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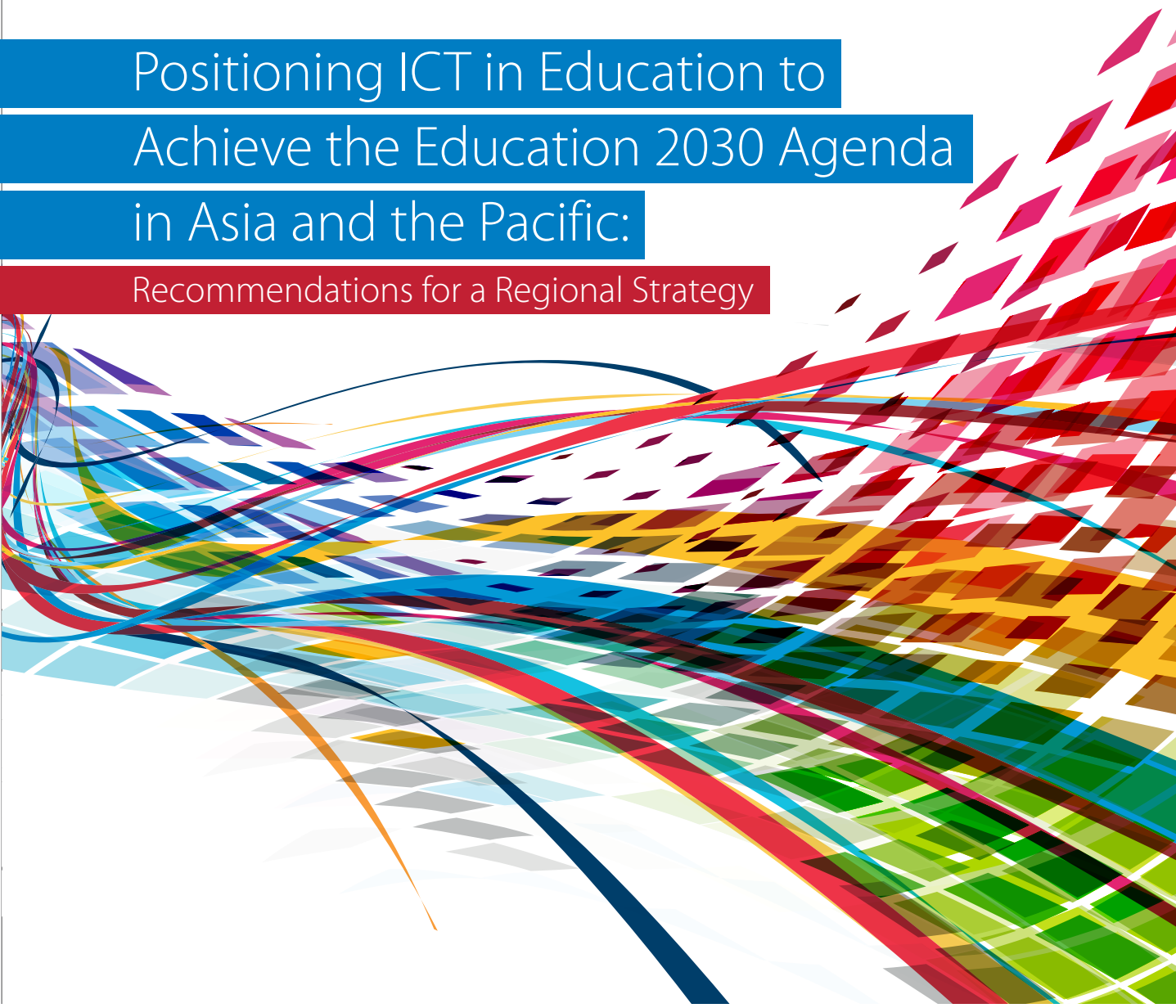
Positioning ICT in Education to Achieve the Education 2030 Agenda in Asia and the Pacific:

Recommendations for a Regional Strategy



Education 2030

Positioning ICT in Education to Achieve the Education 2030 Agenda in Asia and the Pacific:

Recommendations for a Regional Strategy

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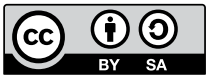

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Acronyms

ANER	Adjusted net enrolment ratio
EFA	Education for All
EMIS	Education Management Information System
GER	Gross enrolment ratio
GPI	Gender Parity Index
ICT	Information and communications technology
ITU	International Telecommunications Union
MDG	Millennium Development Goal
MOOC	Massive open online course
OER	Open educational resource
SDG	Sustainable Development Goal
TVET	Technical vocational education and training
UIS	United Nations Institute for Statistics
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNICEF	United Nations Children's Fund

Acknowledgements

This study was written by Dr Hyo-Jeong So (Professor, Ewha Womans University), Dr Kyung-sim Yeon (Research Professor, Pusan National University), Dr Seong-hye Yoon (Lecturer, Ewha Womans University) and Jian Xi Teng (Programme Officer, ICT in Education, UNESCO Bangkok). Work related to this study was coordinated by the UNESCO Bangkok ICT in Education team, led by Jonghwi Park (Programme Specialist).

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Foreword

"A journey of a thousand miles begins with a single step." – Lao Tzu

Almost three years have passed since the historic, unanimous adoption of the 2030 Agenda for Sustainable Development by the Member States of the United Nations. Since the launch of the Sustainable Development Goals (SDGs), the Member States have sought ways to best implement, monitor and evaluate relevant policies and activities to achieve these ambitious new goals.

Sustainable Development Goal 4 (SDG4), which expands on the Education for All goals and the education-related Millennium Development Goals, focuses on the education needs of a sustainable society and exhorts the global community to 'Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all' (United Nations, 2015).

Under the SDG4-Education 2030 Framework for Action, information and communication technology (ICT) is highlighted for its cross-cutting role in improving inclusiveness, equity and quality in education. ICT is seen to have the potential to connect those who are marginalized and those in remote areas and conflict zones to education opportunities, increase literacy rates through mobile technology based literacy programmes, improve quality through appropriate pedagogical approaches supported by ICT, and facilitate lifelong learning for all through ICT-supported non-formal education and informal learning.

