Regional Research Paper

Education Reform in Thailand: The Case of Basic Education Quality Improvement for Raising the National Competitiveness of Thailand among ASEAN Member Countries

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I. Introduction

Thailand, like other countries worldwide, has been confronted with the challenges of dramatically changing trends in political, economic and socio-cultural integration at the national, regional and international levels arising from globalization. In particular, Thailand's challenges at the regional level have obviously emerged since it became one of the five ASEAN founding states in 1967, and, from 2015, when it committed to the AEC-related obligations. The economic and social context is now knowledge-based and in transformation as a result of the digital revolution era. People need knowledge and skills that nurture innovation so that they can adapt to emerging breakthroughs in advanced technologies related to economic and social activities[1] and can thus add value to productivity.[2] National competitiveness is a key indicator for measuring the effectiveness of national institutions, policies and relevant factors influencing economic productivity which, in turn, boost the capacity of the nation to create and sustain a good standard of living for citizens, and prosperity for the nation as a whole.[3] Quality of education is one of the indicators of competitiveness. For this reason, education reform is recognized as a priority on the national agenda to ensure that it meets its target to serve the knowledge-based economy and society.

In order to enhance the national competitiveness of the country in the 21st century, outstanding performance of Thai students in STEM-related and English subjects has been emphasized.[4] However, the resulting level of national competitiveness during the past five years (2012-2016), has been troubling, in particular when indicators relating to basic education quality and enrolment as well as to proficiency in mathematics and science are examined. In particular, the performance of Thai students in both national and international achievement tests in education, including the Ordinary National Education Test of Thailand (O-NET), the Programme for International Student Assessment (PISA), the Trends in International Mathematics and Science Study (TIMSS)[5] and English First's English Proficiency Index (EF EPI)[6] are still below the average scores or benchmarks. Therefore, the main tasks and responsibilities of educational authorities and stakeholders are now focused more on strengthening the teaching and learning system for the STEM-related subjects (science, technology, engineering and mathematics) to prepare students with the skills needed in this era.

The path towards basic education reform that Thailand has taken over the past two decades has achieved significant success, but, at the same time, some constraints have been emerging. To overcome challenges, many concerns have become a focus, namely effective budget allocation, development of educational personnel, teaching and learning procedures[7] and gender in education which is an interesting issue to support better performance in the teaching and learning process.[8]

In order to widen perspectives and understanding in respect of existing challenges in improving the quality of basic education so that it can boost national competitiveness, the objectives of this study are: (1) to explore the significant roles of basic education in strengthening national competitiveness; (2) to explain the current status of the basic education in terms of

challenges and achievements that influence the level of national competitiveness compared with other ASEAN member countries; (3) to explore current situations or challenges in terms of the gender disparity in STEM-related studying opportunities and gender neutrality in classroom management; and (4) to outline best practices for further application.

II. Overview of the Basic Education System

Formal basic education in Thailand complies with the 3-6-3-3 system: three years for pre-primary education (Kindergarten schools), six years for primary education (Grade 1-Grade 6), three years for lower secondary education (Grade 7-Grade 9) and three years for vocational or academic upper secondary education (Grade 10-Grade 12). Nevertheless, compulsory education, according to Section 17 of the National Education Act, 1999 and Section 4 of the Compulsory Education Act, 2002, spans only nine years, from Grade 1 to Grade 9. The entry age into compulsory education is six years.[9] In 2009, the 15-Year-Free-Education with Quality Policy was introduced according to the provision of the Constitution of the Kingdom of Thailand 2007[10]. The Office of the Basic Education Commission is the central authority under the Ministry of Education, the major function of which is the supervision, oversight and control of the overall administration and management of affiliated organizations at both regional and local levels, and all basic education schools. An academic year is divided into two semesters, the first goes from 16th May to 11th October and the second from 1st November to 1st April.[11]

III. Basic Education as a Factor of National Competitiveness

The 21st century is not only the era of globally interconnected and interdependent economy, politics and societies, but it is also the era of transformation to the digital revolution which is "characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres".[12] To reshape the characteristics and qualifications of the workforce and citizens in the country to conform to changing trends and requirements of international standards, the promotion of knowledge and skills in respect of STEM subjects (science, technology, engineering and mathematics) is especially crucial.[13] In particular, basic education contributes to business development and increases the efficiency of an individual worker. A worker who attains basic education can at least carry out more complicated tasks and easily adapt to advanced production processes and techniques or contribute to devising or executing innovations.[14]

The national competitiveness rankings are an important tool of law-makers, decision-makers and policy-makers in assessing achievements in terms of national productivity in relevant sectors that boost the competitiveness of individual countries.[15] The World Economic Forum (WEF) and the International Institute for Management Development (IMD) are two institutes well-known for their annual Global or World Competitiveness Ranking Reports. Both institutes define education as one of the indicators of national competitiveness analysis based on statistical data collected from international or national organizations, such as the World

Bank, the International Monetary Fund, UNESCO, and so on, and interviews with leading business executives in each country.

The Global Competitiveness Index (GCI) of the WEF combines 114 sub-indicators which are categorized into 12 Pillars. Among these, there are 10 sub-indicators directly related to education including two sub-indicators which are under Pillar No. 4 (Health and Primary Education) and eight sub-indicators which are under Pillar No. 5 (Higher Education and Training). In addition, the sub-indicator on the availability of scientists and engineers under Pillar No. 12 (Innovation) should also be considered as it reflects the weakness or strength of the nation in scientific, mathematical or technological competiveness to set up proper processes for further national improvement.

Figure 1: WEF Global Competitiveness Framework

Source: WEF Global Competitiveness Report 2016-2017[16]

At the same time the IMD indicators in respect of education are categorized as a sub-factor under the infrastructure factor. Achievement levels of each indicator suggest how much it can influence the productivity of business or enterprise in the nation.

Figure 2:IMD Criteria Used for Computing Rankings in World Competitiveness

Source: Thailand Management Association[17]

IV. Related Legal Frameworks and National Policies

The National Education Act, 1999, is the overarching law covering education and is considered as the catalyst of education reform to expand access to education for all Thai citizens. Since then, basic education has been prioritized. Laws, regulations, policies and plans have been enacted with various terms of implementation to facilitate the process of reform. Key legal frameworks and policies relating to basic education reform include:

1. **The National Education Act, 1999,** which was promulgated by virtue of the Constitution of the Kingdom of Thailand, 1997 (the 1st Amendment 2002 and 2nd Amendment 2010) focusing on the development of workforce capacity and productivity in compliance with international requirements and support for other national reforms to increase national competitiveness;[18] Second Decade of Education Reform (2009-2018) prioritizes the separation of administration relating to primary education and secondary education, the evaluation of teaching and learning based on the performance of teaching staff, and the implementation of the Basic Education Core Curriculum, 2008;[19]
2. **The Education Development Plan of the Ministry of Education 2012-2016** focuses on developing life-long learning and working skills in compliance with the demands of the labor market, harnessing IT for teaching and learning activities, promoting efficient administration of education, decentralizing administration power, and strengthening cooperation in education at the regional and global levels to achieve higher national competitiveness and peaceful co-existence in the global community;

3. **The Roadmap of Education Reform for Sustainable Development of Human Resources, 2015–2021**,[20] sets out guidelines for the implementation of six key points, including teacher reform, equal opportunities in accessing quality in education services, educational administration and management systems, the reform of knowledge acquisition skills, and the improvement of ICT systems for education;
4. **The National Education Plan, 2017-2031**, emphasizes the efficiency of educational administration, equality in educational opportunities and the development of life-long learning skills;
5. **Orders of the Leader of the National Council for Peace and Order (NCPO)** No. 10/2559 (2016) [21] and No. 11/2559 (2016)[22] dated 21 March 2016, which prescribe that the Regional Education Reform Steering Commission should be set up as the central body to mobilize the reform of education in regional and provincial areas. Eighteen Regional Education Service Offices and 77 Provincial Education Service Offices have also been established as subordinate authorities of that Committee;
6. **Order of the Leader of the National Council for Peace and Order (NCPO)** No. 28/2559 (2016) dated 15 June 2016, on the Fifteen-Year Free Basic Education Management is an influential framework for basic education reform as it prescribes that the free basic education service should be expanded from 12 to 15 years, including another three years in pre-primary education;[23]
7. **Policy of the Office of the Basic Education Commission of the Fiscal Year 2017** (from 1 October 2016 to 30 September 2017) emphasizes equal access to basic education for all school-age citizens, teacher and educational personnel development, and the participation of stakeholders in basic education management with the vision to develop the quality of basic education to meet international standards but still keep the Thai identity in mind.[24]

