HUAWEI

CSR ASIA


# The role of ICT in realising education for all by 2030

## Achieving Sustainable Development Goal 4

#ICT4SDG4

# Contents

# Message from Huawei

We live in an exciting era, where technological progress moves at the speed of imagination. Internet is becoming another form of infrastructure, enabling access to infinite possibilities. Technology is a powerful catalyst for change, bringing people closer, making our society more efficient, and promoting a more sustainable world.

We have 7.2 billion people and more than 25 percent of them are below 18 years old. Inspired by the benefits brought by technology, young people will help define the future of mankind. A future where the digital and physical worlds will become more integrated, and boundaries no longer exist between technologies, countries, businesses and industries.

Connectivity will emerge as the new normal. By 2025, there will be 100 billion connections. Cloud computing, Big Data, mobile broadband and the Internet of Things will be leading the next wave of social development. More than ever, capacity building and education are pivotal to support the digital agenda and to contribute to socio-economic growth.

Investing in ICT and education is a prerequisite to invest in the future. It is about conveying knowledge, connecting the ecosystem and fostering collaboration between teachers, students, parents, and school administrators, anytime and anywhere. It is about making people, communities, and nations more competitive.

With advanced technologies and strong collaboration with different partners, we are redefining the way of learning, interacting and teaching. Technology empowers and enriches people's life, through products, solutions and programs that embrace innovation and shared value.

Huawei is committed to bridging the digital divide, promoting equal access to educational opportunities, and building a better connected world.

# Message from CSR Asia

Education is a fundamental right and is indispensable for the achievement of sustainable development. For education to create positive change, it must be inclusive and high quality. Sustainable Development Goal 4 (SDG4) prioritises equitable access to quality education for all ages and aims to fill gaps in education systems worldwide. There is now a global call to create more than just good quality schooling – we need to equip today's learners for tomorrow's job market.

Innovation, imagination and strong decision-making skills are becoming increasingly important in meeting new challenges. We must implement new teaching methodologies that facilitate the development of the skillsets required to fully participate in a highly globalised, digital world. The use of ICT can enhance and supplement classroom learning and is an important tool in working to provide quality education for all.

This paper focuses on ASEAN and China – a region that encompasses tremendous diversity and is of crucial importance in achieving the SDGs. Education standards in the region are highly variable. Used strategically, ICT can enhance access to and standards of education by providing fast and scalable connectivity. More broadly, it opens up possibilities for rebooting education systems and developing new learning platforms for global use.

Our conversations with a diverse team of education and ICT practitioners highlighted the need to first focus on those receiving little and/or poor quality education in seeking to affect a regional shift in knowledge and skills acquisition. This paper discusses how ICT can help determine how best to proceed with changing education systems and pedagogies for the future.

A stronger commitment to reducing disparities and improving equity in education will require governments, regulators and policymakers to strategically deploy more financial and human resources and develop specially tailored programmes to reach underserved areas and vulnerable groups. This paper provides some recommendations on the most effective and efficient ways to bring ICT into education in the region.

In presenting the various ways in which ICT and education can be brought together in service of SDG4, this paper aims to provide a framework for action in efforts to reimagine the learning experience and provide universal access to a quality education.

# Executive Summary

This thought leadership paper explores how information and communications technology*(ICT) can enable and accelerate the achievement of the United Nations (UN) Sustainable Development Goal 4 (SDG4) and its associated targets. The paper focuses on China and the 10 Association of Southeast Asian Nations (ASEAN) member states (Indonesia, Malaysia, Philippines, Singapore, Thailand, Brunei Darussalam, Vietnam, Laos, Myanmar and Cambodia),+ which collectively possess tremendous geographic, demographic, socioeconomic and cultural diversity and are at different stages of economic development.

The region serves as a primary engine of global economic growth, and moving forward, access to quality education will play a central role in the region's ability to sustain growth momentum through structural reforms and greater regional integration.[1] This integration relies on the principles of improving access to inclusive and equitable education; ensuring that, once access is attained, the quality of education matches both the needs of students and the labour market; and, lastly, that individuals of all ages can access learning opportunities throughout their lifetime.

This paper serves as a primer on the current reality of education in the region and the ways in which ICT could help drive positive change in access and quality. It is a starting point from which to explore and expand our understanding of the use of ICT in education and the extent of the role that ICT can play in realising SDG4 and related Sustainable Development Goals‡ (SDGs). With direct reference to the three key principles established under SDG4, the paper maps out and prioritises the educational needs in the region that could most benefit from ICT solutions.

### 1. Towards Inclusive and Equitable Education

- An inclusive education takes into account the specialised learning needs of vulnerable people, including women and girls, children of migrant workers, refugees, children with disabilities, and ethnic minorities
- ICT in education can help all types of learners as it breaks down some of the barriers to access they encounter

### 2. Towards Quality Education

- The key to improving the quality of education begins with addressing the main components of an education system and determining how they interact. Quality learning results from addressing all processes within the education system: context of learning, learner characteristics, enabling inputs, teaching and learning support, and outcomes[2] – and then finding ways to improve each process
- ICT in education can help streamline education system processes and, thereby, improve the quality of education

### 3. Towards Lifelong Learning

- Lifelong learning facilitates the personal development of learners and enhances their employability, social mobility and capacity to be effective in participating in activities designed to improve the quality of life in their communities[3]
- ICT can play a central role in opening up access to lifelong learning programmes. Creative learning options come from creating flexible learning spaces, such as interactive websites, chat rooms, web-based courses and online libraries[4]

The paper calls for collective action, urging key players in the educational ecosystem – governments, regulators, policymakers, non-governmental organisations, educational institutions, teachers, content and ICT solutions providers, employers, investors and funders, learners and their families – to actively participate in helping shape a better future for education in the region. At the same time, stakeholders and decision makers at the local level must have sufficient agency and voice to determine the best utilisation of resources for ensuring ICT facilitates positive learning outcomes in local education systems and learner communities. A collaborative approach will encourage the ICT industry to apply best practices and engage responsibly in education initiatives, including the promotion of sustainable development topics in higher education and supporting the education sector's ability to provide inclusive and equitable quality learning opportunities for all.[5]

The region's needs with respect to attaining inclusive and quality education are immense, and all stakeholders can leverage their resources and core competencies to support governments in delivering on their promise of education for all. Decisive leadership by governments and building strategic partnerships with the private sector will help unlock the necessary investment of capital and resources. Integration of ICT in education will help ensure SDG4 is achieved, but only if all stakeholders are engaged and collaborate.

---

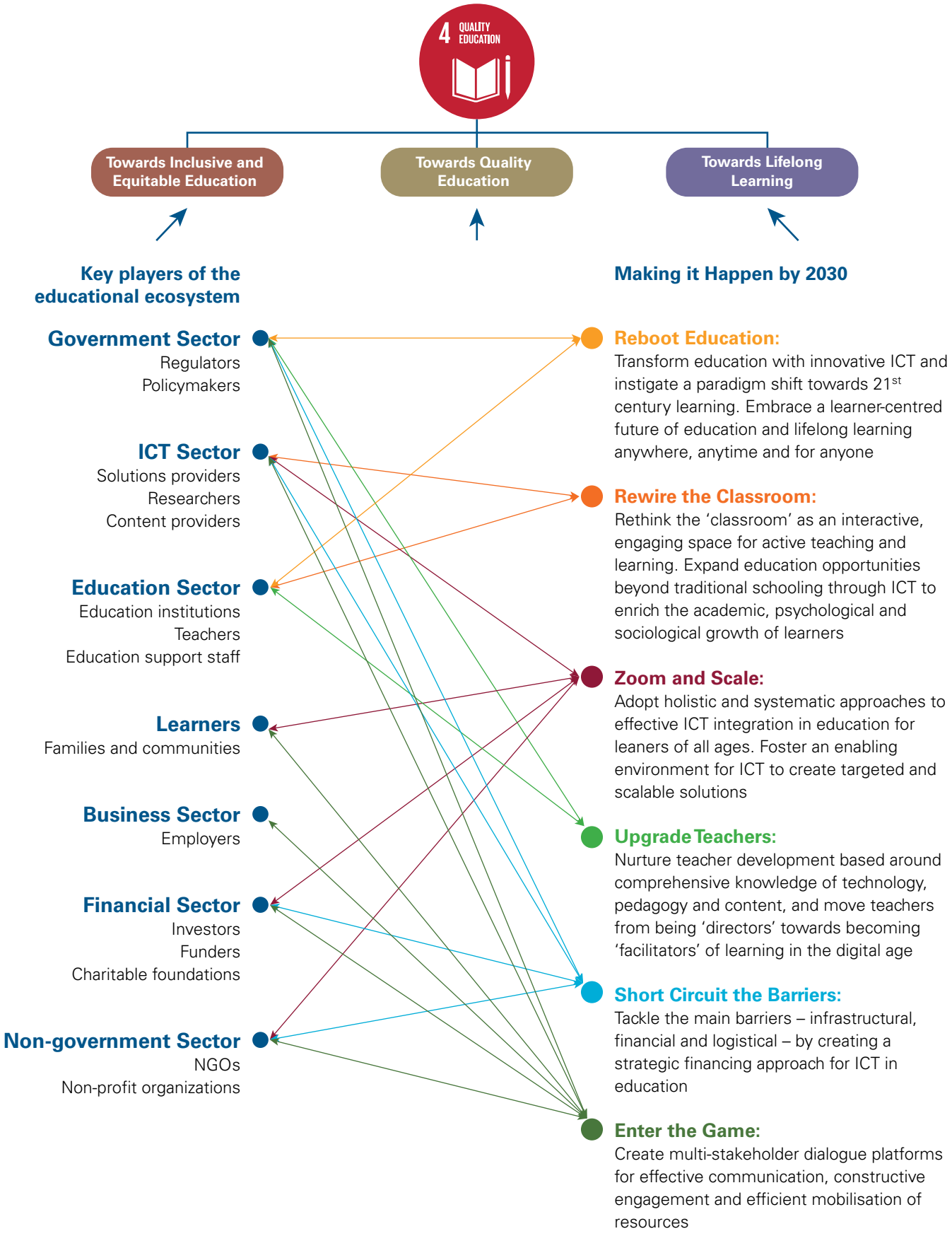
* Information and Communication Technology (ICT): Consists of the hardware, software, networks, and media for the collection, storage, processing, transmission and presentation of information (voice, data, text, images), as well as related services (The World Bank).

+ These 11 nations will be collectively referred to as 'the region' in this document

‡ World leaders adopted the 2030 Agenda at a UN Summit in September 2015 and the 17 SDGs came into effect on 1 January 2016.

## • The Education Ecosystem •

Making SDG4 a reality in the region will require all stakeholders to assemble and to unleash the transformative power of ICT for education. Unlocking the huge opportunities that technology can provide will expand participation, improve quality and increase efficiency in education.



# Sustainable Development, ICT and Education

At its most fundamental level, sustainable development is about improving the state of the world. The UN's 2030 Agenda for Sustainable Development sets out 17 SDGs that are designed to eradicate poverty, reduce inequality, and tackle environmental concerns on a global scale.*

The stated aim of SDG4 and its associated targets is to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all." This emphasis on quality education is one of the key differences between the SDGs and the Millennium Development Goals (MDGs), which placed more emphasis on quantitative targets such as increasing enrolment rates only to see the quality of education decline in many societies.

Providing universal access to quality education is foundational to enhancing people's lives and driving sustainable development. Education is a powerful catalyst for achieving other development goals, such as lifting people out of poverty, empowering women and girls, and ensuring decent work and healthy lives for all.

Since the launch of the MDGs in 2000, the world has made significant progress towards increasing access to education at all levels, increasing enrolment rates in schools and improving basic literacy skills. However, many challenges to achieving universal education remain.[6] SDG4 is an ambitious goal that seeks to narrow persistent education gaps and disparities, and improve learning and skills from early childhood to adulthood.

Achieving SDG4 will require significant progress in the following areas:

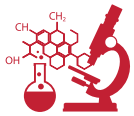
- **Out-of-school Children** – Globally, **59 million** school-age children – one in 10 girls and one in 12 boys – were not in school in 2013
  - Children from the poorest **20%** of households are nearly four times more likely to be out of school and five times more likely to not to complete primary education than their richest peers[7]
  - Out-of-school rates are higher in rural areas and from households headed by someone with less than a primary education


- **Incomplete Education** – Around **100 million** school-age children in low and middle income countries will not have completed primary school by 2015[8]

- **Female Literacy** – Women accounted for two-thirds of the **757 million** adults (aged 15 and over) who were unable to read and write worldwide in 2013


- **Language Barriers** – As much as **40%** of the global population may not have access to education in a language they speak or understand[9]

- **Underqualified Teachers** – In one-third of the countries for which there is data, less than **75%** of primary school teachers are trained up to national standards[10]




- **STEM Education** – While women make up almost half of the world's population, only an estimated **30%** of researchers in science, technology, engineering and mathematics (STEM) education and innovation are female[11]

* World leaders adopted the 2030 Agenda at a UN Summit in September 2015 and the 17 SDGs came into effect on 1 January 2016.

# 4 QUALITY EDUCATION

By 2030, the goal is to:

## Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

## Seven substantive targets


Ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes


Ensure that all girls and boys have access to quality early childhood development, care and pre-primary education


Ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university


Increase the number of youths and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship


Eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations


Ensure that all youths and a substantial proportion of adults, both men and women, achieve literacy and numeracy


Ensure that all learners acquire the knowledge and skills needed to promote sustainable development

## Three means of implementation


Build and upgrade education facilities that are child, disability and gender-sensitive and provide safe, non-violent, inclusive and effective learning environments for all


Expand globally the number of scholarships available to developing countries for enrolment in higher education, including vocational training and information and communications technology, technical, engineering and scientific programmes


Increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries

# Education and the SDGs

Education is a powerful catalyst for achieving other SDGs. A report issued by the United Nations Department of Economic and Social Affairs (UNDESA)[12] in 2015 identified links between education and nearly all the SDGs. The most emphasised connections are those between education and growth (SDG8) and education and gender (SDG5).

# Education Today - Spotlight on China and ASEAN

Education can help to alleviate poverty and improve livelihood opportunities. If SDG4 is to be achieved, the many gaps in education access and quality (including addressing enrolment and completion rates, gender parity, improving literacy rates and student teacher ratios, and assessing government expenditures on education) must first be addressed throughout the region. Using the most up to date data available, the education indicators show that while the region has made significant progress in education already, each county in the region has a different education landscape, and ICT can help improve several of these gaps.

Children growing up in poverty are less likely to have access to education.

## POVERTY AND EDUCATION

**Countries with poverty rates above 20% also have lower primary education completion rates**

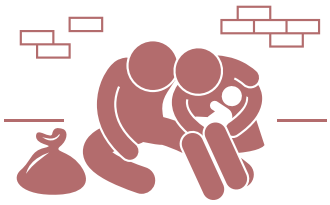
| | Net enrolment ratio in primary education |
|---|---|
| Lao PDR | 95.1 |
| Myanmar | 94.5 |
| Philippines | 98.0 |

| | Primary education completion rate |
|---|---|
| Lao PDR | 77.6 |
| Myanmar | 74.8 |
| Philippines | 75.8 |

**1 in 4**

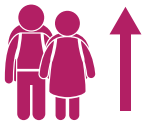
**Living below the Poverty line in**

**Lao PDR**
**Myanmar**
**Philippines**



## ENROLMENT VS COMPLETION


**The region has some of the highest rates of school enrolment in the world, with each country at nearly equal rates for gross enrolment and net enrolment in primary school.**



**Overall as students progress up from primary to secondary school...**

**...education completion rates go down**

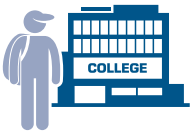
**In Cambodia only 47% of students completed their primary education in 2015**

**Biggest completion gap in primary education is in Cambodia**


Net enrolment rate


Completion rate







| | Primary | | Lower secondary | | Upper secondary | | Tertiary |
|---|---|---|---|---|---|---|---|
| | Net enrolment ratio | Completion rate % | Net enrolment ratio | Completion rate % | Net enrolment ratio | Completion rate % | Gross enrolment ratio |
| Lao PDR | 95.1 | 77.6 | 79 | 35 | 50 | 27 | 17 |
| Myanmar | 94.5 | 74.8 | 56 | 74.2 | 39 | 31 | 14 |
| Philippines | 98 | 75.8 | 96 | 75 | 80 | 72 | 36 |

The most urgent education gap in the region is the issue of **OUT OF SCHOOL CHILDREN**.

## Over 3,500,000 Out of School Children

**2,000,000** children do not attend school in Indonesia

**380,000** children do not attend school in Thailand

**402,000** children do not attend school in Philippines

**52%** of them are **GIRLS**

**18%** of them are **GIRLS**

### China

There are **9.02 million** "left-behind" children who either have both parents absent or one parent who was not capable of taking care of them.

Nearly **90% or 8.05 million children** –live with their grandparents, **3%** are cared for by other relatives, and **4%** are entirely alone.

## LITERACY RATES

Regional literacy rates are overall quite high. Data shows that both male and female learners of today are more likely to be literate than their parents. Today's female adults are less literate than their male counterparts, which incites a greater need for more lifelong learning and literacy skills training to better prepare women for employment opportunities.

**96%**
**Youth Literacy Rate (aged 15-24) Regional Average**

Lao PDR @84%

VS

Singapore, China, Indonesia @100%

**48%**
**Female Youths illiterate Regional Average**

Brunei Darussalam @35%

VS

Lao PDR @66%

**91%**
**Adult Literacy Rate (aged 15 and over) Regional Average**

Lao PDR @73%

VS

Singapore @97%

**67%**
**Female Adults illiterate Regional Average**

Philippines @45%

VS

Lao PDR @79%

### China

**2nd highest in female adult illiteracy**

**GENDER PARITY** in primary education enrolment has nearly been achieved in the region, however boys are still more likely to finish school than girls.

