

Digital Innovations for Sustainable Development in Asia and the Pacific

DIGITALIZING EDUCATION FOR SUSTAINABLE DEVELOPMENT

A Path to Equity, Inclusion and Life-Long Learning in Thailand

Chantri Polprasert¹ and Chutiporn Anutariya*

¹Department of Information and Communication Technologies
School of Engineering and Technology
Asian Institute of Technology, Thailand
Email: chantri@ait.ac.th

*Corresponding Author

Abstract

ASEAN countries have demonstrated a strong commitment to achieving Sustainable Development Goal 4 (SDG4) emphasizing quality education. To achieve this goal, technology plays a crucial role in helping ASEAN countries enhance quality education by promoting inclusive and high-quality learning opportunities. Despite its potential, digitalizing education faces several challenges that need to be addressed for successful outcomes. This article discusses the importance of digitalizing education in achieving sustainable development with a focus on the case study in Thailand. During the past 20 years, Thailand has strategically utilized technology to advance toward SDG 4, implementing various initiatives that showcase the country's commitment to leveraging digital solutions for educational development. In addition, several challenges and recommendations are addressed for improving the quality of education in Thailand through equitable access to technology and resources, investment in education, and collaboration among stakeholders.

ASEAN Summit, focusing on education, resource mobilization, and capacity building (ASEAN, 2022).

Technology is one of the most promising solutions to tackle education inequality in ASEAN countries, offering innovative strategies to overcome traditional limitations and promoting life-long learning. By harnessing the power of digital tools, ASEAN member States can amplify the accessibility, affordability, and effectiveness of education systems. The ASEAN Declaration on Strengthening Education for Out-of-School Children and Youth, established in response to the pandemic, highlights the commitment to developing digital initiatives to reach marginalized populations (ASEAN, 2007). For instance, the Roadmap on the Declaration encourages the sharing of resources, such as platforms, curriculum, and assessments, to facilitate the digital transformation of schools (ASEAN, 2007). In addition, EdTech companies, such as Ruangguru in Indonesia, exemplify the potential of technology to scale up quality instruction, offer personalized learning, and expand opportunities to practice, potentially leading to lifelong learning (EDTECH, 2022). However, it is crucial to consider other factors, such as the digital divide, the effectiveness of platforms, and instructors' competency in utilizing these technologies, to ensure that technology reaches underserved communities.

While there are numerous approaches for ASEAN countries to address education inequality, this article focuses on the case study of education inequality in Thailand and its use of technology to tackle this issue. Although initial results show promising outcomes, there are many challenges and recommendations that all parties, both from the public and private sectors, must consider

Introduction

ASEAN countries have made progress in improving incomes, reducing poverty, and enhancing economic opportunities since 2000. However, challenges remain in achieving more inclusive and environmentally sustainable growth. Income inequality persists in several countries, emphasizing the need for comprehensive Sustainable Development Goals (SDG) strategies tailored to each country's context (IMF, 2018). Education plays a vital role in sustainable development, with educational attainment crucial for improving lives and health outcomes. Inequality in education can hinder progress towards SDGs related to gender equality, inclusive learning

opportunities, and equitable quality education (ESCAP, 2017). For instance, CLMV countries (Cambodia, Lao PDR, Myanmar, and Viet Nam) have the lowest higher education enrolment ratios in the region (ASEAN, 2022). In addition, in Thailand specifically, education inequality is a pressing issue. The country's education system has faced challenges as reflected in its rankings on international assessments like the Programme for International Student Assessment (PISA). Thailand's rankings have shown struggles over the years, indicating the need for improvements in the quality of education to address inequality effectively (PISA, 2022). Efforts to address these disparities include initiatives like the Roadmap on the Declaration on Digital Transformation adopted at the

achieving the SDG 4 goal of equity, inclusion, and lifelong learning in Thailand.

Education inequity issues in ASEAN countries

Education inequity in ASEAN is a complex issue that stems from various factors: economic disparities, access to quality education, cultural norms, and government policies. Economic inequality plays a significant role in perpetuating learning inequality, as wealthier families can afford better educational resources and infrastructure, giving their children a distinct advantage over those from lower-income households (ADB, 2022). Generally, higher incomes and standards of living are correlated with higher educational attainment. This is also the case for ASEAN countries as shown in Figure 1 where countries with higher GDP

per capita yield higher average years in education. Disparities in access to educational infrastructure widen this economic gap, with rural and marginalized communities often lacking adequate schools and facilities compared to urban areas (ADB, 2022). Additionally, schools in rural areas often struggle with a lack of well-trained teachers and up-to-date educational resources, leading to lower learning outcomes than in urban areas.

Cultural norms and attitudes towards education also contribute to learning inequality in ASEAN. In some cultures, there may be a preference for boys' education over girls', leading to disparities in educational opportunities (UNICEF, 2018). Traditional beliefs about education's role and valued skills can also impact outcomes. For instance, an emphasis on rote memorization and examinations may hinder critical thinking and problem-solving skills needed for the modern economy.

