Journal of Positive School Psychology
2022, Vol. 6, No. 3, 8809–8817

A Causal Relationship Model of Factor Influencing Academic Achievement among Mathayom 6th Students under Secondary Educational Service Area Office 4

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Abstract

The objectives of this research paper were 1) to study the causal relationship of factors related to academic achievement of Mathayomsuksa 6 students in secondary schools under the Secondary Educational Service Area Office, Region 4, 2) to develop a causal relationship model between factors influencing the academic achievement of Mathayomsuksa 6 students in secondary schools, and 3) to propose a causal relationship model of factors influencing academic achievement of Mathayomsuksa 6 students in secondary schools under the Secondary Educational Service Area Office, Region 4. The research was designed using a multiphase mixed methods research divided into 3 phases. Phase 1-2 uses qualitative research. The key informant is Grade 6 teachers with at least 10 years of experience, received a special education level (Ed. 3) and are recognized teachers of 12 people and the target group in focus group discussions of 9 experts from purposive sampling. Data were analyzed by using analytic induction. Phase 3 used quantitative research, a sample of 590 people was obtained by using two-stage random sampling. Data were analyzed by descriptive statistics and research hypothesis was tested by checking the validity of the structural equation model. Results showed that 1) the causal relationship of factors related to the learning achievement of Mathayomsuksa 6 students in secondary schools Under the Office of Secondary Education Service Area 4, the variables consisted of 1) teaching quality, 2) friend characteristics, 3) family environment, 4) student characteristics, 5) Trisikkha, 6) academic achievement. 2) A causal relationship model between factors affecting academic achievement of Mathayomsuksa 6 students in secondary schools Under the Office of Secondary Education Service Area 4, it consisted of 3 latent variables, namely 1) teaching quality with observable variables: (1) teaching is easy to understand, (2) encouraging students to participate, (3) having activities in learning, (4) Evaluate and give feedback, (5) Use teaching media. 2) Characteristics of peers, the variables observed were: (1) helping friends, (2) giving advice, (3) inviting each other to attend classes, (4) tutoring additional friends, 3) family environment. The variables observed were (1) home conditions suitable for learning, (2) interest or stimulation in learning, (3) care for their well-being, (4) behavioral care, the latent variables in 3 variables were 1) characteristics of student. The variables observed were 1) achievement motivation, (2) learning aptitude, (3) learning strategies, (4) time spent on additional studies. 2) Trisikkha variables were observed: (1) discipline and treatment, (2) Concentration in studying, (3) Understanding the lesson in the classroom. 3) Academic achievement,

the observed variables were (1) O-NET value, (2) cumulative GPA,3) A causal relationship model, factors influencing academic achievement of Mathayomsuksa 6 students in secondary schools Under the Office of Secondary Education Service Area 4, proposed as a causal relationship model. There was harmonization with the empirical data. Chi-square = 161.96, df = 138, p = .07990, RMSEA = .017, accounting for the variations in learning achievement was 65.00 percent.

Keywords— Causal Relationship Model, Academic Achievement, Secondary Educational Service Area Office 4

I. INTRODUCTION

Education is an important tool for building people, building a society and building a nation. It is the main mechanism for developing quality manpower able to live happily with others in society and in the fast changing trend of the 21st century world as education plays an important role in building a country's advantage in order to compete and stand on the world stage under the economic system and society that is dynamic. Countries around the world therefore attach great importance and dedication to the development of education in order to develop their human resources to keep up with the changes in the economic and social systems of the country, region and the world [1].

The United Nations Development Programme (UNDP) has released the Education Index, a country ranking index for education by the Thailand Education Index in B.E. 1990, ranked 101, Thailand's lowest ranking, ranked 113 in 2013, and ranked highest at 95 level in 1998 and 1999, based on 30 years of publication (1990-2019), average 102 rank and year of release. Most recently, 2019, it is ranked 97 out of 190 countries [2], which sees Thailand rank roughly in the middle of countries worldwide.