V. Current Status of Basic Education Reform in Thailand: Achievements and Challenges

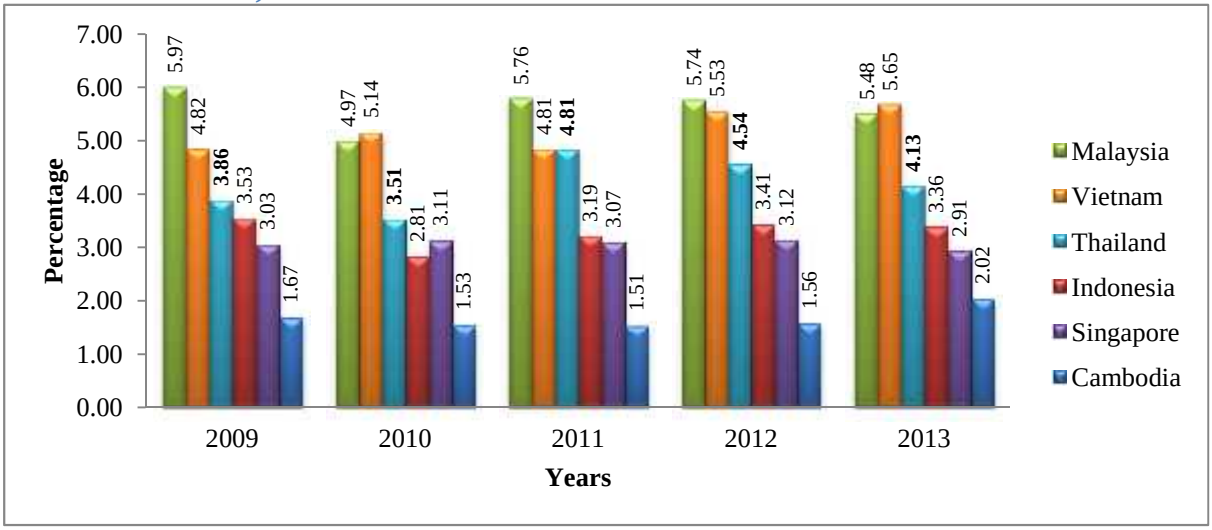
From 1999 to the present, the reform has been divided into two decades. The First Decade of Education Reform spanned 1999 to 2008 and the Second Decade of Education Reform, 2009 to 2018.[25] Along the path of the almost-two-decade-long reform, both achievements and (remaining) challenges have emerged.

1. Achievements and Challenges in the Allocation of the National Budget for Education

Budget allocation for national education has grown and, since 2009, has remained the highest proportion of the total national expenditure.[26] Compared with five other selected ASEAN member countries, namely Cambodia, Indonesia, Malaysia, Singapore and Vietnam, from 2009 to 2013, expenditure on education in Thailand as a percentage of the Gross Domestic

Product (GDP) was ranked third after that of Malaysia and Vietnam. The rate fluctuated between 3.51 percent in 2010 and 4.81 percent in 2011.

Figure 3: Budget for Education as a Percentage of GDP in Thailand and in Selected ASEAN Countries, 2009-2013



Source: UNESCO Institute for Statistics (UIS)[27]

However, many studies have argued that the educational budget is still inadequate to increase the teaching-learning quality of schools throughout the country, especially those in remote areas, to the standard of schools in larger cities. In addition, a study by the Thailand Development Research Institute (TDRI) found that the allocation of government's *per capita* subsidies on supply depends on the decision of central government, which does not satisfy the exact demands of students. Some 70-80 percent of the total subsidies on supply are for personnel and the rest is for operational costs and new investments. Meanwhile, *per capita* subsidies on demands allocated to schools are still inadequate.[28] Small schools in the provinces, especially those in remote areas in Thailand, are so underfunded that the *per* student spending for small schools would need to be increased substantially in order to provide students in specific areas with adequate resources to attain the same level of educational outcome as students in Bangkok.[29]

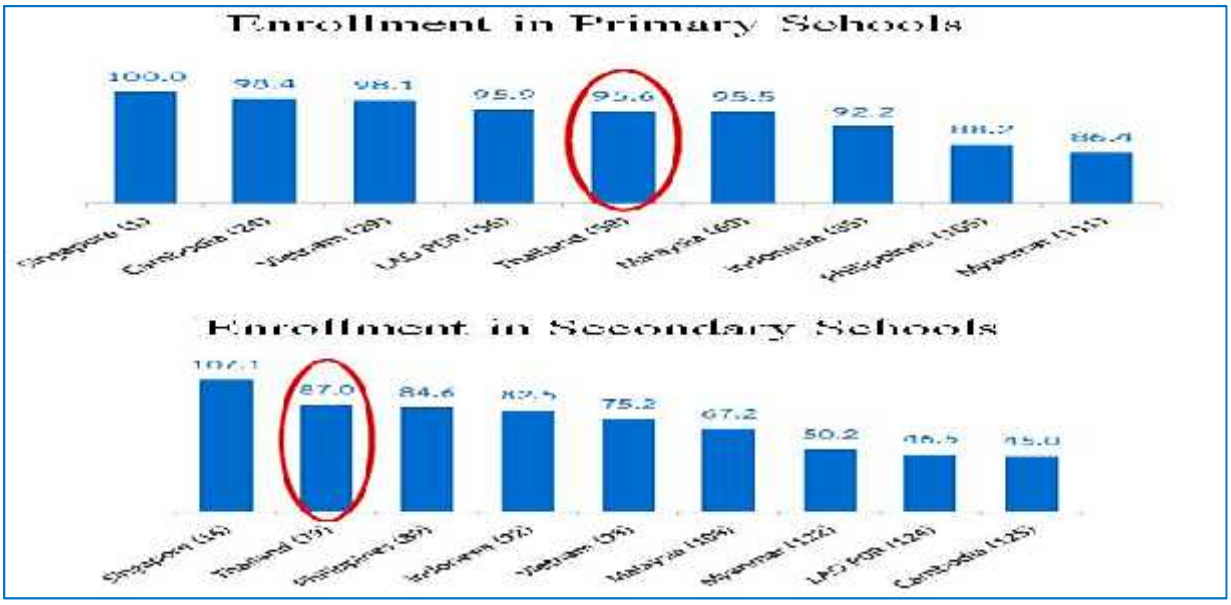
Consequently, a productive allocation and management system for the basic educational budget is needed to enable relevant authorities and organizations to achieve a balance between expenditure relating to the salaries of teachers and other educational personnel, and non-salary items including operational and maintenance costs and teaching materials.[30]

2. Achievements and Challenges in the Expansion of Access to Quality Compulsory and Basic Education

In terms of student enrolment, primary and secondary school figures have improved and gender disparity has been narrowed. From 2012 to 2015, the net enrolment rate for primary and secondary students increased. According to the WEF Global Competitiveness Ranking Report 2014-2015, the net percentage of enrolment of the population aged 6-11 years in

primary schools increased to 95.60 percent, higher than the previous year which was 89.70 percent. As a result, out of 144 countries, Thailand was ranked 58th in respect of this indicator, a substantial climb from its previous ranking of 101st. It is ranked 5th out of the nine ASEAN countries. Thailand's enrolment figures for secondary schools among the population aged 12-17 years – 87 percent - gave it a ranking of 79 out of 144 countries, an improvement on its ranking of 94 in the previous year. In this category it was ranked second out of the nine ASEAN countries, just below Singapore.[31]

Figure 4: Rankings for ASEAN Countries in Primary and Secondary Education Enrolment as a Percentage of the Primary and Secondary-School Age Populations



Source: Office of Education Council based on World Economic Forum 2014-2015

In terms of access to adequate resources, many studies found that small schools in remote areas are underfunded because there is only a small number of students in each school. Taking the number of basic education schools divided by the total number of students, among 30,719 schools under the supervision of the Office of the Basic Education Commission (OBEC), 50.69 percent - or 15,572 schools - are categorized as small-sized schools with 0-120 students and most of them are located in the provinces. In 2015, according to the Office for National Education Standards and Quality Assessment (ONESQA), more than 9,000 small primary and secondary schools under the jurisdiction of OBEC were substandard due to the shortage of necessities for developing educational services and boosting their performance to meet the standards of schools in cities. One of the critical challenges is the inadequate budget which has been allocated on the basis of a per-pupil calculation. On a tight budget, the use of information and communication technology for developing teaching materials and supporting students' learning performance in small schools are limited compared with those in larger schools.[32]

Table 1: Basic Education Schools Divided by Student Numbers

School Sizes	Number of Students	Number of Schools	%
Small Size	Not more than 20	1,058	3.44
	21 - 40	2,487	8.10
	41 - 60	3,387	11.03
	61 - 80	3,514	11.44
	81 - 100	2,768	9.01
	101 - 120	2,358	7.68
Total		**15,572**	**50.69**
Medium Size	121 - 200	6,782	22.08
	201 - 300	3,533	11.50
	301 - 499	2,284	7.44
Large Size	500 - 1,499	1,857	6.05
	1500 - 2,499	389	1.27
Extra Large Size	More than 2500	302	0.98
Grand total		**30,719**	**100**

Source: Office of the Basic Education Commission. 2015[33]

3. Achievements and Challenges in the Decentralization of Administrative Powers to Local Areas

The Ministry of Education is authorized to promote and oversee national education administration and management as a whole. After the announcement of Order No. 10/2559 (2016) and No. 11/2559 of the Leader of the National Council for Peace and Order (NCPO), dated 21 March 2016, the education administration structure in local areas has been reorganized. The National Steering Commission for Regional Education Reform is set up consisting of the Minister of Education as the Chairperson and other Members who are executives of key educational organizations. This Commission is responsible for mobilizing and transferring educational policies directly from the Ministry of Education (MOE) to the 18 Regional Education Offices which are established under the jurisdiction of the Office of the Permanent Secretary for the Ministry of Education. Each Office is headed by a Chief Education Officer, appointed by the Minister of Education. The intention is that educational policies will be further transferred to the Provincial Education Boards in 77 individual provinces. Each Provincial Education Board is headed by the Provincial Governor with main responsibilities including strategy or plan making, and implementing, monitoring and evaluating the educational management in each province. Therefore, 183 Primary Education Service Area Offices and 42 Secondary Education Service Area Offices, which are in charge of primary and secondary schools in different areas nationwide, the Bangkok Metropolitan Administration, which is responsible for overseeing education institutions in Bangkok, and the Border Patrol Police Bureau, which is responsible for Patrol Police Schools in provinces, will be expected to implement education policies in terms of management systems, quality

development, reform, curriculum development, personnel development and management, and student related policies in the manner of integration.