Government policies and education systems also play a significant role in shaping learning quality in ASEAN. While many ASEAN countries have made efforts to improve educational access and quality, there are still gaps in policy implementation and resource allocation. Insufficient funding for education can lead to overcrowded classrooms, inadequate teaching materials, and a lack of teacher training, all of which can contribute to learning inequality (World Bank, 2017). Additionally, rigid education systems that do not cater to diverse learning needs can further exacerbate disparities in educational outcomes (C. Faikhamta, J. Ketsing, A. Tanak, and S. Chamrat, 2018).

One particular group that faces significant challenges in accessing quality education in ASEAN is people with disabilities. They often encounter physical accessibility challenges, discriminatory

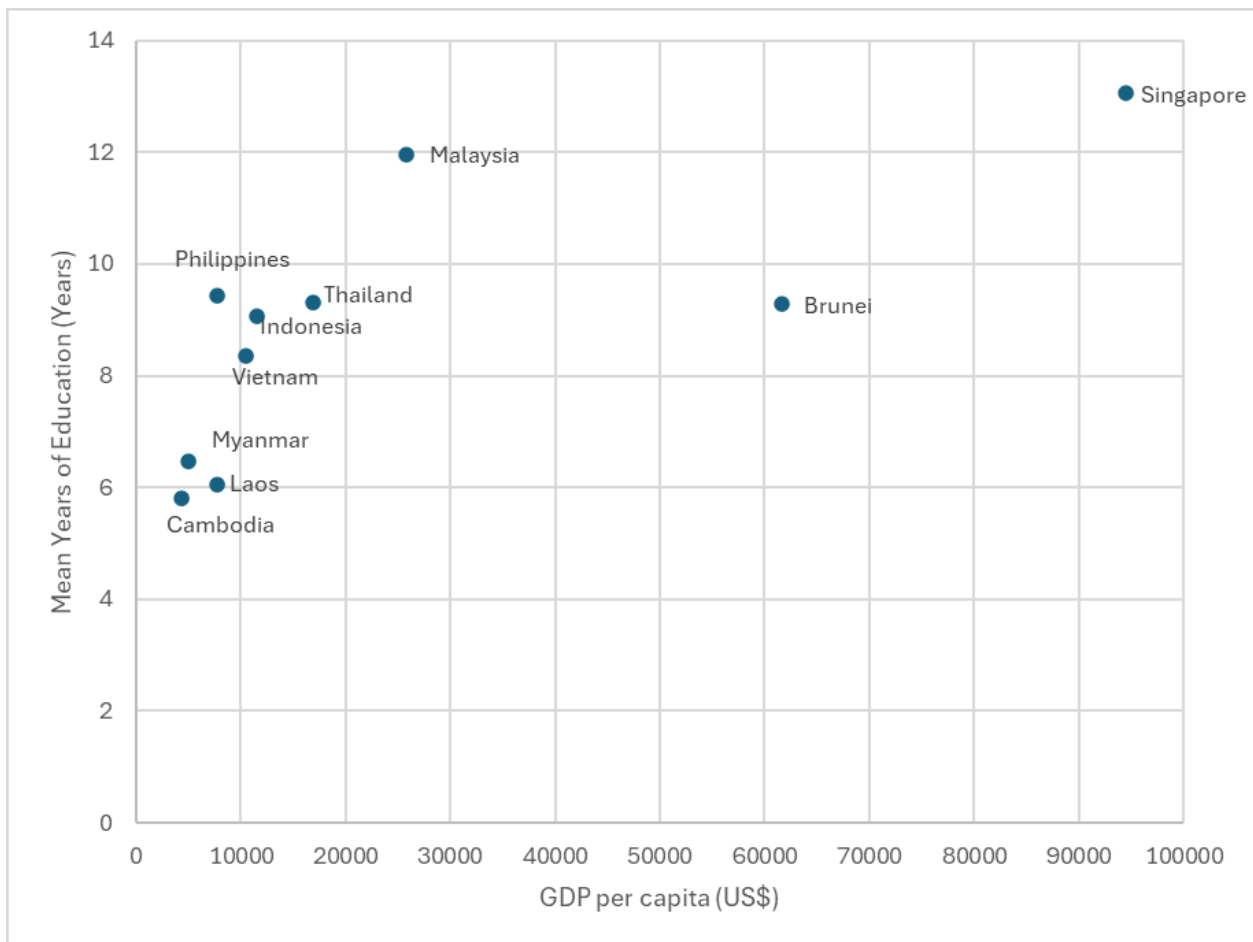


Figure 1: GDP per capita and mean years of education in ASEAN countries.

(Source: OurWorldInData, 2020)

attitudes, and a lack of specialized resources and support. Addressing the needs of people with disabilities requires a comprehensive approach that includes improving physical accessibility, providing specialized support services, and promoting inclusive educational practices (ESCAP, 2017).