The Program for International Student Assessment (PISA) reported that Thailand's average reading score between 2006 and 2018 was 415.6, ranked 74 out of 82 countries, 2006 to 2018, 419.4 points, ranked 61 from 82 countries. The average science score of Thailand between 2006 and 2018, 427.4 points, ranked 57th out of 82 countries [3] found that reading, math and science scores were reduce and Thailand's ranking is quite towards the end.

The Basic National Educational Test (O-NET) is an examination of learner quality in accordance with the Standards and Indicators Framework for Basic Education Core Curriculum, B.E. 2551. It was tested on students in Grade 6 and Mathayomsuksa 3 and 6 by the National Educational Testing Institute (Public Organization) is the operator of the examination which the test results of the Office of the Basic Education Commission. The mean scores of Mathayomsuksa 6 between 2015 and 2020 are as follows: Thai language average 48.7 points, Mathematics 34.9 points, Science 37.7 points, English language average 32.8 points, and it was found that all subjects during B.E. 2018 to 2020 has a decreasing trend and all subjects had a grade point average of less than 50 percent [4].

Problems in Thai Education 1) in terms of educational services, it was found that the structure of the Thai economy was highly disparity, which was the main reason why most people did not receive basic education. Although the state has to provide its citizens with a comprehensive and quality education free of charge for at least 12 years, but no government has followed up to be truly effective. 2) In terms of education management as a whole, the country has low quality academic achievement as measured by national examinations averaged less than 50 percent, most of them especially mathematics, science, assessments by the Office for Accreditation and Quality Assessment (ONEP) and other agencies reported that most students study memorization in order to get grades but not analyzing, synthesizing and applying lack of skills for further learning and skills necessary for work

and self-development. 3) Quality of administrators, teachers, educational administrators, most of the teachers (including high-level national administrators) are not love of reading, research, and self improvement. The process of producing and hiring teachers in Thailand does not select and encourage the best people to be teachers. 4) Curriculum, teaching methods, learning, and evaluation curricula are set from the center to focus on teaching based on textbooks for learners to remember information and practice skills at a level. It is more academic background than teaching learners to love reading eager to learn think analytically develop emotional and social intelligence to work effectively in the real world and a highly responsible citizen[5].

From the importance of education, results of Thai education both globally and in Thailand including the problems of education in Thailand. Therefore, the researcher is interested in studying the causal relationship model of factors affecting academic achievement of Mathayomsuksa 6 students in secondary schools Under the Office of Secondary Education Service Area 4, the study will study variables or factors affecting academic achievement, namely teaching quality, characteristics of peers family environment. The characteristics of students, and the Trisikkha as information and guidelines for improving teaching and learning will result in higher student achievement.

II. RESEARCH OBJECTIVES

1. To study the causal relationship and factors related to the academic achievement of Mathayomsuksa 6 students in secondary schools Under the Office of Secondary Education Service Area 4.
2. To develop a causal relationship model between factors influencing academic achievement of Mathayomsuksa 6 students in secondary schools Under the Office of Secondary Education Service Area 4.
3. To propose a causal relationship model of factors influencing academic achievement of Mathayomsuksa 6 students in secondary schools Under the Office of Secondary Education Service Area 4.

III. CONCEPTUAL FRAMEWORKS

The causal relationship model, factors influencing academic achievement of Mathayomsuksa 6 students, secondary schools under the Secondary Educational Service Area Office 4, obtained from the study of documents. The connection between variables can be shown as follows.