**Poor boys are more likely to complete their education in Lao PDR than girls. This is exceptional: in ANY other country in the region, poor girls complete more education.**

**In Myanmar, the female and male net enrolment ratio is 90.8% and 98.2%.**

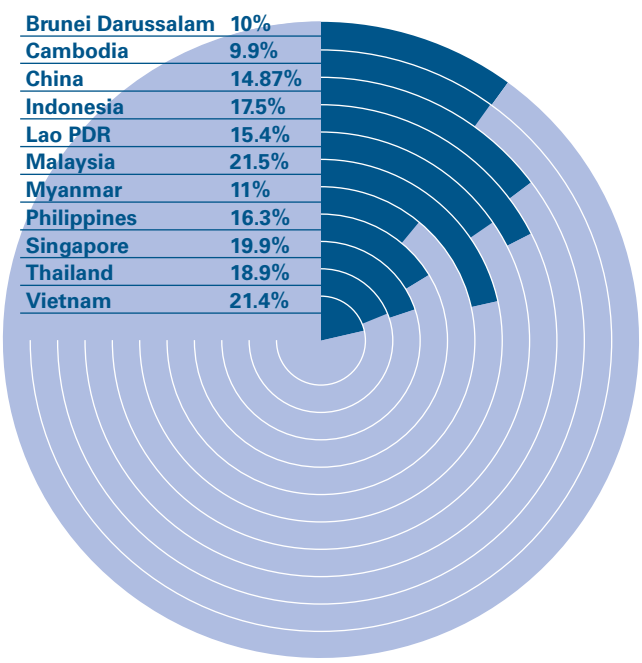
**So, if a village had 209 primary school age children...**

| | | |
|---|---|---|
| | 107 | 102 |
| Absolute number in school | 97 | 100 |

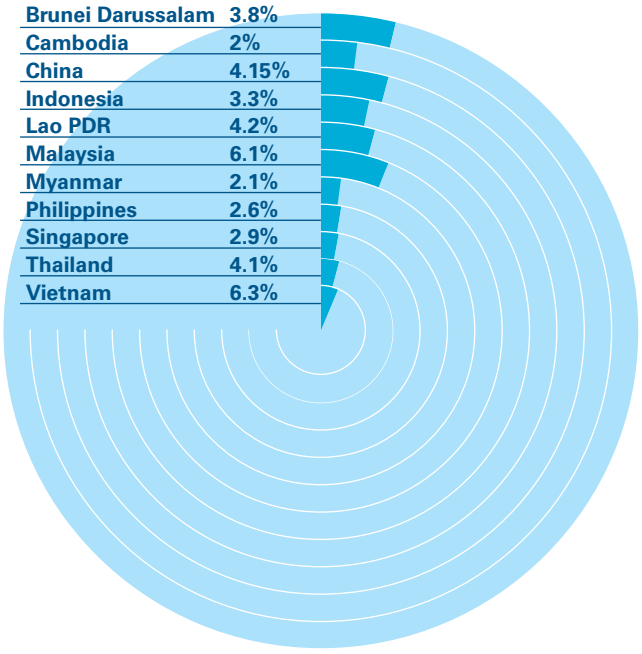
This means in the context of one village, **10** girls aren't in school vs only **2** boys.*

* We use the village analogy to understand three indicators of gender parity in Myanmar:
1. **Ratio of girls to boys in primary education is 0.97**, meaning that for absolute number in school, if we have 97 girls, we will have 100 boys
2. **Female Net enrolment ratio in primary education is 90.8%**, meaning that for 97 girls in school, there is a total amount of around 107 girls in the village - 10 girls are not in school.
3. **Male Net enrolment ratio in primary education is 98.2%**, meaning that for 100 boys in school, there is a total amount of around 102 boys in the village - 2 boys are not in school.

## GOVERNMENT AND EDUCATION EXPENDITURES




Expenditure on education as % of total government expenditure (2014)




Government expenditure on education as % of GDP (2014)

## GOVERNMENT EXPENDITURES AND TEACHER RATIOS

**Vietnam and Malaysia**

**Spent over 21% of their government expenditure on education in 2014. That's about 6% of their GDP on education, and among the highest throughout the region. In both countries, student: teacher ratios are below the region average:**

**Vietnam at 19:1**

**Malaysia at 11:1**


**Student: teacher ratio**

**regional average**

**Philippines 31:1** **Myanmar 28:1**

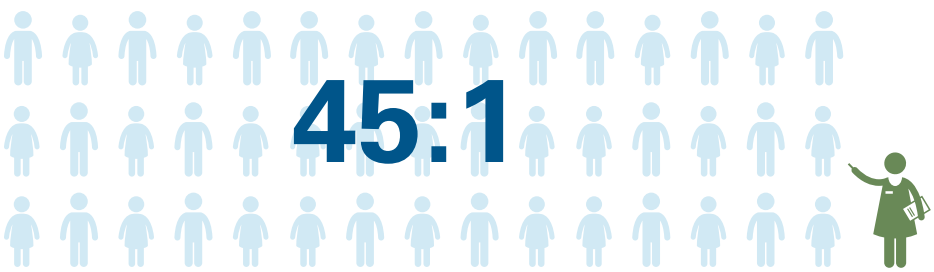
**Lao PDR 25:1**

**Brunei has the LOWEST**

**student: teacher ratio in the region**


**Cambodia has the HIGHEST**

**student teacher ratio in the region**



# Regional ICT Development

All countries in the region support the SDGs and have committed to boosting regional partnerships in their efforts to achieve the stated objectives. ICT will play an important role in moving towards sustainable development in the region. In their *#SystemTransformation* report, the Global e-Sustainability Initiative states that digital solutions in all areas of life can directly contribute to achieving all 17 goals and over 50 percent of the 169 established targets.[13]

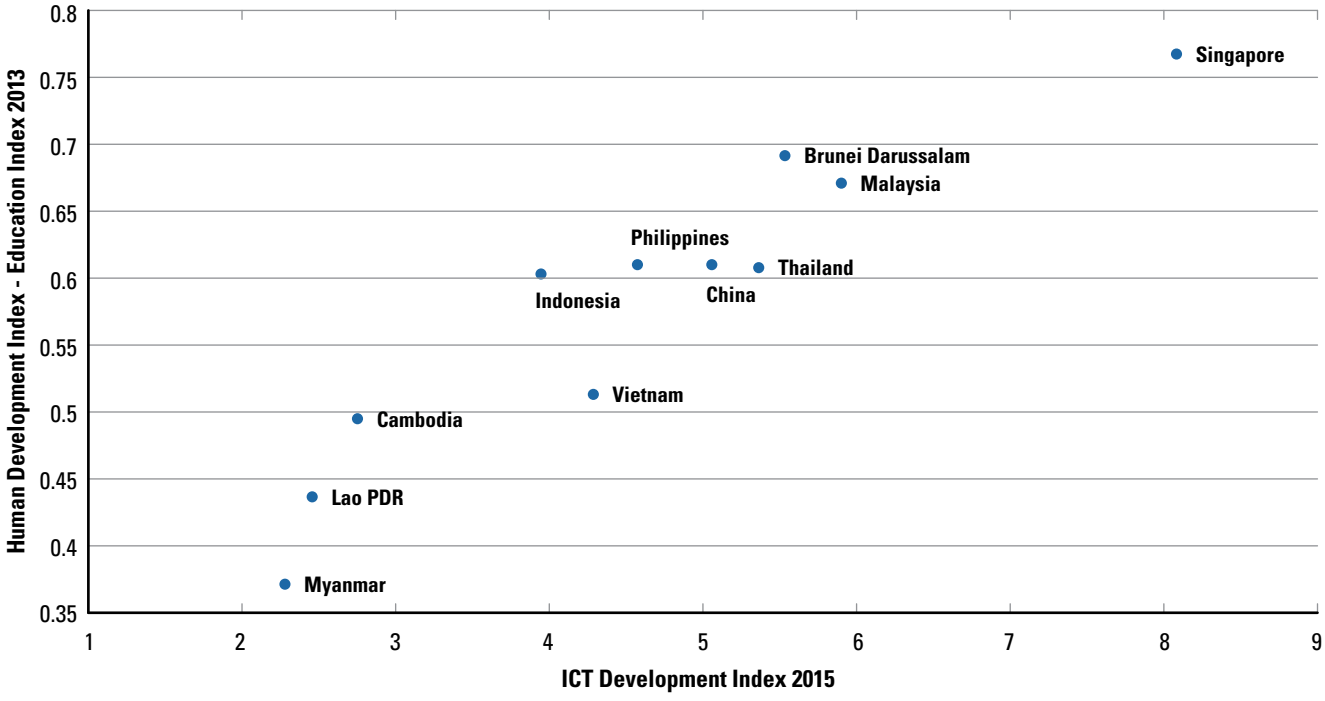
The region adopted the Beijing Declaration on ASEAN-China ICT Cooperative Partnership for Common Development in 2005, followed by two 'Plans of Action' for 2007-2012 and 2012-2016. The region has since signed a memorandum of understanding (MOU) for cooperation in ICT in 2013. The MOU covers areas such as promoting industry, human resources and infrastructure development, as well as cooperation in new technologies and information exchange.

In a region with significant economic and social diversity, the greatest leveller, social unifier, and driver of sustainable development in all countries is education. Used strategically, ICT can dramatically enhance education equity, quality and efficiency through its ability to facilitate fast, synergetic and scalable change.[14] However, compared with most developed nations, the region has yet to take full advantage of this opportunity.

That said, the digital divide has become narrower in recent years. Launched in 2011 and updated in 2015, the ASEAN ICT Masterplan (AIM 2015) provides a framework for the regional development of ICT that is helping to accelerate positive change. Initiatives include working to strengthen collaboration between the ICT and education sectors, providing more students with access to ICT-based learning opportunities and advocating for ICT education from an early age. The Masterplan also includes a discussion of how ICT could be better integrated into the planning, design and implementation of education curricula, assessments and teaching methodologies to enrich the learning environment for students and equip them with the competencies needed to succeed in a knowledge economy.[15]

China has also created a long-term ICT development plan, known as the State Informatization Development Strategy, which sets forth the nation's ICT goals for 2020, 2025 and 2050.[16] Particularly for education, the plan includes improving ICT infrastructure, deploying free high-quality digital educational resources, and establishing online learning spaces suited to changing education models. One of the objectives is to reduce the disparity between regions, rural and urban settings, and schools, and to support education for all and lifelong learning in China.

As of 2014, all countries providing data in the region, with the exception of Lao PDR, have a national policy on ICT in education.[17] In Cambodia, the policy for ICT in education applies only for upper secondary education.[18] However, as demonstrated by the chart below that maps the Human Development Index – Education Index against the ICT Development Index, on a country-by-country basis, there is still significant variation in the levels of ICT and education development across the region.[19]




**Source**

- ICT Development Index (IDI) compiled by ITU - the United Nations specialised agency for ICTs
- Education Index compiled by the United Nations Development's (UNDP) Programme Human Development Report Office (HDRO) as a subset data of the Human Development Index
- Based on latest available data

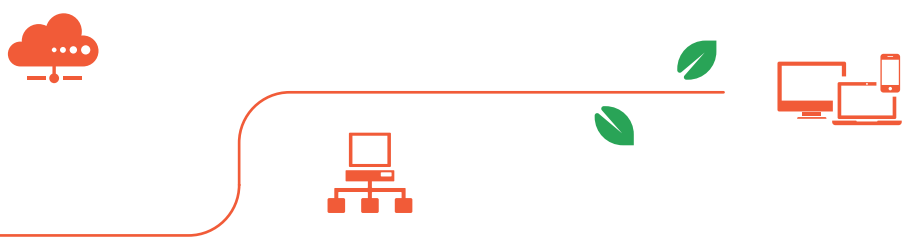
# ICT for Education:
# Now and in the Future

Rapid advancements in the field of ICT are radically transforming the way we interact at individual, local and international levels and how we view our place in the world. ICT is not only changing the way we communicate, work and travel – it is also changing how and what we learn. ICT-driven changes in many aspects of daily life are reshaping the landscape of education and creating tremendous potential, especially in developing regions, to achieve an ambitious universal education agenda.

ICT in education can be used to build borderless networks and facilitate innovative peer learning around the world. The interactive multi-dimensional education experience that ICT makes possible can inspire and encourage students by providing them with opportunities to gather knowledge, explore ideas and express themselves using channels and tools that suit their individual preferred learning modalities. ICT is already transforming the concept of classrooms by moving learning online, offering new options for information delivery and creating new ways to provide in-service teacher training and support.

More broadly, ICT is underpinning a rising proportion of economic growth across many industry sectors and is a powerful tool for social transformation. Students who are able to take ICT capabilities acquired through education into social and professional spheres will be well equipped to drive innovation and make substantive contributions to economic and social development in an increasingly digitized world.[20]

SDG4 encourages the use of ICT to support the principles of improving access to inclusive and equitable education, providing a good quality of education that matches both the needs of students and the labour market, and ensuring that individuals have opportunities to continue learning throughout their lifetime. Achieving the aims of SDG4 requires a clear understanding that ICT solutions must serve, rather than shape, the definition of and requirements for providing context-specific inclusive and quality education.



> Technology is a tool. With its rapid advancement, there will be so many ways to realize individual potential and unique competencies. It will be useful to help learners score better in exams but it should be go beyond. It can change their mindset and greatly expand their exposure to a wealth of knowledge beyond their personal bubble. We should use technology more to make sure learners are engaged and absorbed into learning with their interests, curiosities, and passion.
>
> – Ichiro Miyazawa, Programme Specialist in Literacy and Lifelong Learning, Section for Educational Innovation and Skills Development, United Nations Educational, Scientific and Cultural Organization (UNESCO) Bangkok

# ICT Solutions for Education

From slates to typewriters to computers and now smart phones and tablets – technology revolutionising education is not a futuristic ideal. This graphic lists just a few tools already expanding into classrooms and increasing learner awareness of the future possibilities for ICT use in education. For further insight, Huawei has compiled a summary HERE of the top ICT Trends for the future of education. Huawei's innovative ICT solutions for building better connected education can be found HERE.

## Mobile Devices

Mobile devices such as tablets, mobile/smart phones and e-readers enable students and teachers to access learning assets anytime and anywhere for literacy training, numeracy training, interactive tutoring, and 'educative games.' Families, educational institutions and governments can monitor learning results anytime and anywhere.

## Smart Systems

Smart systems can describe and analyze patterns of student learning, prescribe individual learning plans, and make decisions based on the available data to improve results. Smart systems can generate a 'total package design' concept to education whereby a student's learning is monitored and measured in real time and then their educational gaps can be predicted throughout their entire education experience.

## Hardware

Innovative equipment or hardware such as computers, projectors, smart boards and document cameras are the essential tools to engage students and maintain interactive, high quality teaching and learning in the classroom.

## 3D Printing

3D printing is a process of making a three-dimensional solid object of virtually any shape from a digital model. It fuels boundless creativity by enabling practical application and hands-on discovery of learners, who may encounter the same cutting-edge technologies in their future careers.

## The Internet of Things

The Internet of Things is a global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies. Using networks of sensors and actuators to generate rich, highly accurate and interrelated sets of data about objects such as the location of schools, the communities they serve, and school transportation routes for data collection, monitoring, decision making, and process optimization.

## Cloud Computing

Use of computer hardware and software resources delivered over a network or the Internet that can provide the capability to establish online classrooms, labs, and resource sharing platforms, bringing together learning assets that can be accessed anytime, anywhere by learners and teachers.

## Internet Connectivity

Wireless, mobile, hotspots, dial-up, broadand, DSL, Cable, Satellite, ISDN and others

**ICT Products**

**ICT Infrastructure**

**ICT Sector**

**4 QUALITY EDUCATION**

## Virtual Classrooms

A virtual classroom is an online learning environment. The environment can be web-based and accessed through a portal or software-based and require a downloadable executable file. With adequate bandwidth, teachers are able to use free tools like Skype to provide students with asynchronous communication tools, such as message boards and chat capabilities, web conferencing, video conferencing, live streaming, and web-based VoIP to provide remote students with the ability to collaborate in real time. PBS Video and Khan Academy, for example, can give every student access to advanced educational video instruction, regardless of whether their school offers a particular course.

### Big Data and Advanced Analytics

Big data analytics is the process of examining large data sets to uncover hidden patterns, unknown correlations, market trends, customer preferences and other useful business information. This can provide capabilities that governments, educational institutions and civil society organizations need to improve educational effectiveness and support basic research on learning by examining large data sets. Online teaching can use Big Data to reform educational delivery and enhance learning in numerous ways, for example to: adapt and improve delivery through personalizing learners' experience; create communities of practice; and standardize the presentation of knowledge.

### Artificial Intelligence (AI)

AI can support every learner with virtual tutors/mentors for self-learning, self-assessment, teamwork, analysis of interaction data about individual learning, personal interests, social and learning contexts and more. AI can offer personalized and customizable knowledge acquisition based on the student's particular interests, skills and/or gaps. It can ensure consistent and on the spot assessments, and can continually learn more about the students' learning gaps and adapt to their individual processing capacities. It can be an aid to grading exams in large courses and it can assist CwDs by predicting their needs or helping speak on their behalf if needed… the possibilities are endless.