Digitalizing education: A case study of Thailand

Digitalizing education, also known as digital transformation in education, involves integrating digital technologies into the education sector to enhance teaching and learning methods, broaden access to education, improve the quality of education processes and delivery, and ultimately foster better learning outcomes (UNESCO, 2021). This section explores Thailand's efforts in advancing digital education initiatives to ensure inclusive and equitable quality education, while also promoting lifelong learning opportunities for all.

a. Policies and roadmap

Education in Thailand is provided by the Thai government with the aim of expanding educational opportunities for all citizens, encompassing formal, non-formal, and informal education. Access to at least 12 years of quality basic education is provided for free, with nine years being compulsory, ensuring the enrolment of all children up to the lower secondary level. The Ministry of Education (MOE) is the primary government body responsible for promoting and overseeing basic education at all levels. Conversely, the Ministry of Higher Education, Science, Research, and Innovation (MHESI) plays a key role in managing, administering, and providing higher education.

Over the past few decades, Information and Communications Technology (ICT) and digital technologies have been recognized as potential enablers for enhancing the efficiency of education provision, increasing access to education for learners of all ages, reducing gaps, and promoting equality throughout the education system. These technologies can boost literacy rates through

mobile technology-based literacy programmes, enhance quality through suitable pedagogical approaches, and facilitate lifelong learning for all through technology-supported non-formal and informal learning.

Thailand has made significant initiatives and achievements in integrating ICT and digital technologies into national policies and practices. The country has promoted the adoption of ICT in education and has actively enhanced the technological skills of teachers and students over the past two decades. The government initially introduced the National IT Policy (IT2000) in 1996 and the IT2010 Policy in 2001 to further advance Thailand into a knowledge-based society. The use of ICT in distance education was explicitly included in the National Education Act A.D. 1999 to enable access for all citizens, regardless of age, profession, distance, or geography, for continuous education and skills upgrading.

The recent 20-Year National Strategy (2018-2037), the National Scheme of Education (2017-2036), as well as the MOE Digital Transformation Roadmap 2023-2027, have affirmed that transforming and digitalizing education is one of the country's priorities. The government has committed to achieving the UN's SDG 4 under the supervision of the MOE and relevant agencies.

b. Implementation

This section highlights key priorities and implementations aimed at digitalizing education in Thailand.

Digital Connectivity for All

School and campus network access: UniNet (Inter-University Network) and the National Education Network (NEd-Net) are nationwide networks for education and research connectivity, covering all primary and secondary schools, vocational and higher education institutes, libraries, and offices under the MOE/MHESI, as well as other international research networks worldwide. In 2022, the network reached over 10,000 schools or institutes throughout Thailand (UniNet, 2022).

Internet accessibility in rural and remote areas: To bridge the digital divide, Universal Service Obligation

(USO) NET Centers have been established since 2005. These centers aim to promote accessibility and the use of telecommunication and internet services in rural areas throughout the country through cooperation between the National Broadcasting and Telecommunication Commission (NBTC) and the International Telecommunication Union (ITU). By 2016, there were over 900 USO Net Centers established, also serving as school and community internet centers. Rural children can freely use the internet and computing services available in these centers to develop their ICT literacy and learn the fundamental use of technology.

In 2017, the Village Broadband Internet (Net Pracharat) project was launched under the Ministry of Digital Economy and Society (MDES) to expand high-speed broadband internet networks to every village in rural and border areas of Thailand, targeting a total of 24,700 villages. Each village was equipped with a Wi-Fi hotspot offering speeds of 30/10 Mbps (Download/Upload), available in public places such as community centers, village headman offices, temples, schools, or hospitals for convenient access by villagers (APT, 2019). The Wi-Fi speed was later upgraded to 100/50 Mbps. In 2021 (MDES, 2021), reports indicated that the government's nationwide high-speed Internet connectivity had expanded to cover nearly 75,000 villages, encompassing nearly 9.5 million people across the country, as illustrated in Figure 2.

Internet users and ICT accessibility by households: Figure 3 illustrates the increasing trend of Internet users in Thailand over the past decade. With a total population of 65.86 million (considering only Thai citizens aged over 6 years old), Thailand had 58.97 million Internet users in 2023, representing a growth rate of approximately 39.31% over the past five years and an Internet penetration rate of 89.54% as of 2023. A similar trend is observed for the proportion of households with Internet access, which reached 90.95% in 2023.

Interestingly, prior to COVID-19 (2014-2018), the proportion of households with a computer showed a declining trend. However, during and after COVID-19, the trend shifted upwards,

Net Pracharat Project: Village Internet Broadband



- **MDES** 24,700 villages (completed Dec 2017)
- **NBTC** 15,732 villages
- **NBTC** 3,920 villages
- **Urban Area** 30,635 villages

● **Open Access Network**
Local operators provide connecting services to household

Speed 100/50 Mbps (Download/Upload)

Total: 74,987 villages
9,493,312 registered users
11,361,367 devices

Figure 2: Net Pracharat Project: Coverage of high-speed broadband internet networks to every village in rural and border areas of Thailand as of January 2021.