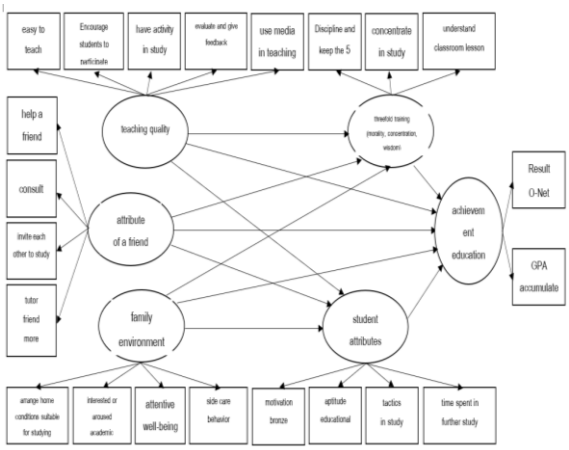

Figure 1 *Research Conceptual Framework*

IV. RESEARCH METHODS

The method of conducting research is divided into 3 phases as follows: Phase I: In-depth interview to study the causal relationship of factors related to academic achievement of Mathayomsuksa 6 students in secondary schools under the Office of Secondary Education Service Area 4, with the target group being Teachers of Mathayom 6 students were selected by purposive sampling, consisting of 12 people. The researcher requested assistance. The director of the Monitoring and Evaluation Group on Educational Management of the Office of Secondary Education Service Area 4 selects teachers according to the qualifications as follows: 1) being a teacher in Mathayomsuksa 6, 2) having experience of not less than 10 years, 3) having received Academic

qualifications as special expertise (Kor Sor 3), 4) being a recognized teacher.

Phase 2: Focus group discussion to develop a causal relationship model between factors influencing academic achievement of Mathayomsuksa 6 students in secondary schools Under the Office of Secondary Education Service Area 4, by using the data to develop a causal relationship model of factors influencing the learning achievement of Mathayomsuksa 6 students in secondary schools under the Office of Secondary Education Service Area 4, there are 6 components as follows: 1) teaching quality, 2) friend characteristics, 3) family environment, 4) student characteristics, 5) Trisikkha, and 6) learning achievement. The target group used in the group discussion were experts in educational institution administration by using purposive sampling of 9 experts.

Phase 3 Using the questionnaire, to propose a causal relationship model of factors affecting academic achievement of Mathayomsuksa 6 students in secondary schools under the Office of Secondary Education Service Area 4 by quantitative method. The population is 8,323 students in Mathayomsuksa 6 under the Office of Secondary Education Service Area 4. The sample group used the formula of Hair et al. (1998), using the sample size of 10 people per 1 parameter to estimate the value or the number of paths that Show the relationship between variables in the research conceptual model. In this research, there were 59 parameters to be estimated. Therefore, the appropriate sample size should be 590 people. The randomization method was two-stage random sampling. Step 1: Select a school. In the Secondary Education Service Area Office 4 by purposive sampling, 17 of the 20 schools with the highest O-Net mean were selected. Step 2 Simple random sampling was performed to find the groups. Example students in step 1 by comparing the Triyang of commandments and develop the model with LISREL.

V. RESEARCH RESULTS

1. The causal relationship and factors related to the academic achievement of Mathayomsuksa 6 students in secondary schools Under the Office of Secondary Education Service Area 4, obtained from the study of documents related research and in-depth interviews with 12 teachers in Mathayomsuksa 6 with 6 variables, namely teaching quality, characteristics of peers, family environment, characteristics of students in Trisikkha, academic achievement. The effect of variables on academic achievement consisted of 1) Teaching quality directly affects the quality of learning achievement result through the triad to academic achievement. It affects through the student's attributes to academic achievement. 2) The friend's attributes directly affects the student's achievement. Results through the Trisikkha to academic achievement, this result in the student's attributes leading to academic achievement. 3) The family environment directly affects the quality of learning achievement. Result through the Trisikkha to academic achievement, it affects through student attributes to academic achievement, 4) Trisikkha directly affects academic achievement only, and 5) Student attributes directly affects academic achievement only.
2. The development of a causal relationship model between factors influencing academic achievement of Mathayomsuksa 6 students in secondary schools under the Office of Secondary Education Service Area 4, from the group discussion. The experts agreed that the model presented was 3 latent variables, namely 1) teaching quality with observable variables: (1) teaching is easy to understand, (2) encouraging students to participate, (3) having activities in learning, (4) Assessment and provide feedback, (5) Use teaching media. 2) Friend