## Online Learning

### Game-based Learning or Gamification

The gamification of learning is an educational approach to motivate students to learn by using video game design and game elements in learning environments. The goal is to maximize enjoyment and engagement through capturing the interest of learners and inspiring them to continue learning.

### Social Media

Computer-mediated technologies that allow all stakeholders to view, create and share information, ideas, career interests, and other forms of expression via virtual communities and networks.

### Massive Open Online Courses (MOOCs)

A massive open online course ( MOOC) is an online course aimed at unlimited participation and open access via the web. In addition to traditional course materials such as filmed lectures, readings, and problem sets, many MOOCs provide interactive user forums to support community interactions between students, professors, and teaching assistants.

## Information and electronic content

### Digital Services

Digital services include e-learning programs, e-books, MOOCs, game-based learning, online competitions and labs, and student advisory services. These services build learning assets and prepare students for new livelihood opportunities. Digital teacher development by online teacher training and learning results monitoring allows governments to build teacher capacity and reduce the cost of public education services.

### Virtual Reality (VR)

VR in education can change a learners understanding of their surrounding world in a very tactile way. It is a key tool for immersive education where generating realistic images, sounds and other sensations that replicate a real environment enhances the lesson, engages students with more fun, increases retention, and facilitates distance learning. VR turns a classroom into an exploratory platform where if they want better appreciate the works of Michelangelo, they can go inside the Sistine Chapel. If they need to learn about how a coral reef works, they can dive in and see one first-hand.

# Towards Inclusive and Equitable Education

Education is a fundamental human right and a key driver for attaining the SDGs by 2030. But for education to have the greatest possible impact in advancing these goals, it is necessary to ensure inclusive equality of learning opportunities for all.

The post-2015 development agenda places a heavy focus on protecting the rights of and providing equitable, inclusive opportunities for vulnerable people, including women and girls, children of migrant workers, refugees, children with disabilities, and children of ethnic minorities. SDG4 addresses disparities in access and opportunities with respect to education. Particularly relevant is Target 4.5, which calls on countries to ensure equal access to all levels of education for "vulnerable people". Individuals have varying abilities and competences, and it is therefore unrealistic to expect equality of education outcomes. However, such differences should not be amplified by factors such as ethnicity, gender, family status or place of birth.[21]

ICT can support efforts to improve the social and economic inclusion of vulnerable people. It yields many opportunities for social integration and opens up new learning opportunities inside and outside formal education and training. Online resources can facilitate education, participation and access to employment opportunities for vulnerable people.[22] ICT can also help lower barriers to education by providing tools that overcome challenges created by differences in cultural norms and language.

## Women and Girls

There are approximately **1 billion** women and **200 million** girls (ages 0-15) in the region

**80%** of out-of-school girls in the region will never start school compared to **16%** of out-of-school boys

A child whose mother can read is **50%** more likely to live past the age of five, **50%** more likely to be immunized, and twice as likely to attend school.[25]

While the average number of years of school enrolment and attendance has increased across the region, a **small gap still persists between girls and boys** in all countries, with the exception of Brunei, Myanmar and the Philippines[23]

Girls are catching up with boys in terms of years of education, but this is not translating to equal opportunities for women in the labour force, even in more prosperous economies

## Why it is an issue

While gender parity in education in the region has nearly been achieved, there are still several gaps remaining to be addressed, especially concerning female out-of-school children and literacy rates. For both indicators girls are more likely to be out of school or illiterate, because of a number of obstacles in and outside of schools. Because women are often the primary caregivers in family situations, they have a central role in the intergenerational transmission of knowledge.[24] Investing in female education can also increase labour force participation, which can help support economic expansion. While women make up an estimated 45% of workers in ASEAN and China, they are largely concentrated in low-skilled, low-paid jobs with insecure employment benefits. Investing in female education can:

- Increase labour force participation, which can help support economic expansion
- Result in positive health outcomes for women and their families
- Lower fertility and child mortality rates* [26]
- Increase representation in the administrative and political arena

Disparity in education for women and girls persists as a result of complex and deeply embedded cultural values that tend to discourage women from actively participating in personal and professional development compared with their male peers. This is often reinforced by gender stereotyping

* According to the Education Commission, the mortality reductions from education improvements in 2050, measured in years of life gained, would almost be equivalent to eradicating HIV and malaria deaths today or to reducing the two main causes of death in 2050 – cancer and cardiovascular disease – by two-thirds Each additional year's increase in average years of girls' schooling reduces adolescent birth rates annually by 8.5 births per 1,000 girls.

> Many girls and women in the region cannot attend university because their parents do not want them to live far away from home. In the future, these girls may be able to receive education at home with the help of ICT technology.
>
> – Professor Amina Akhter, Computer Science, Asian University for Women

in textbooks and the structuring of educational curricula, and the fact that the allocation of resources for education and training often favours boys over girls. More steps should be taken to embed gender mainstreaming in the development of education policies. Promoting equal access to education must be supported by efforts to ensure equal opportunities for women in the labour force.

## How ICT can help women and girls:

- **Access to education:** In situations where attending conventional institutions of learning is difficult or impossible for women and girls, ICT can be used to bring education into homes and non-traditional learning spaces.[27] Informal learning opportunities via ICT platforms arguably represent the most transformational education opportunity for women and girls
- **Reduce isolation:** Simple, easily affordable access to information and improved communications tools can minimise the isolation of women and girls (particularly in rural areas) by making them part of online and other distance learning communities
- **A safe space to explore taboo subjects:** Many women and girls receive inadequate or incorrect information about topics such as reproductive health and HIV/AIDS. ICT tools can offer a private way for women and girls to access resources and information on these issues
- **Access to health and reproductive services:** Tools such as short message services (SMS) and mobile applications can provide personal health management information and reminders

Encouraging women to make effective use of ICT remains challenging as uptake of technology-based tools remains relatively low among women and girls in many parts of the region. Even in areas where computers and other ICT-based resources are available to everyone, gender bias often encourages boys to make more use of such resources compared with girls. In adulthood, many women are financially dependent on men or have no control over economic resources, and are therefore less able to make self-determined decisions with respect to accessing ICT services.

Overcoming these obstacles requires action on several fronts, including consideration of positive discrimination or affirmative action policies in some situations. Women should be included in the planning for the development and provision of ICT tools designed to meet their needs in the social and cultural contexts of their communities.[28] Developing gender-aware best-practice ICT and education policies is a crucial element in bridging the gender gap more generally in the region.[29]

## • Wedu: Technology enables experiential learning for tomorrow's female leaders

Wedu is a non-profit social enterprise that is built around the concept of "investing in women leading the change" through a programme of leadership development for young women across Asia. The programme identifies 'Rising Stars', high-potential young women at university level or above who show leadership potential and aim to create social, environmental and political change in their communities. There are currently 315 Rising Stars across 20 different countries and, with the help of ICT, Wedu aims to name 1,000 more in the next couple of years.

Wedu's core mentorship programme leverages technology to connect each Rising Star with an appropriate mentor from a global community of inspiring female leaders. These mentors offer their Rising Star mentees guidance, encouragement and advice on achieving their short and long-term goals via ICT-enabled channels that are managed centrally and remotely by the Wedu Leadership Development team.

Wedu is also leveraging ICT tools to build strong connections among mentors, donors, partners and supporters to support community-level online education initiatives and fundraising, as well as to collect and analyse data to track the effectiveness of various leadership development initiatives in achieving the Wedu mission.

More information about Wedu is available HERE.

# Children of Migrant Workers

There are approximately **59 million** migrant workers in ASEAN[30] and **273.95 million** in China[31]

The top three countries of origin are Myanmar **(2,151,000)**, Indonesia **(1,216,000)** and Malaysia **(1,050,000)**

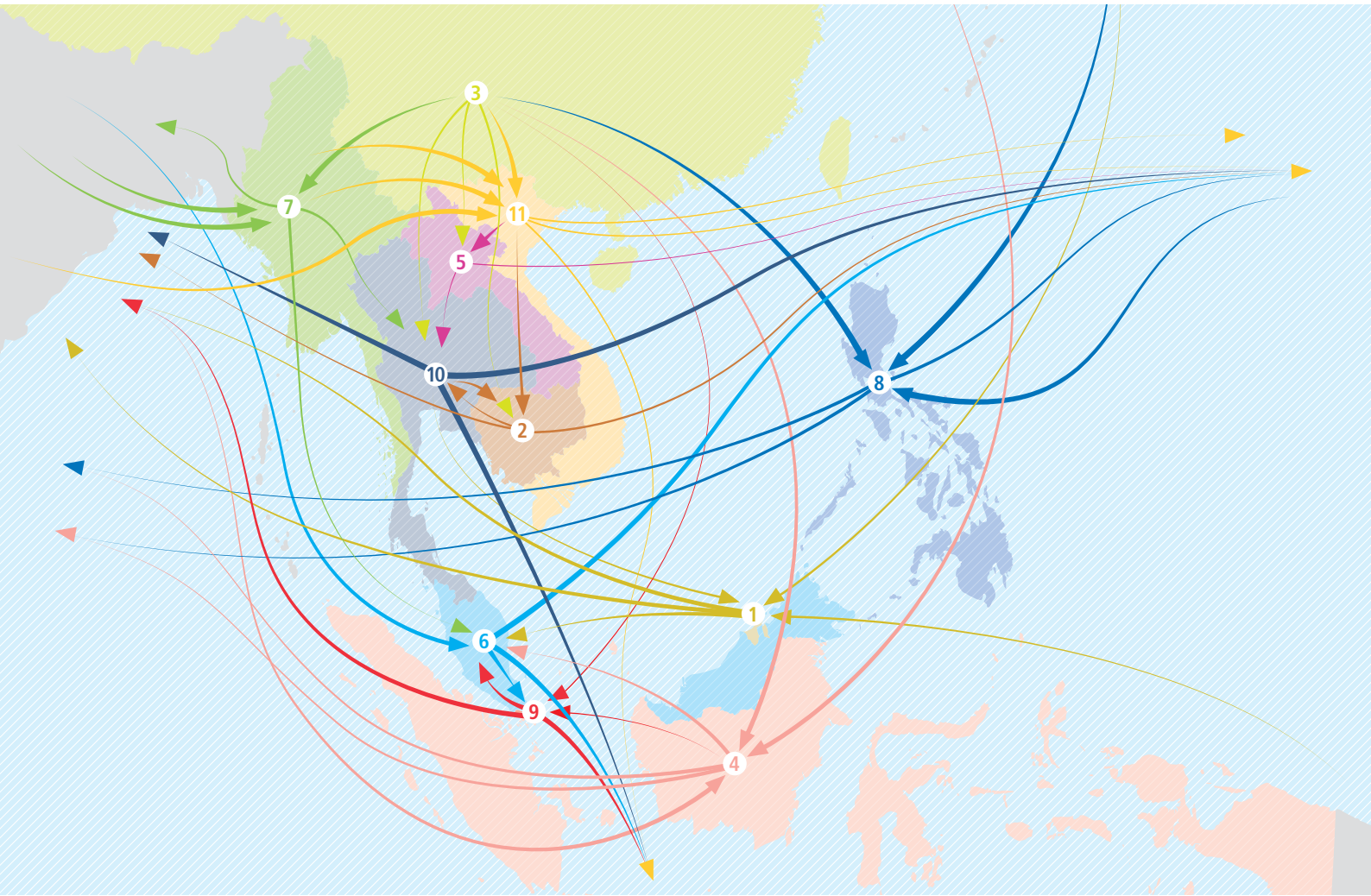
The top three destination countries are the United States **(4,328,000)**, Thailand **(3,579,000)** and Malaysia **(1,512,000)**

In 2010, there was an estimated **35.8 million** migrant children in China's cities – up by **41%** compared with 2005. Of these children, **28.8 million**, or about **80%**, were from rural families[32]

In 2012, **3.5%** of migrant children in Beijing; **5.1%** of migrant children in Shanghai, and **5.3%** of migrant children in Guangzhou did not attend school, compared to the national average of **2%**.

**• Flow of Migrant Workers •**

This map shows the estimated net migration (inflows and outflows) by origin and destination country in 2013. Note the thicker lines indicate a heavier flow of migration.




1 Brunei 2 Cambodia 3 China 4 Indonesia 5 Laos 6 Malaysia 7 Myanmar 8 Philippines 9 Singapore 10 Thailand 11 Vietnam

## Why it is an issue

The issue of education access for children of migrant workers is most pervasive in large cities and countries that play host to mass labour migrations. Many children who migrate with their families do not have automatic right of access to schools and may not be fluent in the local language of instruction. Such children may be discriminated against and it is not uncommon for them to fail to complete a full course of education even when they are enrolled in a school. The mobile nature of migrant families means their children often miss out on consistent access to schooling and education, creating a risk that they may fall behind in their achievement potential compared to their non-migrant peers.[33]

One pervasive challenge in seeking to provide education for migrant children is that they are often 'invisible' to the school system. A common fear among undocumented or temporary migrants is that they will be detained or deported if they try to enrol their children in school without the proper paperwork.[34]

Other barriers to entry include the cost of uniforms, books, transportation and food, which can be prohibitively high for low-income migrant families, and a lack of local language skills. In Thailand, for example, about 200,000 migrant children are not in school despite having the right to attend, in many cases because of their inability to communicate in or comprehend the Thai language.

## How ICT can help

One of the most powerful uses of ICT is to make children of migrant workers visible and countable, which will help make adults and governments more accountable for their welfare. ICT can help migrant children gain access to education through:[35]

- Low-cost targeted online platforms, particularly those that focus on the development of language, cultural and digital skills, as these will facilitate social integration and educational achievement. A prerequisite for ensuring the effectiveness of such platforms is to provide access to computers and opportunities to gain basic digital skills in migrant communities
- Online programmes, which offer 'location-independent' learning and help minimise educational disruptions
- Flexible courses of study that can help migrant students enrol in remote education programmes, accelerate their education or complete courses in different locations
- Online support for teachers of migrant children via online teacher training and the development of targeted teaching materials

### • Digital Superheroes Academy

Launched in January 2015 by the **Baan Dek Foundation** in Thailand, the Superheroes Academy is a programme that teaches 'superpowers' (otherwise known as essential life skills) to migrant children. This fun and engaging programme educates children about 15 key issues, including the importance of vaccinations, how to protect themselves from insect-borne diseases, safe migration, waste management and human rights as they pertain to young people. About 1,000 vulnerable children take part in the programme each year, most of whom are migrant children living in construction site camps.

Based on the success of the Superheroes Academy, Baan Dek is currently developing an e-curriculum with the aim of reaching greater numbers of children. The Digital Superheroes Academy will be an electronic-based programme, delivered via mobile devices and available in a variety of languages. Education about the life skills covered will first be facilitated through live interaction with a teacher or social worker. The young participants will then be able to access and reinforce the content they have covered through open-source availability on tablets and smartphones, and through e-life skill programmes that have been tailored to their learning needs. The pilot Digital Superheroes Academy programme will begin in January 2017.

# Refugees


ASEAN is home to more than **520,000** refugees and asylum seekers, **855,000** internally displaced people and **1.4 million** stateless people

Reducing educational inequality reduces conflict – in countries with twice the levels of educational inequality, **the probability of conflict more than doubles**[36]

In ASEAN, the majority of refugees originate from **Myanmar**

Asylum seekers in Southeast Asia also come from Bangladesh, Pakistan, Sri Lanka, North Korea, Syria, Somalia and the Balkans[37]


Data about refugees remains limited, but the UNHCR estimates that worldwide, **50%** of primary school age refugee children and **75%** of secondary school age adolescent refugees are out of school

## Why it is an issue

Refugees are doubly disadvantaged in many countries where children and young people are unable to enrol in school, register for exams or receive certification. Refugee children and adolescents are five times more likely to be out of school than their non-refugee peers.[38] For displaced individuals, access to education can help foster social cohesion, provide life-saving information, address psychosocial needs, and offer a stable and safe environment.[39]

## How ICT can help

Multiple opportunities exist to broaden the scope of using technology within refugee education in both camp and urban settings, and in enabling refugees to develop skills that are important in today's increasingly technological society.[40] For refugees, ICT can provide effective educational approaches that can:

- Reach children directly, providing them with catch-up study methods
- Serve as a self-study method where schools may not be available
- Create communities of learning that cut across international borders
- Train teachers in refugee contexts more quickly

Some technology solutions that can help bridge the educational divide for refugees include:

- MOOCs, which are free and can be accessed online or downloaded from anywhere with an Internet connection. Such courses can be adapted for low bandwidth networks
- Deploying online versions of national school curricula and making them available in remote locations[41]
- Utilising existing refugee-targeted platforms such as:
  - **UNHCR Exchange**: a platform offering online courses and livelihood training programmes that are constantly modified and updated to meet the needs of those they serve
  - **Refugee Open Ware**: a for-profit impact investment fund, which invests in entrepreneurial and solutions for those living in conflict situations that feature humanitarian technology and innovation

While ICT has the potential to positively affect refugee lives, there are many hurdles to overcome, not least of which is access given the relatively high cost of many ICT solutions, particularly in situations where food and shelter are more immediate concerns.[42]

### • Bringing education to refugee children on the borders of society

A collaboration between UNESCO, Microsoft, True and the Thai Ministry of Education, the Mobile Literacy for Out-of-School Children Project is a pilot programme that is providing Microsoft tablets to selected learning centres along the Thai-Myanmar border. The tablets include a UNESCO-designed app that provides access to over 1,000 learning resources in Thai, Burmese and several minority languages, as well as satellite TV with educational programmes and free Internet. The project aims to enhance the basic literacy and numeracy skills of thousands of migrant, ethnic minority and stateless children living in the Thai-Myanmar border areas.[43]

## Children with Disabilities

Across ASEAN, approximately **62 million** people live with disabilities,[44] about **10%** of the region's population. Just under half **(45%)** live in Indonesia, **16%** live in the Philippines, **13%** in Vietnam, **11%** in Thailand, and the other **15%** in the remaining ASEAN countries

In China, there are more than **85 million** people living with a disability. Over the past 19 years, there has been a steady increase in the proportion of disabled individuals in China relative to the size of the total population

Of the **115 million** children worldwide who are not in school, **30 to 40%** are children with disabilities.[45] Approximately **90%** of children with disabilities in developing countries do not regularly attend school[46]

The precise number of children with disabilities (CwDs) is not available as most countries in the region do not collect comprehensive data on people with disabilities or any data on CwDs in schools. The UNESCO Global Education for All Monitoring Report[47] has no indicators on the participation of CwDs in education. In many cases, children with severe and moderate disabilities may be acknowledged, but children with mild or hidden disabilities are often ignored or overlooked. This is also true for a large proportion of children with learning disabilities or difficulties which are often seen as a sub-set of disabilities.[48]

### Why it is an issue

CwDs often face considerable discrimination in the form of negative attitudes, a lack of adequate policies and protection, and are often effectively excluded from formal education options. The prevalence of disabilities in the region is exacerbated by the presence of landmines and explosive devices (for example in Cambodia and Lao PDR), high road accident rates, and poor access to maternal health services in many rural areas. CwDs are particularly vulnerable during and after natural disasters and in refugee camps.[49] Women and girls with disabilities are exceptionally disadvantaged and are at high risk of experiencing abuse and neglect.

