2. General administration: In my school…						
2.4	Development of operational standards.					
2.5	Establishment of an internal control system.					
2.6	Welfare teacher welfare and educational personnel.					
2.7	Raising resources for education.					
3. Monitoring, evaluation and supervision: In my school…						
3.1	The system of monitoring.					
3.2	Supervision of academic education management.					
3.3	Supervision of budget education management.					
3.4	Supervision of educational management in personnel management.					
3.5	Supervision of general administration.					
3.6	Implementing policies into practice.					
4. The efficiency of school administrators: In my school…						
4.1	Executives have leadership and good governance.					
4.2	Executives support, supervise, monitor, procure, use, maintain, educational information technology for management and service management.					
4.3	A qualified and professional principal.					
4.4	Leadership capacity, integrity, and managerial skills could encourage students to excel.					
5. Curriculum development: In my school…						
5.1	The school designed its own curriculum for teaching and learning.					
5.2	The school published its curriculum for teaching and learning.					
5.3	The school has collaborated with other institutions on curriculum for teaching and learning.					

No.	Content	Opinion				
		5	4	3	2	1
5. Curriculum development: In my school…						
5.4	Instructional teams develop standards-aligned units of instruction for each subject and grade.					
5.5	Units of instruction include standards-based objectives and criteria for mastery.					
5.6	Objectives are leveled to target learning to each student's demonstrated prior mastery based on multiple 3 points of data (e.g., unit tests and student work)					
6. Teacher training: In my school…						
6.1	The school solidly provided mentorship to student teachers.					
6.2	There are special programs established to assist student teachers during their field experience.					
6.3	Reliable and professional teachers.					
6.4	Teacher reliable and effective teachers are able to realize the expectations of the school principal and parents.					

Thank you for your participation

แบบสอบถาม

เรื่อง การพัฒนาตัวบ่งชี้การบริหารจัดการที่มีประสิทธิผลของโรงเรียนในภาคตะวันออก

English Programs

(ฉบับแบบสอบถามครูผู้เกี่ยวข้องในโครงการ)

คำชี้แจง

       1. การวิจัยเรื่องการพัฒนาตัวบ่งชี้การบริหารจัดการที่มีประสิทธิผลของโรงเรียนในภาคตะวันออก English Programs ในครั้งนี้เป็นส่วนหนึ่งของการศึกษาปรัชญาดุษฎีบัณฑิต สาขาการบริหารการศึกษา มหาวิทยาลัยบูรพา มีวัตถุประสงค์เพื่อศึกษาตัวบ่งชี้การบริหารจัดการที่มีประสิทธิผลของโรงเรียนในภาคตะวันออก English Programs

       2. การเก็บรวบรวมข้อมูลครั้งนี้ ผู้วิจัยมุ่งศึกษาปัจจัยแต่ละด้านของผู้เกี่ยวข้องในโครงการทั้งนี้ข้อมูลในครั้งนี้ผู้วิจัยจะนำมาใช้วิเคราะห์ผลในภาพรวมเท่านั้น ไม่มีผลในการเปิดเผยข้อมูลเป็นรายบุคคล จึงไม่มีผลกระทบต่อตัวผู้ตอบแบบสอบถาม หรือโรงเรียนของผู้ตอบแบบสอบถาม

       3. แบบสอบถามฉบับนี้สอบถามเกี่ยวกับตัวบ่งชี้การบริหารจัดการที่มีประสิทธิผลของโรงเรียนในภาคตะวันออก English Programs

       4. เมื่อท่านให้ข้อมูลครบทุกข้อคำถามแล้ว ขอความกรุณานำส่งคืนผู้วิจัยตามเวลาที่กำหนด

       โปรดให้ข้อมูลตรงกับสภาพความเป็นจริงตามความคิดเห็นของท่าน ข้อมูลที่ได้รับจากท่านจะเป็นประโยชน์อย่างยิ่งต่อการนำข้อมูลมาวิเคราะห์เพื่อศึกษาตัวบ่งชี้การบริหารจัดการที่มีประสิทธิผลของโรงเรียนในภาคตะวันออก English Programs