(Source: <https://www.mdes.go.th/mission/detail/416>)

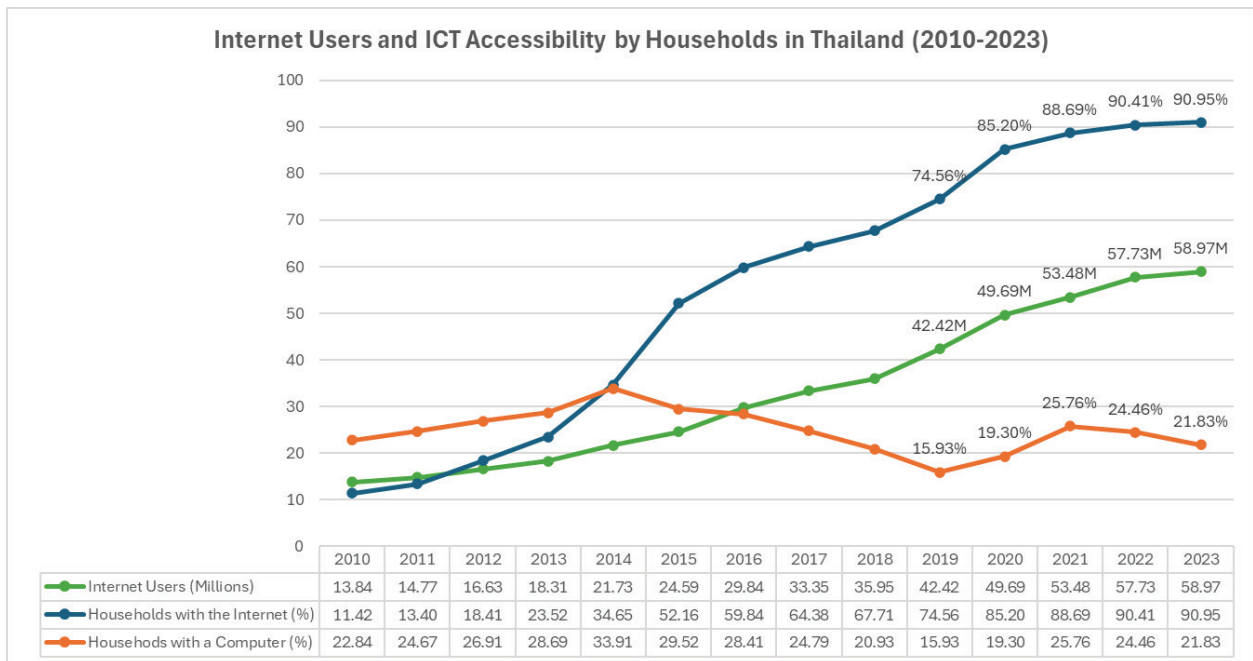


Figure 3: Internet users and ICT accessibility by households, author generated chart.

(Source: Internet User Survey and Household Survey on the Use of ICT (NSO, 2024))

reaching 25.76% in 2021, before decreasing again in 2022 and 2023. By the end of 2023, the percentage of households with a computer was approximately 21.83%. Nonetheless, according to the NSO (2021) ICT Indicator Survey, Internet activities related to learning purposes accounted for only 10.5% of all activities.

Open digital learning platforms and open educational resources

A Digital Learning Platform is a comprehensive set of resources, tools, and interactive online services designed for teachers, learners, and others involved in education. Its purpose is to support and enhance educational delivery and management. In contrast, Open Educational Resources (OERs) are materials utilized for learning, teaching, and research, accessible in various formats and mediums. Typically, these resources are either in the public domain or are made available under an open license, permitting free access, reuse, repurposing, adaptation, and redistribution by educators and learners.

Recognizing the significance of digital learning platforms and OERs in improving teaching and learning activities, the government has initiated several related projects. Below are some of the available public Digital Learning and OER platforms.