### How ICT can help

ICT offers a range of opportunities for CwDs, who often require assistive technology to carry out various daily. Some approaches and ICT tools that can help to ensure that CwDs are part of an inclusive education proposition include:

- **Distance learning**: distance courses allow students with disabilities to continue living at home while they are studying, to share documents, lessons, exchange ideas and make presentations. Using a computer is a common component of the training and studying process
- **Digital and audio libraries**: students with intellectual, hearing or reading disabilities; impaired vision, dyslexia and other disabilities can make effective use of digital and audio libraries to complete educational courses, accessing their material, content and resources via the Internet from their homes and non-conventional learning environments such as hospital wards
- **ICT telecentres and assistive technology centres**: these centres can maximise the use of IT skills for the welfare of disabled students in rural and disadvantaged communities. They also promote public awareness of how CwDs using adaptive technology to fully participate in a wide range of jobs and employment settings

A key aspect to integrating ICT into education programmes for CwDs is advanced teacher training. It is important to ensure that teachers are equipped and trained on how to use assistive technology to support students with special needs.

> "ICT should be available and accessible. Accessible means low cost, simple, and designed for all. It means it can be reached, used, and understood by any person with or without a disability."
>
> – Dr. Samart Ratanasakorn, Head of Curriculum and Instruction Division - Bureau of Special Education Administration, Office of the Basic Education Commission Thailand

## • AUTISAY MOBILE APP

AutiSay is a mobile application, designed in 2013 by a group of Higher National Diploma Level students at the Universiti Teknologi Brunei, to help autistic individuals with severe verbal communication disabilities to express themselves more effectively. The app, which uses visuals to aid communication, was designed with input from local autism centres in Brunei, parents with autistic children and government authorities specialising in the care and needs of autistic individuals.

The app features three categories: Activity, Communication and Life Skills. If, for example, an autistic child wants to play with a particular toy, he or she can point to the relevant picture in the Activity category. In the Life Skills category, the app allows for the creation of 'repetitive reminders' for tasks such as brushing teeth so that the child can complete the activity following visual step-by-step instructions. A key strength of the app is that it is customisable and culturally independent as caregivers can freely upload images that are relevant to their particular context or situation.

More information about the application's development and use is available in a 2015 paper published in the International Journal of Knowledge Engineering and Soft Data Paradigms.

## Ethnic Minorities

The region is home to a vast number of people considered as of an ethnic minority:

Brunei Darussalam: **24%**

Cambodia: **1.1%**

Indonesia: **15%**

Malaysia: **19.2%**

Myanmar: **50%**

Philippines: **25.3%**

Singapore: **12.5%**

Thailand: **4.2%**

- Nearly one third of Lao PDR's population is classified as belonging to an ethnic minority. There are four broad ethnic linguistic groups in the country: the Lao-Tai **(67% of the population)**, the Mon-Khmer **(21%)**, the Hmong –Lu Mien **(8%)** and the China-Tibetan **(3%)**[50]
- Vietnam has an estimated **12.5 million** people who are considered to belong to one of the **54** officially recognised ethnic minority groups in the country

The Chinese government officially recognises **55** ethnic minority nationalities. The country has **113.9 million** people who are classified as belonging to an ethnic minority group[51]

On average, individuals from ethnic minority groups across the region complete **less years of schooling** than individuals from ethnic majority groups[52]

### Why it is an issue

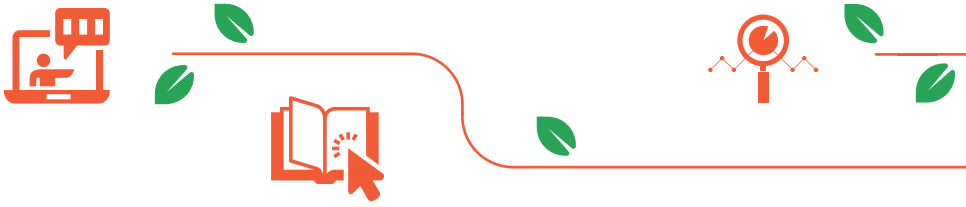
Individuals from ethnic minority groups often face higher-than-average barriers to accessing quality education. Commonly cited reasons for this situation include:

- Lack of financial and other resources: ethnic minorities are overrepresented among the poorest populations in the region
- Geographical isolation and poor transportation infrastructure: many ethnic minorities live in remote and/or rural regions
- Diversity of ethnic minority languages and limited knowledge of the national language among some ethnic minority groups

## How ICT can help

ICT can play a role in addressing the gaps in ethnic minority education by:

- Providing accurate data and information about ethnic minorities so that effective targeting mechanisms for education support can be devised
- Offering language learning tools for children with limited or no capability in the official national language and improve access to learning material in their native languages
- Creating resources for teacher training and monitoring and evaluation methods that target ethnic minorities
- Incorporating both national culture and local knowledge into education content to recognise and promote the value of cultural identity through online games, videos and cultural awareness social media campaigns
- Expanding vocational training for ethnic minority youths through ICT skills development initiatives
- Connecting and empowering ethnic minority communities by offering better communication options



### • Vietnam's YouthSpark Digital Inclusion project

The YouthSpark Digital Inclusion project in Vietnam is designed to close the digital gap and get students from rural areas engaged in developing knowledge related to digital skills as well as computational thinking. The public-private initiative is jointly organised by the Ministry of Education and Training, Microsoft Vietnam and Vietnet Information Technology and Communication Centre (Vietnet-ICT).

The project consists of a series of training lessons and materials related to computer science and ICT that target secondary school students and youths in rural remote areas. Additionally, it seeks to get young people engaged in activities that provide them with practical experience that may assist them in developing their careers in the future.

The extracurricular training is expected to benefit up to 50,000 students and 300 teachers by 2018, adding to the 10,000 students from remote areas that have received training through other Microsoft Vietnam – Vietnet ICT programmes in the last four years. The project will provide both in-person training and self-directed e-learning lesson content that will be publicly available through the Ministry of Education and Training's online training portal.[53]

# Towards Quality Education

If children are motivated, can see the value of education, and if the learning experiences provided are of a high quality, they are more likely to stay in school. While the MDGs pushed to increase school attendance, the number of children who participate in formal education is a secondary element: merely filling schools with children does not necessarily guarantee they will enjoy a quality education. In addition, while enrolment rates and number of years in school are useful general indicators, but they are not a proxy for measuring the intended outcomes of a quality education.

SDG4's emphasis on improving the quality of education and enhancing student learning beyond primary school is designed to achieve tangible advancements in the processes and dimensions of education that will support other sustainable development objectives such as the eradication of poverty and narrowing of the wealth gap. ICT can streamline these processes and enhance the overall quality of education.

The dynamics of education and its value in national development and social transformation is a complex issue that makes defining and measuring 'quality education' a challenging undertaking. A first step is to identify the foundational elements of the education system and the external and internal factors that may influence the processes and decisions made within the existing structure. This must then be mapped to current learning outcomes to identify areas in which the structure is failing with respect to achieving learning outcome goals. It will then be possible to identify opportunities to use ICT tools to drive the march towards providing quality education in a sustainable way.

## Context of Learning

The contextual atmosphere in which students learn can greatly influence education quality. The values and attitudes of the local community and society significantly inform education. The following factors all contribute to the context of learning:

- Economic and labour market conditions
- Socio-cultural and religious factors
- Education professionals and support infrastructure
- Public resources available for education
- Availability of quality teachers
- National governance and management strategies
- Peer pressure
- Parental support
- Time available for schooling and homework
- National examination standards
- Public expectations
- Labour market demands

Access to information, communicating effectively and having the capacity and skills to function in an increasingly digitised world are all made possible by ICT and how it can facilitate effective learning contexts. ICT solutions can:

- Empower learners to voice their opinions, be engaged and connect with their families and friends using various communication platforms
- Enhance efficiency and effectiveness of communication in education-related activities
- Be used by policymakers and school leaders to improve internal efficiency in schools and make informed decisions[54]

## Learner Characteristics

How people learn – and how quickly – is strongly influenced by their capabilities and attitudes. Important learner characteristics include socio-economic background, health, place of residence, cultural and religious background and prior knowledge. These differences in learner characteristics require specific responses if education quality is to be improved.[55]

### Family and Community for Learners

One of the most influential factors in learning is family and community involvement. Whether parents send their children to school at all is often dependent upon whether they view school attendance as a valuable use of time and money.[56] Community and family involvement in schools is a well-documented influence on student success; yet educators often find it challenging to increase the involvement of parents and other key community members in supporting education.[57]

ICT can be a bridge between schools, families and the community and help secure family support for learning at home in a variety of ways. ICT can:

- Encourage parents to engage with their child's education by offering tools and information about what the child is currently learning and how to assist them
- Deliver content to parents and other support groups and ask them to encourage school attendance
- Help illiterate parents via simple SMS or gamified tools to advance both their own and their children's learning

### • WeChat connecting parents and teachers in Shanghai

An example of a family-focused ICT education initiative comes from Shanghai, China, where teachers are establishing official WeChat groups for each of their classes to engage with parents. As a response to parents who were already creating groups, schools are now encouraging teachers to lead the discussions and involve working parents with their child's education.

Using WeChat, an already existing platform, has proven to be an easy way to create a group dialogue that involves parents and the school, while offering an official communications link involving classroom teachers and parents. This encouraged parents to connect with each other, to be more aware of what is required of their children in school, and fosters activities outside of school to promote friendships. It addresses a key element of involving working parents with their children's education and encourages them to expand education-focused questions beyond the standard "what did you learn today?" to include discussions about their friends, interests and fears.

Participants in the initiative report that the programme has helped them become more involved in all aspects of their children's lives and enhanced their understanding of their aspirations and concerns. Thus far, it has been a successful use of ICT and a low cost way of incorporating families into child education, albeit with a few caveats concerning overuse by some parents.

> Education, particularly in government run primary and secondary systems, tends to lag far behind other sectors when it comes to updating and investing in new technology. The students today are entirely aware of the digital world and do not fear technology the way their parents may have. This willingness to poke around and make mistakes is a window of opportunity for harnessing innovative curriculum and educational eco-systems. As long as there's access.
>
> – Sanna Johnson, Regional Director for Asia, Caucasus, and Middle East Program, International Rescue Committee (IRC)

## Enabling Inputs

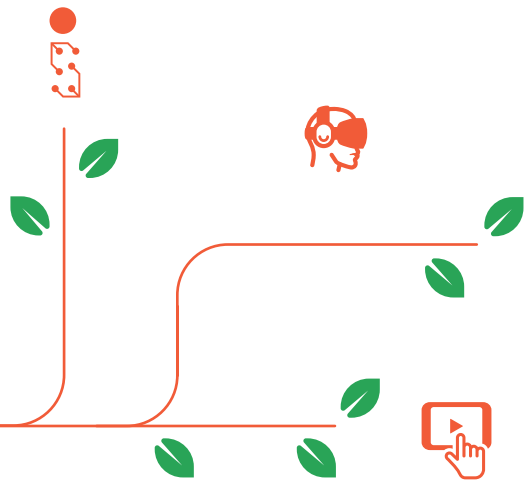
Quality of education requires quality resources and material inputs. While resources such as teachers, textbooks and learning materials are important for ensuring quality education, on their own they are not sufficient.[58] Another contributing factor is the physical learning environment.

### Learning Environment

At a basic level, a school should be clean and hygienic, provide toilets and drinking water facilities, have an energy supply, and a safe outdoor play area. Second-level considerations include, but are not limited to, a cafeteria, seating and classroom decor. Key considerations in seeking to integrate ICT in schools include providing computer equipment and/or computer lab facilities, developing curriculum based e-learning materials in local languages, and training teachers to use computers and other ICT facilities. If Internet access for students is available, online course content and related materials can also be provided.

At a minimum, an effective ICT system for educational settings requires:

- Internet access and broadband connectivity and/or Wi-Fi network
- Computers and mobile devices
- Display technologies



## Huawei MAN Project – an Agile Educational Network

The Jingyang District, located in Deyang, China, counts over 50 schools. However, the educational resource allocation is unbalanced, with a significant gap between rural and urban areas. To help address this problem, the Jingyang District Education Bureau devised a plan to enable the sharing of high-quality teaching resources by building an educational Metropolitan Area Network (MAN) that covers all primary and middle schools in the district.

To handle the exponential growth of educational system bandwidth and users' access needs over the next few years, the district had to build a best-in-class, highly reliable IP MAN to serve as a unified backbone communications platform, which will allow educational departments to offer a full array of new educational IT services that can accommodate the requirements of broadband multimedia applications.

The benefits of this solution include a wide variety of teaching management applications, such as office automation for teaching affairs, a school roll management system, interactive classes, video-on-demand, online communication, online examination and assessment, and electronic school bags.

The MAN not only enriches teaching methods but also promote resource sharing among teachers and educators, while improving their effectiveness in the classroom and the quality of education for all primary and middle schools in the district.

More information on this project is available HERE.

## Education Content

Appropriate teaching materials are needed to deliver a quality education. In many countries, schools lack basic materials such as textbooks, teacher support materials, student workbooks and supplementary learning aids. They may be unavailable due to lack of financial resources to purchase them, lack of human resources to develop them and or due to geographical barriers that make delivery challenging.[59]

ICT can improve the quality of education content by enabling easier access to such materials. It can also assist with the teaching of a variety of academic and life skills. In addition to basic literacy and numeracy skills, a quality education should include the development of skills and competencies such as:[60]

- Other foundational skillsets such as ICT and financial literacy skills
- Competencies such as good problem solving, creativity and critical thinking
- Character qualities such as effective leadership and social and cultural awareness

ICT can deliver diverse learning content to students through a variety of platforms and applications. 3D printing, for example, can revolutionise classrooms by transforming e-learning into e-making.[61] Gamification – the application of game elements and digital game design techniques to non-game problems such as business and educational challenges[62] – in education technology products can foster social and emotional learning through incorporating interactive role-playing and making play adaptive to performance and educational outcomes. Technologies such as wearable devices, mobile applications, virtual reality, advanced analytics and machine learning, and affective computing can also advance social and emotional learning in a way that supports quality education.

### • Teach for All – Global STEM Initiative

**Teach for All**, a growing global network of 40 independent partner organisations, is committed to developing a collective leadership approach for education to ensure all children have the opportunity to fulfil their potential.

In today's increasingly technology-driven world, a focus on science, technology, engineering and mathematics (STEM) education is important for any global effort to expand educational opportunity. Through its Global STEM Initiative, Teach for All is working to ensure that underserved children around the world have the opportunity to receive high-quality STEM education that builds the skills necessary for 21st-century work and global citizenship. The network's teachers strive to enhance educational outcomes by leveraging best practices in ICT to incorporate more hands-on learning experiences that are co-designed by the students themselves.

In Southeast Asia, Teach for Malaysia, **Teach for the Philippines** and Teach For Thailand have recruited and supported over 500 teachers – 21 percent of whom work in STEM classrooms – who collective reach more than 108,000 students. At a worldwide level, the Teach for All network is contributing to the achievement of SDG4 by engaging with the multilateral community and its partner organisations to work on building leadership capacity in various countries.

## Teaching and Learning Support

Providing targeted support for teachers and staff members responsible for managing education processes is vital to delivering a quality education. These individuals are on the frontline as regards ensuring teaching methods work and that learners are motivated to actively participate in the education process.

### Teachers

A substantial increase in the supply of qualified teachers in developing countries by 2030, especially in marginalised regions, is one of the dedicated targets established under SDG4. Teacher competency is recognised as an important factor in quality education delivery in both developed and developing countries because of its evident,[63] and in some cases dominant, direct correlation to the learning outcomes of students.