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คำชี้แจง แบบสอบถามตัวบ่งชี้การบริหารจัดการที่มีประสิทธิผลของโรงเรียนในภาคตะวันออก English Programs เป็นลักษณะมาตราส่วนประมานค่า 5 ระดับ โดยแบ่งเป็น 6 ด้าน
โปรดทำเครื่องหมาย ลงในช่องที่ตรงกับสภาพที่เป็นจริง โดยมีเกณฑ์ในการเลือกตอบมี ดังนี้

     5   คะแนน   หมายถึง   ปฏิบัติมากที่สุดหรือเป็นจริงมากที่สุด

     4   คะแนน   หมายถึง   ปฏิบัติมากหรือเป็นจริงมาก

     3   คะแนน   หมายถึง   ปฏิบัติปานกลางหรือเป็นจริงปานกลาง

     2   คะแนน   หมายถึง   ปฏิบัติน้อยหรือเป็นจริงน้อย

     1   คะแนน   หมายถึง   ปฏิบัติน้อยที่สุดหรือเป็นจริงน้อยที่สุด

ข้อที่	ปัจจัยการสำรวจ	ระดับความคิดเห็น				
		5	4	3	2	1
ด้านที่ 1 การบริหารงานด้านวิชาการ						
1.1	โรงเรียนควรพัฒนากรอบหลักสูตรระดับท้องถิ่นให้สอดคล้องกับเป้าหมาย จุดเน้น สาระท้องถิ่น และสอดคล้องกับแผนการศึกษาแห่งชาติ พ.ศ. 2560-2579 จะทำให้โรงเรียนมีการบริหารจัดการการศึกษาที่มีประสิทธิผล					
1.2	โรงเรียนควรส่งเสริมให้มีการพัฒนาหลักสูตรสถานศึกษาให้สอดคล้องกับหลักสูตรการศึกษาปฐมวัย หลักสูตรแกนกลางการศึกษาขั้นพื้นฐาน กรอบหลักสูตรระดับท้องถิ่น และความต้องการของสถานศึกษา จะทำให้โรงเรียนมีการบริหารจัดการการศึกษาที่มีประสิทธิผล					
1.3	โรงเรียนควรมีการส่งเสริมและสนับสนุนให้มีการจัดกระบวนการเรียนรู้ที่เน้นผู้เรียนเป็นสำคัญ จะทำให้โรงเรียนมีการบริหารจัดการการศึกษาที่มีประสิทธิผล					
1.4	โรงเรียนควรมีการส่งเสริมและสนับสนุนให้มีการผลิต จัดหา และพัฒนาสื่อ เครื่องมือ อุปกรณ์ในการเรียนรู้ที่หลากหลายของผู้เรียนให้ทันต่อการเปลี่ยนแปลง จะทำให้โรงเรียนมีการบริหารจัดการการศึกษาที่มีประสิทธิผล					
1.5	โรงเรียนควรมีการส่งเสริมและสนับสนุนให้มีการวัดผลประเมินผล และนำผลไปใช้ในการปรับปรุงพัฒนาคุณภาพการจัดการศึกษาของเขตพื้นที่การศึกษา จะทำให้โรงเรียนมีการบริหารจัดการการศึกษาที่มีประสิทธิผล					
1.6	โรงเรียนควรมีการพัฒนา ส่งเสริม สนับสนุน กำกับ ดูแล ติดตามและตรวจสอบคุณภาพการศึกษาตามระบบการประกันคุณภาพการศึกษา จะทำให้โรงเรียนมีการบริหารจัดการการศึกษาที่มีประสิทธิผล					
1.7	โรงเรียนควรมีการจัดทำวิจัย ส่งเสริมการวิจัย และนำผลการวิจัยไปใช้พัฒนางานวิชาการ จะทำให้โรงเรียนมีการบริหารจัดการการศึกษาที่มีประสิทธิผล					