4. Achievements and Challenges in Educational Competitiveness

The indicators of the WEF and IMD measure the performance of an individual country in terms of basic education, STEM-related education and the English proficiency of students. Looking first at the IMD assessments, from 2009 to 2014, Thailand gradually slipped down the rankings in overall educational competitiveness. In 2015, Thailand rose six places, achieving a better performance than four other ASEAN countries, namely Indonesia, Malaysia, the Philippines and Singapore. However, in 2016, the rankings for Thailand and Malaysia dropped four and three places, respectively. That said, in general, from 2009 to 2016, Thailand has been ranked third after Singapore and Malaysia.

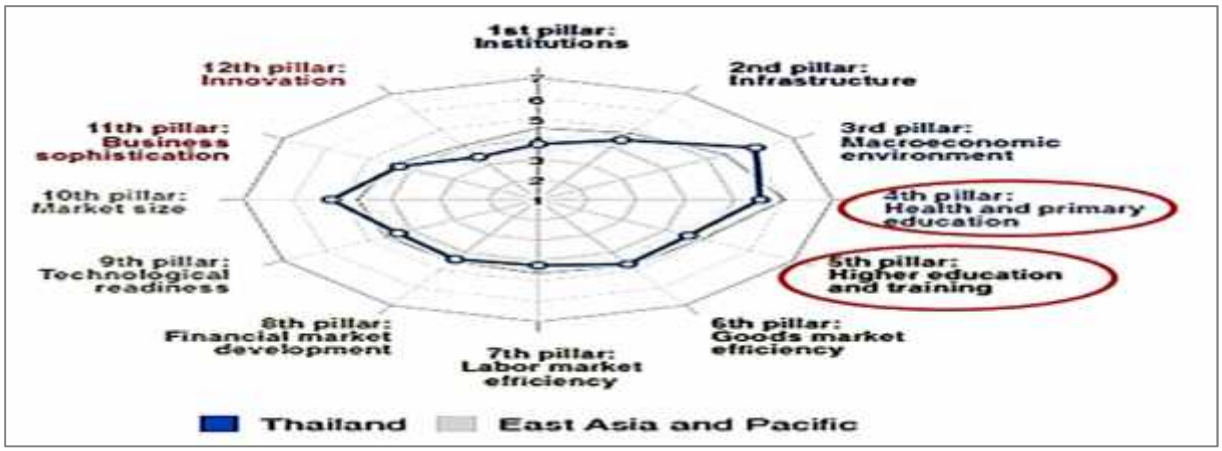
Table 2: Overall Rankings of the Educational Competiveness of ASEAN Countries,

Years / **Countries**	**2009** 57 Countries	**2010** 58 Countries	**2011** 59 Countries	**2012** 59 Countries	**2013** 60 Countries	**2014** 60 Countries	**2015** 61 Countries	**2016** 61 countries	**Change 2015-2016**
Singapore	13	13	10	6	4	2	3	4	-1
Malaysia	30	33	30	33	34	32	35	38	-3
Thailand	**47**	**47**	**51**	**52**	**51**	**54**	**48**	**52**	**-4**
Philippines	54	56	57	57	59	59	60	59	+1
Indonesia	55	55	53	53	52	52	57	56	+1

Source: Ministry of Social Development and Human Security, based on the IMD World Competitiveness Yearbook 2004-2015 and the IMD World Competitiveness Yearbook 2016.

Figure 5 indicates the competitiveness level of Thailand compared with the average of countries in East Asia and the Pacific. It shows that the educational competitiveness of Thailand (blue line) in both Pillar No. 4 and Pillar No. 5 is still below the average standard (grey line).

Figure 5: Educational Competitiveness Level of Thailand on the WEF GCI Pillars



Source: WEF Global Competitiveness Report 2016-2017

Looking at the WEF global competitiveness assessments for 2014 to 2015, Figure 6 shows the rankings of ASEAN member countries in terms of educational competitiveness. It uses 10 separate educational indicators. Out of 140 countries, Thailand achieved high ranking figures in five indicators, namely primary education enrolment (net percent), secondary education enrolment (gross percent), tertiary education enrolment (gross percent), internet access in schools, and extent of staff training. It is noted that the ranking of Thailand in terms of the quality of primary education is quite low - and has dropped from the previous year - and that it leads Vietnam by only one place.

Figure 6: Rankings of ASEAN Member Countries in 10 Educational Indicators

Countries (9)	WEF's Educational Indicators									
	Quality of primary education	primary education enrollment, net %	Secondary education enrollment, gross %	Tertiary education enrollment, gross %	Quality of the education system	Quality of math and science education	Quality of management schools	Internet access in schools	Availability of research and training services	Extent of staff training
Cambodia	113 ↓	24 ↑	125 ↑	101 ↑	101 ↓	111 ↓	123 ↓	100 ↓	104 ↓	82 ↓
Indonesia	48 ↑	85 ↓	92 ↑	77 ↑	32 ↑	36 ↓	49 ↑	48 ↑	50 ↓	24 ↑
Lao PDR	84 ↓	56 ↓	124 ↓	99 ↑	60 ↓	83 ↑	79 ↑	88 ↑	85 ↑	45 ↑
Malaysia	17 ↑	60 ↓	108 ↓	72 ↓	10 ↑	16 ↑	26 ↑	34 ↑	13 ↑	4 ↑
Myanma	137 ↑	111 ↑	122	103	129 ↓	129 ↑	139 ↑	137 ↑	135 ↑	138 ↑
Philippines	60 ↑	105 ↑	89 ↓	82 ↓	29 ↑	70 ↑	40 ↓	66 ↑	69 ↑	27
Singapore	3	1	16 ↑	10 ↑	4 ↓	1	6	6 ↓	12 ↑	3 ↓
Thailand	90 ↓	58 ↑	79 ↑	54 ↑	87 ↓	81 ↓	81 ↓	61 ↑	69 ↓	37 ↑
Vietnam	91 ↑	29 ↓	98 ↓	88 ↑	94 ↑	82 ↑	119 ↑	47 ↓	118 ↑	85 ↑

Source: WEF Global Competitiveness Report 2014-2015

Different reports on the ranking of Thailand in respect of the educational competitiveness indicators mentioned above suggest both the weakness and efficiency of past performance in strengthening national competitiveness. For this reason, the lessons learned from these reports are useful for policy-making or for the planning process for education reform so that it corresponds more closely to international standards and requirements.

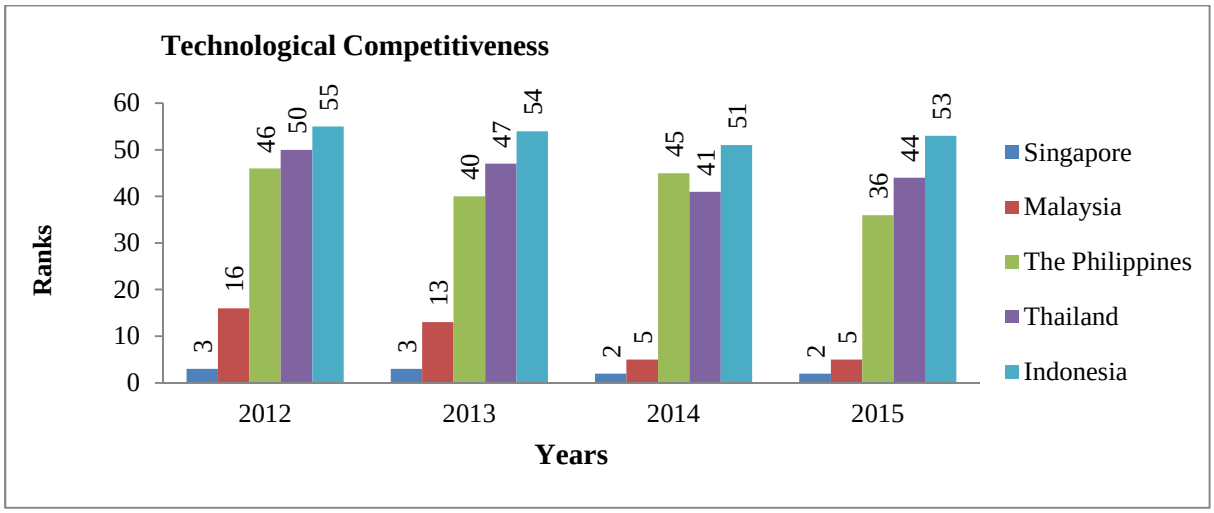
5. Achievements and Challenges in STEM-Related and English Skill Competitiveness

