

Factors of the 21st Century Skills for School Administrators under the Nonthaburi Secondary Educational Service Area Office

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Abstract

The purposes of this research were to: 1) analyze factors and indicators of the 21st century skills for school administrators in under the Nonthaburi Secondary Educational Service Area Office, and 2) confirm the factors in terms of expert-based seminars. This research was of a mixed method in that the quantitative research used a questionnaire with an index of consistency (IOC) of 1.00 and a confidence value of 0.98 responded by a sample of 327 randomly selected from administrators and teachers of the 18 schools totaling 327 people by using Krejcie and Morgan's table. (Krejcie & Morgan, 1970: 608) and used simple proportional sampling. Statistics used in data analysis were analyzed in terms of frequency, percentage, and exploratory factor analysis by testing values of Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO), Bartlett's Test of Sphericity, and factors extraction by using principal factors analysis and rotated factors through orthogonal rotation with varimax method, while the qualitative research using connoisseurship to confirm the factors. The results of this research were as follows. 1. Factors and indicators of the 21st century skills for school administrators under the Nonthaburi Secondary Educational Service Area Office consisted of four factors with 53 indicators as follows: 1) Creative human relationship skills with 21 indicators, factor loading between 0.51-0.76, 2) Curriculum management skills with technology digital with 15 indicators, factor loading between 0.51-0.68, 3) Communication digital technical skills with 10 indicators, factor loading between 0.52-0.71, and 4) strategy skills with 7 indicators, factor loading between 0.51-0.64. 2. Confirm the factors in terms of expert-based seminars from 11 experts to check the correctness, suitability, and possibility of all four new factors of the 21st century skills for school administrators under the Nonthaburi Secondary Educational Service Area Office were at the highest level.

Keywords: School, Administrator, Skill, 21st Century, Exploratory, Factor, Analysis

INTRODUCTION

The changing circumstances of the world in the 21st century have resulted in rapid changes in knowledge, information systems are expanding. Humans receive new trends in all directions. The world can also be interconnected in the form of networks. Humans have changed their way of life and changed jobs in the 21st century, which is an era of extremes (Panich, 2011: 5). It is the dynamic of change from the transition from the 20th century to the 21st century, from an era of prosperity to an era of extremes, from the public and private sectors to the people (Mesintree, 2012: 3). Therefore, developing Thai people to be complete human beings in the 21st century is developing Thai people to be sharp and high skills that show results, have knowledge, and have responsibility for the public, be able to stand with dignity on the international stage, and can learn and work normally in the digital age (Division of Research Administration and Educational Quality Assurance, 2016: 19)

From the 2017–2036 National Education Plan, which is a 20-year long-term plan, a master plan for agencies that face problems with personnel development and educational management in educational institutions that are not yet appropriate. It has an impact and must be adjusted to respond and support the challenges of driving under the Section 258 of the 2017 Constitution of the Kingdom of Thailand, which stipulates that there should be mechanisms and production systems and develop teaching professionals who have the teacher spirit, have true knowledge and ability, earn remuneration appropriate to their teaching ability and efficiency, as well as have a mechanism to create a moral system in personnel management of teaching professionals. Improving teaching and learning at all levels so that students can study according to their attitude and improve the structure of relevant agencies to achieve these goals both at local and the national level (Office of the Senate Secretariat, 2017: 79-80). But the results of improving the quality of education are

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still not satisfactory. This is because academic achievement at the basic education level is much lower than average and lower than many countries in Asia. The first area that needs to be improved is the efficiency of teachers' teaching and learning arrangements (Office of the Secretariat of the Education Council, 2017: E.)