ข้อที่	ปัจจัยการสำรวจ	ระดับความคิดเห็น				
		5	4	3	2	1
1.8	โรงเรียนควรมีการส่งเสริมและสนับสนุนให้มี การจัดกิจกรรมพัฒนาผู้เรียนและระบบการดูแลช่วยเหลือ นักเรียนอย่างต่อเนื่อง จะทำให้โรงเรียนมีการบริหารจัดการ การศึกษาที่มีประสิทธิผล					
1.9	โรงเรียนควรมีการประสานงาน และส่งเสริมให้บุคคล ครอบครัว เอกชน องค์กรวิชาชีพ สถาบันศาสนาสถาน ประกอบการ และสถาบันสังคมอื่น ๆ มีส่วนร่วมในการจัด การศึกษา รวมทั้งเป็นเครือข่ายและแหล่งเรียนรู้ เพื่อพัฒนา คุณภาพการศึกษา จะทำให้โรงเรียนมีการบริหารจัดการ การศึกษาที่มีประสิทธิผล					
ด้านที่ 2 การบริหารทั่วไป						
2.1	โรงเรียนควรมีการพัฒนาระบบเครือข่ายข้อมูลสารสนเทศ จะทำให้โรงเรียนมีการบริหารจัดการการศึกษาที่มี ประสิทธิผล					
2.2	โรงเรียนควรมีการจัดทำสำมะโนนักเรียนและ การรับนักเรียน จะทำให้โรงเรียนมีการบริหารจัดการ การศึกษาที่มีประสิทธิผล					
2.3	โรงเรียนควรมีการดูแลอาคารสถานที่ ระบบสาธารณูปโภค และสภาพแวดล้อมให้ดีอยู่เสมอ จะทำให้โรงเรียนมี การบริหารจัดการการศึกษาที่มีประสิทธิผล					
2.4	โรงเรียนควรมีการพัฒนามาตรฐานการปฏิบัติงาน อย่างต่อเนื่อง จะทำให้โรงเรียนมีการบริหารจัดการ การศึกษาที่มีประสิทธิผล					
2.5	โรงเรียนควรมีการจัดวางระบบการควบคุมภายในหน่วยงาน จะทำให้โรงเรียนมีการบริหารจัดการการศึกษาที่มี ประสิทธิผล					

ข้อที่	ปัจจัยการสำรวจ	ระดับความคิดเห็น				
		5	4	3	2	1
ด้านที่ 2 การบริหารทั่วไป (ต่อ)						
2.6	โรงเรียนควรมีการจัดสวัสดิการ สวัสดิภาพครูและบุคลากรทางการศึกษาให้ทั่วถึง จะทำให้โรงเรียนมีการบริหารจัดการการศึกษาที่มีประสิทธิผล					
2.6	โรงเรียนควรมีการจัดสวัสดิการ สวัสดิภาพครูและบุคลากรทางการศึกษาให้ทั่วถึง จะทำให้โรงเรียนมีการบริหารจัดการการศึกษาที่มีประสิทธิผล					
2.7	โรงเรียนควรมีการระดมทรัพยากรเพื่อการศึกษาอย่างต่อเนื่อง จะทำให้โรงเรียนมีการบริหารจัดการการศึกษาที่มีประสิทธิผล					
ด้านที่ 3 การติดตาม ตรวจสอบ ประเมินผล และนิเทศ						
3.1	โรงเรียนควรมีการติดตาม ตรวจสอบ ประเมินผลอย่างเป็นระบบ จะทำให้โรงเรียนมีการบริหารจัดการการศึกษาที่มีประสิทธิผล					
3.2	โรงเรียนควรมีการนิเทศการจัดการศึกษาเชิงวิชาการอย่างสม่ำเสมอ จะทำให้โรงเรียนมีการบริหารจัดการการศึกษาที่มีประสิทธิผล					
3.3	โรงเรียนควรมีการติดตาม ตรวจสอบ ประเมินผลการจัดการงบประมาณการศึกษาอย่างต่อเนื่อง จะทำให้โรงเรียนมีการบริหารจัดการการศึกษาที่มีประสิทธิผล					
3.4	โรงเรียนควรมีการติดตาม ตรวจสอบ ประเมินผลการบริหารงานบุคคลอย่างต่อเนื่อง จะทำให้โรงเรียนมีการบริหารจัดการการศึกษาที่มีประสิทธิผล					
3.5	โรงเรียนควรมีการติดตาม ตรวจสอบ ประเมินผลการบริหารงานทั่วไปอย่างต่อเนื่อง จะทำให้โรงเรียนมีการบริหารจัดการการศึกษาที่มีประสิทธิผล					
3.6	โรงเรียนควรมีการนำนโยบายไปปฏิบัติอย่างเคร่งครัด เพื่อการบริหารจัดการการศึกษาที่มีประสิทธิผล					