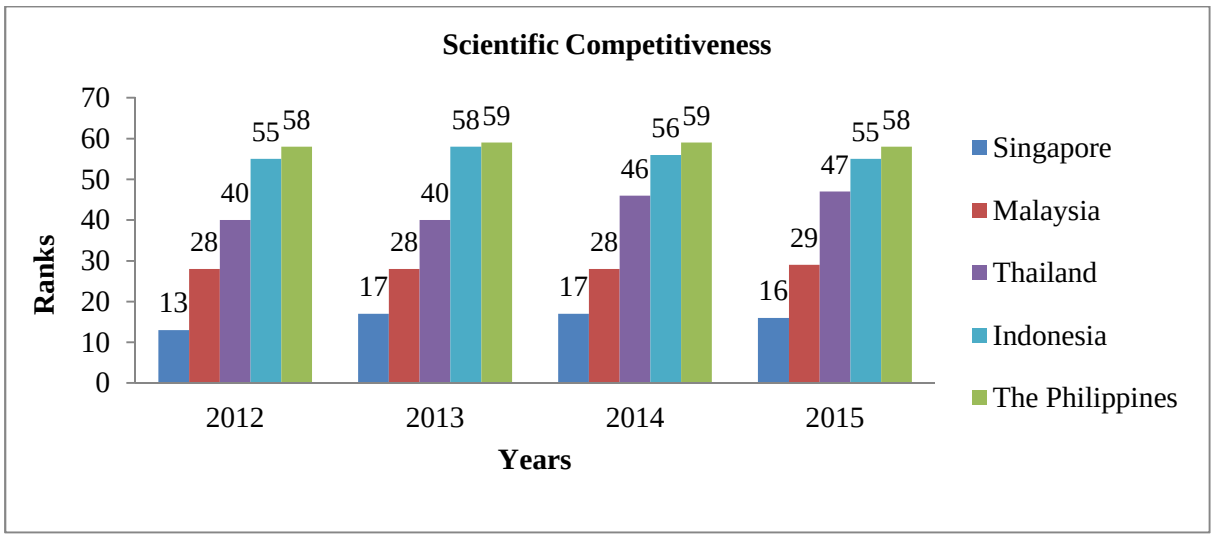
Student achievements in key education subjects in basic education, including science, mathematics and English language, are of the greatest concern because higher achievements in these subjects will be crucial to continue fostering innovation and the country's technological development. Therefore, an overview of student achievements is important for reviewing past performance and subsequently for future action planning.

5.1) Technological, scientific and mathematical competitiveness of Thailand at the ASEAN and global levels

From 2012 to 2015, the rankings for Thailand in terms of technological competitiveness were near to the bottom of 60 or 61 countries participating in the IMD surveys. Compared with other ASEAN countries, Thailand was ranked 4th, except in 2014 when the country was ranked 3rd. For scientific competitiveness it sank from 40th place in 2012 and 2013 to 46th and 47th place in 2014 and 2015, respectively.

Figure 7: Technological and Scientific Competitiveness in Five Selected ASEAN Countries, 2012-2015

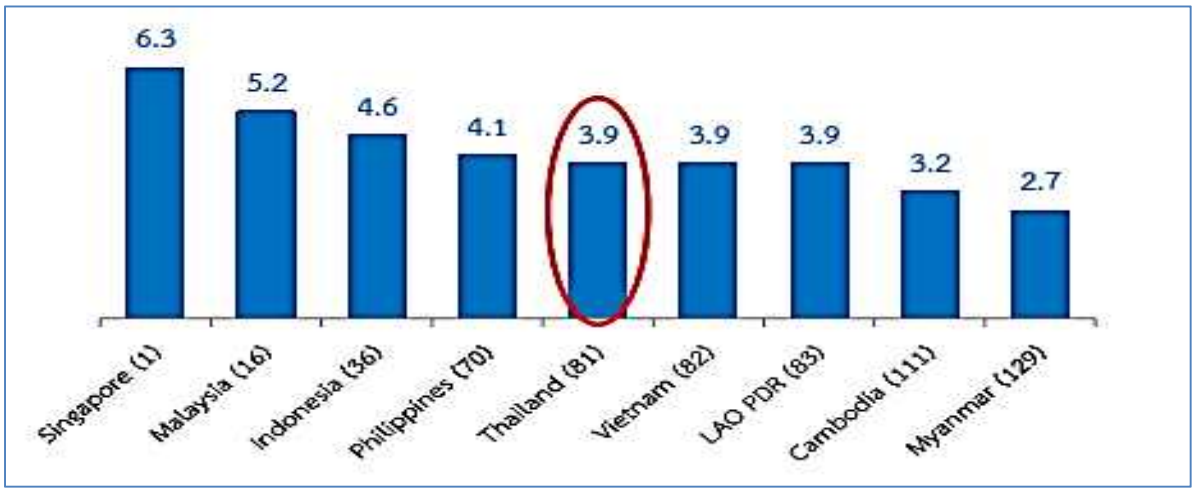




Source: IMD World Competitiveness Yearbook 2012-2015

In terms of the quality of mathematics and science study management reported by the WEF, Thailand was ranked 81st out of 144 countries and 5th out of nine ASEAN countries.

Figure 8: WEF ASEAN Rankings in Mathematics and Science Study Management in 2014

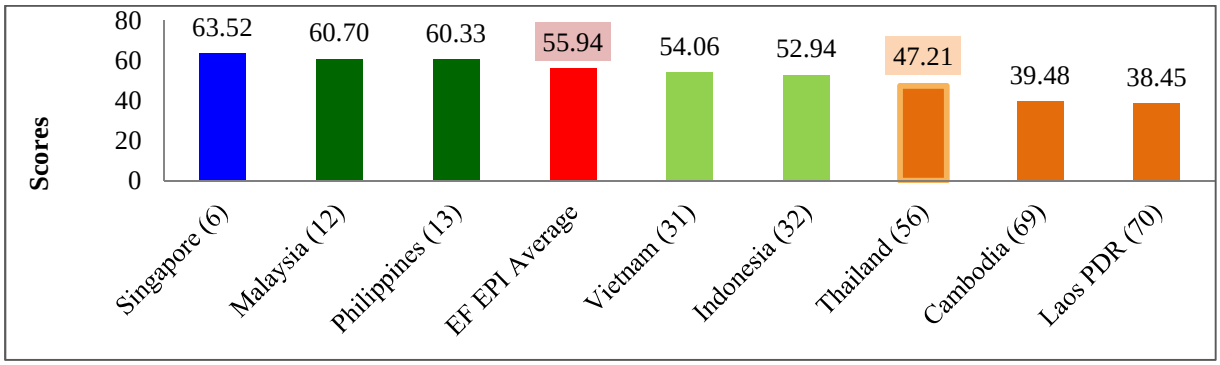


Source: Office of the Education Council, based on the WEF Global Competitiveness Report 2014-2015

5.2) English skill competitiveness

The ranking of the Thai people in terms of English proficiency is low according to the 2016 English Proficiency Index Report of English First (EF EPI) in their World Ranking of Countries by English Skills table. EF tests the English skills of adults around the world every year. In 2015, about 950,000 test-takers from 72 countries completed three different EF English online tests. In calculating the test results, EF classifies English proficiency levels into five groups, including: 1) very high proficiency; 2) high proficiency; 3) moderate proficiency; 4) low proficiency; and 5) very low proficiency. The results rank Thailand 56th out of 72 countries around the world, climbing from the 62nd place out of 70 countries in 2014 with an average score level in the group described as 'very low proficiency'. Out of eight ASEAN member countries, Thailand is ranked 6th, above Cambodia and the Lao PDR, respectively, as shown in the Figure 9 below.[34]

Figure 9: Scores and Rankings of ASEAN Member Countries by English Proficiency in 2015



Level of proficiency: Very high High Moderate Low Very low

Source: EF English Proficiency Index Report. 2016

6. Achievements and Challenges in National and International Benchmarking Tools in Education Performance Assessments

For assessing and measuring levels of achievement in terms of basic education for students in the areas mentioned above, the two levels of achievement tests are:

6.1) National achievement test in education

The Ordinary National Education Test of Thailand (O-NET)[35] is the national achievement test organized by the National Institute of Educational Testing Service (NIETS) to assess the achievements of Thai students at Grade 6, Grade 9 and Grade 12.

Students in those three grades need successful O-NET scores for admission to Grade 7, Grade 10 and higher education, respectively. Tests in the academic year 2015 cover the five subjects that form part of the core curriculum, namely the Thai language, mathematics, science, social studies, religion and culture, and foreign languages (English). This study particularly focuses on the student results in mathematics science and English that have an impact on the competitiveness of the nation.

The results showed that the average scores for all three focus subjects had improved compared with the results of 2014. However, they were still under 50 percent in respect of the total scores. English remained the subject with lowest average scores in all three Grades. NIETS has reported that students from University Demonstration Secondary Schools, which are operated by universities to serve the pre-service student teaching programs, performed better than those from schools under the Office of the Basic Education Commission (OBEC). The Grade 12 students achieved average scores that were higher than the national average, at 46.19 in English, 45.85 in mathematics and 42.57 in general science, while OBEC students averaged 24.98 in English, 26.65 in mathematics and 33.55 in general science. NIETS also compared the O-NET scores of students based on school location. It found that students in urban areas performed better than those in rural or remote areas.