The SDG4-Education 2030 agenda was prescient in designating ICT skills as one of the key indicators under Target 4.4 and the use of computers and the internet for pedagogical purposes under Target 4.a. There is no doubt in 2018 that rapid advances in technology, such as artificial intelligence, big data analytics, the Internet of Things, and improved affordability of ICT devices and internet connectivity are driving rapid changes in global labour markets, financial markets, national and global politics, urbanization and migration patterns and, last but not least, all aspects of education. This facet of how our future may look led the Framework for Action to identify an 'urgent need for children, youth and adults to develop throughout life the flexible skills and competencies they need to live and work in a more secure, sustainable, interdependent, knowledge-based and technology-driven world' (UNESCO et al., 2015).

In light of SDG4-Education 2030, the participants in high-level regional discussions at the Asia-Pacific Meetings on Education 2030 (APMED 2030) shared the challenges they face in taking concrete steps to implement SDG4 at the national level. Based on this and a deep understanding of the unique challenges faced by the Asia-Pacific Member States in implementing SDG4-Education 2030, in early 2017 UNESCO Bangkok commissioned a regional study to better

understand the opportunities in the Asia-Pacific for ICT interventions to facilitate progress towards SDG4.

This regional study is an important document for Asia-Pacific Member States as it consolidates data related to the effective use of ICT in education. One highlight of this study is the five priority areas for the use of ICT towards achieving SDG4 and Education 2030 that were identified based on a synthesis of the data:

- ICT for transforming and expanding TVET and higher education
- ICT for improving teacher quality
- ICT for improving access to and quality of secondary education
- ICT for enabling inclusive and equitable learning
- ICT for monitoring and evaluation

The regional study's findings informed the development of the 'Asia-Pacific Regional Strategy on the Use of ICT to Facilitate the Achievement of Education 2030', which was adopted on 11 May 2017 at the Asia-Pacific Ministerial Forum on ICT in Education in Seoul, Republic of Korea. The regional study and the regional strategy should be regarded as complementary documents. Both are designed to guide the implementation by Member States, over the following five years, of a set of concrete and feasible actions that leverage ICT towards achieving the Education 2030 agenda.

We trust that this regional study will benefit policy-makers, officials and other stakeholders in the Member States and we hope that the comprehensive information supplied here will provide additional impetus for stakeholders to develop and implement appropriate policies and activities that harness the power of ICT to build lifelong, inclusive, quality education systems for all.

Maki Hayashikawa

Officer-in-Charge
UNESCO Bangkok

Executive summary

1. Introduction

In the lead up to the 2017 Asia-Pacific Ministerial Forum on ICT in Education (AMFIE), which was held in Seoul, Republic of Korea, on 11 and 12 May 2017, UNESCO launched a study to compile information and data to support the development of the 'Asia-Pacific Regional Strategy on Using ICT to Facilitate the Achievement of Education 2030'. The regional strategy was intended to guide the implementation by Member States of a set of concrete and feasible actions to leverage information and communication technologies (ICT) towards achieving the Education 2030 agenda over the five years: 2017 to 2022, but with a 15-year long-term vision. The regional strategy was formally adopted by the Asia-Pacific Member States at the AMFIE on 11 May 2017.

2. Context regarding SDG4 and integration of ICT into education

Sustainable Development Goal 4 (SDG4) calls for bold breakthroughs so as to achieve quality education and lifelong learning for all. ICT is positioned as a critical mechanism that can help improve access, inclusion and equity, and address quality issues in education. UNESCO Member States have acknowledged the need for ICT to 'be harnessed to strengthen education systems, knowledge dissemination, information access, quality and effective learning, and more effective service provision' (UNESCO et al., 2015). In particular, the importance of integrating and using ICT to achieve the SDG4 targets was recognized in the Qingdao Declaration on Information and Communication Technologies in Education (UNESCO, 2015b).

With regard to the SDG4 targets (see Appendix IV), ICT serves three main roles: 1) ICT as a competency - Targets 4.4 (skills for work), 4.5 (equity), 4.b (scholarships) and 4.c (teacher quality); 2) ICT as a delivery mechanism - Targets 4.5 (equity) and 4.6 (literacy and numeracy); and 3) ICT as resources - Target 4.a (education facilities and learning environments).

The Asia-Pacific region faces particular challenges in achieving the universal education goals, improving the quality of education and achieving the targets under SDG4. Key obstacles for the latter include a lack of coordinated action and of monitoring and evaluation systems.

3. Research methods

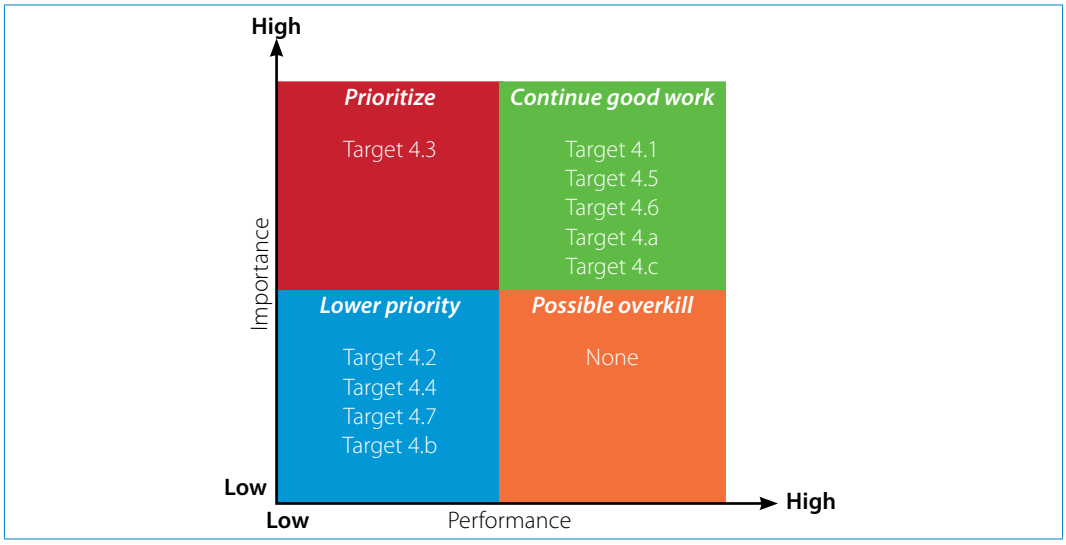
The study had two main methods: a review of relevant literature and a survey. The latter was sent out to 46 Member States in the Asia-Pacific region. A total of 26 responses were received, and these were analyzed regarding their integration of ICT into education as a means of assisting in achieving SDG4 in the region. Importance-Performance Analysis (IPA), which examined the difference between the perceived importance and the current level of performance for a range of SDG4 targets, was used to identify the areas requiring priority action.