ข้อที่	ปัจจัยการสำรวจ	ระดับความคิดเห็น				
		5	4	3	2	1
ด้านที่ 4 ประสิทธิภาพผู้บริหาร						
4.1	ผู้บริหารที่มีภาวะผู้นำและมีธรรมาภิบาล จะทำให้โรงเรียนมีการบริหารจัดการการศึกษาที่มีประสิทธิผล					
4.2	ผู้บริหารที่สนับสนุนการใช้เทคโนโลยีสารสนเทศเพื่อการศึกษาและการจัดการบริการ จะทำให้โรงเรียนมีการบริหารจัดการการศึกษาที่มีประสิทธิผล					
4.3	ผู้บริหารที่สร้างแรงจูงใจในการทำงานให้กับบุคลากร จะทำให้โรงเรียนมีการบริหารจัดการการศึกษาที่มีประสิทธิผล					
4.4	ผู้บริหารที่มีทักษะในการกระตุ้นการเรียนรู้ของครูและนักเรียน จะทำให้โรงเรียนมีการบริหารจัดการการศึกษาที่มีประสิทธิผล					
ด้านที่ 5 การพัฒนาหลักสูตร						
5.1	โรงเรียนควรออกแบบหลักสูตรของตนเองในการจัดการเรียนการสอน จะทำให้โรงเรียนมีการบริหารจัดการการศึกษาที่มีประสิทธิผล					
5.2	โรงเรียนควรเผยแพร่หลักสูตรของตนเองที่จะใช้ในการจัดการเรียนการสอน จะทำให้โรงเรียนมีการบริหารจัดการการศึกษาที่มีประสิทธิผล					
5.3	โรงเรียนควรร่วมมือกับสถาบันอื่น ๆ เพื่อการพัฒนาหลักสูตรการเรียนการสอน จะทำให้โรงเรียนมีการบริหารจัดการการศึกษาที่มีประสิทธิผล					
5.4	โรงเรียนควรพัฒนามาตรฐานหน่วยการเรียนรู้ที่สอดคล้องของแต่ละวิชา และแต่ละระดับชั้น จะทำให้โรงเรียนมีการบริหารจัดการการศึกษาที่มีประสิทธิผล					

ข้อที่	ปัจจัยการสำรวจ	ระดับความคิดเห็น				
		5	4	3	2	1
ด้านที่ 5 การพัฒนาหลักสูตร (ต่อ)						
5.5	โรงเรียนควรพัฒนาหน่วยการเรียนรู้ ที่สอดคล้องกับวัตถุประสงค์ และเกณฑ์มาตรฐาน สำหรับความเชี่ยวชาญของนักเรียนแต่ละคน จะทำให้โรงเรียนมีการบริหารจัดการการศึกษาที่มีประสิทธิผล					
5.6	โรงเรียนควรพัฒนาวัตถุประสงค์ของหลักสูตรที่มีการกำหนด เป้าหมายการเรียนรู้ ให้เหมาะสมกับระดับความเชี่ยวชาญ ของนักเรียนแต่ละคน จะทำให้โรงเรียนมีการบริหารจัดการการศึกษา ที่มีประสิทธิผล					
ด้านที่ 6 การอบรมครู						
6.1	โรงเรียนควรมีระบบให้คำปรึกษาแก่ครู และนักเรียนอย่างเต็มที่ จะทำให้โรงเรียนมีการบริหารจัดการการศึกษาที่มีประสิทธิผล					
6.2	โรงเรียนควรมีโปรแกรมพิเศษเพื่อช่วยเหลือครู และนักเรียนระหว่าง การปฏิบัติงาน จะทำให้โรงเรียนมีการบริหารจัดการการศึกษาที่มี ประสิทธิผล					
6.3	โรงเรียนที่มีครูที่เชื่อถือได้และเป็นมืออาชีพ จะทำให้โรงเรียน มีการบริหารจัดการการศึกษาที่มีประสิทธิผล					
6.4	โรงเรียนที่มีครูที่เชื่อถือได้ มีประสิทธิภาพ สามารถตระหนักถึง ความคาดหวังของผู้บริหารโรงเรียนและผู้ปกครอง จะทำให้โรงเรียน มีการบริหารจัดการการศึกษาที่มีประสิทธิผล					

ขอบพระคุณสำหรับความร่วมมือในการตอบแบบสอบถาม