characteristics, the variables observed were: (1) helping friends, (2) giving advice, (3) inviting each other to attend classes, (4) tutoring additional friends, and 3) family environment, the variables observed were (1) home conditions suitable for learning, (2) interest or stimulation in learning, (3) care for their well-being, (4) behavioral care, the latent variables in 3 variables were 1) characteristics of student. The variables observed were 1) achievement motivation, (2) learning aptitude, (3) learning strategies, (4) time spent on additional studies. 2) Trisikkha variables were observed: (1) discipline and treatment, (2) concentration in studying, (3) Understanding the lesson in the classroom. 3) Academic achievement, the observed variables were (1) O-NET value, and (2) cumulative GPA.

3. A causal relationship model of factors influencing academic achievement of Mathayomsuksa 6 students in secondary schools Under the Office of Secondary Education Service Area 4, in the data analysis of this model, there were 6 latent variables: Quality of Teaching (STU), Friend Characteristics (FRI), Family Environment (FAM), Student Attributes (STU), Trisikkha (TRI), academic Achievement (ACH) by the observed variables used in the analysis of all 22 variables. The model is consistent with the empirical data. Considered from the statistical values used to check the coherence between the model and the empirical data: chi-squared value was 162.231 degrees of freedom 138, probability (p) was .095, insignificant difference from zero showed that the main hypothesis was accepted that the causal relationship model of factors influencing the academic achievement of Mathayomsuksa 6 students in secondary schools Under the Office of Secondary Education Service Area 4 was not significant., developed model fit with the empirical data. Corresponding to the analysis results, Goodness of Fit Index (GFI) was 0.976, Adjusted Goodness of Fit Index (AGFI) was 0.955, approaching 1, and the mean square root index of the sections. The residual (RMR) is equal to 0.0212, approaching zero and the residual value in the form of a standard score between the highest variables (Largest Standardized Residuals) was 4.681, which supports that the research model is consistent with the empirical data.

When considering the reliability of the observed variables, it was found that the observed variables had the reliability values between 0.423 and 0.843. The variables with the highest reliability were learning strategies (STU3) with the reliability values of 0.843, followed by evaluation and feedback data (TEA4) has a reliability of 0.805 and the variable with the lowest reliability is Concentration in learning (TRI2) had a reliability of 0.423. Overall, the reliability of most of the observed variables was high.

When considering the forecast coefficient (R-SQUARE) of the latent internal variable structure equation, it was found that the student attributes (STU) had the predictive coefficient of 0.697, indicating that the variables within the model were Teaching Quality (TEA), Friends Characteristics (FRI), and Family Environment (FAM) can account for 69.7% of student characteristics (STU) variance. Trisikkha (TRI) has a predictive coefficient of 0.874, indicating that the variable within the model is Teaching Quality (TEA). The friend's (FRI) and family environment (FAM) were able to account for 87.4% of the variance in the Trisikkha (TRI). The academic achievement (ACH) had a predictive coefficient of 0.650, indicating that the variable within the model was the teaching quality (TEA), friend characteristics (FRI), family

environment (FAM), student attributes (STU), and Trisikkha (TRI) could account for 65.00 percent of the variance in academic achievement (ACH). Highest Correlation Coefficient and Family Environment (FAM).

When considering the correlation matrix between the latent variables, it was found that the correlation coefficient between the latent variables ranged from 0.629 to 0.972. All pairs of variables were correlated in the same direction (positive correlation). The variables with the highest correlation coefficient were friend characteristics (FRI) and family environment (FAM) with a correlation coefficient of 0.972 having a high correlation add more. The family environment is also increasing. The second variable with correlation coefficient was friend characteristics (FRI) and academic achievement (ACH) with a correlation coefficient of 0.887, indicating that when the friend's characteristics were increased, the learning achievement increased, too.