All ASEAN countries and China stressed the need to enhance teacher competence in their Education for All National Review in 2014. Five common domains are used to measure teaching competency standards:

- professional knowledge
- professional skills
- personal characteristics
- professional/personal ethical standards and values
- professional development and lifelong learning[64]

Qualified teachers are defined in terms of a teacher's academic and training qualifications. In ASEAN countries where data is available (Brunei, Malaysia, Myanmar, Laos, Vietnam and Cambodia),[65] the percentage of teachers meeting the country's minimum requirement of academic qualifications at primary and secondary education levels ranged from 98 to 100 percent, with the exception of Brunei. However, the numbers for the same benchmark among pre-primary education is significantly lower. In Myanmar, for instance, only 48 percent of pre-primary schoolteachers meet the national minimum training requirements. Since 2000, ASEAN and China have started to develop and steadily implement national teacher competency standards to standardise assessment of teachers' capabilities.

Most countries in the region are already working on

measures to improve teacher competencies and are updating curricula to help teachers cope with changing pedagogical requirements. For example, in 2004 a National Educational Technology Standard for Teachers, with ICT at its core, was issued in China, requiring all teachers to attain the necessary knowledge, skills and application ability of ICT in teaching by attending training and completing various assignments.

### How can ICT help teachers

- ICT solutions can greatly improve teacher development. Digital learning formats enabled by mobile devices, connectivity technologies and cloud computing can improve teacher supply and quality by offering online teacher training, especially in remote, rural or poor areas
- ICT can enhance the quality of teaching and learning in nearly every aspect of a teacher's classroom, administrative and professional development work. Using smart solutions in education systems, for example, can help teachers monitor learning results via online communication, analyse learning patterns and customise individual learning plans to improve student-learning results[66]
- ICT can offer a platform for sharing digital teaching and learning resources, engaging teachers in professional development and building a professional learning community[67]
- ICT can strengthen academic support structures via online networking between individual specialists, institutions and organisations, including national education ministries. This can improve collaboration and aid in addressing key education sector-related challenges. It can also promote an exchange of experiences and expertise to facilitate the formulation of evidence-based policy options and programmatic initiatives relevant to the needs of each of the countries in the region[68]

**Monitoring and assessment:** ICT can support monitoring and assessment by accelerating the collection and analysis of learning performance indicators, while empowering documentation for reporting student progress to parents. Adopting school-wide ICT-based assessment tools or systems can facilitate easier comparison of students' transition between teaching years and/or teachers.[69]

Problems of educational quality and relevance manifest themselves in different ways in the region. The curriculum and approach to education must be of direct relevance to the student's social, cultural, environmental and economic context. Governments throughout the region that are responsible for their own education systems have been trying to address such problems by introducing changes in curricula and their delivery. However, the task of pursuing meaningful curriculum reform is a complex undertaking, particularly in environments where context, aspirations and expectations are evolving rapidly.[70]

## • Project VolunOnline in China

Established in July 2014, **Project VolunOnline** is an education NGO in China that attempts to address the problem of inadequate teachers for marginalised children by utilising existing ICT and "remote" teachers. They target two groups of marginalised children, namely children studying in under-resourced village level schools, and orphans and disabled children in post disaster areas. It is their belief that education resources are more unevenly distributed than simply inadequate. They work with local schools and children's homes to set up regular and interactive online classes on Skype, through which volunteer teachers within and outside of China reach students who would not be reached otherwise. They currently work with over 500 volunteer teachers and have reached over 1000 children in 19 classrooms connected across the most rural or post-disaster regions in China.

The programme aims to address the need for qualified teachers in most public schools in rural villages throughout in China. While many of these village schools have internet access and computer facilities, they lack qualified teachers due to financial and institutional barriers. Utilising the ICT resources available, volunteer teachers become just a computer screen away from their students.

The programme stresses on the need of human interaction in remote learning. As their target beneficiaries are children in their formative age, they believe by providing the access to online teaching resources (e.g. MOOC) alone will not guarantee good learning outcomes. For some groups of children, such as the left-behind children of migrant workers in rural villages, or children from families affected by AIDS, the volunteer teachers provide not only teaching, but also the companionship that the children long for. Learn more about Project VolunOnline HERE.

> Teachers and their quality are at the heart of our programme. The past decade saw enormous amount of donation and funding be used on improving educational infrastructure at all levels in China, including ICT facilities. Yet providing ICT facilities and better education hardware is just a means, it should not be seen as an end. Now we will need more of those money and attention going to the educational software, such as the quality of teachers and delivery.
>
> – Mr. Gu Siyi, Founder Project VolunOnline

## Outcomes

Learning outcomes are still generally measured through academic achievements such as graded assessments and examinations. However, there is a growing realisation that assessing creative and emotional development, as well as changes in values, attitudes and behaviour can also be valuable in understanding learner growth and achievement. Other proxies for learner success and broader social or economic gains – for example, attaining meaningful employment – are also starting to be used.[71]

Traditional academic test scores cannot adequately assess many of the skills that are required to succeed in today's world. A quality education must provide basic literacy, numeracy, and languages skills but should also seek to nurture these less easily measured skills and characteristics such as entrepreneurship, effective communication and civic responsibility.

### Literacy skills

Literacy skills have economic and social pay-offs that include higher incomes, improved productivity in both rural non-farm and urban environments, and strengthened community ties.[72] Literate adults also foster a healthy learning environment where early literacy for children is encouraged and can thrive under parental support. Having literate parents and family members motivates children to stay in school.[73]

ICT can assist in accelerating literacy using a number of tools and platforms and help make written information a part of everyday life. For example, television can bring written material into classrooms and homes using subtitled programming. Similarly, mobile technology applications can encourage the development of basic reading and writing skills using engaging and relevant learning material.[74]

### Numeracy skills

Numeracy refers to the ability to make sense of mathematics and to use mathematics effectively in real-life situations. Having basic numeracy skills has been linked to improving livelihoods and making well-informed financial decisions.

The digital age is creating the need for most people to handle more numerical data than ever before. ICT can do the mathematical processing, but good numeracy skills are vital in order to use ICT tools effectively. A growing number of new graduate jobs now require a high level of digital skills, which are built on having a good grasp of basic numeracy.[75]

### • Education for anyone, anywhere

The **Khan Academy**, a non-profit educational organisation that aims to provide a "free, world-class education for anyone, anywhere", offers educators powerful e-learning tools to teach students numeracy. The Academy provides learning materials for mathematics by subject and grade, including short YouTube video lectures, suggested syllabi and test exercises, and an interactive online classroom to answer any questions raised by students The visual teaching materials enabled by e-learning help make mathematics more enjoyable. Moreover, the Academy offers tools for personalised learning by evaluating and monitoring the level of numeracy students possess, and providing recommendations on what to learn next.

### Language skills

Good language and communication skills can contribute to a wide range of positive educational outcomes[76] such as building self-esteem and confidence, and providing the social tools needs to interact in a variety of personal and professional environments.

Integrating ICT into language skills training has positive effects for both teachers and students. There are numerous open-access or free resources available – including online courses, virtual classrooms and social networks – that can encourage learners to communicate and collaborate with native or non-native speakers around the world to improve their language skills.[77] Moreover, with the ability to reach a broader, more international audience that is not limited by geographical distance, ICT supports a more open and inclusive learning atmosphere.

## Huawei Nurturing ICT Professionals in Myanmar

Huawei nurtures ICT professionals and transfers ICT knowledge in the local communities. The objective is to help build digital societies and make information and communication technologies available to all. Huawei believes in the importance of sharing knowledge: "if you give a person a fish, you feed them for a day; if you teach a person to fish, you feed them for life."

In Myanmar, Huawei has cooperated with the training organization KMD to provide end-to-end ICT training. Specifically, Huawei offered a wide array of training materials, donated equipment to create a practical training environment, trained trainers, arranged internships and developed a pool of ICT talent.

Huawei trained more than 1,500 ICT professionals in Myanmar in 2014 and plans to train 5,000 more over the next three years to address the country's shortage of technical personnel and boost socio-economic growth. Learn more about this initiative HERE.

### Employability skills

The pace of economic development in the region over the past decade has been remarkable, with an average annual real GDP growth of 10 percent in China and 5.1 percent in ASEAN between 2000 and 2013. China and ASEAN are now two of the world's top three economies. Such growth has been mainly driven by rapid urbanisation and industrialisation. The accompanying demographic and economic transformations indicate that workforce needs are shifting towards more technological skill and knowledge-based requirements.

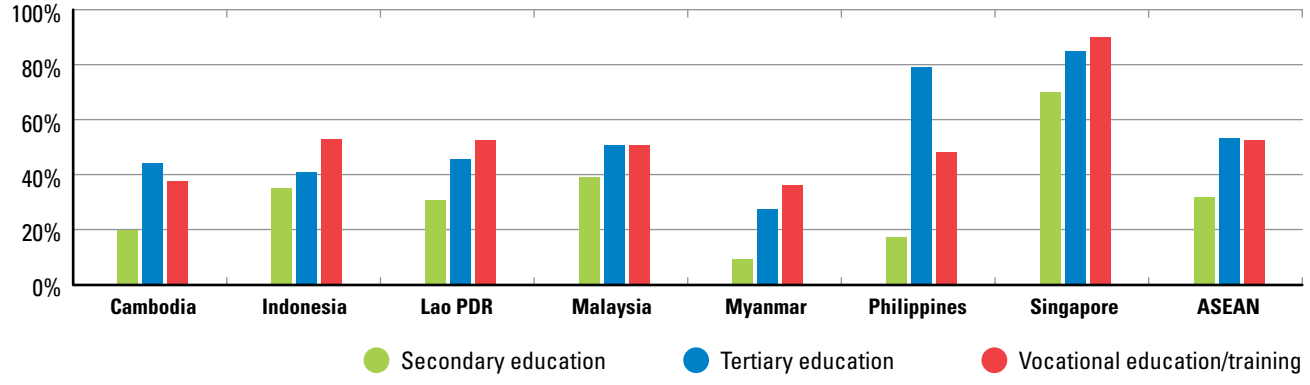
The labour force in the region is young and expanding. This 'demographic dividend' is expected to add to the region's growth potential, provided appropriate programmes are formulated and implemented to enable younger generations to achieve higher levels of education and skills development.[78]

A 2013 International Labour Organisation (ILO) survey[79] revealed that almost half of respondents in ASEAN did not agree that the skills of secondary, tertiary and vocational education graduates match enterprise needs. In Indonesia and Myanmar alone, there is a projected undersupply of 9 million skilled and 13 million semi-skilled workers by 2030. Based on current trends, it is estimated that by 2025 workers with insufficient qualifications will fill more than half of all high-skill jobs in Cambodia, Indonesia, Lao PDR, the Philippines, Thailand and Vietnam.[80] This high-skill mismatch is already reflected in the relatively high youth unemployment rate of 13.1 percent, with the problem being particularly acute in Indonesia (21 percent) and the Philippines (16.6 percent).

To address the issue of mismatched labour supply, many countries in the region have already included, and in some cases prioritised, the development of technical and vocational education and training (TVET) in their educational agenda. Currently, TVET only accounts for about 0.8 percent to 18 percent of secondary school enrolment across ASEAN. However, China has continued to enhance the implementation of TVET in both formal and informal education settings[81] and TVET students at secondary school level reportedly accounted for half of all high school students in 2011. The Chinese government also has pledged to build a modernised and comprehensive TVET system by 2020.

A universal challenge faced by TVET development in the region is the perception that TVET is a second (i.e. inferior) choice to a more strictly 'academic' or 'traditional' education. Many students still place higher value on the tertiary education path despite an exceptionally high unemployment rate among university graduates throughout the region. Rebranding and repositioning TVET in both formal and informal education is an important next step in addressing the mismatched labour supply issue.

**• Share of respondents who agree that skills of secondary, tertiary and vocational graduates match enterprise needs, 2013 (%) •**




Note: ASEAN regional averages exclude Brunei Darussalam, Thailand and Vietnam.

Source: ILO: Survey of ASEAN Employers on Skills and Competitiveness (2013).

## • Skills gap in the Philippines

A mismatch between skills demanded and supplied in the workforce continues to be a problem in the Philippines. While the gross post-secondary education enrolment rate was 36 percent in 2014[82] (relatively high among ASEAN members), **50.4 percent of the unemployed population were in the age group of 15-24 years old, and 21.9 percent were college graduates**.[83] At the same time, emerging industry sectors such as business process outsourcing (BPO) or call centres are facing acute worker shortages.

In 2010, the Philippines superseded India to become the global leader in BPO. Service export revenues from call centres have climbed from US$6.1 billion in 2008 to more than US$11 billion in 2011, accounting for 5 percent of the country's GDP.[84] In 2015, the industry became the country's second-largest economic contributor, behind only inward remittances from over 10 million Filipinos working abroad. The BPO, information and communications technology industries were the top employment generators in 2015[85] and this is expected to persist. ICT skills are of crucial importance in enabling this industry to thrive and expand.

In 2012-2013, only 5 percent of students of the Technical-Vocational high schools run by the Department of Education through the Strengthened Technical-Vocational Education Program had studied an ICT subject,[86] while 68 percent of them had enrolled in arts and trade courses. Given the rapid growth of ICT-related industries, there is huge potential for connecting unemployed workers with job opportunities if they can attain the correct skills.

Seeds for the Future

## Huawei's Seeds for the Future

Seeds for the Future, Huawei's global CSR flagship program, was launched in 2008 to enhance knowledge transfer, promote a greater understanding of, and interest in, the telecommunications sector, and improve and encourage regional building and participation in the digital community.

Through the program, Huawei collaborates with local governments, higher educational institutes, and other organizations to select top undergraduate STEM students and offer them an eye-opening opportunity to set foot in China, to experience Chinese culture and to gain more insights of the ICT industrial transformation. It also offers first-hand learning opportunities through interactions with Huawei staff and visits to Huawei laboratories, R&D facilities, data centres and manufactory centres. Program participants receive hands-on practice such as building signal towers and configuration of LTE base station; and witness live demonstrations of the latest ICT technology, such as the fifth generation network and cloud computing. The program helps them get the latest skills needed to be successful in ICT, build a global outlook and be immersed in a multicultural business environment.

> "It will benefit us if we want to pursue our career in the ICT industry"
>
> – Daryus Chandra, Student of University of Gadah Mada, Indonesia

> "I am used to being taught ICT courses in the classroom, sitting down and just taking notes, but in this programme I can see it in practice"
>
> – Nelly-Kim Tran, Student of Ecole Centrale d'Electronique, Paris, France

> "Overall, my experience in China was truly an unforgettable adventure that allowed me to see the future. I can see how and where my present studies can be applied. I am excited to know that there are such great opportunities in ICT"
>
> – Kathleen Rozman, Carleton University, Canada

To date, Seeds for the Future provided ICT skills training to more than 20,000 students, in 80 countries. Over 2,000 ICT students came to China to be trained on the latest technologies and be immersed in a global work environment. Learn more about Seeds for the Future HERE.

## ICT Skills

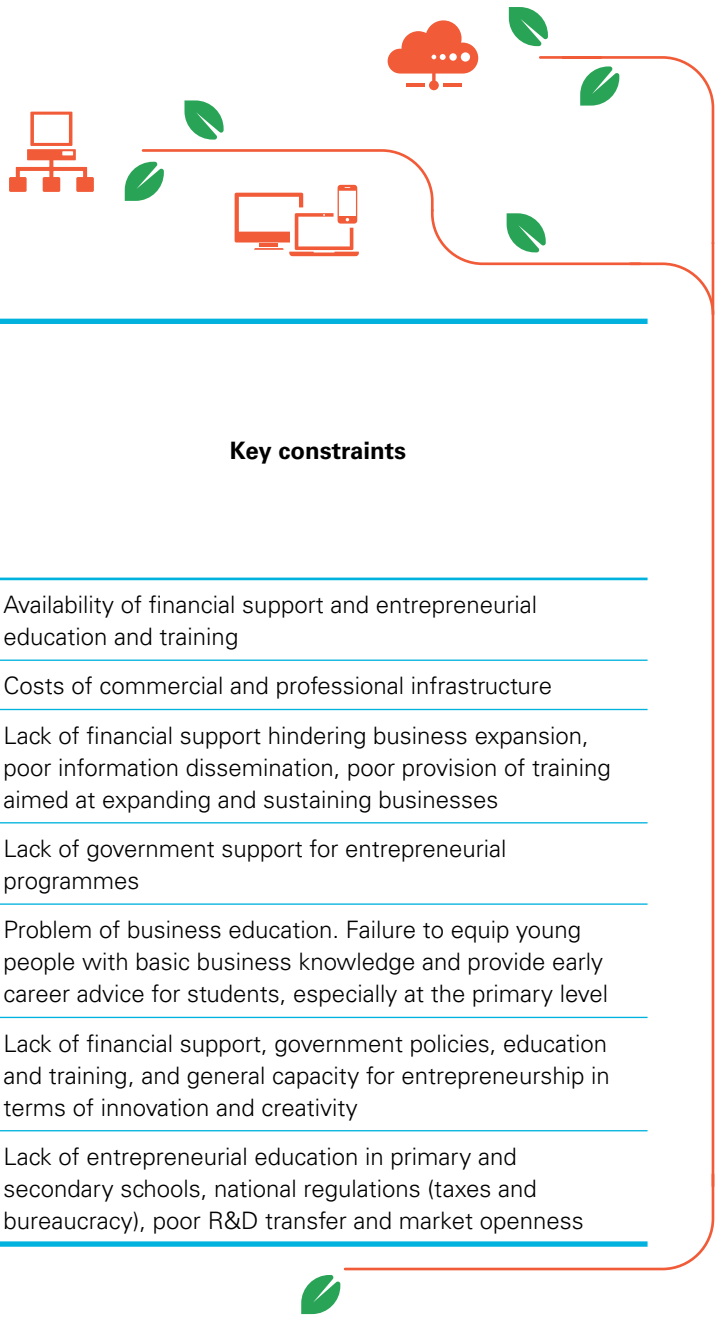
ICT literacy has fast become a necessity in virtually all workplaces. Some ASEAN member states have identified a shortage of trained ICT personnel and teaching resources in the labour market. In addition, some teachers, especially among older generations, are uncomfortable teaching ICT skills or using ICT as an educational tool. This demonstrates a need to further explore how to encourage the proliferation of ICT teaching competencies, learning materials and curricula, as well as ICT equipment for delivering education in the region.