To be in line with modern skills, which are important skills for effective leadership, school administrators as leaders must develop necessary skills because they are important for the management of educational institutions and can lead effective academic quality management. Administrators must have skills of visionary leadership, creative thinking, problem solving, communication, and technology and innovation skills (Phaphan, 2016: 1.) So the leaders in the 21st century are not only responsible for managing organizations to achieve their objectives. But still also need to improve and change the organization to be modern and keep up with the changes of globalization. Encourage personnel to be creative. Motivate personnel to take on challenges and can work together with other personnel by using innovation and technology to help in management (Rost, 1991) with a proactive way under pressure or in a changing world to inspire personnel stimulate commitment to use innovation and technology digital in management. (Olaizola, Morales-Sánchez & Eguiguren, 2021). Administrators, teachers, and educational personnel should be improved, from recruitment systems and administrator development. Highly talented people should be induced to become teachers. There should be a system for continuous development of potential and competency for administrators, teachers and all types of educational personnel to be of professional and qualified personnel with advanced professional skills (Office of the Basic Education Commission, 2019: 14-15). From the research results of Amdonkloi (2013: 6) who studied the role of school administrators in the 21st century and found that administrators must develop students in both core subject areas and the 21st century skills, which include learning skills and innovation, life and career skills, and skills in information, media, and technology. Therefore, it is the main duty of administrators to think of new management strategies and be responsible for organizing education effectively as: be aware of the changes, have self-improvement, changing the working and teaching styles of teachers, create a learning network both inside and outside the school by encouraging teachers to use technology to develop students to have knowledge and skills comparable to those of other countries and are accepted by other nations.

From the concepts and research results mentioned above, that researcher viewed that the 21st century skills of school administrators may be a problem for new administrators who lack of management experience and for old administrators who are unable to adapt to the era of rapid change. As a result, most administrators lack of the necessary skills for managing the organization, therefore, the management of the said administrators were not as successful as it should have been. Therefore the researcher was interested in studying "Factors of the 21st century skills for school administrators under the Nonthaburi Secondary Educational Service Area Office" to find out new factors and indicators that require modern technology for management and confirm theoretical factors through expert-based seminars (Connoisseurship). This is so that administrators can access the information quickly and the results would be beneficial to teachers and related personnel. Research results can be used as guidelines in formulating policies to develop the skills of school administrators, and use information to plan to achieve goals efficiently. This is in line with the government's urgent policy to prepare Thai people for the 21st century. The 2021 fiscal year budget aimed to develop school administrators with the 21st century skills and to provide teachers with the skills to organize proactive instruction and to give students to worldwide vision with new world perspectives. Consequently, learners will develop the 21st century learner skills compatible with the policies and goals of the Ministry of Education.

Research Objectives

1. To analyze factors of the 21st century skills for school administrators under the Nonthaburi Secondary Educational Service Area Office
2. To confirm theoretical factors through expert-based seminars (Connoisseurship) of the 21st century skills for school administrators under the Nonthaburi Secondary Educational Service Area Office in terms of the correctness, suitability, and possibility

RESEARCH METHODOLOGY

Population

The population used in this research included 79 administrators and 1,924 teachers at 18 schools under the Nonthaburi Secondary Educational Service Area, in the 2022 academic year.

Sample Group

The sample group used in this research included 15 administrators and 312 teachers at the randomly selected from 18 schools under the Nonthaburi Secondary Educational Service Area Office, in the 2022 academic year.

Research Tools

The tools used in this research were a questionnaire and a connoisseurship appraisal form, both created by the researcher.

1. The questionnaire, with the index of consistency (IOC) of 0.99 and Alpha Coefficient of 0.98, was divided into two parts.

Part 1: General information of the respondents including gender, educational background, job position, and work experience. It was in checklist form.

Part 2: Factors and indicators of the 21st century skills for school administrators. It was in a five rating scales as: very high, high, moderate, low, and very low.

2. To confirm theoretical factors through expert-based on seminars (Connoisseurship) using appraisal form in terms of the correctness, suitability, and possibility. It was also in rating scale form.

Data Analysis

1. The general information of the respondents was analyzed using frequency and percentage.

2. The confirming of the data were analyzed using Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) statistics with the following criteria for consideration (Angsuchot et al., 2009: 97)

KMO values of 0.80 and above are most appropriate for factor analysis.

KMO values 0.70 – 0.79 are very appropriate for factor analysis.

KMO values 0.60 – 0.69 are appropriate to analyze medium factors.

KMO values 0.50 – 0.59 are appropriate to analyze few factors.

KMO values less than 0.50 are not appropriate for factor analysis.