4. Key findings

National ICT Master Plan: About 75.6 per cent of the participating Member States responded that ICT is part of their national policy, and over half (56.4 per cent) have separate ICT in Education Master Plans.

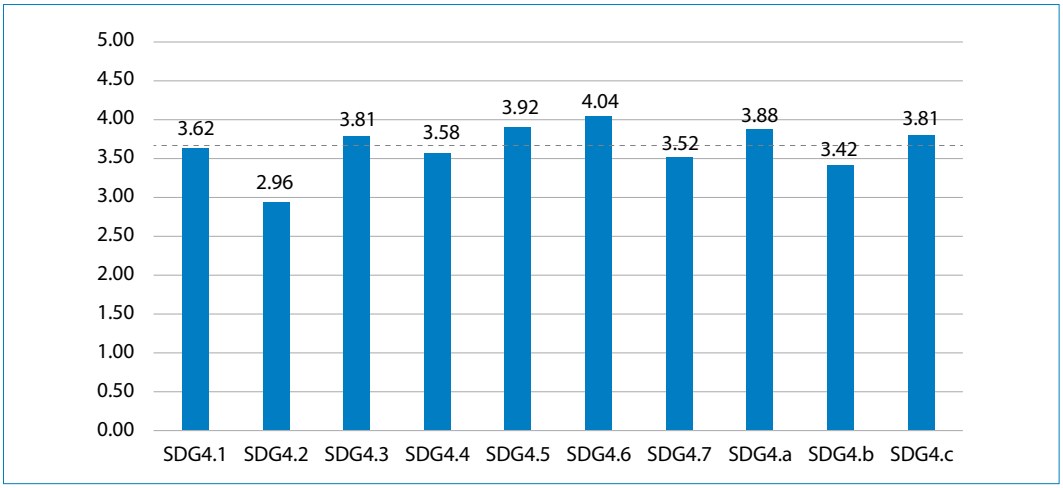
IPA of SDG4 targets: Overall, Member States reported a high level of performance with regard to the targets that they considered important. As shown in Figure 1, the targets that were considered of high importance and also saw high performance included 4.1 (access to education), 4.5 (equity), 4.6 (literacy and numeracy), 4.a (education facilities and learning environments) and 4.c (teacher quality). On the other hand, targets with both low importance and low performance included 4.2 (early childhood), 4.4 (skills for work), 4.7 (global citizenship and cultural diversity) and 4.b (scholarships). Analysis indicated that while Target 4.3 (TVET and higher education) was perceived by respondents to be important, the current performance was relatively low, indicating the need for higher prioritization of this target. At the sub-regional level, Targets 4.2, 4.3 and 4.4 in East and South-East Asia, Target 4.3 in the Pacific, and Target 4.b in South Asia were identified as the specific areas of priority.

Figure 1: Importance and performance of SDG4 targets



Feasibility of integrating ICT: ICT integration was perceived to be the most feasible for attaining Targets 4.6, 4.5, 4.3, 4.a, and 4.c. In contrast, Target 4.2 (early childhood) received the lowest rating (See Figure 2).

Figure 2: **Feasibility of integration of ICT for each SDG4 target, on a 5-point scale from 1 (low) to 5 (high)**



ICT for enhancing access to education: The research team found that current use of ICT for enhancing access was insufficient at all school levels given its level of importance. Respondents felt that TVET and higher education were the most important education levels for using ICT to enhance access.

Mobile technology for learning: The responses indicated that most Member States consider mobile technology useful in increasing access to primary, secondary, TVET and higher education, and in improving skills for employment. The respondents reported that financial support, training for capacity building and content development were important means of promoting mobile learning.

Teachers' ICT competency and delivery of teacher education/training: The study found that Member States felt it was important for both pre-service and in-service teachers to develop ICT competency. In several Member States, pre-service teacher education/training is delivered only in a face-to-face mode, whereas in others in-service teacher education/training takes various modalities, including face-to-face instruction, online learning and blended learning.

Following a synthesis of the key research findings, the researchers identified the following five priority areas for the use of ICT towards achieving SDG4 and Education 2030:

- ICT for transforming and expanding TVET and higher education
- ICT for improving teacher quality
- ICT for improving access to and quality of secondary education

- ICT for enabling inclusive and equitable learning
- ICT for monitoring and evaluation

5. Regional strategy

Following the research study, a rigorous process of drafting the regional strategy commenced. The UNESCO Asia and Pacific Regional Bureau for Education (UNESCO Bangkok) coordinated the drafting process and sought to obtain and incorporate the inputs of all Asia-Pacific Member States. Accordingly, UNESCO established a drafting committee to ensure that the voices of Member States from each of the sub-regions were heard. The committee included a representative from each of the five Asia-Pacific sub-regions: South and West Asia (Bhutan), Central Asia (Uzbekistan), East Asia (People's Republic of China), South-East Asia (Thailand) and the Pacific (the Cook Islands).