Table 3: National Average O-NET Scores of Grade 6, Grade 9 and Grade 12 Students in 2015 (Total score = 100)

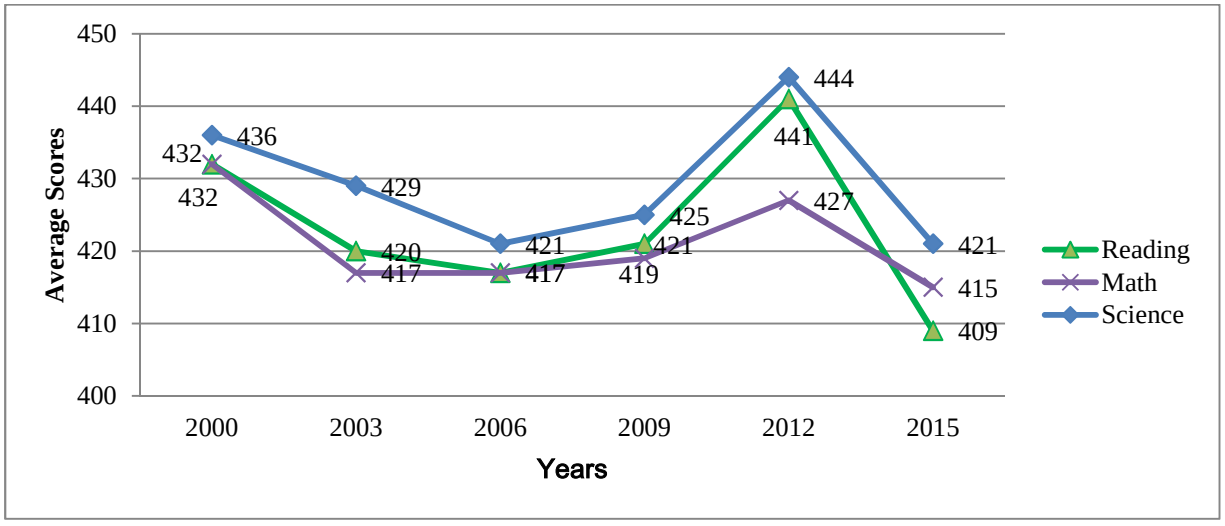
Grades / Subjects	2015		Mean 2014
	Total No. of Test Takers	Mean	
Grade 6			
English	716,780	40.31	36.02
Mathematics	716,684	43.47	38.06
Science	716,778	42.59	42.13
Grade 9			
English	656,701	30.62	27.46
Mathematics	656,491	32.40	29.65
Science	656,463	37.63	38.62
Grade 12			
English	423,417	24.98	23.44
Mathematics	423,654	26.59	21.74
Science	422,718	33.40	32.54

Source: NIETS, Summary of O-NET Scores of Grade 6, Grade 9 and Grade 12 Students 2014- 2015

6.2) International achievement tests in education

1) The Programme for International Student Assessment (PISA) of the Organization for Economic Co-operation and Development (OECD) is organized every three years to assess the knowledge, competency and attitudes of 15-year-old students in scientific, mathematical and reading literacy. PISA tests what students know and what they can do with what they know.[36]

Figure 10: Performance of 15-Year-Old Thai Students in PISA, 2000-2015



Source: PISA 2000-2015: Result in Focus

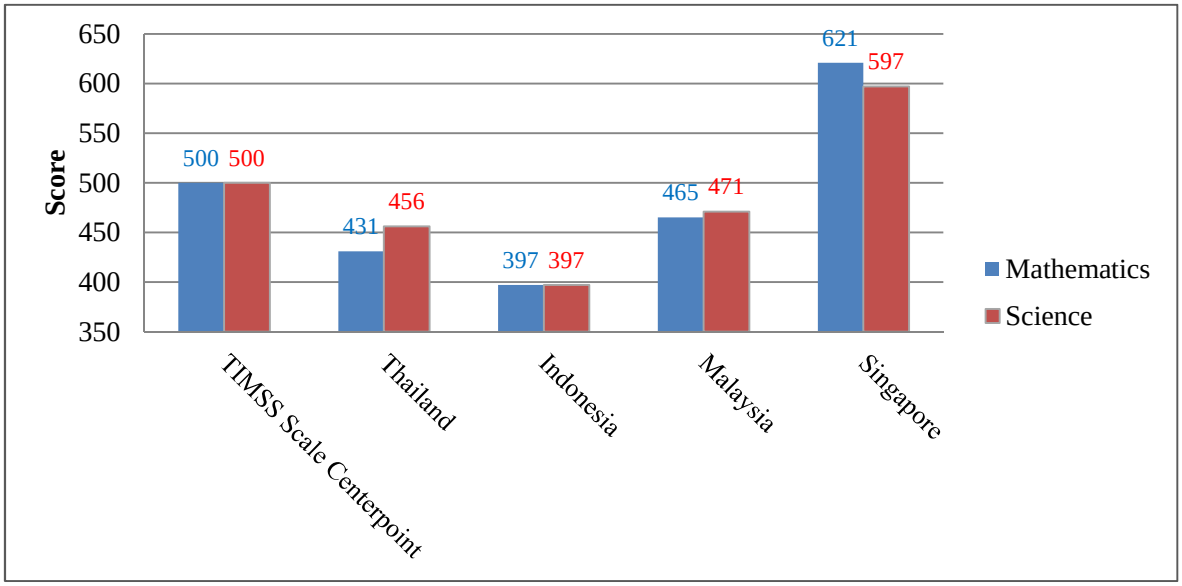
From 2000-2006, scores in all three subjects - science, mathematics and reading- decreased before moving back up in 2009 until 2012 and declining again in 2015. Mean scores of Thai

students were still lower than the average score of OECD. The results of 2015 also showed that Singapore achieved the top rank in the world from 72 countries participating in the assessment, and in ASEAN, with scores that were higher than the average score of OECD in all three subjects. At the same time, Vietnamese students performed better than the OECD's average in science and mathematics. The above mentioned trends of PISA results suggest that the mathematical, scientific and reading skills of most 15-year-old Thai students who were graduating from compulsory education (Grade 9) were still below average in terms of international standards.

2) The Trends in International Mathematics and Science Study (TIMSS) is organized every four years by the International Association for the Evaluation of Educational Achievement (IEA) to assess the achievements of primary and lower secondary students (Grade 4 and Grade 8) in mathematics and science.[37] Four ASEAN member countries participate in this evaluation, namely Indonesia, Malaysia, Singapore and Thailand.

However, in 2015, Thailand chose to participate in only the 8th Grade assessment. Compared with three other participating ASEAN countries, Thai students' achievements in both mathematics and science were lower than those of Singapore and Malaysia. In addition, the score of Thailand was lower than the 500 center point score of the TIMSS scale.

Figure 11: TIMSS 2015 Results of Eighth-Grade Students from Four ASEAN Countries



Source: TIMSS 2015 International Results in Mathematics and Science. 2016. p. 21[38]

7. Achievements and Challenges in the Teaching and Learning Process

To implement policies and the roadmap to achieve the second decade of education reform and to produce a quality workforce for the 21st century in the era of the digital revolution, the appropriate design of teaching and learning methods is important for creating learning environments to stimulate the participation of students in thinking creatively, analytically and

scientifically. Students are encouraged to debate, express opinions or ask questions independently in a class. For this reason, a student-centered approach is promoted in teaching and learning activities.[39]

However, the findings of many academic studies have shown that many teachers in primary and secondary schools in Thailand still adopt the rote-learning and teacher-centered approaches which do not motivate or encourage students to think and express themselves independently.[40]

Application of information and communication technology (ICT) is one of the factors that positively influences the performance and achievement of students. Nevertheless, ICT for education is a key challenge for many schools. Disparity in the distribution of resources for developing teaching and learning materials still exists between schools in large cities and those in remote areas. The causes of these challenges and disparities range from no electricity supply and out-of-date devices or equipment, to inadequate financial support to make necessary purchases. The application of educational technology can support teaching practice, making it more attractive for students and encouraging them to pay attention to the subject content or teachers' explanations. It is thus likely to have a positive influence on student achievement.

8. Teacher-Related Achievements and Challenges

8.1) Pre-Service Performance

- ***Inadequate budget allocated for teacher education and training***

Most of the government's increasing national budget for education is spent on operation costs – salaries and staff wages – as well as the provision of facilities instead of investments in education through the improvement and development of students' capacity and the provision of teacher training.[41] This implies that the budget is not spent effectively. The students' achievement in national and international competitiveness is still far below the standard and part of this problem stems from the teaching quality of teachers, some of whom are not specialists in the subject they are teaching. This, therefore, suggests that the quality development of education has not been fully embraced and has not, therefore, achieved any obvious success. As a result, the government should focus on revising the national budget, in either fiscal or education reform, especially in promoting specialization training for teachers, in order to raise the quality of education.

- ***Unsupportive teacher licensing system and teachers' specialized qualifications and requirements in specific areas***

The nation's requirement to raise the national competitiveness of its students has not been integrated with the requirements of the teacher licensing system and teachers' specializations, education background and training experience.[42] The lack of teachers in the past drove the government to increase the number of teachers in subjects for which there was a shortage, and various educational institutes responded without proper policies or planning directions.