3. Test the relationship of various factors using Bartlett's test of sphericity. The hypotheses were: H_0 : no interrelationship among various factors; and H_1 : various factors were interrelated. If analysis of Bartlett's test of sphericity found to be statistically significant, the hypothesis H_1 is accepted, that is, the various variables were interrelated and can be used for factor analysis. (Kaiyawan, 2013: 74)

4. Check by considering the variance of each variable by considering the commonality of the variables. (Community: h^2) which should not be lower than 0.50 and if the value is lower than 0.50, that variable should be eliminated (Kaiyawan, 2013: 75.)

5. Extract the factors (factor extraction) by means of principal factor analysis and rotate the factor axis orthogonally (orthogonal rotation) by the Varimax Method by finding the KMO and Bartlett's test values.

Kaiser-Meyer-Olkin measure of sampling adequacy and Bartlett's test of sphericity by selecting elements with three or more variables. Reported results of research items with less than 3 variables will be discarded according to the rules of Kaiser (1974: 31–36)

6. Name the 21st century skill factors of school administrators under the Nonthaburi Secondary Educational Service Area Office, in the 2022 academic year, that had been extracted as new factors by considering the indicators in each factor.

7. Confirm theoretical factors through expert-based seminars (Connoisseurship) that were the correctness, suitability, and possibility by considering the indicators in each factor.

RESEARCH RESULTS

Respondents of 327 were mostly female (221), with bachelor's degrees (188), were teachers (312), and work experience of 1-5 years (107)

Factors of the 21st century skills for school administrators under the Nonthaburi Secondary Educational Service Area Office were as follows:

Relationship between variables using Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) statistics and Bartlett's test of Sphericity were shown in Table 1.

Table 1 Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO)

(n=327)

Statistics		results
Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO)		0.97
Bartlett's Test of Sphericity	Approx Chi-Square	23126.44
	Df	1770.00
	Significance	0.00

From Table 1, it was found that 53 observed factors used in the analysis of factors of the 21st century skills for school administrators under the Nonthaburi Secondary Educational Service Area Office had a Kaiser-Meyer-Olkin Measure of Sampling Adequacy value of 0.97, which is greater than 0.50, indicated that the factor were related in an appropriate size for exploratory analysis. High values close to 1.0 indicate that factor analysis was useful to the data. And when testing statistical significance with Bartlett's Test of Sphericity, it was found that It was statistically significance results at the 0.00 indicating that the obtained correlation matrix was not an identity matrix, indicating that the data were appropriate and useful in factor analysis. Therefore, it was concluded that the set of data can be carried out by exploratory factor analysis (Kaiser.1974: 31–36).

After that, the factors were extracted (Factor extraction) by means of principal factor analysis and rotated the vertical factor axis, orthogonal rotation using the varimax method had four factors with an Eigen Value greater than 1, as shown in Table 2.

Table 2 Total Variance Explained

factor	Initial Eigen Values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	38.358	63.930	63.930	38.358	63.930	63.930	14.402	24.004	24.00
2	1.992	3.320	67.250	1.992	3.320	67.250	12.351	20.586	44.59
3	1.516	2.526	69.776	1.516	2.526	69.776	9.263	15.438	60.02
4	1.140	1.899	71.675	1.140	1.899	71.675	6.989	11.648	71.67

From Table 2, it was found that the Eigen value, which was the sum of the squares of the weights of all 53 factors, each with an Eigen value greater than 1. The cumulative percentage variance for all four factors was equal to 71.68. It could be explained that the 21st century skill factors of school administrators under the Nonthaburi Secondary Educational Service Area Office consisted of four factors. Communalities value showed initial Eigen values and extraction method: principal factor analysis of 59 indicators, organized into four factors when rotating the axis rotation sums of squared loadings factor 1, sum 14.40 percent of variance 24.00, cumulative percentage variance 24.00, factor 2, sum 12.35, percentage of variance 20.59, cumulative

percentage of variance 44.50, factor 3, sum 9.26, percentage of variance 15.44, cumulative percentage of variance 60.03, and factor 4, sum 6.99 percentage of variance 11.65 percentage of cumulative variance 71.68 value of factor loading analysis and number of skill factors of school administrators in the 21st century under the Nonthaburi Secondary Educational Service Area Office. The results of data analysis using exploratory factor analysis (EFA) using principal factor analysis and orthogonal rotation with Varimax Method by the researcher. Select factors with 3 or more indicators as factors. Items with less than 3 indicators are eliminated according to Kaiser's rules (Kaiser, 1974: 31–36) The results had got a total of 4 new factors as follows:

Factor 1 Creative human relationship skills had 21 indicators.