The regional strategy went through three rounds of reviews. In the first round, a draft of the regional strategy was circulated to the committee members and other relevant stakeholders. Based on their feedback, a list of concrete action points was drawn up and key thematic amendments were made. In the second round, the revised regional strategy was circulated to all Member States for their comments and feedback. Member States' responses were taken into consideration during the meeting of the drafting committee on 10 May 2017. At this final meeting of the committee, revisions were made to ensure a clearer demarcation of the roles of stakeholders and international organizations at all levels, and to improve the clarity of the text. On 11 May 2017, during the AMFIE 2017 Ministerial Dialogue, the participating ministers, vice-ministers and other participants collectively reviewed and adopted the regional strategy, with the understanding that further amendments would be undertaken by UNESCO Bangkok. The key amendment proposed and agreed during the Ministerial Dialogue was for higher education to be included in the first priority area.

On 23 May 2017, after further review and completion of key amendments, the final regional strategy, titled the 'Asia-Pacific Regional Strategy on Using ICT to Facilitate the Achievement of Education 2030', was circulated to all Asia-Pacific Member States. It set out four priority areas and six action points for the five-year period: 2017-2022, as follows:

Four priority areas

- ICT for expanding relevant skills development in secondary education, TVET and
- higher education
- ICT for improving the quality of teaching and teaching practices
- ICT for enabling inclusion and equality in education
- ICT for monitoring and evaluation

Six action points

- Member States to develop ICT in Education policies that are an integral part of sector-wide national education plans and aligned with the national ICT strategy.
- Member States are to engage in cooperation and partnerships across the four priority areas, with the support of sub-regional and international organizations, to set up platforms for localized educational solutions, initiate research and share good practices from the progress and lessons learned on common challenges.
- On secondary education, TVET and higher education, Member States to allocate resources to maximize the full potential of ICT tools to expand flexible access to and enhance the quality and relevance of secondary education, TVET and higher education in the formal, non-formal and informal sectors.
- On the quality of teaching and teaching practices, Member States to develop competency standards for teachers towards ICT-integrated transformative pedagogies, and establish learning spaces and communities of practices to support teachers and share innovations.
- On inclusion and equality in education, Member States to take explicit and concrete measures in their national ICT in Education policies to tackle the learning divide, unleashing the potential of assistive technology, mobile technology, OERs and open and distance learning platforms.
- On monitoring and evaluation, Member States, in coordination with the SDG4 National Coordinators, to closely monitor progress of the four priority areas using the potential of new technologies, such as mobile technology, cloud computing and big data, and to develop SDG4-targeted EMIS.

1 Introduction

In the lead up to the 2017 Asia-Pacific Ministerial Forum on ICT in Education (AMFIE 2017), UNESCO launched a study to compile supporting information and data for the development of a regional strategy document. This report describes the study and its findings.

The 'Asia-Pacific Regional Strategy on Using ICT to Facilitate the Achievement of Education 2030' aims to support the 47 Member States of the Asia-Pacific region[1] to carry out harmonized and feasible actions. The strategy delineates priority areas and strategic recommendations, focusing on how ICT can be leveraged to facilitate the achievement of Sustainable Development Goal 4 (SDG4) across the Asia-Pacific region over the five-year period: 2017-2022, but with a 15-year long-term vision in mind. The regional strategy was formally adopted on 11 May 2017 by the Asia-Pacific Member States at the AMFIE 2017 held in Seoul, Republic of Korea, on May 11 and 12. See Appendix I for the complete regional strategy.

1 **1) Caucasus and Central Asia:** Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan, **2) Eastern and South-eastern Asia:** Brunei Darussalam, Cambodia, China, Democratic People's Republic of Korea, Indonesia, Japan, Lao People's Democratic Republic, Malaysia, Mongolia, Myanmar, Philippines, Republic of Korea, Singapore, Thailand, Timor-Leste and Viet Nam, **3) The Pacific:** Australia, Cook Islands, Fiji, Kiribati, Marshall Islands, Federated States of Micronesia, Nauru, New Zealand, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu, **4) South Asia:** Afghanistan, Bangladesh, Bhutan, India, Islamic Republic of Iran, Maldives, Nepal, Pakistan and Sri Lanka

2 Global context

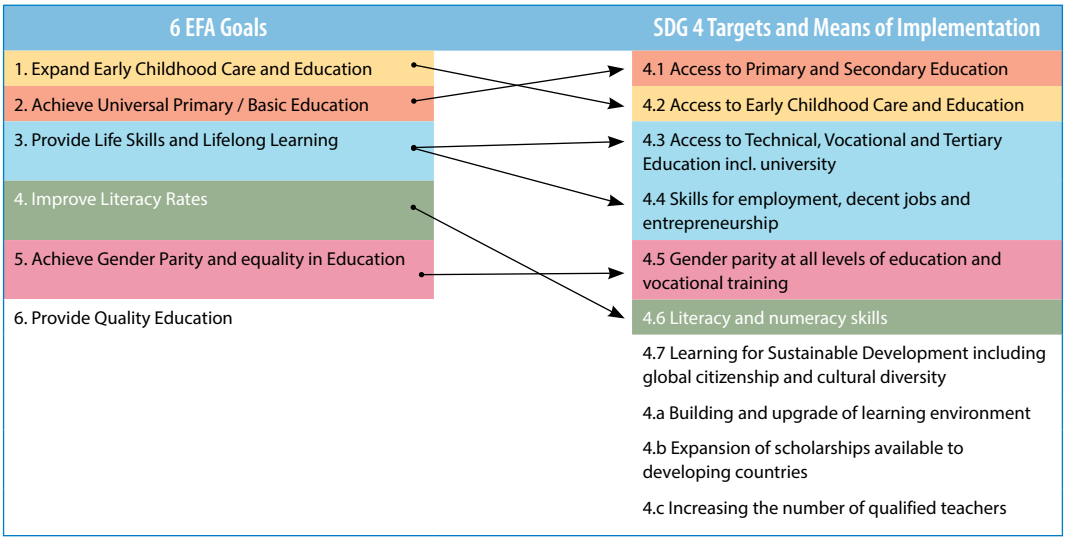
2.1 Overview of Sustainable Development Goal 4

In 2000, the international community made a commitment to achieve the Millennium Development Goals (MDGs) and the Education for All (EFA) goals. Although progress was made under the MDGs agenda, much remained to be done. At the World Education Forum 2015, the global community agreed to launch 'Education 2030: the Incheon Declaration and Framework for Action', which seeks to ensure access to basic education for all (UNESCO, 2015b). That same year, the international community adopted the Sustainable Development Goals (SDGs), a set of 17 global goals and 169 targets with the unifying thread throughout of commitment to ending poverty (United Nations, 2015).