ICT can support the next generation of workers with a strong focus on learning outcomes, vocational training and expanding skill development opportunities, while also building a system that supports continual education and lifelong learning. The region can establish itself as a key player in a globally integrated digital economy, by taking steps to cultivate a skilled ICT work force and equipping citizens with the latest infrastructure, technology, digital skills, information, applications and services through digital education in schools, relevant re-skilling in continuing education programmes and encouraging lifelong learning.[87]

## Entrepreneurship Skills

Entrepreneurship allows learners to create job opportunities for themselves and others. Entrepreneurs and small and medium-sized enterprises are considered major drivers of economic growth and job creation in several emerging economies in the region. Education levels can influence the growth of entrepreneurial activity as well as the ability of entrepreneurs to cope with the challenges of running their own business.

Over 80 percent of early-stage entrepreneurs in ASEAN have at least a secondary education, and more than half hold a post-secondary qualification.[88] The lack of entrepreneurship education is a major constraint to growth in the entrepreneurial sector throughout the region (see table below).[89]



**• Overview of Entrepreneurship in the Region •**

| Country (most recent data) | Key Indicators | | Key constraints |
|---|---|---|---|
| | Percentage of 18-64 population who are either a nascent entrepreneur or owner-manager of a new business | Percentage of 18-64 population who believe they have the required skills and knowledge to start a business [1] | |
| China (2013) | 14% | 36% | Availability of financial support and entrepreneurial education and training |
| Singapore (2014) | 11% | 21% | Costs of commercial and professional infrastructure |
| Philippines (2014) | 18.4% | 66% | Lack of financial support hindering business expansion, poor information dissemination, poor provision of training aimed at expanding and sustaining businesses |
| Indonesia (2013) | 25.5% | 62% | Lack of government support for entrepreneurial programmes |
| Vietnam (2014) | 15.3% | 58% | Problem of business education. Failure to equip young people with basic business knowledge and provide early career advice for students, especially at the primary level |
| Thailand (2013) | 17.7% | 44% | Lack of financial support, government policies, education and training, and general capacity for entrepreneurship in terms of innovation and creativity |
| Malaysia (2013) | 6.6% | 28% | Lack of entrepreneurial education in primary and secondary schools, national regulations (taxes and bureaucracy), poor R&D transfer and market openness |

[1] Individuals involved in any stage of entrepreneurial activity excluded
Note: Data for Brunei, Cambodia, Lao PDR and Myanmar was not available

# Towards Lifelong Learning

Lifelong learning has an important role to play in meeting all 17 SDGs as it promotes the concept of a self-directed learner who takes responsibility for their own learning, who questions, reflects and perseveres in the pursuit of educational experiences.[90] The concept of lifelong learning has a long history, but it is arguably more of an imperative today than ever before.[91] A globalised and connected world requires continual learning of new skills and competencies in order to remain up to date and relevant.

Lifelong learning is defined as all purposeful learning activity undertaken throughout life with the aim of improving knowledge, skills and competencies from a personal, civic, social and/or employment-related perspective. Lifelong learning helps to:

- Develop the autonomy and sense of responsibility of people and communities
- Reinforce the capacity to deal with the transformations taking place in the economy, culture and society
- Promote coexistence, tolerance, and the informed and creative participation of citizens in their communities
- Enable people and communities to take control of their destiny and society to face the challenges ahead[92]

This not only facilitates the personal development of learners, but also enhances their employability, social mobility and capacity to be effective in participating in activities designed to improve the quality of life in the community.[93]

To be successful in the global knowledge economy, public and private organisations and industries need information-age workers. Knowledge is growing at an exponential rate: employers need managers and employees who are creative problem-solvers; innovators who are constantly updating their knowledge and expertise, reflecting on what can be done to improve productivity, seeking to be at the cutting edge of knowledge in their field and capable of being effective team players. Successful organisations take the notion of lifelong learning for their employees and the organisation seriously.[94]

As ICT permeates our societies and communities, the role of the individual learner is further emphasised. With ICT tools, people can learn at any time and in almost any location.[95] Using ICT as part of lifelong learning can create:

- new approaches to teaching, such as learner-centred teaching
- increased flexibility and self-sufficiency for students
- increased networking of institutions and of public-private partnerships between education stakeholders
- improved access opportunities allowing those with fewer resources to benefit from advances in knowledge

Equipping these areas with the appropriate infrastructure and providing equal access to ICT for everyone are important factors, but are not, by themselves, sufficient. In order for ICT to play a real role in achieving quality lifelong learning for all, knowledge and skills acquired through online and open learning should be recognised as being equally credible as those acquired in more traditional and formal settings. Well-organised online learning courses have the potential to add to the variety and quality of the learning process and provide another opportunity for tertiary education and lifelong learning.[96] It is this realisation that has seen the proliferation of online courses coming out of the world's best universities in recent years. MOOCs provide video lectures, structured deadlines and interactive learning communities. Some recommended[97] MOOC platforms include:

- **Coursera** – The largest course platform for free MOOCs. Founded by two former Stanford University professors
- **Udacity** – Founded by Sebastian Thrun, the creator of the artificial intelligence system behind Google's self-driving cars. Udacity's focus is on free MOOCs for improving your knowledge of STEM disciplines
- **EdX** – A rapidly expanding, free MOOC platform developed through a partnership between Harvard, MIT and Berkeley. Some ASEAN and China-based partner universities include Hong Kong Polytechnic University (HKPolyUx), Peking University (PekingX), Tsinghua University (TsinghuaX) and The University of Hong Kong (HKUx)
- **MIT Open Courseware** – This project launched over a decade ago by MIT makes the course materials used in virtually all of MIT's courses available for free on the Internet

There is an ever growing number of online resources that can provide invaluable lifelong learning tools beyond certification or accreditation. These include online lectures and video learning websites – such TED or Solve for X – as well as streaming documentaries, practical skills platforms and open educational resources. There is much room for improvement of online resources that are created in China and ASEAN. Current options tend to focus on English or Maths tutoring and soft skills. With billions more lifelong learners moving their education experience online each year, the mobile-learning industry and the education sector in the region should take concrete steps towards expanding their lifelong learning presence on ICT-driven platforms.

## • Singapore's SkillsFuture Programmes

**SkillsFuture** is a national movement to provide Singaporeans with opportunities to develop their full potential, regardless of their starting point. Through this movement, the skills, passion and contributions of every individual will drive Singapore's next phase of development towards an advanced economy and inclusive society.

Originally designed as a work-study programme to give fresh graduates from polytechnics and the Institute of Technical Education a head start in careers related to their discipline of study, it has since expanded throughout the nation. It provides learners with more opportunities to build on the skills and knowledge they acquired in school, and to better support their transition into the workforce. The programme uses ICT blended learning to:

- Help individuals make well-informed choices in education, training and careers
- Develop an integrated high-quality system of education and training that responds to constantly evolving needs
- Promote employer recognition and career development based on skills and mastery
- Foster a culture that supports and celebrates lifelong learning

Singapore's dedication to lifelong learning prompted all five Autonomous Universities (Singapore Institute of Technology, National University of Singapore, Nanyang Technological University, Singapore Management University and Singapore University of Technology and Design) to establish new Lifelong Learning Units (LLUs) in 2016. These LLUs have a dedicated focus on lifelong learning tailored for adults. To cater for the needs of working mid-career individuals, the LLUs provide industry-relevant courses, including short certificate programmes, and make skills upgrading more accessible through customising the mode of educational delivery. Learn more about SkillsFuture HERE.

> "The innovation divide and the inequality of opportunities has changed, in that not everyone needs to have had a college education to create an app or computer game which can turn a profit. ICT can enable more equality in the workforce and entrepreneurship. Computers don't know or care about the wealth or gender of the user nor does it matter where or under what circumstances one is using a computer or smartphone."
>
> – Anshul Sonak, Regional Director - Innovation and Education Programs (Asia Pacific Japan), Corporate Affairs Group, Intel Corporation

# Making it Happen by 2030

Achieving SDG4 by 2030 in the region requires unleashing the transformative power of ICT and unlocking the huge opportunities that technology can provide to expand participation, improve quality, and increase efficiency in education. ICT is a powerful tool for improving equitable and inclusive access to education not only because it offers adaptable solutions over a range of platforms, but also because it has the potential to reach so many people, and place them in control of their own educational experience.

The following six actions can help make SDG4 a reality in the region:

### Reboot Education
Transform education with innovative ICT and instigate a paradigm shift towards 21st century learning. Embrace a learner-centred future of education and lifelong learning anywhere, anytime and for anyone

### Rewire the Classroom
Rethink the 'classroom' as an interactive, engaging space for active teaching and learning. Expand education opportunities beyond traditional schooling through ICT to enrich the academic, psychological and sociological growth of learners

### Zoom and Scale
Adopt holistic and systematic approaches to effective ICT integration in education for leaners of all ages. Foster an enabling environment for ICT to create targeted and scalable solutions

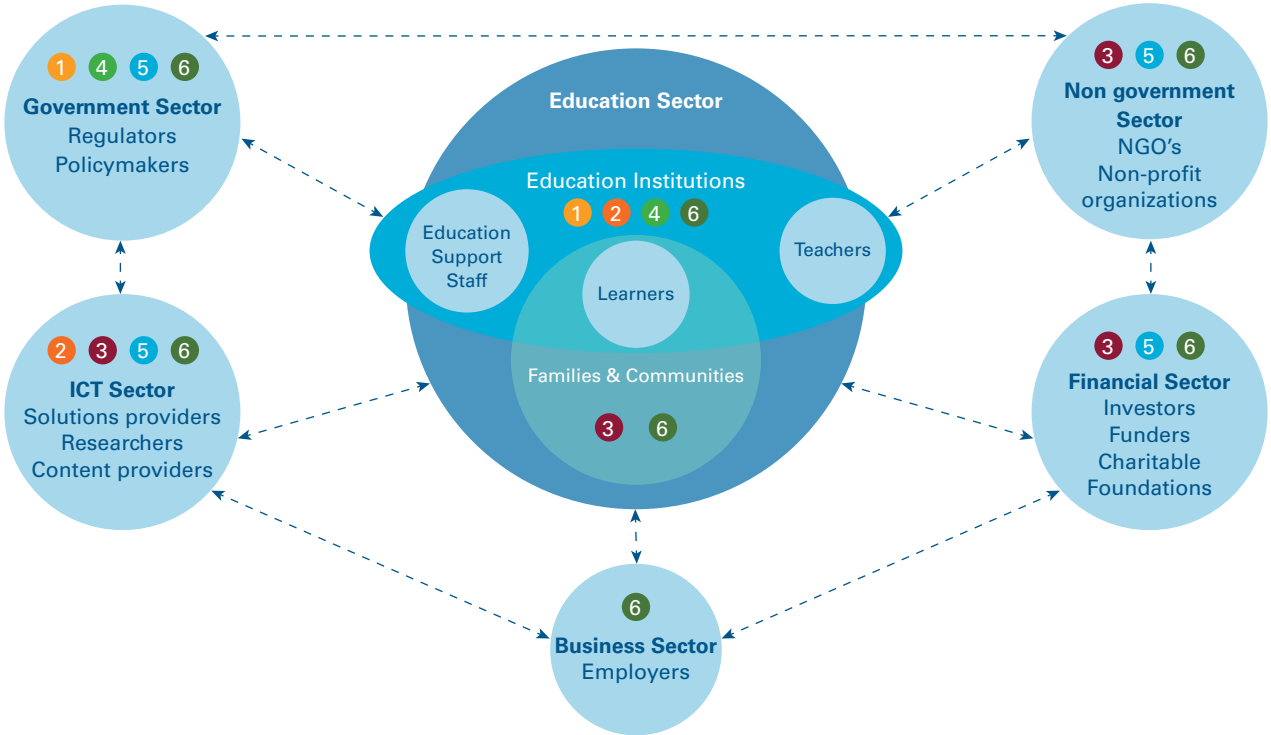

### Upgrade Teachers
Nurture teacher development based around comprehensive knowledge of technology, pedagogy and content, and move teachers from being 'directors' towards becoming 'facilitators' of learning in the digital age

### Short Circuit the Barriers
Tackle the main barriers – infrastructural, financial and logistical – by creating a strategic financing approach for ICT in education

### Enter the Game
Create multi-stakeholder dialogue platforms for effective communication, constructive engagement and efficient mobilisation of resources

## • The Roles of Education Ecosystem Players •

The different players of the education ecosystem can take prominent, targeted action in various sectors.



# Reboot Education

**Transform education with innovative ICT and instigate a paradigm shift towards 21st-century learning. Embrace a learner-centred future of education and lifelong learning anywhere, anytime and for anyone.**

The current education sector in the region generally discourages creativity and too often focuses on rote, systemic learning. Effective education in the future will require a more creative, flexible and personalized education system. This will require moving away from the traditional top-down, one-dimensional approach of teaching and towards a multi-dimensional approach that takes place in an interactive, experiential learning environment. This shift should encourage active learning. The pressure of teaching to a test will no longer exist, as multi-dimensional learning will allow for more creativity in the evaluation process. This refocusing of processes and priorities will require an enabling environment in which ICT can deliver better educational outcomes for the entire life of a learner.

Current and future generations of learners require innovative, imaginative and decisive skills to be capable of meeting new challenges head on. This requires a paradigm shift in their education, which starts with adapting all skillsets and teaching methodologies to match future expectations in a digital world. Using ICT based on an evaluative, data collection approach towards education will help identify how best to proceed with changing education systems and pedagogies.

Students are already playing a part in the creation and construction of their learning materials. Heavy, expensive and quickly out-dated textbooks are being replaced by cheap, easy-to-update and interactive digital 'flexbooks.' The authors of digital texts often are teachers — and sometimes students. With project-based learning, students and teachers around the world are generating more and more open-source materials.[98] This is also a cost-effective option for schools with few resources or limited government funding.

The next generation will have more innovative perspectives on how ICT could change the face of education beyond our current imaginations. ICT is already an important and integrated part of their daily lives. Young people should also now have a louder voice in discussions over how ICT should be integrated into their education.

## • Youth for Global Goals

In February 2016, AIESEC, an international youth-run organisation that aims to develop globally minded young leaders for a better future, initiated the Youth for Global Goals (#Youth4GG) initiative. The initiative aims to mobilize youth to act and contribute to the SDGs. Through it, young people around the world activate their leadership potential by engaging and mobilising them through purposeful and cross-cultural projects. Along with the campaign, AIESEC created the YouthSpeak Survey asking millennials specific questions about how they want to see the world change and what actions of change were most important to them. Over 160,000 young people worldwide completed the survey, and the results reaffirmed the urgent need to increase access to education and skills training. According to the survey results, the top three SDGs priorities should be:

1. SDG #4 – Quality Education (48% of millennials chose this answer)
2. SDG #1 – No Poverty (33%)
3. SDG #3 – Good Health and Well-being (29%)

In addition to placing strong emphasis on quality education, the respondents also stressed the necessity for practical education and 'hands-on' experiences. The survey showed that 80 percent of millennials believe that gaining practical experience is the most useful learning method in education today, and 29 percent believe that the biggest benefit of college and university study is to acquire the skills necessary for a career. Transitioning young people into sustainable jobs requires investment in education and training of the highest possible calibre, providing them with the skills that the labour market demands, and giving them a better chance at long-term career success by providing more opportunities for pre-employment hands-on training.[99]

The full YouthSpeak Global Report is available HERE.

# Rewire the Classroom

**Rethink the 'classroom' as an interactive, engaging space for active teaching and learning. Expand education opportunities beyond traditional schooling through ICT to enrich the academic, psychological and sociological growth of learners.**

The classroom of the future need not be in a single room or building. Stepping beyond the concept of the single fixed-location education space requires promotion of the idea that what influences learning is not just the classroom but also the daily context of learning.

Rethinking the classroom takes into consideration and integrates ICT tools designed to aid the entire learning experience for students. Internet access allows the virtual classroom to create a worldwide connection between 'classrooms' and students, with the goal providing a greater understanding of different viewpoints and ideas through what is being taught and learned elsewhere and nurturing well-informed global citizens with strong connections to cultures and people around the world.

Another emerging innovation involves experiments with 'flipped classrooms,' a concept that involves delivering education online with students completing homework in the classroom. Students can watch lectures at home at their own pace while communicating with peers and teachers via online discussions. Concept engagement takes place later in the classroom with the help of teachers.[100] Flipped classrooms have the potential to be an effective solution in schools dealing with teaching staff shortages. Making this model a reality will require classrooms to have the basic ICT infrastructure and hardware in place with a reliable Internet connection. While this may not seem possible for poorer schools at this time, it is becoming increasing attainable.

> "Technology can be a great equalizer. You can be using some great learning resources and whether you are a rural school or in the middle of the capital city, you all get to look at the same videos on how to dissect a frog in biology class. Even if in real life the school in the rural area cannot afford laboratory equipment, classrooms in both locations can benefit from the same information regardless of their location or quality of equipment."
>
> – Karina Veal, Education Expert, Asian Development Bank

## • CONNECTING THE DATA

Gaps in statistics currently make it difficult to accurately assess the state of education in several countries in the region. The creation of a system that supports the regularised collection of relevant data will enable decision-makers to identify how best to improve access to education and invest time and resources in the most effective way. This system should include structures targeting data about children in vulnerable, mobile or underrepresented groups such as migrant communities.