Factor 2 Curriculum management skills with technology digital had 15 indicators.

Factor 3 Communication digital technical skills had 10 indicators.

Factor 4 Strategy skills had 7 indicators.

Analysis of factor weights (Factor Loading) and number of indicators. Factor Loading values as shown in Table 3-6.

Table 3 Creative human relationship skills

Item	Indicator	Loading
1	Administrators have the skills to listen to opinions from teachers and personnel with an open mind.	0.76
2	Administrators have skills in creating motivation and building morale for teachers and personnel to be diligent in their assigned missions.	0.73
3	Administrators accept and see the value in individual differences.	0.73
4	Administrators communicate, negotiate and present opinions in public.	0.73
5	Administrators are sincere, moral, humorous, optimistic, and do not take advantage of others.	0.70
6	Administrators create an atmosphere that supports creativity by listening to opinions and suggestions from co-workers.	0.70
7	Administrators create participatory interactions in work using group processes.	0.69
8	Administrators stimulate teachers to have energy in working for the development of the school effectively.	0.66
9	Administrators know how to use people to suit their individual's aptitudes.	0.64
10	Administrators have predictive skills to analyze problems, plan, and solve immediate problems.	0.63
11	Administrators have the skills to think and make decisions carefully and correctly.	0.63
12	Administrators honor teachers and personnel who perform outstanding work.	0.62
13	Administrators adapt to the situation by applying knowledge and previous experiences to new knowledge.	0.61
14	Administrators participate in discussions and reflect opinions.	0.61
15	Administrators are creative in working with others by sharing knowledge.	0.60
16	Administrators have the skills to manage educational institutions in a systematic and quality manner.	0.59
17	Administrators think of new unique things and prepared to face risks according to various situations.	0.59
18	Administrators analyze the situation, synthesize ideas of complex matters with critical thinking quickly.	0.58
19	Administrators are creative in developing work, modify work, and plan as appropriate	0.58
20	Administrators use their intelligence to solve problems creatively	0.57
21	Administrators organize, and structure the mission appropriately to abilities of the personnel.	0.52

From Table 3, it was found that factor 1, Creative human relationship skills, had 21 indicators, with a factor loading were between 0.52-0.76.

Table 4 Curriculum management skills with technology digital

Item	Indicator	Loading
1	Administrators publicize activities on the website, Line, Facebook to increase convenience and speed in accessing information	0.69
2	Administrators play an important role to support teachers in conducting research in classroom. bring research results to improve and develop quality of teaching and learning.	0.67
3	Administrators provide adequate online classrooms and laboratories	0.67
4	Administrators develop teachers to be able to do academic work in order to advance in their duties	0.66
5	Administrators play an important role in promoting teachers and personnel to use technology in organizing teaching and presenting work	0.66
6	Administrators develop a digital library by providing the internet where learning can be done anywhere, anytime	0.63
7	Administrators provide adequate digital technology media for use in educational institutions	0.63
8	Administrators supervise teachers' teaching in the classroom to improve the quality of teachers' teaching	0.62
9	Administrators supervise teachers' teaching in the classroom to improve the quality of teachers' teaching	0.59
10	Administrators use teaching media, speaking, and explaining to make listeners understand	0.58
11	Administrators use a variety of strategies and techniques in organizing student-focused learning and teaching	0.58

Item	Indicator	Loading
12	Administrators are academic leaders. Seeking new knowledge Always about organizing teaching and learning	0.57
13	Administrators use techniques to convey speech and information in various formats to coworkers through digital technology media and devices	0.56
14	Administrators create a digital technology network for parents. To check the learning behavior of students	0.59
15	Administrators have skills and techniques for managing teaching using a rational thinking process.	0.51

From Table 4, it was found that factor 2, Curriculum management skills with technology digital, had 15 indicators. factor Loading values were between 0.51-0.69.