Many special programs, such as evening or weekend programs (part-time), were set up in all Teachers Colleges (which had been changed to Rajabhat Universities) but this ultimately resulted in a surplus of teachers, and many of these pedagogical graduates could not find a job.[43] This is reflected in the next generation's decision in respect of studying pedagogy, weighing that against the chance of a job guarantee. Furthermore, students who were not academically gifted entered tertiary education by choosing pedagogy since it was easy for them to enroll in this subject. This tended to degrade the image of pedagogical careers since these less able graduates became professional teachers and contributed to the decline of education quality in Thailand.[44]

The screening process for pedagogical applicants involves a written examination, which is, in fact, not an effective means to select qualified teachers. What is more important is the teachers' capacity to draw students' attention through various teaching techniques, supported by the use of modern technology.[45]

Another factor is derived from evidence that the old education system hinders the government-school administrators in pursuing their right to choose their teachers. Instead, teachers are assigned by central authorities. Teachers, instead of being assigned to teach the subjects in which they are specialized, have to cope with the subjects that they are not good at. This factor clearly has an adverse effect on knowledge delivery from teacher to students and in students' opportunities to study the subjects in which their teachers are not specialized - the so-called process of studying in a "dead classroom".[46] This will interrupt the students' knowledge development and continuous learning process.

- Larger gap between the numbers of retired teachers and the new teachers to replace them due to the Early-Retirement Campaign of the government

The government's Early-Retirement Campaign, directed at government officers, has created a disparity between the numbers of retired teachers and the number of new teachers available to replace them in the education system. This has resulted in a scarcity of teaching personnel. This shortage has accumulated over years. The survey of the Basic Education Commission found that in early 2007 there was a shortage of 70,000 teachers, registered in the Office of the Teacher Civil Service and Educational Personnel Commission, for secondary schools at the national level.[47] One factor was that the training and admission of teachers were not synchronized. The Early-Retirement Plan was introduced and many teachers readily embraced it while plans to fill the ensuing vacancies were still limited and not well-planned in advance by the central authorities, such as the Office of the Teacher Civil Service and Educational Personnel Commission and the State Resources and Policy Specification Committee, Office of the Civil Service Commission (OCSC).[48] This ineffective plan led to a period of insufficiency in respect of both teaching periods in class and teaching preparation. In addition, teachers could not attend skills development programs throughout the period of the whole program since they had to spend time completing their academic standing papers and also preparing their students for international achievement tests or academic contests, resulting in a low quality of both teaching and education in Thailand.[49]

A study by the Thailand Development Research Institute (TDRI) estimated that, in the next 10 years, the number of teachers retiring will vacate 200,000 positions.[50] This requires long-term planning by the central authorities in teacher recruitment and training preparation. However, it is estimated that there will be a surplus of teacher applicants in the next five years, which will comprise up to 300,000 new graduates from teaching colleges. This number will be merged with another 300,000 graduates who already hold teaching licenses.[51]

The Office of the Teacher Civil Service and Education Personnel Commission conducted a planning exercise focusing on the replacement of retired teachers and in 2013-2017, they estimated that there would be around 103,797 retired teachers. For the fiscal year 2013, there were teacher resources to completely replace retired teachers. This would, however, be the last year the Ministry would be able to completely fill vacancies: for the fiscal year 2014, there would be replacements for only 20 percent of vacancies.[52]

8.2) In-service Performance

- Teacher shortages in small-sized schools

A shortage of teachers is a significant problem that can be found throughout the country, and it is one that causes many problems in education development. For example, it can lead to teachers teaching subjects that are out of their specialist field, or to student-teacher ratios that do not adhere to the standard. Considering the number of teachers in Type 1 schools (the smallest with 1-120 students/school), in 2013, the average number was 2.8.[53] This shows the risk that every teacher in a small school is obliged to teach multiple subjects (out of the eight standard subjects, which are: (1) Thai language; (2) mathematics; (3) science; (4) social studies, religion and culture; (5) health and physical education; (6) arts; (7) careers and technology; and (8) foreign languages) and at many grades.

Table 4: School Sizes and Number of Teachers per School in Percentages

Size of school	Number of students	Number of teachers per school (Percentage)
Type 1 (Smallest)	1-120	2.8
Type 2	121-200	3.7
Type 3	201-300	4.7
Type 4	301-499	5.7
Type 5	500-1,499	6.8
Type 6	1,500-2,499	8.3

Source: www.thaipublica.org. 2014

Besides the number of teachers in small schools (Type 1), which does not, relatively speaking, correspond with the numbers in bigger schools, the numbers of teachers in Bangkok and in other provinces differ, too. In 2013, the number of teachers, under the supervision of the Office of the Basic Education Commission in Bangkok accounted for 2.83

percent per school while the average number of teachers in each province is only 1.3 percent per school.[54]

- ***Shortage of teachers in English language and STEM-related subjects***

The shortage of teachers in English language and STEM-related subjects has long been a problem in the Thai education system. This problem can be found in most small schools, especially in rural areas, where one teacher has to teach many subjects (in which s/he may not be a specialist) and in many grades. Tracing back to 2004, there were approximately 20,000 teachers who had to teach subjects they had not specialized in. There is still a need in many schools for teachers who are pedagogical graduates in important subjects, such as English language, mathematics, science and even in the Thai language.[55]

- ***Unattractive financial incentives and non-financial incentives for teachers***

The factors that motivate teachers to develop a professional career include direct and indirect influences, external motivation and rewards including financial incentives (remuneration and welfare) and job security.[56] Wiles (the author of *Supervision For Better Schools)* explained that the desire for job security is a key factor that drew people to work as teachers. [57]

The financial incentives for teachers in Thailand, compared to those of other professions (such as engineers, doctors, architects, and so on) or of private companies, are relatively low.[58] Many teachers, therefore, face financial problems, especially family debt. Dr. Varakorn Samkoses noted that more than 130,000 teachers were in heavy debt, on average, for 1.1 million baht.[59] This is reflected in teachers' feelings of insecurity and decreasing life quality and there is a need for teachers to take part-time jobs to enable them to support their families.[60] These factors inhibit teachers' full teaching performance in class and also have a detrimental effect on students' learning capability.

In contrast, the TDRI research found that, comparing the incomes of school teachers and university professors, school teachers' incomes have been progressing significantly. In 2001 the income of school teachers holding Bachelors' degrees and teaching in public schools was 15,000 baht (approximately USD 428), while their 2010 income had risen to 24,000-25,000 baht (around USD 685-USD 714). Furthermore, the teachers' salary was increased by up to 8 percent in March 2011 and by another 5 percent in April 2011, which was in total 8 percent higher than the salaries of university professors.[61] In contrast, the salaries of university professors holding Bachelors' degrees and teaching in public universities, starts at the minimum of 10,190 baht (around USD 312).[62] This shows that, among professionals, school teachers no longer earn the least. Therefore, the financial incentives for teachers may not be the main factor that deters people from becoming teachers. What should be considered is how to improve the teacher recruitment process and teaching quality.

Non-financial (dis)incentives are other factors that hamper the quality of teachers' performance in class. Teachers' salary increases are based on their academic standing instead of their ability to improve student learning and outcomes.[63] Instead of conducting teaching preparation, they have to spend part of their teaching time in school preparing academic

papers for the academic standing evaluation, which is the same as university lecturers. This requires complex research methodology and is time consuming. The disadvantage of this non-incentive requirement can, for example, be seen in the 2010 ONET test of students at Grade 6, Grade 9 and Grade 12 for which overall scores had been declining and for which the average score was less than 50 percent.[64] One of the factors behind this unsatisfactory result is that teachers have been spending most of their time conducting papers for academic standing evaluation and less of it in class. This inevitably affects the development of learning in Thailand.

- Unqualified teachers

Another claim made by the Office of the Education Council relates to unqualified teachers. The reason cannot be attributed to an error in the education system but to a lack of self-development among the teachers themselves. Neither effective knowledge management systems nor well-planned knowledge exchange among retired teachers and the younger generation have been established. Only 20 percent of the knowledge taught to students comes from curriculum and books, while the rest (that counts for 80 percent), that comes from retired teachers, is ignored. As Lekha Piyaatchariya argues, this is despite the fact that they have been collecting teaching experience and tacit knowledge throughout their careers.[65] In addition, there is a teacher shortage in small schools, as mentioned earlier. Therefore, the teacher is obliged to teach multi-subjects and at many grade levels. As a result, the Ministry of Education should apply knowledge management concepts and ways for them (i.e., retired teachers) to share their experience with the new generation of teachers in order to design better curriculums and teaching methods for students. Training programs on the specific subjects they are currently teaching, some of which are not their specialization, will be useful. One good training project to develop teachers' skill is the government's Professional Teacher project, with practical and intensive course that focuses on subject fields and on remote areas short of teachers.[66]

9. Achievements and Challenges in Gender Equality in Basic Education

9.1) Gender parity in enrolment in schools

One set of statistics relating to the education system in Thailand relates to gender parity in accessibility to basic education, comparing the numbers of male and female students in this country to the situation in three other ASEAN member countries (Cambodia, Indonesia and Malaysia), as well as the numbers in the global arena.

Table 5 below shows that the Gender Parity Index (GPI) of Thailand is 0.98 at the primary education level. This means that there is almost no disparity between male and female students enrolling in primary education. In lower secondary education the GPI for enrolment is 1.00 (i.e. there is no disparity at all in numbers between male and female students). More female students enroll in upper secondary education than do male students.[67] As a result, it can be deduced that male and female Thai students receive an equal opportunity to access basic education.