1. *OBEC Content Centre*¹ maintains open educational resources covering learning materials of 8 core subject areas of basic education, suitable for students, teachers, and the public. The platform is developed and provided by the Office of the Basic Education Commission (OBEC), MOE, and hosts a digital ecosystem that comprises the following 5 key components: Authoring Tools, Content Centre, Content Verification system, Content Management System, and Local Content Server.
2. *Digital Learning Centre*², developed by the Office of Private Education Commission (OPEC), is an online learning portal that collects and shares instructional resources, and tutorial video clips of key subjects in basic education. The portal focuses on compiling and categorizing such digital resources published by other platforms and available nationwide during the COVID-19 pandemic.
3. *IPST Learning Space*³ is a national digital learning center for learning mathematics, science, and technology, developed by the Institute for the Promotion of Teaching Science and Technology (IPST), MOE. The platform consists of a *Teacher Professional Development System*⁴, *Online Testing System*⁵, and *SciMath Knowledge System*⁶ which archives digital learning resources developed by IPST.
4. *Project14*⁷ and *Project14+*⁸, recently initiated and developed by IPST in 2021, are public platform that allows students to freely learn online courses, comprising quality assured video lectures of STEM subjects in all levels of basic education from primary level to secondary level. The published online courses have been developed in accordance with the country's Basic Education Core Curriculum 2008 (Revised 2017). The platform does not only encourage students to independently learn, practice, and review the content based on their interests and potentials, but it also enables teachers to apply it as part of the blended learning or flipped learning approach.
5. *Thai Open Educational Resources (Thai OER)*⁹, initiated in 2015, is a project which encourages teachers, learners, educators, and academic institutions to collaboratively produce and share high-quality educational resources under the open license concept. The platform has over 70,000 OERs free of charge and services growing the number of users up to 2.0 million users.
6. *ThaiMOOC*¹⁰, established in 2017, is a national platform that promotes lifelong learning by providing free, high-quality online courses for any Thai citizen by means of Massive Open Online Courses (MOOCs). The platform has been developed under the Thailand Cyber University Project, MHESI. According to the 2023 statistics, ThaiMOOC had over 630 MOOCs available, developed by 104 higher education institutes and serving more than 1.5 million registered users.
7. *LearnBig*¹¹, developed by UNESCO Bangkok's initiative, is a public digital platform developed to enhance the basic reading, numeracy, and literacy skills of unreached and out-of-school children. It offers over 700 open e-books, teacher's guides, exercises, and multimedia content in Thai and Myanmar languages, supported by over 20 organizations.

1 <https://contentcenter.obec.go.th>

2 <https://odlc.opec.go.th>

3 <https://learningspace.ipst.ac.th>

4 <http://teacherpd.ipst.ac.th>

5 <https://onlinetesting.ipst.ac.th>

6 <https://www.scimath.org>

7 <https://proj14.ipst.ac.th>

8 <https://project14plus.ipst.ac.th>

9 <https://oer.learn.in.th>

10 <https://thaimooc.org>

11 <https://www.learnbig.net>

Table 1: Publicly available digital educational platforms and OERs (in Thai Language).

Digital Educational Platform	Available Resources													
	Platform Provider	Education Level & Purpose				Subject					Type			
		Basic Education	Higher Education	Teacher Professional Development	Non-formal Education & Lifelong learning	STEM	English	Social Science	Health	Other Subjects	Learning Objects	Exercises/Quizzes	E-books	Others
OBEC Content Centre	OBEC/MOE	✓				✓	✓	✓	✓	✓		✓	✓	
Digital Learning Centre	OPEC/MOE	✓												✓
IPST Teacher PD System	IPST/MOE			✓		✓					✓		✓	✓
IPST Online Testing System	IPSTMOE	✓				✓					✓			
IPST SciMath Knowledge System	IPST/MOE	✓		✓		✓							✓	
Project14 and Project14+	IPST/MOE	✓				✓					✓			
Thai Open Educational Resources (Thai OER)	MHESI/MOE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ThaiMOOC	TCU/MHESI		✓		✓					✓	✓	✓		
LearnBig	UNESCO	✓				✓	✓	✓	✓	✓			✓	
Thailand Learning	NGO	✓	✓			✓	✓	✓	✓	✓				✓
True Plook Panya	Private	✓				✓	✓	✓	✓	✓	✓	✓		
Khan Academy Thai	Private	✓				✓					✓			

8. *Thailand Learning*¹² is a Web portal compiling existing online learning and cultural resources as well as educational tools useful for children to learn and explore?

9. *True Plook Panya*¹³ is a public digital knowledge hub initiated and

supported by True Corporation, a telecommunication service provider in Thailand. The platform offers diverse learning content and tools appropriate for students at all levels of basic education in various formats, such as tutorial

video clips of popular teachers and/or tutors, interactive lessons, quizzes, and test papers of past years.

10. *Khan Academy Thai*¹⁴ publishes video lessons in the Thai language instructing important mathemat-

12 www.thailandlearning.org

13 <https://www.trueplookpanya.com>

14 <https://th.khanacademy.org>

ics topics at primary and secondary levels.

11. *Coding Colosseum Platform*¹⁵: a gamified coding arena for learning to program online.

Table 1 presents various educational resource platforms categorized by several dimensions, including their providers, education levels and purposes, subjects, and types.

Remark: Platform Provider indicates the organization and/or ministry supporting and hosting the platform, as well as providing the learning resources. It is important to note that the table primarily focuses on platforms supported by government offices, with a few examples provided by the private sector and other types of organizations. Education Level & Purpose defines the specific education levels and purposes of the available resources, categorized into four broad categories: (i) Basic Education Resources, which support student learning in basic education, (ii) Higher Education Resources, which assist learners in higher education, (iii) Professional Development Resources, which aim to professionally develop teachers in various dimensions such as improving effective instructions, administration, and career guidance, and (iv) Non-formal Education & Lifelong Learning Resources, which support non-formal education and promote lifelong learning for the general public. Subject categorizes the subject knowledge of the available resources. Type refers to the content type of the resources. This can include: (i) Learning Objects, which are resources such as video clips designed to meet course learning outcomes and can support a wide range of learning activities, (ii) Exercises/Quizzes, used for testing student understanding, (iii) E-books, and (iv) Others, such as simulations, demonstrations, and tutorial video clips.