When considering direct and indirect influences between variables in the model found that the relationship between the variables Student characteristics (STU) and academic achievement (ACH) (correlation size = 0.685) had only direct influence 0.662. = 0.701), only direct influence 0.693, the relationship between teaching quality (TEA) variables and learning achievement (ACH) variables (correlation size = 0.806), separated as direct influence -0.472 and indirect influence 0.624 as a total influence 0.152, relationship between variables Family environment (FAM) and academic achievement (ACH) (correlation size = 0.771) separated as direct influence -0.830 and indirect influence 1.278 as a total influence 0.448. The characteristics of peers (FRI) and academic achievement (ACH) (correlation size = 0.887) were separated as direct influence -0.159 and indirect influence 0.471 as a total influence 0.312. It is noteworthy that 3 variables were teaching quality (TEA).) Friends characteristics (FRI), family environment (FAM) direct influence on academic achievement (ACH) was negative, and indirect influence was positive. and have a positive overall influence. It was shown that friend characteristics (FRI), family environment (FAM) directly influenced academic achievement (ACH), only indirect effect on academic achievement (ACH).

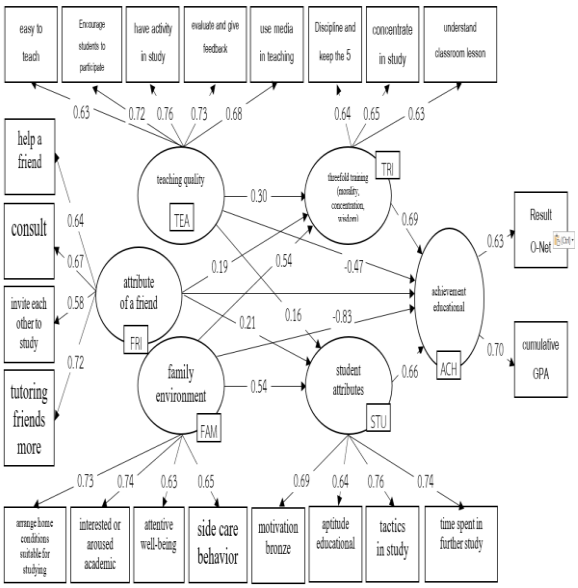

Figure 2 *A causal relationship model of factors influencing academic achievement of Mathayomsuksa 6 students in secondary schools under the Secondary Educational Service Area Office, Region 4*

VI. DISCUSSIONS

The researcher discussed the results according to the research objectives as follows:

1. To study the causal relationship and factors related to the learning achievement of Mathayomsuksa 6 students in secondary schools. Under the Office of Secondary Education Service Area 4, the results showed that there were 6 panel variables, namely teaching quality, peer characteristics. family environment Characteristics of students in Trisikkha, academic achievement partially consistent with Sutin Kongngern [6] conducted research on Factors Influencing

Mathematics Learning Achievement Mathayomsuksa 6, Maha Sarakham Province, using variables, teaching quality, family relationship Attitude towards the course aspirations for further study self-image achievement motivation academic aptitude basic knowledge achievement. It was also partly consistent with Suchada Pianont [7] conducted research on the causal factors influencing the Japanese language learning achievement of Mathayomsuksa 6 students, Secondary Education Service Area Office 31, using the variables: teaching quality, parental attention, achievement motivation Japanese language proficiency basic knowledge willingness to study Attitude towards the course self-concept achievement.