Table 5:GPI in Education per Country

Country	Year	Primary Education	Lower Secondary Education	Upper Secondary Education	Tertiary Education
Cambodia	2012	0.95	1.00	0.73	0.61
Indonesia	2011	1.04	1.04	0.98	0.85
Myanmar	2010	0.99	1.03	1.11	1.34
Thailand	**2012**	**0.98**	**1.00**	**1.13**	**1.31**
Global	2011**	0.97	0.97	0.96	1.08

Source: UIS Data Center, 2013

In 2016, the total number of male students was higher than that of females in primary education and vice versa in secondary education. If the details of each Grade are looked at in detail, it appears that the number of male students has increased from Grade 1 to Grade 7. From Grade 8 to Grade 12 the number of female students is higher.

9.2) Gender equality in STEM-related education

According to the UNESCO Institute for Statistics (UIS), as of 2014, a serious labor shortage in STEM fields existed, particularly among women who represent only about 30 percent of researchers in science, technology and innovation. However, among 18 Asian countries, Thailand is one of three countries that have an equal, or above proportion, in favor of females represented in STEM-related subjects. Although the Thai Government launched a policy to develop Master Plans for the Promotion of Gender Equality in Bureaucratic Systems in 2011[68] and requested all government offices to integrate a gender dimension into their activities, there is no specific policy or legal framework in respect of STEM education for girls and women in Thailand.

The report on *Complex Formula: Girls and Women in Science, Technology, Engineering and Mathematics in Asia* launched by UNESCO in March 2015 provides surveyed data that is likely linked to future trends and overviews of the gender dimension in STEM-related education. The interesting points include:

- In the STEM-related arena, the higher the level, the lower the number of women there are. In education or in the workplace, the number of women engaged in STEM-related work is lowest at the highest levels. For example, the proportion of women and girls represented in the highest levels of achievement such as the Nobel Prize, Fields Medal or International Olympiads etc. is relatively low[69];
- It is necessary to ensure that STEM-related materials and textbooks selected do not reinforce gender stereotypes: for example, in the ways they present male or female pictures in textbook illustrations;
- STEM-related class management or teaching styles have an influence in stimulating female students' interest in these subjects. Class activities that promote female students' creative thinking and practical learning that helps them to understand how to apply knowledge to real life are more inspiring; and

- Fewer female students or teachers in STEM-related subjects mean that there is a lack of role models to motivate or attract more girls to study or women to teach STEM-related subjects.[70]

9.3) Gender neutrality in classroom management

A positive environment in the classroom influences students' learning. A classroom that is well-organized as a safe, open, and inviting place to learn can effectively motivate and inspire students to participate in class. Gender neutrality is one of the crucial factors for creating a comfortable atmosphere for teaching and learning.

Gender neutrality means "policies or ideas that seek to avoid or remove obvious distinctions between males and females".[71] To promote gender neutrality in classroom management, the first basic step for teachers is the use of neutral language in oral explanations, textbooks or handouts by avoiding words, pictures, or materials that convey gender bias. For instance, this includes the use of both 'she' and 'he', 'her' and 'him', and alternation between male and female examples.

Second, textbooks and audio-visual materials should be checked to ensure that they portray only non-gender stereotypes. For example, books that have stereotypes only of male doctors and female nurses reinforce gender stereotyping, encouraging students to believe that a woman cannot be a doctor.

Moreover, seating arrangements and group activities in a classroom must be organized in a way that integrates boy and girl students working together. Girls and boys should be given equal opportunities to participate in classroom activities and sports. Another option for promoting gender equality in the teaching and learning process is to give the same assignments or homework to both boys and girls.

Furthermore, sex education should be provided for boys and girls. Sexual harassment of girls and boys should be a case for severe punishment. Any embarrassment for either sex must be removed both in textbooks and teaching-learning materials by using relevant and humorous illustrations.[72]

VI. Learning from Best Practices and Innovations

1. Best Practices in the Allocation of the National Budget for Education

In order to bring the quality of small and remote schools up to the level of Bangkok, equality in the budget allocation is important. The increase in spending *per* student is a way to provide adequate resources for students and schools by calculating the estimated change in average personnel salary *per* student that would be necessary for each province to have more quality teachers *per* classroom. This is called 'the input-based approach' to budget allocation.

However, another challenge of this approach is how to recruit more quality teachers who would be willing to work in small and remote schools.

The budget allocation based on the number of students enrolled in each school is another option. The calculation is made on the basis of the `demand-side-financing approach', not on the inputs that schools would employ. This approach would stimulate the educational authorities and local communities to expand the school size, and has been the most widely adopted in Eastern Europe where the number of students had been decreasing dramatically.[73]

2. Best Practices in the Expansion of Opportunities in Quality Compulsory and Basic Education

Currently, the challenge to education equalization in Thailand is not to increase the number of students enrolling for basic or compulsory education. Instead it revolves around the equality of schools in gaining sufficient resources to develop their performance. There are at least three methods that have been adopted in other countries:

2.1) School merger is a way to combine two or more schools within the same area to form a bigger school so that resources are no longer spread thinly across numerous small schools. A merged school would be better resourced, particularly in respect of the higher allocated budget due to the larger number of students. However, this option is sensitive in respect of local concerns. A flexible plan and measures are needed to handle the possible resistance of local stakeholders. Examples of such measures are:

- To introduce the concept of a "central school" that would gain additional resources and support, such as teachers, transport, canteen meals, and so on, for building the school capacity in absorbing more students. This measure has been adopted in Bulgaria and Moldova.
- To introduce the concept of a "protected school" (in cases in which a school cannot be consolidated) by providing data-driven criteria to define how the school is distinguished from other small schools, so that it will be easier for it to attract more support and resources.
- To provide conditional allowances for students who enroll in a merged school. This measure would alleviate resistance from parents.
- To expand boarding facilities to ensure that children are able to access schools in remote areas.[74]

In order to ensure that no student and parent will be penalized on account of longer travel distances, which may lead to an increase in the student drop-out rate, the Action Plan for Small School Mergers to Support the 2nd Decade of Education Reform 2011-2018 in Thailand emphasized the allocation of a special budget to lessen travel costs for students who are affected.[75]

2.2) School networking is a way to reorganize classes or the structure of schools in the same areas that cannot be consolidated for better resource sharing. All relevant authorities and people work together to build up a network for sharing education programs. This method tends to meet with less resistance from local communities and stakeholders.[76]

2.3) Redefining schools is an approach to review the performance of schools. A school that had expanded from primary to cover lower secondary education (Grade 9) and that did not perform well enough to reach the appropriate standard, could be converted back to a primary school. In such a case, some of the budget for transportation costs would be allocated to a nearby secondary school instead.[77]

3. Best Practices in Decentralization of Administrative Powers to Local Areas

An increase in school autonomy is an option. According to assessments relating to the implementation of school autonomy and accountability policies in Thailand and some other countries, increasing school autonomy over personnel management can improve student learning, especially for better performing schools. Increasing the autonomy of schools perhaps starts from better performing schools and gradually expands to others until they are ready in terms of capacity and proper accountability to produce good results.[78]

In addition, the Secretariat of the Cabinet of Thailand cites the results of a survey in which 90 percent of teachers questioned agreed that schools should be independent in terms of academic and curriculum issues, budget and personnel management in order to improve the teachers' training assessment. This relates to a particularly important factor which is the decentralization of teaching management. Through this method, the combined participation of teachers, parents, the local community, students and executives, is expected to enhance teaching quality.[79]

4. Best Practices in Increasing Educational Competitiveness and Student Performance

In order to bring educational performance up to an international standard, the results of global rankings in national education competitiveness and national and international achievement tests in education are useful as information to support the creation or modification of plans for improving teachers' and students' performance.

In addition, the results of standardized exams in education, both at the school and state level, that are publicized and available for all key stakeholders at the state level, and for teachers and students, would be useful for holding all key stakeholders accountable for improving achievement. This approach has been used in the United States of America and Mexico.

Currently, the World Economic Forum (WEF) is revising the methodologies and criteria for measuring each indicator of the Global Competitiveness Index (GCI) to support their global competitiveness survey and rankings to match changing economic and social contexts around the world. The new framework of the GCI will be adopted soon80 after feedback from

different countries has been received. Therefore, all stakeholders at the state level can use the new framework as a guideline for further improving educational factors to increase national competitiveness as a whole.

5. Best Practices in the Teaching and Learning Process

The teaching and learning process is an essential step in the provision of education services in order to produce graduates or a workforce who are equipped with the knowledge and skills needed in the 21st century to increase national competitiveness. Interesting options for teaching and learning development in Thailand include:

1) Self-study: a love of reading, data exploration and analytical thinking should be cultivated in young people. Problem-based learning is a method that can encourage learners to analyze problems and find smart solutions.[81]
2) To comply with the new national education standards, schools have been required to shift from a teacher-centered approach to a student-centered one. Moreover, the system of admission to basic education should be modified to ensure that examinations do not as much depend on the rote-learning approach.[82]
3) To provide ICT and digital resources for creating teaching materials to attract the interest of students to promote better learning and achievement. This can be done by implementing the ICT for Education Development Plan of the Ministry of Education 2013, which focuses on supplying computer devices for education in all schools, equally and adequately, establishing a basic education data center and education satellite station for supporting teaching and learning activities and developing digital content in the form of on-line media and e-books.