Under the umbrella of the SDGs, education should expand target areas from focusing on universal primary education to improving post-secondary education and quality education for all levels. Hence, SDG4 represents transformative and universal efforts towards improving the quality of education in the era of lifelong learning and further highlights the role of education in supporting the rest of SDGs, referring to human rights and dignity, social change and sustainable development.

SDG4, which seeks to 'ensure inclusive and equitable quality education and promote lifelong learning opportunities for all' (United Nations, 2015), has ten targets, including seven outcome targets and three means of implementation (see Appendix IV). Global efforts to achieve the SDG4 targets are guided by the Education 2030 Framework for Action. Figure 3 illustrates the continuity of the EFA goals and how they are related to the new targets and means of implementation under SDG4.

Figure 3: Links between the EFA goals and the SDG4 targets and means of implementation



2.2 Specific targets under SDG4

The ten SDG4 targets and means of implementation (See Figure 3 and Appendix IV) can be categorized into four themes (UNESCO et al., 2015; UNESCO, 2016b):

1. **Access** to at least 12 years of free, publicly funded, inclusive and equitable quality primary and secondary education, of which at least nine years are compulsory.
2. **Equity and inclusion** in and throughout education, addressing all forms of exclusion and marginalization, disparity, vulnerability and inequality.
3. **Quality:** relevant, equitable and effective learning outcomes at all levels and in all settings of education as a part of the right to education.
4. **Lifelong learning:** to complement and supplement formal schooling and non-formal pathways with adequate resources and mechanisms, including the use of ICT.

Targets 4.1, 4.2, 4.3, 4.4 and 4.b come under the theme of **access**. Targets 4.1 and 4.2 highlight the critical need to expand access to education through increasing publicly-funded compulsory education, and the need for sustained actions to assist out-of-school children and adolescents to attend school.

While access to education improved significantly under the EFA agenda, in 2014 only half (51 per cent) of low income countries had reached the target primary completion rate, and 263 million children and youth were still out of school (UNESCO, 2016b). Over the period between 2010 and 2015, only 14 out of 128 countries reached the target completion rate for secondary education (90 per cent) (UNESCO, 2016b; 2017). As of 2015, 61 million children of primary school age were out of school, with over half (56 per cent) of 387 million primary-school-aged children

not reaching the minimum proficiency level in reading, and 62 million adolescents of lower secondary school age still out of school (UNESCO, 2017). Furthermore, in spite of evidence that high-quality early childhood education has beneficial long-term developmental and educational outcomes, in 2017 pre-primary education gross enrolment ratios in low- and middle-income countries were only around 21 per cent and 32 per cent, respectively (UNESCO, 2017).

Targets 4.3, 4.4 and 4.b seek to increase access to secondary and higher education and aim to reduce the knowledge gap for social and economic development and barriers to skills development and technical and vocational education and training (TVET). In 2014, the secondary education net enrolment ratio was only 65 per cent and the tertiary education gross enrolment ratio was around 34 per cent (UNESCO, 2016b).

Targets 4.5, 4.a and 4.b fall under the **equity and inclusion** theme. Target 4.5 seeks to reduce gender disparities at all levels of education, including TVET and tertiary education. In 2015, only about half of female students worldwide could make the transition to upper secondary education (UNESCO, 2016b). Furthermore, of the 757 million adults (aged 15 and over) worldwide who were unable to read and write, two-thirds were women (UNESCO et al., 2015). Target 4.a seeks to provide safe, non-violent, inclusive and effective learning environments for all learners, including those with disabilities, women and girls, and those in disadvantaged areas. As of 2015, around 246 million girls and boys were harassed and abused in and around schools annually (UNESCO et al., 2015). Target 4.b focuses on the need to ensure scholarships are available for those students who are financially disadvantaged.

Targets 4.7, 4.a, 4b and 4.c fall under the **quality** theme. The efforts undertaken within the framework of the MDGs and EFA movement led to outstanding achievements in universal primary education, with primary education enrolment and basic literacy rates rising to around 91 per cent (UNICEF, 2013), but in many countries, education quality remained low. Increasing the quality of education requires tackling issues such as inadequate learning environments, outdated curricula, a lack of trained teachers and poor school management. Target 4.7 addresses the need to ensure all learners gain the knowledge and skills required to become global citizens and ensure development is sustainable. Target 4.a addresses the importance of improving physical infrastructure in the education environment and of ensuring well-resourced, efficient and effective administrative systems. In 2012, around two-thirds (68 per cent) of schools in 126 developing countries met sanitation standards, while in 52 of the least developed countries only one in two schools met the standards (UNESCO et al., 2015). Target4.c emphasizes the importance of empowering teachers and educators, who are fundamental to the quality of education.

Targets 4.3, 4.4 and 4.6 fall under the **lifelong learning** theme. These targets emphasize the need for flexible learning pathways, effective means of validating and accrediting knowledge, skills and competencies acquired through non-formal and informal education, and timely responses to the diverse needs and requirements of instructors and learners. Here, ICT can support the sharing and creating of knowledge, ideas and resources.

2.3 Challenges

Achievement of SDG4 requires Member States to make significant efforts, including committing the required financial resources and facilitating collaboration across sectors. In this respect, there are four challenges to be considered:

- How to manage the targets.