Teacher support and capacity development for technology-enabled teaching

Ensuring the successful digitalization of education and advancing the country's development in the digital era hinges on the capacity development of teachers in digital skills. Teachers must be proficient in utilizing ICT and digital tools to design educational materials, deliver instructions through digital platforms, and effectively monitor and assess student learning outcomes.

To address this need, numerous capacity development programs have been established and launched, both online and offline. These initiatives are not solely driven by the Ministry of Education and relevant agencies but also involve collaborations through public-private partnerships. Examples of such programs include EDUCATORS THAILAND¹⁶, Class for Super Teachers¹⁷, and the DEPA Teacher Boost Camp¹⁸.

Furthermore, the formation of a Professional Learning Community (PLC), akin to the concept of a Community of Practice (CoP) in the education sector, encourages teachers from all disciplines to share their expertise and collaborate to enhance teaching and learning processes.

ICT and digital literacy education

With reference to the Basic Education Core Curriculum 2008 (MOE, 2008), Thailand by the Institute for the Promotion of Teaching Science and Technology (IPST), has redefined IT skills from being specialized to foundational since 2017. Thus, Computing knowledge and skills have been integrated into the Science learning area rather than the Occupations and Technology learning area. This has been reflected in the Revised Edition 2017 of the Learning Standards and Indicators (IPST, 2017), where the Computing Science subject consists of three main strands:

Digital Literacy (DL), Information and Communication Technology (ICT), and Computer Science (CS). DL covers safe, respectful, and ethical ways to use technology. ICT focuses on using computers and applications as tools to create, organize, analyze, and visualize data to support decision-making. CS emphasizes computational thinking, teaching students to solve problems using logic and algorithms. The implementation of the revised curriculum took 3 years of roll-out plan. In the academic year 2018, the curriculum was applied for Grade 1st and Grade 4th, then applied for Grade 2nd and Grade 5th in 2019, and since the academic year 2020, the curriculum has been applied for all grades.

c. Challenges and way forward

As previously discussed, Thailand has implemented various significant initiatives to drive digital transformation in its education sector. These efforts include formulating national policies, strategies, and action plans, providing accessible ICT infrastructure, offering open digital learning platforms and content, supporting and developing teachers' capacities, and launching updated ICT and digital literacy curricula as part of basic education. These drivers have contributed to achieving SDG 4 by providing inclusive, equitable, and quality education, improving the capacities of the education system and teachers, applying technology in the education sector, and ensuring lifelong learning. However, the country still faces several obstacles that must be effectively addressed for the impact of these initiatives to be fully realized.

Digital divide

The digital divide refers to the gap between those who have access to digital technologies and those who do not or have limited access. In the context of education, this divide can significantly impact inequality. Students without

15 <https://thecodingcolosseum.com>

16 <https://www.aisacademy.com/theeducatorsthailand>

17 https://www.depa.or.th/en/article-view/20200817_02

18 <https://www.depateacher-boostcamp.com>

or with limited access to digital resources such as computers and the Internet face challenges in accessing educational materials, completing assignments, and communicating with teachers and peers. This can lead to a lack of engagement, falling behind in coursework, and ultimately, lower academic achievement. In addition, as education increasingly relies on digital tools for learning, the digital divide exacerbates existing inequalities. Students from lower-income families or marginalized communities are more likely to lack access to digital devices and reliable internet connections, putting them at a disadvantage compared to their more affluent peers. This inequality in access to digital resources can perpetuate socio-economic disparities, limiting opportunities for those already marginalized. In Thailand, the digital divide poses a significant challenge, impacting access to reliable broadband internet, computing devices, and quality education resources in schools. Although most schools have optical fiber Internet, a staggering 29% still rely on low-end computing devices and slower and less reliable Internet connections such as ADSL, 3G, and satellite (UNESCO, 2023). Furthermore, there is a significant variation in the student-to-computer ratio across regions, underscoring the urgent need for policies that prioritize the equitable distribution of educational resources and technology access nationwide. Closing the digital divide is essential for ensuring equitable access to education and reducing educational inequality.

Lack of teacher competency in teaching ICT and computing subjects

During the implementation of the revised computing curriculum, Thailand has faced significant challenges in three areas: teachers, students, and the learning environment (Katchapakirin and Anutariya, 2019). Teachers have limited fundamental knowledge and lack confidence in teaching computational thinking (CT) in the classroom. Challenges related to students include differentiation, limited computing literacy skills, low mathematics knowledge, lack of understanding of the topics, and limited problem-solving skills.

Challenges related to the learning environment include insufficient time in the curriculum and a lack of materials. To address these challenges, teacher training programs, the development of open educational resources, and the organization of extracurricular activities for students have been prioritized.