ICT solutions can used to gather baseline data and facilitate the comprehensive and efficient measurement and monitoring of the education landscape by improving census and survey coverage and capture rates, tracking Wi-Fi and network usage, and surveying the development of education infrastructure in geographically isolated areas. Governments and institutions can then use Big Data analytics to mine these enhanced data sets to identify patterns and trends and make evidence-based decisions for better policy planning.

# Zoom and Scale

**Adopt holistic and systematic approaches to effective ICT integration in education for learners of all ages. Foster an enabling environment for ICT to create targeted and scalable solutions.**

The global ICT in education market will grow to US$37.8 billion in 2020, up from US$3.4 billion in 2011. Digital technologies have permeated almost every aspect of the classroom, with enhancements such as desk-sized screens, tablets that track eye movements, performance dashboards, object-embedded intelligence and interactive whiteboards.[101] For many such technological advancements to truly meet the needs of future learners and the education system in the region, they must be tailored to the needs of individual students. Once proven, they then must be scalable and expandable with an emphasis on lifelong learning for entire communities.

**Zoom:** ICT offers the opportunity for education to be focused on the individual learning needs. It can track progress and design a curriculum to match a learner's capacity. Through ongoing assessment and evaluation, ICT can actually measure the learning of an individual and use this to manage the pace at which learning proceeds to ensure that is set to delivering an optimal outcome. Technologies like Smart systems and AI can support a 'total package design' concept for education, whereby a student's learning is monitored and measured in real time by a system that can predict educational gaps throughout their entire education experience. ICT can take existing curricula and make them more relevant to the learning needs and capabilities of young people as well as delivering skills-based vocational education. ICT also has the capacity to enhance academic studies and deliver innovative programmes for lifelong learners who want to study in their leisure time.

**Scale:** Education for everyone requires scaled access for whole communities and not just young people. ICT learning centres create open access learning opportunities that meet a whole array of different learning needs, from employment-focused skills development or learning for pleasure. An agenda that focuses on delivering education for a whole community, rather than a just in schools, can by greatly advanced by taking an ICT-centred approach.

To create targeted and scalable solutions requires collaboration between ICT and education sectors within the region. Leveraging existing platforms and creating new ones for this type of collaboration will be a helpful next step.

A collaborative multi-stakeholder forum through which participants can share best practices and learn new methods of educating with technology will help ICT in education projects to scale more rapidly. This will also require more studies on the actual and potential application of ICT in education and workforce development. The end result will furnish the region with a better understanding of the current strengths and weaknesses of ICT in learning situations, and the knowledge to properly develop and scale domestic and regional ICT in education initiatives into national education plans.[102]

# Upgrade Teachers

**Nurture teacher development based around comprehensive knowledge of technology, pedagogy and content, and move teachers from being 'directors' towards becoming 'facilitators' of learning in the digital age.**

Teachers matter more than any other single factor in learning and in the ongoing, formative assessments that are critical to improving learners' achievements. Extensive investment is required to improve teachers' qualifications and compensation in order to strengthen and motivate the educators and to ensure that well qualified and highly talented individuals remain within the education sector. Sporadic rewards and short-term training is not enough.[103]

Upgrading teachers requires transitioning towards a learner-centred future of education. Teacher development should be geared towards nurturing their comprehensive competency as 'facilitators' of learning in the digital age, instead of the 'director' role that is common in today's traditional schooling structure. As this relates to ICT, there are three essential pillars:

- **Technology:**
  - Take ICT training, access up-to-date teaching materials and explore resources, and increase technological capacity by fostering a supportive teaching community
- **Pedagogy:**
  - Identify education needs that could be addressed by ICT
  - Integrate ICT into daily teaching practice in a way that supplements the subject matter in a non-disruptive way
  - Monitor differences in learning outcomes before and after the application of the ICT integration
- **Content:**
  - Examine the plethora of educational technology products on the market and test those that appear to best fit the needs and context of the students
  - Put forward preventive measures to address potential risks related to use of ICT and the Internet by young learners

# Short Circuit the Barriers

**Tackle the main barriers – infrastructural, financial and logistical – by creating a strategic financing approach for ICT in education.**

ICT has had a significant impact on the global economy and on the way people work, live and play. However, despite earlier forecasts and predictions of ICT revolutionising education, it has yet to radically transform education processes or what and how people learn. While recognising the potential value of ICT in education, many countries face significant challenges in translating the promise of ICT into tangible benefits for learning. Throughout the region, the three main barriers to ICT in education are infrastructural, financial and logistical.

| **Infrastructural** | **Barriers** |
|---|---|
| Infrastructural barriers are found in the least developed countries in the region, particularly in rural or remote communities. | Lack of electricity in classrooms |
| | Lack of Internet connectivity in classrooms |
| | Lack of physical ICT infrastructure (e.g. computer labs) in schools |
| **Financial** | |
| The fiscal capacity of some governments to implement and sustain the use of ICT is doubtful, especially if it is not a priority or not generally endorsed by citizens. Resources - financial and human - that are available to tackle this barrier are limited. | Lack of government funding in supporting ICT infrastructure |
| | Lack of government funding in supporting ICT in education software |
| | High costs of digital devices and solutions |
| | High connectivity costs due to connectivity monopolies (in locations with only one network provider) |
| **Logistical** | |
| Developed and developing countries in the region may face certain logistical barriers during the application or planning of ICT-enhanced education, which undermine the learning outcomes of students. Other barriers include the lack of relevant content in a language understood by the user and limited access to open education resources.[104] | |
| Teacher competency | • Lack of skills for using ICT in teaching<br>• Resistance to the use of ICT due to unwillingness to change, or lack of confidence<br>• Insufficient free time to complete relevant training |
| Availability and quality of teaching contents | • Inconsistent quality of teaching materials<br>• Lack of teaching materials in subjects other than languages and mathematics |
| Potential risks of ICT implementation in education | • Physical risks of users such as deteriorating eyesight due to long hours in front of computers or smartphones<br>• Psychological risks of users such as less human interaction<br>• Educational risks such as distracting children from their studies, and using ICT to facilitate cheating in examinations or plagiarism in assessments, and using ICT to harass others<br>• Access to violent or obscene images, cyberbullying, online sexual solicitation and circulation of child sexual abuse materials<br>• Exposure to digital security and personal data protection risks |

## Financial Focus

A range of financial considerations is required to realise the full potential of ICT in education. A large majority of funding for education comes from domestic governments, whose commitment to investment and reform are the most important drivers[105] in achieving SDG4 and in integrating ICT in national education agendas. To increase the international financing of education and improve its effectiveness, greater input from the international financial community – including governments, financial institutions, investors, and philanthropists – is required. According to the International Commission on Financing Global Education Opportunity, also known as the Education Commission,* the international financial community must significantly scale up financing for education from all sources and set ambitious but achievable targets in this regard.[106]

Perhaps the biggest barrier to scaling up financing for ICT in education is a lack of available data on the true costs involved. This data is limited worldwide, and particularly more so in ASEAN and China. Governments who are deciding where and how to spend public financing need solid information regarding the cost of ICT in education and the expected impact of the interventions available to address this challenge.[107] Data collection and data reporting need to be made more robust while also ensuring they are streamlined and made readily available.

In its Learning Generation Report, the Education Commission makes recommendations regarding the financial aspects of improving education. In addition to the Commission's general recommendations, the following targets to aid in achieving SDG4 and to improving ICT in education are recommended:

- **Increase the international financing of education and improve its effectiveness**
  Donors should improve the effectiveness and impact of international finance by re-examining the frameworks within which they make allocations, to ensure that they reflect needs and domestic commitment to education, and to ensure extra support for fragile states.[108] Once this is addressed, allocating education budgets specific to ICT initiatives can be more effective and focused. New innovative and collaborative funding platforms should be encouraged, like the Sustainable Finance Collective Asia, which to aims support sustainability themed funding proposals in Asia by providing expert feedback to eligible proposals and to accelerate the funding process.

- **Leverage interest and support from the private sector**
  Public-private partnerships (PPP) can play an important role in mobilising the scale of resources required for financing and building ICT infrastructure, developing applications and locally relevant content, and developing the human capacity required for harnessing the full capacity of productive ICT tools.

- **Establish a Multilateral Development Bank (MDB) investment mechanism for education to deliver improved MDB financing**
  An MDB investment mechanism would increase banks' leadership and financing of education, leverage their capital bases with the potential to raise billions for education, improve coordination between financial institutions, and support innovation in encouraging new sources of financing.

- **Invest across sectors to tackle the factors preventing learning**
  Getting all children into schools and other learning environments requires greater collaboration across sectors, recognizing the impact that all sectors can have in enabling the most disadvantaged children to learn. Any separate costs associated with targeting children of vulnerable people (CwDs, migrant children, girls, children of ethnic minorities, etc.) requires a cross-sectoral strategy to reach marginalised populations and narrow inclusion gaps.

- **Do not compare the relative resources of countries**
  It is necessary to consider all unique financial barriers within national agendas before comparing one country's situation and policies to others in the region. Every nation in the region should first consider their individual needs, their available resources, and their specific ICT infrastructure gaps when making plans to implement ICT in education initiatives.[109]

- **Internet connectivity costs vary tremendously throughout the region**
  Costs related to the provision of Internet connectivity vary greatly throughout the region, both between and within countries, and depend on a wide variety of factors.[110] Assessing the true cost of Internet connectivity for schools requires a systematic, government-supported, approach to ensure consistent, affordable access for schools.

- **Invest in the entire education sector**
  Budget beyond ICT use in classrooms. It may be that the most cost-effective use of ICT for education in certain contexts is first to improve organisational and systemic efficiencies (including use as a tool to combat corruption) in the education sector.[111]

- **Computers in schools may be most cost-effective when placed in common areas**
  The few available cost figures suggest that many countries should deploy computers in school libraries, in teacher-training institutions and possibly in community telecentres (which may be based in schools), but stop short of seeking to do so in every classroom.[112]

* The UN created Commission is supported by the government of Norway and is chaired by Gordon Brown, UN Special Envoy for Global Education and former British Prime Minister. It examines how to reverse the lack of financing for education around the world.

# Enter the Game

**Create multi-stakeholder dialogue platforms for effective communication, constructive engagement and efficient mobilisation of resources in the region.**

There are many ways to act and engage in ICT and education. Each country, organisation and person can take part in creating and innovating ICT in education solutions. Achieving SDG4 will require the entire region to create and collaborate on ideas and join in on shaping the future of education together. Everyone has a role to play.

**Get connected:**

- The world is connected already, so work together to connect the right people to the right solutions. Encourage action across stakeholder networks via social media and other online ICT platforms such as EdTech Asia
- Engage stakeholders at every level. Including the student community to ensure ICT solutions are relevant, accessible and affordable

**Recommendations for specific stakeholder groups:**

***Governments, regulators, and policymakers:***

- Gather data on access and utilisation of ICT in education. Once the data is disaggregated by gender and major social, economic, or other dimensions, inequalities in access can be detected and addressed through policies and public awareness initiatives
- Identify education needs that could potentially be addressed by ICT
- Allocate national education budgetary funds for the building of ICT infrastructure in schools and the development of ICT enhanced educational materials
- Engage with the ICT industry to identify possible existing solutions
- Reach out to multilateral development banks in the region (namely the Asian Development Bank and the Asian Infrastructure Investment Bank) to obtain supplemental funding for the installation and implementation of ICT in education
- Launch ICT enhanced educational programmes in areas that are already equipped with the necessary infrastructure first to increase the success rate upfront and accumulate experience
- Collaborate with multilateral organisations such as UNESCO and SEAMEO to develop a regional database on education
- Additionally, as suggested in AIM 2015,[113] assist individual nations in their pursuit of their own national agenda or initiatives supporting ICT in education. Continue initiating projects that promote increasing access to more affordable or free ICT products

***Businesses in the ICT industry:***

The business case to invest in ICT for education can range from improving brand leadership to developing the capacity of future employees and building a more diverse employee pipeline. Education can help address the mismatch between skills of the available workforce and job vacancies, which is a key problem in many markets. Businesses can make long-term strategic investments in ICT for education that will lead to a larger, more talented pool of future employees.

Many ICT companies have been built on innovation and a common desire to collaborate, communicate and bring people together. Collaboration across all sectors will be crucial to ensuring that any product that is designed is suitable for its intended users and customisable for different user groups. When teams from different sectors combine their resources and allow for full stakeholder engagement from the beginning, the resulting product is more likely to be a good solution. Merging the expertise of each organisation can help ensure products are made well. To make this a reality, it will require businesses to:

- Recognise the opportunity in making a difference while developing business opportunities in the region
- Develop cost-effective education products and services that eliminate barriers to access and improve the quality of learning (e.g. ICT solutions to improve the delivery of education and innovative measurement tools)[114]
- Leverage existing services and technology to provide ICT-enhanced education solutions
- Innovate and be flexible in customising existing services or technology to fit specific needs
- Consult policy makers, academia and NGOs before launching related community investment programmes to ensure that actual needs exist
- Keep track of learning outcomes of related community investment programmes
- Collaborate within the industry to replicate successful programmes and avoid duplication
- Create programmes (e.g., internships, work-study programmes and traineeships) that give students early, pre-employment access to the corporate environment[115] and the ICT sector

***Education NGOs:***

- Collaborate with schools and teachers to communicate the opportunities for using ICT in education
- Collaborate with ICT companies to identify ICT solutions that could enhance or scale up current programmes
- Help identify education needs in local communities that could potentially be addressed by ICT and communicate these to policy makers and ICT companies
- Collaborate with other education NGOs and multilateral organisations in the region to share knowledge and best practices as well as replicable models

A shift in educational priorities, curricula and ICT accessibility is already underway in the region. Many of the solutions and innovations needed are out there, and it is simply a matter of finding the determination and ingenuity to bring them into schools. There are challenges that will not be overcome on the first try and sustainable progress requires a long-term broad-based commitment. There is increasing complexity in developing tools based on empirical data and sound pedagogies that demonstrate the educational benefits. We must continue to ask "what if?" and to strive to find the answers by focusing our collective energies, thinking creatively, being willing to commit resources and take risks, and to learn from our failures as well as celebrate our successes on the journey ahead.

• **'What Ifs' for the future of education** •

### Automatic translation ear buds

Created with CwDs in mind, but also greatly beneficial for ethnic minorities, migrants, and those seeking to learn a new language.

### Gamified Learning

Created for any potential topic… such as for students who need to train up in a new language for a job overseas - they can use gamified software at their fingertips.

### ICT Learning Centres

Created to serve a whole community and encourage the sharing of hardware, online resources, and enhance connectivity worldwide.

### Education Apps for mobile phones

Created for people who want to improve their literacy or pick up numeracy skills. There's an App for that!

### Sharing Economy for Education

Created to break down practitioner silos via crowdsourcing online sharing (like an Airbnb for NGO projects). This allows for better integration of new curricula and teaching methodologies. It also can encourage a more unified approach to education projects amongst the NGO community.

### Virtual Field trips using Augmented Reality (AR)

Teachers can customize classroom learning into multi dimensional experiences on the other side of the world using AR tech like Google Glasses and connections via Hangouts.

## The possibilities are endless

### BYOD Learning

BYOD (bring your own device) allows students and staff to use personal mobile devices on your school wireless network. It offers a cost-effective way to save schools money on technology and students are more likely to continue learning outside of schools hours.

### Immersive VR Education

Immersive VR Education simulates a lecture hall in virtual reality, while adding special effects which can't be utilized in a traditional classroom setting. Lectures are accompanied by images, videos, and immersive experiences which enhance the lesson.

### Multi-Touch LCD Screens

Classrooms equipped with a giant LCD touchscreen screen which allows a greater amount of interactivity and can be connected to multiple students' devices.

# Acknowledgements

Engaging key stakeholders that are active in the education field was an important part of the process of building the content of the paper. CSR Asia and Huawei are grateful to the many organisations and individuals that have contributed their time and insights in interviews and workshops. They are, however, not responsible for the accuracy, content, findings or recommendations.

## Interviewees (arranged alphabetically by name)

Aarti Kapoor, Managing Director, Embode

Anshul Sonak, Regional Director - Innovation & Education Programs (Asia Pacific Japan), Corporate Affairs Group, Intel Corporation

Bong Esguerra, Director- Citizenship, Globe Telecom

Clive Lee, CEO, Aidan Prize Foundation

Dang Kimlong, Media Affairs Manager, Huawei Vietnam

Davis Bookhart, Sustainability Head, Hong Kong University of Science and Technology

Dr Daiana Beitler, Regional Director, Asia, Microsoft Philanthropies

Dr Kirk Person, Director External Affairs, SIL International

Dr Nantanoot Suwannawut, Academic Official, Bureau of Special Education Administration Office of Basic Education Commission Ministry of Education Thailand

Dr Samart Ratanasakorn, Head of Curriculum & Instruction Division, Bureau of Special Education Administration, Office of the Basic Education Commission Thailand

Eiko Narita, Programme Specialist, United Nations Population Fund (UNFPA)

Eileen O'Connell, Director, Christina Noble Children's Foundation

Eric Sheninger, Senior Fellow, International Centre for Leadership in Education

Erik Nyman, Corporate Alliances Specialist, United Nations Children's Fund (UNICEF) Regional Office for East Asia and the Pacific

Ernest Wong, Asia Supply Chain Responsibility Program Manager, HP Inc.