  SDG4 deals with multiple education levels (pre-primary, primary, secondary, tertiary and TVET) and diverse issues (e.g. gender equality, employment and entrepreneurship, global citizenship). To achieve the targets, it is critical to fully understand the targets and the links between them. The targets and indicators need clear interpretation with statistical data and information (Hayashikawa, 2016).

- How to supply adequate and proper resources – especially financial resources.

  The practical aspects of securing and delivering financial support should not be overlooked. The achievement of SDG4 requires the improvement of multiple aspects of learning environments, thus requiring the effective provision and allocation of financial support (Hinchberger, 2016). Many countries, especially developing countries, are struggling to meet the financial requirements, however. At the same time, disbursements of aid to education from donor countries has dropped, falling from 10 per cent in 2009 to 6.9 per cent in 2015 (UNESCO, 2017). Thus, it is important to discuss how to provide global support and resources as well as to put in place sustainable and systemic financial plans for pursing the SDG4 targets.

- How to encourage and coordinate collective actions by the public and private sectors.

  Collaboration between the public and private sectors is essential to achieve SDG4, especially for targets 4.3, 4.4, 4.6 and 4.7. Effective coordination of the diverse contributions from the public and private sectors requires that Member States implement practical approaches that bring together the right stakeholders in the right places at the right times (ICSU and ISSC, 2015; Patterson, 2015). Member States and stakeholders can support such approaches by ensuring ownership, partnership and harmonization of relevant support and resources, sharing information and avoiding duplication of activities. To clarify the division of labour, it is necessary that Member States and stakeholders have a common understanding of the SDG4 targets and means of implementation.

- How to monitor and evaluate the outcomes of efforts towards achieving SDG4.

  A lack of monitoring and evaluation systems was an issue under the MDGs agenda, as progress and results were not effectively monitored (UN, 2015b). Considering that in many countries the data that would allow the measurement of progress towards the achievement of SDGs is not available, robust regular monitoring and evaluation schemes should be established, coupled with efficient systems for collecting data and empowering relevant human resources.

3 SDG4 and ICT

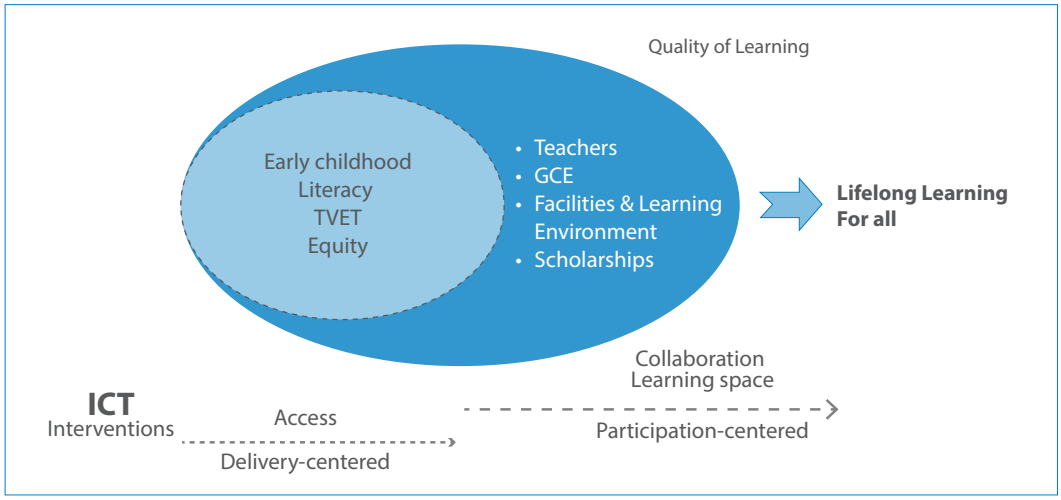
ICT is viewed as a critical mechanism that can improve access to education and address issues relating to inclusion, equity and quality. ICT can also play a transformative role in raising public awareness and reducing the cost of extending new services to a wide audience. For the SDG4 targets to be achieved by the year 2030, it is necessary to leverage existing accessible technologies. Concomitantly, it has been predicted that the traditional approaches to using technologies will not be adequate for achieving the universal goals by 2030. Therefore, new, holistic approaches to ICT integration are required (The Earth Institute Columbia University and ERICSSON, 2016; UNESCO, 2015b; 2016a).

3.1 Emerging views of ICT in Education

A review of the literature suggests that there has been increasing interest in the role of ICT in achieving SDG4. In particular, there is increasing recognition of the role of ICT in improving access to learning opportunities, which remains central to the achievement of SDG4.

As indicated in Figure 4, educators in the Asia-Pacific region need to implement both delivery-centred and participation-centred interventions in order to achieve the targets under SDG4. Targets related to access to early childhood education, TVET and literacy can be achieved through delivery-centred interventions where ICT is employed to provide multiple ways of accessing education opportunities and delivering learning resources. Concomitantly, other targets, such as improving the quality of teachers, learning environments, scholarships and global citizenship education (GCE), may need new approaches, such as participation-oriented interventions in which ICT is employed to promote collaborative learning and to extend learning spaces beyond traditional classroom contexts.

Figure 4: Changing views of ICT in Education



3.2 The Qingdao Declaration on ICT in Education

The Qingdao Declaration, which was approved at the Incheon World Education Forum in 2015 (UNESCO, 2015b), emphasizes the need for ICT to be leveraged to achieve SDG4 by 2030.

The declaration states that,

> The remarkable advances in Information and Communication Technologies (ICT) and the rapid expansion of internet connectivity have made today's world increasingly interconnected and made the knowledge more accessible for every girl and boy, woman and man. To achieve the goal of Inclusive and Equitable Quality Education and Lifelong Learning by 2030, ICT must be harnessed to strengthen education systems, knowledge dissemination, information access, quality and effective learning, and more efficient service provision.