Lack of child online protection

Another crucial challenge that Thailand encountered when adopting digitalization education is the lack of child online protection. The recently published *Disrupting Harm in Thailand* (UNICEF, 2022) report pinpoints the need for a comprehensive approach to creating a safe online environment for children in Thailand. Despite several efforts from the public sector, Thailand faces several child online protection challenges. One major issue is the prevalence of inappropriate content online, including pornography and violent material, which children can easily access. Additionally, cyberbullying is a growing concern, with children being targeted on social media platforms. Another challenge is the lack of awareness and education among parents, teachers, and children about online safety practices. Furthermore, the enforcement of existing laws and regulations related to child online protection is often inadequate, leading to gaps in protection. Limited resources and capacity also hinder the government's ability to address these issues effectively. For instance, serious instances of online sexual exploitation and abuse affected 9% of internet-active children aged 12-17 (UNICEF, 2024). While numerous private sector and non-governmental efforts are ongoing to address this issue, there is still much work to be implemented to ensure that Thai children are adequately protected from online harm. It is crucial to have policies and initiatives that increase public awareness about safe and responsible Internet use, especially among children and youth.

Low performance in international assessments

Despite significant efforts and investments from both the public and private sectors to enhance education, Thailand

is still grappling with the persistent challenge of the achievement gap and lower performance in international assessments such as the Programme for International Student Assessment (PISA). The PISA scores, which measure literacy and competencies in real-life situations, have shown a decline in Thai students' performance in reading, mathematics, and science over the past two decades. Despite some improvement in access to primary education, there are still serious concerns regarding the quality and equity of education across the country. The trend of Thailand's PISA scores reflects these challenges, showing relatively low performance in reading, mathematics, and science over the years (UNESCO, 2023) compared to the average OECD score from other 23 countries as shown in Figure 4. This can be attributed to disparities in educational resources and opportunities between urban and rural areas, inadequate teacher training and support, and a curriculum that fails to adequately prepare students for the demands of the modern economy. Possible approaches to address these challenges include comprehensive education reform to improve the quality of teaching and learning, enhancing the relevance of the curriculum, and ensuring equitable access to education for all students in Thailand.

Decreasing investment

The Thai education system is facing a significant challenge due to the decreasing investment in education from 2010 to 2024 as shown in Figure 5. Despite the growth in total budget spending in Thailand, the percentage of the budget allocated to education has been decreasing, with a noticeable decline in recent years. This trend is concerning as it may impact the quality of education and restrict access to education for the Thai population especially those from lower socio-economic backgrounds. It is important to maintain equitable financing in education at every level to promote access to technology and ensure that all students have the necessary resources for a quality education.

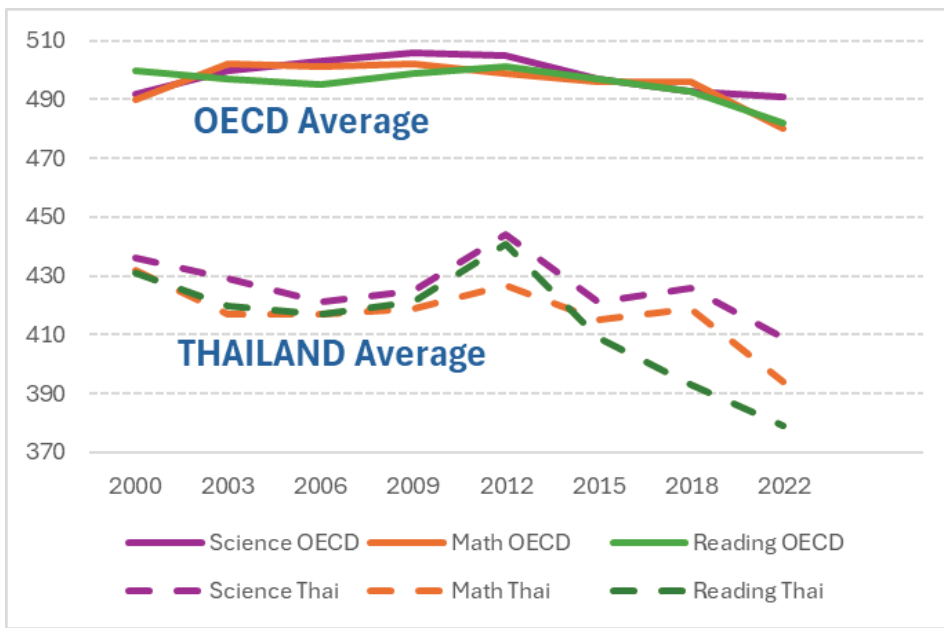


Figure 4: Trends of PISA performance in mathematics, reading, and science in Thailand