6. Best Practices in Teacher Development and Reform

Apart from those factors mentioned above, teachers are key education resources for driving the reform of education as a whole. Regarding basic education development and reform for the sustainable competitiveness of the nation, there are many aspects of concern relating to the development of teachers' qualifications for the 21st century, as follows:

6.1) It is important for teachers to spend their school time effectively and dedicate themselves to teaching rather than focusing on extra income from part-time jobs. The United States Agency for International Development (USAID) conducted a study in 2012 on teachers' school time in five countries and found that in cases where teachers spent only 20-30 percent on their time on teaching, students' learning ability and concentration on the curriculum were adversely affected and thus decreased. Moreover, as Assoc. Prof. Dr. Sompong Chitradub points out, students' achievement scores declined.[83] Research conducted by TDRI shows that today, teachers are increasingly required to carry out non-teaching activities, which forces them to leave the classroom for up to 84 days a year. This means that most Thai teachers can meet their students in class for only 200 days per year, or 60 percent of 1,000 hours, while the other 40 percent is dedicated to the completion of mandatory assessment forms required by

the Ministry of Education. Such activity contributes no improvement to teaching quality neither does it benefit the students. Teachers are also responsible for other out-of-classroom work to help students to prepare for various international achievement tests or academic contests. This takes up to 23 days a year of school time. A further 10 days of school time is spent on academic competitions.[84]

6.2) The challenge of vacancies in teaching posts in schools has been solved by various governments and related agencies. Assoc. Prof. Dr. Varakarn Samakoses points out that many projects and initiatives were set up to stimulate more students to enter pedagogical careers such as: (1) a project to employ 5th-year pedagogical students to teach in schools that have a shortage of teaching personnel. The pedagogical students would be provided with per diem expenses; (2) special training provision for teachers who do not graduate in the subject that they are currently teaching, or for the teachers who lack a teaching background; (3) an adjustment of classroom size in medium and large schools into bigger classrooms, and applying modern technology to teaching in the form of e-learning and multimedia; (4) the merger of small schools with less than 120 students into fewer but bigger schools in order to employ teachers with expertise in all eight study areas.[85]

6.3) Debt relief is another concern for the Ministry of Education and the government. The Office of Education Council has stated that cooperation between the Education Ministry and Government Savings Bank resulted in loans of approximately 8,000 million baht to assist teachers with heavy debts. In addition, the Financial Clinic Project was set up to advise the debtors on saving, debt allocation and debt management, to produce a manual and to give seminars to teachers from every part of the country relating to debt management.[86]

6.4) The quality of teachers under the reform initiated by the Ministry of Education and related agencies focuses on many aspects such as: (1) improving the teacher training policy in Teachers' Colleges and other relevant institutes (in 2014) in order to produce a new generation of teachers able to cover the eight subject fields; (2) providing training and development for teachers by establishing the Teachers, Professors and Teaching Personnel Development Institution, as well as issuing a teacher training and development policy, and planning, promoting and honoring the best teachers; (3) developing professional standards and controlling professional licensing by establishing pedagogical profession institutions.[87]

6.5) Financial incentives and non-financial incentives are also measures that will attract or deter the best students when they consider pedagogical careers. In order to relieve the financial burdens of teachers, the salary and academic standing and position allowances should be increased so that they match current living expenses in the country. Developed countries have raised teachers' remuneration as high as those of other professions, which can be seen from high-income countries or countries with a GDP of more than USD 20,000 (Purchasing Power Parities-PPPs) and most of the OECD member countries.[88] The current Teachers' Salaries, Academic Standing and Position Allowances for Teachers and Educational Personnel Act (No. 3) B.E. 2558 (2015) has raised the salaries of the teachers.[89] However, the minimum salary of new teachers should be increased and the salaries of retired teachers should be three to four times higher than those of new teachers, which is the practice in developed countries in order to attract the best students to the teaching profession.[90]

7. Best Practices in Gender Equality in Basic Education

Gender equality in education should be promoted across all subject areas because it is one of key factors contributing to an improvement in the quality of education as a whole. However, equal opportunities in education in STEM-related subjects have become a greater concern as these subjects are now crucial for driving global innovation and development. Both men and women, equally, play pivotal roles as contributors to knowledge-based societies which require STEM-related skills.[91] Attracting more girls and women into STEM-related areas depends on a number of crucial influences.

As a result, it would be better for education stakeholders to have the right perception of gender equality and neutrality in education management in all respects because this can promote a more comfortable atmosphere which encourages the required behavior and performance of students studying STEM-related subjects. Therefore, to ensure sustainable gender equality in education, including this in the teacher education and training curriculum is an option.

VII. Conclusion

The reform of basic education in Thailand has been implemented with the main goal of reshaping the characteristics and qualifications of the workforce and citizens in the country to match trends in the global economy and social change. Knowledge and skills in STEM subjects (science, technology, engineering and mathematics) are particularly relevant as they are considered to be vital knowledge and skills for the 21st century. The basic education quality is included in indicators for assessing the national competitiveness of each country. In the process of education reform, there are a number of relevant legal frameworks and national policies to be implemented.

Both achievements and challenges have emerged in this implementation. The first is achievements and challenges in budget allocation for national education, which is higher than it was, and remains the highest proportion of the whole national expenditure. Even so it is still inadequate to increase the quality of small schools to reach the standard of those in larger cities. The second is achievements and challenges in primary and secondary school enrolment, which has been increasing from 2012 to 2015. However, in terms of the numbers of schools that are adequately resourced, challenges remain for small schools in remote areas. Another challenge is the decentralization of educational administrative powers in which the Orders of the Leader of National Council for Peace and Order (NCPO) No. 10/2559 (2016) and No. 11/2559 (2016) represent the latest formal interventions. These are currently influencing educational decentralization and reorganization of local education authorities. Achievements and challenges are also explored including rankings of the country in terms of global competitiveness - both in overall rankings and specific rankings in educational competitiveness. The focus here is on STEM-related education and English proficiency that were discussed based on the report of the World Economic Forum (WEF) and the International Institute for Management Development (IMD). These reports showed the near-bottom ranking of Thailand in respect of the quality of primary education, competitiveness in technological,

scientific and mathematic skills and English proficiency. Furthermore, the challenges evident in the results of national and international achievement tests in education, including the Ordinary National Education Test of Thailand (O-NET), PISA and TIMSS, have been explored as crucial tools for measuring the country's competitiveness in STEM-related subjects. For both PISA and TIMSS, Thai students' performance was assessed against the benchmarks to be below the average scores of other countries in ASEAN and the world. Regarding the challenges in the teaching and learning process, many primary and secondary schools in Thailand still retain a passive format that does not motivate or stimulate students to think independently or to express their opinions in class. Rote learning and teacher-centered approaches are adopted to prepare students for tests, not for success in life. Moreover, a shortage of Information and Communications Technology (ICT) for creating teaching materials is also a challenge. Teacher-related challenges are divided into the pre-service and in-service aspects. The pre-service challenges include those in respect of the inadequacy of the budget allocated for teacher education and training, an unsupportive teacher licensing system, and teachers' specialized qualifications and requirements in specific areas, as well as a large gap between the numbers of retired teachers and the new teachers recruited to replace them due to the Early-Retirement Campaign of the government. The in-service challenges of teachers include teacher shortages in small sized schools, a lack of teachers who can teach English language and STEM-related subjects, unattractive financial incentives and non-financial incentives for teachers, and the shortage of teachers that affects the quality of teaching and results in weakness of teachers in self-development and textbook-based teaching. In addition, achievements and challenges in gender equality in basic education are explored in terms of gender parity in school enrolment, the gender equality in STEM-related education, and gender neutrality in classroom management.

Examples of best practices are also provided as policy options. For the allocation of the national budget for education, the input-based approach and demand-side-financing approach are options to guide calculations. Regarding the best practices in the expansion of opportunities in quality compulsory and basic education, three approaches are mentioned, namely school mergers, school networking and redefining schools. In terms of ways to increase educational competitiveness to achieve higher rankings in global competitiveness, publicizing the results of national and international achievement tests in education are useful for teachers, students and key stakeholders at all levels to monitor and to jointly hold accountability. Moreover, learning the new framework of competitiveness indicators, modified by the WEF, is another way to overcome challenges. Concerning the best practices in decentralizing administrative powers to local authorities and schools, increasing school autonomy is an option. Best practices in the teaching and learning process include self-study, nurturing a love of reading, fostering data exploration and analytical thinking, the shift from a teacher-centered approach to a student-centered approach and developing ICT for education. In addition, the best practices in teacher development and reform also emphasize the importance of using school time effectively, the decentralization of teaching management, the launch of projects and schemes to attract more students to enter the teaching profession, government assistance to reduce teachers' debts, programs for teachers' professional development such as teacher education policy,

teacher training programs, the improvement of financial incentives and the decrease of non-financial disincentives, and the promotion of self-development and knowledge management among teachers. Regarding the best practices in gender parity in basic education, there should be a focus on attracting more girls and women into STEM-related areas.

The reform of education in Thailand in the 21st century is important for nurturing and preparing children so that they can, together, form a quality workforce. The knowledge and skills of this century place an emphasis on science, technology, engineering, mathematics and English proficiency. Achievements and challenges found in this study are partial lessons from which education stakeholders can learn in order to review and update relevant action plans for education reform. At the same time, lessons learned from best practice can be usefully applied to policy-making. More studies on challenges and best practices are recommended for widening perspectives and understanding the real problems and the true situation. In this way, the basic education reform will be implemented properly and with precision.

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