Table 5 Communication digital technical skills

Item	Indicator	Loading
1	Administrators have expertise in using technology tools. Can recommend others to follow.	0.72
2	Administrators have the skills and techniques to present work using digital technology media fluently.	0.71
3	Administrators have information, are aware of their work, and know regulations by using technology to collect information systematically	0.68
4	Administrators can communicate in both Thai. English and ASEAN languages	0.67
5	Administrators have skills and techniques in organizing activities using a variety of technological media.	0.63
6	Administrators use digital technology to manage, translate, and communicate creatively and efficiently.	0.60
7	Administrators upload data on the network. Professionally demonstrate electronic equipment.	0.62
8	Administrators use digital technology to create online learning community networks for exchanging information	0.60
9	Administrators use digital technology networks to store school information in a systematic category. Easy to use	0.55
10	Administrators have techniques for brainstorming ideas in their work to create new innovations	0.52

From Table 5, it was found that factor 3, Communication digital technical skills, had 15 indicators. factor loading values were between 0.52-0.72

Table 6 Strategy skills

Item	Indicator	Loading
1	Administrators analyze the overall problem and needs to clearly define the scope of work in educational institutions.	0.65
2	Administrators plan educational strategies appropriately by using new management strategies.	0.65
3	Administrators have the skills to set vision, mission, goals, policies, and strategies in line with the policies of the parent agency.	0.66
4	Administrators analyze causes of problems, and interpret complex data reliably.	0.56
5	Administrators have a vision of the changes that will occur in the future, and guess the direction that will lead the organization to success.	0.52
6	Administrators are well-versed in all aspects of management for efficient administration of educational institutions.	0.52
7	Administrators have techniques for strategic planning to formulate policies. The direction of the schools clear.	0.51

From Table 6, it was found that factor 4, Strategic skills, had 7 indicators, the factor loading values were between 0.51-0.65.

The results of the exploratory factors analysis had summarized that there were four new factors, 53 indicators, and the factor loading values were between 0.51-0.76 with the following details:

Factor 1: Creative human relationship skills had 21 indicators and a factor loading were between 0.52-0.76.

Factor 2: Curriculum management skills with technology digital had 15 indicators, factor loading values were between 0.51-0.69.

Factor 3: Communication digital technical skills had 10 indicators, factor Loading values were between 0.52-0.71.

Factor 4: Strategy skills had 7 indicators with a factor loading were between 0.51- 0.65.

Results of confirmation theoretical factors through expert-based on seminars (Connoisseurship) of 11 experts by considering the indicators in each factor. It was found that all four factors were overall got the correctness, suitability, and possibility at the highest level.

DISCUSSION

The 21st century skills for school administrators under the Nonthaburi Secondary Educational Service Area Office consisted of four factors, 53 indicators: 1) factor of creative human relationship skills, 21 indicators with a factor loading between 0.51-.0.76, 2) factor of curriculum management skills with digital technology, 15

indicators with a factor loading between 0.51-0.68, 3) factor of communication digital technical skills, 10 indicators with a factor loading between 0.52-0.71, and 4) factor of strategic skills, seven indicators with a factor loading between 0.51-0.64. The finding results were according to the research of Sainampa Meelap, Aomjitir Pansri, and Samran Meejang (2014: 61) who studied the subject of Analysis of the Characteristics of Quality Teachers in the Education Reform Era Based on Perceptions of Teachers at schools under the jurisdiction of the Secondary Educational Service Area Office Area 39, The results of the research found that the survey factors in this area found that there were four factors as: 1) knowledge and ability, 2) morality and ethics, 3) human relationship, and 4) love and faith in the teaching profession. And it was also consistent with the research results of Bahr, Edwin, and Long (2022) who have studied exploratory factor analysis of reliability, validity, and knowledge about the intervention. and survey skills, The results of the research found that there were four factors as: 1) knowledge about intervention, 2) intervention skills, 3) selection and Evaluation of the intervention, and 4) counseling and communication were found. In addition, It was also consistent with the research results of Khomkrit Phromchin (2017: 102) who studied the subject of Confirming the factors analysis of strategy leadership in the 21st century of educational institution administrators. The results of the research found that there were four factors (latent variables) and 10 observed variables, which were ordered according to the weight of the factor as: 1) Components of building core competencies 2) Elements of promoting organizational culture 3) Components of a shared vision and 4) Elements of creative thinking. It was also consistent with the research results of Poramet Klinhom, Mitphanee Phumklom, Patee Ketthanakorn (2020: 61) studied the subject Factors of leadership in the 21st century for educational administrators in educational institutions under the Office of the Basic Education Commission, the research results found that the factors of leadership in the 21st century of educational administrators in educational institutions under the Office of the Basic Education Commission In terms of empowering leadership, there are a number of sub-factors. The 4 factors were as follows: 1) Develop leadership in oneself and others 2) Integration of knowledge leadership ability 3) Good communication and teamwork and 4) Create positive energy for the achievement of work, consisting of 16 variables.