2. To develop a causal relationship model between factors affecting academic achievement of Mathayomsuksa 6 students in secondary schools Under the Office of Secondary Education Service Area 4, the results revealed that there were 6 latent variables, namely teaching quality, friend characteristics, family environment, Student characteristics, trisikkha, academic achievement, and 22 observable variables correlated with Chatchawan Kongphung [8] Influence of Factors Affecting Achievement in Analytical English Reading among Mathayomsuksa 6 Students of Schools in Bangkok. The results revealed that there were 5 panel variables, namely teaching quality, family parenting and peer relationship, attitude, aptitude and learning ability, and learning achievement and 19 observable variables and partly consistent with Mukarin Huang [9] conducted research on a causal relationship model of factors influencing Chinese Mandarin learning achievement of vocational students. The results showed that there were latent variables for teaching quality friend feature family environment teacher attributes student attributes achievement and 17 observable variables.

3. To propose a causal relationship model of factors affecting academic achievement of Mathayomsuksa 6 students in secondary schools Under the Office of Secondary Education Service Area 4, the results showed that the developed model is consistent with the empirical data, teaching quality variables friend characteristics, family environment indirectly affecting academic achievement, student attribute variables, Trisikkha directly affects academic achievement. It was also partially consistent with Suchada Pianont [10] conducted research on the causal factors affecting the Japanese language learning achievement of Mathayomsuksa 6 students, Office of Secondary Education Service Area 31 were found. The factors that directly influenced the achievement of learning Japanese language the most were prior knowledge, followed by Japanese language aptitude. The factors that had the most indirect influence on Japanese language learning achievement were teachers' teaching quality, followed by self-concept and prior knowledge. Partially consistent with Wimon Prajongchit [11] conducted research on Causal Factors Influencing Learning Achievement Science subjects of Mathayomsuksa 6 students under Chaiyaphum Educational Service Area Office 1. The only direct influencing variable on learning achievement was prior knowledge. The only indirect influencing variables on learning achievement were parental educational support, teaching quality, family upbringing. willingness to study Self-efficacy in learning attitudes towards science subjects class atmosphere and achievement motivation. The variables that directly and indirectly influenced the learning achievement were self-image and partly consistent with Wipa Muangming [12] conducted research on the causal

factors influencing mathematics learning achievement of Mathayomsuksa 6 students in Udon Thani Educational Service Area 1. Results of the research were as follows: the only direct influencing variable on mathematics learning achievement including the time spent on the original additional study. The variables that directly and indirectly influenced mathematics learning achievement were intention to study and home environment. The only indirect influence on mathematics learning achievement was attitude towards teachers attitude towards mathematics learning expectation cooperative learning style participatory learning style class atmosphere interaction in a group of friends achievement motivation and the attention of parents.

VII. RECOMMENDATIONS

A. Recommendations for Practice

1. The school organizes a curriculum to develop teachers to have a better teaching quality in order to prepare teachers to teach effectively to students.
2. The school organizes a project for students to learn with one another, learn together study in groups such as the Friends Helping Friends Project.
3. Schools assign teachers to teach students how to help each other study together for success and happiness.
4. Schools arrange for parents to be involved in students' learning, for example, providing knowledge on ways for parents to take care of students to succeed in their studies allowing parents to participate in giving opinions on school development, etc.
5. Schools assign teachers to teach students to realize that students themselves are very important to successful learning.
6. The school organizes a Trisikkha curriculum for students to study and apply the Trisikkha to study in order to make learning more efficient.

B. Recommendations for Further Research

1. Some variables should be adjusted such as teacher characteristics, school features or modify some latent variables such as classroom atmosphere, relationship between teacher and students, parents' income, and education including changing the Dharma principles such as Bhavana IV Iddhipada IV, the heart of the philosopher IV in order to develop a causal relationship model with other factors influencing learning achievement and to be studied for comparison.
2. Should expand the area to study outside the office area of Secondary Education Area 4, which has 62 districts or areas to study as provinces, such as Bangkok, Chiang Mai, Nakhon Ratchasima, as well as areas for education as regions such as the North, the South, to compare the research results.

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