The declaration highlights the role of ICT in upholding the fundamental right to education, and puts particular emphasis on knowledge sharing systems, as in the development of an online global repository and clearing house that can promote sharing resources and lessons learned between countries. The declaration also refers to emerging uses of ICT, such as Massive Open Online Courses (MOOCs) as innovations in online learning.

While the declaration recognizes the potential of ICT to contribute to achieving the Education 2030 goals, it also recognizes the obstacles to ICT uptake and the issues faced by Member States, including the need to redefine the roles of teachers, students, curricula and assessment. Table 1 presents the outcomes of an analysis of the roles of ICT and issues in relation to the Qingdao Declaration's themes.

Table 1: The Qingdao Declaration on ICT in Education and pedagogical issues

Theme	Role of ICT	Issues
Access and inclusion	• Quality-assured online courses	• Digital divide and diversity of learners
OER and open solutions	• Learning content (including textbooks) • Open access journals, Open course software, Open standards	• Access to learning resources
Quality learning	• Integration of basic ICT skills and information literacy into primary and secondary school curricula • Teacher training and ICT	• Need to redefine the role of teachers and learning assessment • Teacher training • Teacher workloads
Lifelong learning and pathways	• ICT to deliver TVET training • Learning anytime, anywhere	• Integrating formal and informal learning settings • Accreditation
Online learning innovations	• MOOCs • Big data	• Access to tertiary education • Availability and ethical use of data
Quality assurance and recognition of online learning	• ICT for certification & assessment	• Recognition of qualifications via online learning
Monitoring and evaluation	• Global repository for ICT in education	• Knowledge sharing
Accountability and partnership	• Funding	• Financial issues
International cooperation	• Clearinghouse of best practices and lessons learned through technology-supported innovations	• Knowledge sharing

3.3 Diverse roles of ICT

A detailed review of the Education 2030 Agenda Framework for Action indicates that ICT is highlighted as a key indicative strategy in several targets. As summarized in Table 2, SDG4 Targets 4.4, 4.5, 4.6, 4a, 4b and 4c include at least one indicative strategy in which ICT is directly mentioned.

ICT is viewed as having three main roles in education:

- As a competency

  ICT is considered a competency, when it is viewed in terms of technology-related skills. For instance, Target 4.4 has an indicative strategy to include ICT skills in TVET curricula and training programmes. Similarly, Target 4.c highlights the need to develop teachers' ICT competencies and media literacy.

- As a delivery mechanism

  ICT is viewed as a mechanism to provide and enhance learning opportunities such as distance learning and mobile learning, as highlighted in targets 4.5 and 4.6. Under Target 4.6 mobile technology is cited as a means of delivering literacy and numeracy programmes, given the high penetration of mobile devices in under-resourced areas.

- As a resource.

  ICT is viewed as a resource when it is seen, as under Target 4.a, as a means to support flexible environments for lifelong learning.

Table 2: Roles of ICT in the SDG4 targets and means of implementation

Target 4.4 By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship.	Engage social partners in designing and delivering education and training programmes that are evidence based and holistic. Ensure that TVET curricula and training programmes are of high quality and include both work-related skills and non-cognitive/transferable skills, including entrepreneurial, basic and **ICT skills**, and that TVET institutions' leaders and teaching staff, including trainers and companies, are qualified/ certified.	ICT as a competency

Target / Means of implementation	Indicative strategy	Roles of ICT
Target 4.5 By 2030, 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.	Provide distance learning, **ICT training**, access to appropriate technology and necessary infrastructure to facilitate a learning environment at home and in conflict zones and remote areas, particularly for girls, women, vulnerable boys and youth, and other marginalized groups.	ICT as a competency ICT as a delivery mechanism
Target 4.6 By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy.	Promote the **use of ICT**, particularly mobile technology, for literacy and numeracy programmes.	ICT as a delivery mechanism
Means 4.a Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all.	Make learning spaces and environments for non-formal and adult learning and education widely available, including networks of community learning centres and spaces and provision for access to **ICT resources** as essential elements of lifelong learning.	ICT as resources
Means 4.c By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small-island developing States.	Provide teachers with adequate technological **skills to manage ICT** and social networks, as well as with media literacy and source criticism skills, and provide training on how to address challenges of pupils with special education needs.	ICT as a competency

Source: UNESCO et al. 2015

4 Asia-Pacific situation and challenges

The Asia-Pacific region faces particular challenges in its efforts to achieve universal education and improve the quality of education (UNESCO, 2015a). Despite having the commitment to improve basic education, and despite success in improving enrolment rates and literacy levels, many countries in the region still face severe issues, such as inequality in access to education and poor quality of education. Achieving the Education 2030 targets requires overcoming the obstacles to achieving quality, equality and inclusiveness in education and lifelong learning for all.

A lack of coordinated actions and inadequate monitoring and evaluation systems across the region has been identified as some of the major impediments to achieving SDG4 in the Asia-Pacific region (Kim and Teter, 2015). In particular, the region lacks regional and national data on the SDG4 targets and the respective thematic indicators.

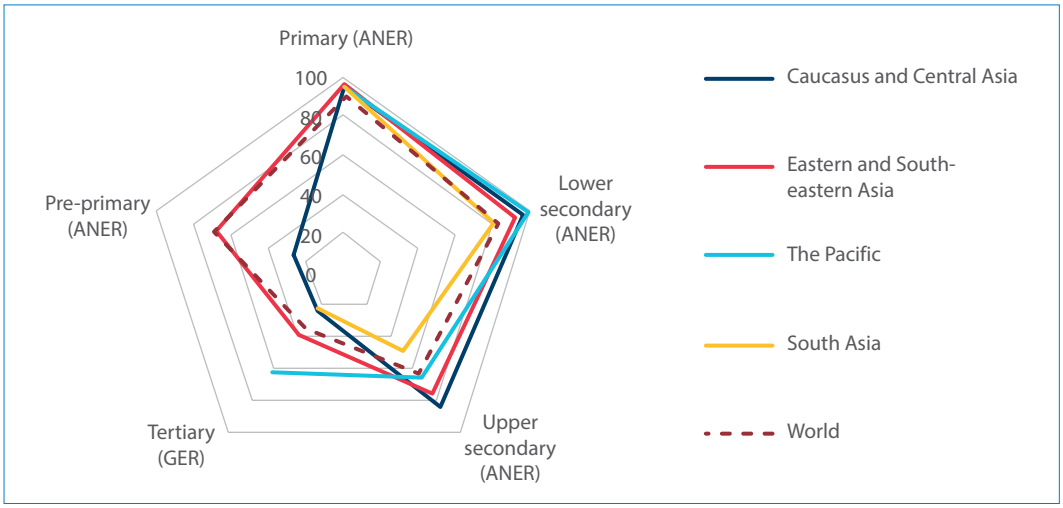
4.1 The current regional status of SDG4 targets