The results of confirming the factors using connoisseurship of 11 experts found that each factor of the correctness, suitability, and possibility were at the highest level. This was because these 11 experts agreed that the aforementioned factors were in accordance with the theory of exploratory factor analysis from which four factors: 1) Creative human relationship skills, 2) Curriculum management skills with technology digital, 3) Communication digital technical skills; and 4) Strategy skills were suggested. The results were consistent with Jirawat's Kitipichetsan research results as cited in and Kitipichetsan (2020) whose study topic was "Standard factors of bachelor's degree qualifications field of education and field of education." The results of the research found that the standard factors of bachelor's degree qualifications the field of education and the field of education consist of four factors: 1) Teaching, learning and teacher ideology, 26 variables, weight values 0.52-0.84, 2) Skills, competencies, and psychology, variables, weight values 0.52-0.64, 3) measurement, evaluation, and research, 3 variables, weight values 0.70-0.98, and 4) intellectual and social skills, 3 variables, weight values 0.65-0.93. Moreover, this was also consistent with that of Su's (cited in Thirakot and Phonnikornkit, 2017: 75-76) who studied the analysis of factors of the elderly's use of health information on the internet. The results of the research found that the Kaiser-Meyer-Olkin (KMO) statistic was 0.87 and the Bartlett statistic Chi-square was 3315.41. Extracting the factors found that there were four factors with Eigen values between 1.21–5.81, and the cumulative variance of the extracted factor was 62.41 percent. Those factors were: 1) Attitude towards using the internet and health information had 8 variables, 2) Education and experience using the internet among the elderly had 4 variables, 3) Quality and quantity of health information on the internet had 3 variables, and 4) Age and elderly people's knowledge of the internet

Recommendations

It was evident from the findings that all four factors of the 21st century skills for school administrators under the Nonthaburi Secondary Educational Service Area Office were the correctness, suitability, and possibility. Based on the findings, the following recommendations at the policy level, as well as at the school level may be offered:

Policy Level

1. Administrators of the Nonthaburi Secondary Education Service Area Office could apply the research findings as a policy to setting a strategy, organizing training courses to develop teachers before being appointed as school administrators, as well as encouraging teachers to top-up the research.

2. Administrators of the Nonthaburi Secondary Education Service Area Office should organize workshops on the 21st century skills for personnel development in accordance with the Ministry of Education's Policy.

School Level

School administrators should have creative human relationship skills, be able to appropriately manage organization, setup functional structure of the mission compatible with the abilities of the personnel.

School administrators should have skills in curriculum management using technology digital and be able to manage teaching using rational thinking supported by information references.

School administrators should have digital technical skills, communication, and school management using brainstorming techniques to create new innovations.

School administrators should have strategy skills to think strategically to formulate clear policies and direction of the schools.

Recommendations for Further Research

The following topics of study should be conducted:

A study relative to factors affecting creative human relationship skills for administrators of schools under the Nonthaburi Secondary Educational Service Area Office and other secondary educational service area offices.

A study relative to factors affecting curriculum administration by technology digital for administrators of schools under the Nonthaburi Secondary Educational Service Area Office and other secondary educational service area offices

A study relative to media and technology digital management for the teachers under the Nonthaburi Secondary Educational Service Area Office and other secondary educational service area offices

A study relative to strategic management affecting school effectiveness for administrators of schools under the Nonthaburi Secondary Educational Service Area Office and other secondary educational service area offices

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