Erwin Locsin, Chief Information Officer, Ayala Foundation, Inc.

Esther Santos, President, PLDT Smart Foundation

Felix Lau, President, AIESEC in Singapore

Gu Siyi, Founder, Project VolunONLINE

Ian Fenwick, Professor, Sasin Graduate Institute of Business Administration of Chulalongkorn University Bangkok

Ichiro Miyazawa, Programme Specialist in Literacy and Lifelong Learning, Section for Educational Innovation and Skills Development, United Nations Educational, Scientific and Cultural Organization (UNESCO) Bangkok

Jennifer Voon, Director Industry Liaison Office, Universiti Teknologi Brunei

Jonathan Shaw, Executive Director, Asian Institute of Technology Extension

Justin Chang, Regional Programmes Manager, Prudence Foundation

Karen Kaplan, Head of Business Development, Teach For All

Karina Veal, Education Expert, Asian Development Bank

Laetitia Lemaistre, Education Specialist, United Nations High Commissioner for Refugees (UNHCR)

Lynn Spreadbury, Partnerships Manager Asia, Action Aid

Mario Franco, Founder, Millennium@EDU Sustainable Education

Mike Michalec, Co-Founder / Managing Director, EdTech Asia

Mono Keo, Acting Programme Manager, VVOB

Niamh De'Loughry, Country Director Thailand, Right to Play

Nicola Crosta, Co-Founder, Baan Dek Foundation

Obaidur Rahman, Global Youth Adviser, Save the Children

Oliver Petzold, Assistant Director, The Asia Foundation

Phil Psilos, Asia Pacific Technical Director, Social & Economic Development, FHI 360

Professor Amina Akhter, Computer Science, Asian University for Women

Professor Mark Mason, Professor and Head of Department of International Education and Lifelong Learning, The Hong Kong Institute of Education

Roy Wadia, Regional Communications Adviser, UNFPA

Sagita Adesywi, Partnership (CSR) Officer, UNICEF

Samphors Vorn, Country Program Director, Aide et Action Cambodia

Sanna Johnson, Regional Director for Asia, Caucasus, and Middle East Program, International Rescue Committee (IRC)

Saw Khu, Community Liaison Manager, IRC

Sherman Kwan, Partnership Officer, Plan International

Silke Friesendorf, Communications Manager, Asia-Pacific Regional Network for Early Childhood

Sowirin Chaunprapun, Project Officer, Section for Educational Innovation and Skills Development, UNESCO Bangkok

Tchissole Carvalho, Corporate Partnership Manager, Wedu

Vivian Lee, Chief Operating Officer, Wedu

Yang Guo, Senior Political Advisor, International Committee of the Red Cross (ICRC)

Yiqi Zhou, Programme Manager, GIZ GmbH

Yoav Elgrichi, Co-Founder, Tech for Good

# Appendix

## • Education Statistics •

| Country | Brunei Darussalam | Cambodia | China | Indonesia | Lao PDR | Malaysia | Myanmar | Philippines | Singapore | Thailand | Vietnam |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Income group^ | High income | Lower middle income | Upper middle income | Lower middle income | Lower middle income | Upper middle income | Lower middle income | Lower middle income | High income | Upper middle income | Lower middle income |
| Real GDP growth forecast (%) (2016-20 average)' | 1.8 | 7.3 | 6 | 5.5 | 7.3 | 5 | 8.3 | 5.7 | 2.6 | 3.6 | 6 |
| Population below the national poverty line (%) (2014)* | …[2] | 13.5 | 7.2 | 11.2[h] | 23.2[f] | 0.6 | 25.6[c] | 25.2[e] | …[2] | 10.9[f] | 8.4 |
| Net enrolment ratio in primary education (%) (2014)* | 99.9 | 95 | 99.73[f] | 93.3[f] | 95.1 | 95[4e] | 94.5 | 98[f] | 100[10] | 96.5[b] | 99.8 |
| Primary education completion rate1 (%) (2013)* | 96.4[d] | 46.9 | 94[#] | 81.8[e] | 77.6 | 99.2[5] | 74.8[b] | 75.8[a] | 98.7[a] | 93.5511[g] | 89.6 |
| Net enrolment ratio in lower secondary education (%) (2014)# | 98 | 83 | … | 86 | 79 | 90 | 56 | 96[f] | … | … | … |
| Lower secondary education completion rate (%) (2009-2014)# | … | 41 | 81 | 78 | 35 | … | 74.2[6] | 75 | … | … | 81 |
| Net enrolment ratio in upper secondary education (%) (2014)# | 86 | … | … | 70 | 50 | 55 | 39 | 80[f] | … | … | … |
| Upper secondary education completion rate (%) (2009-2014)# | … | 19 | 43 | 51 | 27 | … | 31[6] | 72 | … | … | 55 |
| Gross enrolment ratio in tertiary education (%) (2014)# | 32 | … | 39 | 31 | 17 | 30 | 14[e] | 36 | … | 53 | 30 |
| Out-of-school children (in thousands) (2014)# | ... | 97 | 170[13] | 2008 | 36 | 169[e] | 284 | 402[f] | ... | 380 | 127[f] |
| Out-of-school children (Female %) (2014)# | … | 59 | … | 52 | 57 | …[n] | … | 18[f] | … | 52 | … |
| Female net enrolment ratio in primary education (%) (2014)* | 99.8 | 93.95 | 99.83[12] | 93.8[f] | 94.3 | …[n] | 90.8 | 100[f] | 100[10] | 95.9[b] | 100 |
| Male net enrolment ratio in primary education (%) (2014)* | 100 | 96.04 | 99.80[12] | 92.8[f] | 95.9 | …[n] | 98.2 | 96.2[f] | 100[10] | 97.2[b] | 99.7 |
| Ratio of girls to boys in primary education (2014)* | 1 | 0.95 | 1.00[f] | 1.00[f] | 0.95 | 1.01[5] | 0.97 | 1.00[f] | 1.00[9e] | 0.98[f] | 0.99 |
| Youth literacy rate (aged 15-24) (2005-2014)# | 99 | 87 | 100 | 100 | 84 | 98 | 96 | 98 | 100 | 98 | 97 |
| Adult literacy rate (aged 15 and over) (2005-2014)# | 96 | 74 | 95 | 95 | 73 | 93 | 93 | 96 | 97 | 94 | 94 |
| Female % of youth illiterates (2005-2014)# | 35 | 54 | 54 | 49 | 66 | 48 | 51 | 31 | 47 | 40 | 54 |
| Female % of adult illiterates (2005-2014)# | 66 | 69 | 74 | 67 | 69 | 67 | 67 | 45 | 79 | 63 | 68 |
| Pupil/teacher ratio in primary education (2014)# | 10 | 45 | 16 | 17 | 25 | 11 | 28 | 31f | 17.69[f] | 15 | 19 |
| Government expenditure on education as % of GDP (2014)# | 3.8 | 2[f] | 4.15[4] | 3.3 | 4.2 | 6.1[f] | 2.1[6] | 2.6[8d] | 2.9[f] | 4.1[f] | 6.3[e] |
| Expenditure on education as % of total government expenditure (2014)# | 10 | 9.9[f] | 14.87[4] | 17.5 | 15.4 | 21.5[f] | 11[7e] | 16.3[8d] | 19.9[f] | 18.9[f] | 21.4[e] |
| Educational institutions (primary) with access to the Internet (%) (2012)" | 100[b] | 7[i] | 77.4[12] | 39 | …[n] | 90[d] | …[n] | 7[i] | 100[di] | 99 | …[n] |

**Source:**
^ World Bank ' OECD * Asian Development Bank # UNESCO " UNESCO UIS

**Note:**
[a] - 2008 [b] - 2009 [c] - 2010 [d] - 2011 [e] - 2012 [f] - 2013 [g] - 2014 [h] - 2015 [i] - Public institutions only [n] - no data

1 Proportion of pupils starting grade 1 who reach last grade of primary
2 No official poverty line
3 China's official statistics
4 China's official statistics
5 Malaysia Education for All 2015 National Review
6 Myanmar Education for All 2015 National Review
7 UNICEF
8 Philippines Education for All 2015 National Review
9 Singapore Education for All 2015 National Review
10 Singapore's official statistics
11 World Bank
12 China's official statistics
13 China's official statistics

# References


[1] OECD. (2016). *Economic Outlook for Southeast Asia, China and India*.

[2] UNICEF. (2000). *Defining Quality in Education*.

[3, 92, 93, 94] Power, C. & Maclean, R. (2011). *Lifelong Learning for Poverty Alleviation and Sustainable Development*. International Symposium on Lifelong Learning 2011.

[4] UNESCO. (2016). *ICT in Education » Lifelong Learning » Literacy*.

[5] SDG Compass. (2015). *SDG 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all: The Role of Business*.

[6] United Nations. (2016). *Progress towards the Sustainable Development Goals, Report of the Secretary-General*.

[7, 8, 10] UNESCO. (2015). *EFA Global Monitoring Report 2015*.

[9] UNESCO. (2016). *If You Don't Understand, How Can You Learn?*

[11] UNESCO Bangkok. (2015). *10 Facts about Girls and Women in STEM in Asia*.

[12] UNDESA. Vladimirova,K. & Le Blanc, D. (2015). *How well are the links between education and other sustainable development goals covered in UN flagship reports? A contribution to the study of the science-policy interface on education in the UN system*.

[13] Global e-Sustainability Initiative. (2016). *Summary Report #SystemTransformation*.

[14] Sungsup Ra, Brian Chin & Cher Ping Lim (2016) *A holistic approach towards Information and Communication Technology (ICT) for addressing education challenges in Asia and the Pacific*.

[15, 87, 102, 113] ASEAN. (2015). *ASEAN ICT Masterplan 2015: Completion Report*.

[16] Government of China. (2016) *State Informatization Development Strategy*. Chinese version:《2006 – 2020 年国家信息化发展战略》.

[7, 18] UNESCO Institute for Statistics. (2014). *Information and Communication Technology (ICT) in Education in Asia*.

[19] Peeraer,J. & Tran Nu Mai Thy, & Tran Thi Thai Ha. (2010). *Policy Analysis Integration of ICT in Education in Vietnam Translation and Implementation in Teacher Education*.

[20] UNESCO. (2011). *Transforming Education: The Power of ICT Policies*.

[21] ISSC, the Institute of Development Studies & UNESCO. (2016). *World Social Science Report 2016*.

[22] European Commission Joint Research Centre Institute for Prospective Technological Studies. Redecker, C. & Haché, A. & Centeno, C. (2010). *Using Information and Communication Technologies to promote Education and Employment Opportunities for Immigrants and Ethnic Minorities*.

[23] UN Women Asia-Pacific. (2016). *Infographics - ASEAN women are a potential boost to the region's labour force and economy*.

[24, 27, 28, 29] INFODev. (2010). *Gender Equity and the Use of ICT in Education*.

[25, 26, 36] The International Commission on Financing Global Education Opportunity. (2016). *The Learning Generation Fact Sheet*.

[30] UNDESA. (2013). *International Migration Report 2013*.

[31] National Bureau of Statistics of China. (2015). *Statistical Communiqué of the People's Republic of China on the 2014 National Economic and Social Development*.

[32] China Labour Bulletin. (2011-2016). *Migrant workers and their children*.

[33, 35] Dosono, B. (2014). *Digital Inclusion for Migrant Millennials: Improving the ICT Landscape of Yakima Valley Schools*.

[34] Educate A Child. Education Above All Foundation. (N.D.). *Economic Migration*.

[37] Pitsuwan, S. & Parameswaran, P. (2015). *Why Southeast Asia's Refugee Crisis Matters*.

[38] UNESCO. (2016). *No more excuses: Provide education to all forcibly displaced people*.

[39] UNHCR. (2016). *Missing Out: Refugee education in crisis*.

[40, 73, 103] UNHCR. (2012). *Education Strategy 2012-2016*.

[41] News Deeply. Yafi, W. (2013). *Using Technology to Help Educate Syrian Refugees*.

[42] International Research and Exchanges Board. Maisonet-Guzman, O. (2015). *How can technology improve the worst refugee crisis of our time?*

[43] UNESCO. (2015). *UNESCO, Microsoft, True and partners join in 'Mobile Learning for Out-Of-School Children' initiative at Thai-Myanmar Border*.

[44] UNESCO Bangkok. (2009). *Towards Inclusive Education for Children with Disabilities: A Guideline*.

[45, 48] World Bank. (2003). *The Education for All: Including Children with Disabilities*.

[46] UNESCO. (N.D.). *The First Stop for Education Data*.

[47, 65, 82] UNESCO. (2016). *Global Education Monitoring Report 2016: Education for people and planet - Creating Sustainable Futures for All*.


[49] SIDA. (2014). *Disability Rights in Southeast Asia*.

[50, 51, 52] UNDP. (2013). *Ethnic Minority Development in China and ASEAN countries*.

[53] ITU: Digital Inclusion Newslog. (2016). *Vietnamese Rural Students to Receive Digital Skills Training Via Public-Private Collaboration*.

[54] Bătăgana, L. & Boja, C. (2012). *Smart Solutions for Educational Systems - Case Study*.

[55, 56, 58, 71] UNESCO. (2005). *EFA Global Monitoring Report: Chapter 1*.

[57] Hohlfeld, T. N., Ritzhaupt, A. D., & Barron, A. E. (2010). *Connecting schools, community, and family with ICT: Four-year trends related to school level and SES of public schools in Florida*. Comput. Educ. 55, 1 (August 2010), 391-405.

[59] Education A Child. (n.d.). *Barriers to Education: Resources*.

[60] World Economic Forum. (2016). *New Vision for Education: Fostering Social and Emotional Learning through Technology*.

[61] Sculpteo. (2015). *3D Printing in education: from eLearning to eMaking*.

[62] Coursera. (n.d.). *Course: Gamification*.

[63] Stronge, J. H. & Hindman, J. L. (2003). *Educational Leadership*. v60, n8, p48-52, May 2003.

[64] SEAMEO INNOTECH. (2010). *Teaching Competency Standards in Southeast Asian Countries: Eleven Country Audit*.

[66] Bătăgan, L. & Boja, C. (2012). *Smart Solutions for Educational Systems - Case Study*.

[67] Lim, C. P. (2012). *Building the capacity of the next generation of teachers in Asia: Promising practices and lessons learnt*. *Australasian Journal of Educational Technology*. 28, iii–xv.

[68, 78] National University of Educational Planning and Administration. (2014). *Education for All Towards Quality with Equity India*.

[69] MyRead. (n.d.). *Monitoring and Assessment*.

[70] UNESCO Bangkok Office. (2014). *Education Systems in ASEAN+6 Countries: A Comparative Analysis of Selected Educational Issues*.

[72] UNESCO. (2005). *EFA Global Monitoring Report: Chapter 2*.

[74] UNESCO Bangkok Office. (n.d.). *ICT and Literacy*.

[75] National Numeracy. (n.d.). *Why is numeracy important?*

[76] Commissioning Support Programme. (2011). *Speech, Language and Communication Needs: Evaluating Outcomes*.

[77] Isisag, K. U. (2012). *The Positive Effects of Integrating ICT in Foreign Language Teaching*.

[79,80] ILO & ADB. (2014). *ASEAN Community 2015: Managing Integration for Better Jobs and Shared Prosperity*.

[81] Bo, J. (2012). *China's TVET: Reform and Opening-up —Speech at the WFCP 2012 World Congress*.

[83] Philippine Statistics Authority. (2016). *Employment Rate in July 2016 is Estimated at 94.6 Percent*.

[84] World Bank. (2014). *World Bank East Asia and Pacific Economic Update: Enhancing Competitiveness in an Uncertain World*.

[85] Lorenciana, C. S. (2015). *BPO, ICT to remain top job generators in 2015*.

[86] UNESCO. (n.d.). *Education for All 2015 National Review: Philippines*.

[88, 89] Paryono, P. (2013). *Anticipating ASEAN Economic Community 2015: Regional initiatives on human resources development and recognition of professional qualifications*. TVET@Asia.

[90] Ministry of Education, Singapore. (n.d.). *Desired Outcomes of Education*.

[91] UNESCO Institute for Education. (2001). *Revisiting Lifelong Learning for the 21st Century*.

[95] Dinevski, D. & Kokol, P. (2004). *ICT and Lifelong Learning*.

[96] UNESCO Bangkok. (2015). *The Role of ICT in Achieving Lifelong Learning for All*.

[97] Pearce, K. (2013). *100+ Self-Education Resources for Lifelong Learners*.

[98, 100, 101] Huawei. (2015). *13 Trends That Are Shaping the Future Of Education*.

[99] Piotrowska, K. (2016). *Millennials Raise Their Voices for World Youth Skills Day*.

[104] UNESCO. (2011). *Transforming Education: The Power of ICT Policies*.

[105, 106] The International Commission on Financing Global Education Opportunity. (2016). *The Learning Generation: Investing in Education for a Changing World*.

[107] UNESCO-UIS. (2015). *Fixing the Broken Promise of Education for All: Findings from the Global Initiative on Out-of-School Children*.

[108] The International Commission on Financing Global Education Opportunity. (n.d.). *International Financing*.

[109] UNESCO Bangkok. (2013). *ICT in education policy, infrastructure, and ODA status in the selected ASEAN countries*.

[110, 111] Trucano, M. (2005). *Knowledge Maps: ICT in Education*. Washington, DC: infoDev / World Bank.

[112] InfoDev. (n.d.). *ICTs in Education: Costs*.

[114, 115] SDG Compass. (n.d.) *SDG 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all*.


HUAWEI


CSR
ASIA