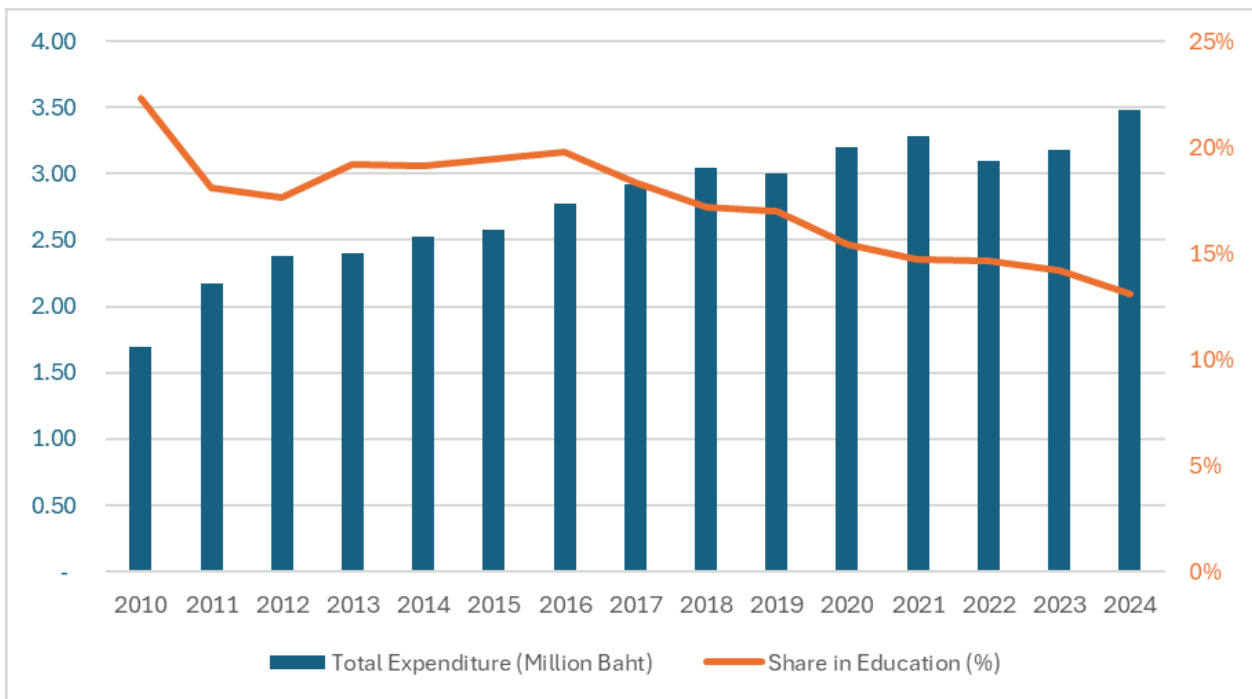


Figure 5: Comparison of the trend of budget spending in Thailand and the percentage of the budget allocated to education (Source: Budget Bureau 2010-2024).

d. Lessons learned & recommendations

According to the World Bank’s teacher demand model, given the current distribution and size of schools, Thailand would need to recruit, train, and deploy

around 65,400 additional instructors (a 13.8% increase in the teaching force) to sufficiently manage all classes in the schools (World Bank, 2023). This is economically almost impossible to achieve given Thailand’s economic situation after COVID-19. However, the World Bank model recommends

that a better and more cost-efficient approach is to drastically downsize the vast network of schools to ensure that teachers and other educational resources are equitably distributed to improve both the quality and equity of the system. The report suggests that the proposed merger of most primary

schools would yield more than 15% surplus teachers, and could potentially be expected to reduce per-student spending at the primary level by as much as 11.2%. This reorganization process could be gradually implemented without the need for any teachers to be laid off.

To address access and infrastructure challenges, investments in infrastructure are crucial, especially in rural areas, to expand Internet access and provide affordable devices to bridge the digital divide. In addition, introducing public-private partnerships in the education sector in Thailand could have significant positive impacts on mitigating education inequality. These partnerships, potentially with several EdTech firms, tailored to Thailand's social and economic context, have the potential to address challenges such as the basic quality of education, gender gaps, regional disparities in college access, and socioeconomic distribution of education. By leveraging private sector expertise and resources, Thailand can enhance access to quality schooling for marginalized groups and improve education outcomes, especially for disadvantaged students. Public-private cooperation could help bridge the gap between public and private schools, ensuring equitable access to quality education for all students regardless of their socio-economic background.

Conclusion

Digitalizing education, aligned with SDG4, has the potential to significantly impact lifelong learning and sustainable development in ASEAN countries. Initiatives such as providing digital connectivity and infrastructure to learning platforms and online educational resources can ensure that all learners, regardless of their background, have equal access to quality education. Embracing digital technology can create inclusive, accessible, and innovative learning environments, empowering individuals to realize their potential and contribute to society. However, realizing the full benefits of digital education requires collaborative efforts from governments, policymakers, educators, and businesses, possibly through public-private partnerships and civil

society organizations. Through such collective action and strategic investments, the ASEAN region can leverage digital education's transformative power to create a more equitable and sustainable future for everyone.

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