The researchers conducted a comparative analysis to gain a clear understanding of the current situation in the Asia-Pacific in terms of progress towards the SDG4 targets. The current situation with regard to each target was analyzed based on data produced by the UNECO Institute of Statistics (UIS) and the International Telecommunication Union (ITU), and particular reference was made to the Global Education Monitoring Report 2016 (UNESCO, 2016b), which is the first global monitoring report produced since the launch of the Education 2030 agenda. Please refer to Appendix II for the region-specific data relating to each SDG4 target.

Targets 4.1, 4.2, and 4.3 (access to education)

The researchers examined the status of access to pre-primary, primary, secondary and tertiary education in the Asia-Pacific countries. While the primary enrolment ratio was close to 100 per cent in all four sub-regions of the Asia-Pacific region, the lower secondary and upper secondary enrolment ratios for the South Asia sub-region were lower than those of the world average. Significant disparities were observed in the tertiary level. The enrolment ratio for tertiary education in East and South-East Asia was higher than the world average, whereas the ratios for Caucasus and Central Asia and South Asia were lower than the world average. The data for Caucasus and Central Asia indicated that the pre-primary enrolment ratio for that sub-region was significantly lower that the world average. The data relating to pre-primary enrolment ratios was insufficient for analysis in some of the other sub-regions. Figure 5 illustrates the enrolment ratios for each education level in the four sub-regions: Caucasus and Central Asia, East and South-East Asia, the Pacific and South Asia.

Figure 5: Enrolment ratio in the Asia-Pacific, by sub-region



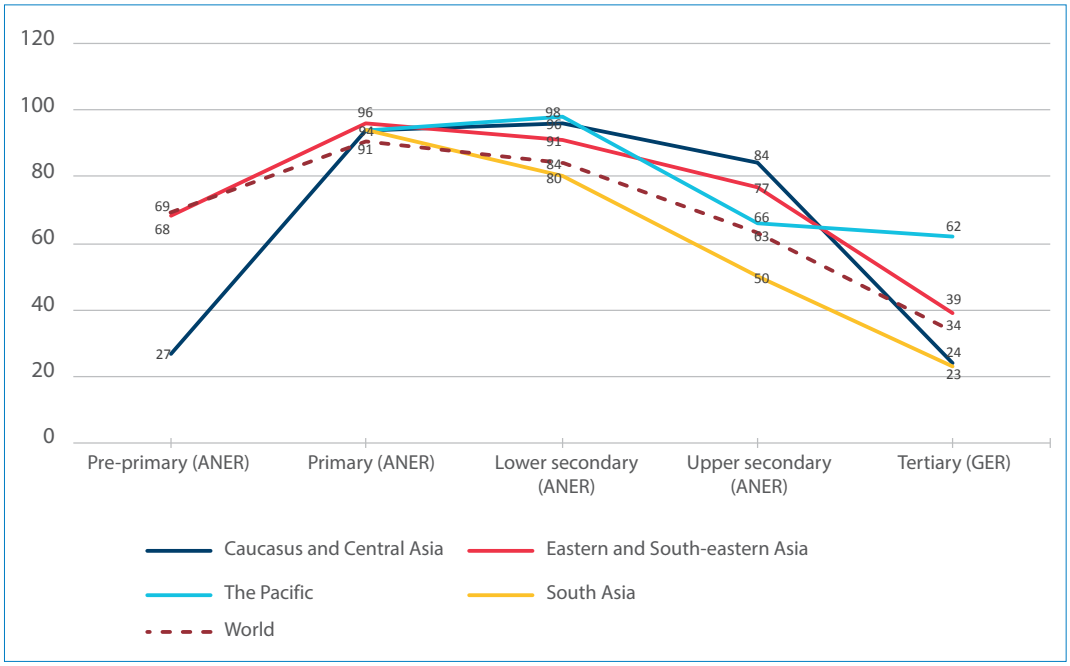
* ANER: Adjusted net enrolment ratio, enrolment of the official age group for a given level of education either at that level or the levels above, expressed as a percentage of the population in that age group.

* GER: Gross enrolment ratio, number of students enrolled in a given level of education, regardless of age, expressed as a percentage of the official school-age population corresponding to the same level of education. For the tertiary level, the population used is the 5-year age group starting from the official secondary school graduation age.

Source: UNESCO, 2016b; 2017

Figure 6 illustrates the differences in the enrolment ratios across the education levels. Primary and lower secondary education have the highest enrolment ratios, and the ratios decrease for upper secondary and tertiary education. Overall, South Asia had a lower enrolment ratio than the world average, and its ratios after primary education were the lowest of all the sub-regions of the Asia-Pacific region.

Figure 6: Target 4.1: Change in enrolment ratio in the Asia-Pacific



Source: UNESCO, 2016b

Table 3 shows the top five countries and the bottom five countries in terms of the adjusted net enrolment ratio for each level of education. The Republic of Korea, Japan and New Zealand recorded high enrolment ratios across all education levels, while countries such as Bhutan, Cambodia, Lao PDR, Myanmar, Nauru and Pakistan recorded low ratios.

Table 3: **The five top-ranked and five bottom-ranked countries, in terms of enrolment ratio, in the Asia-Pacific**

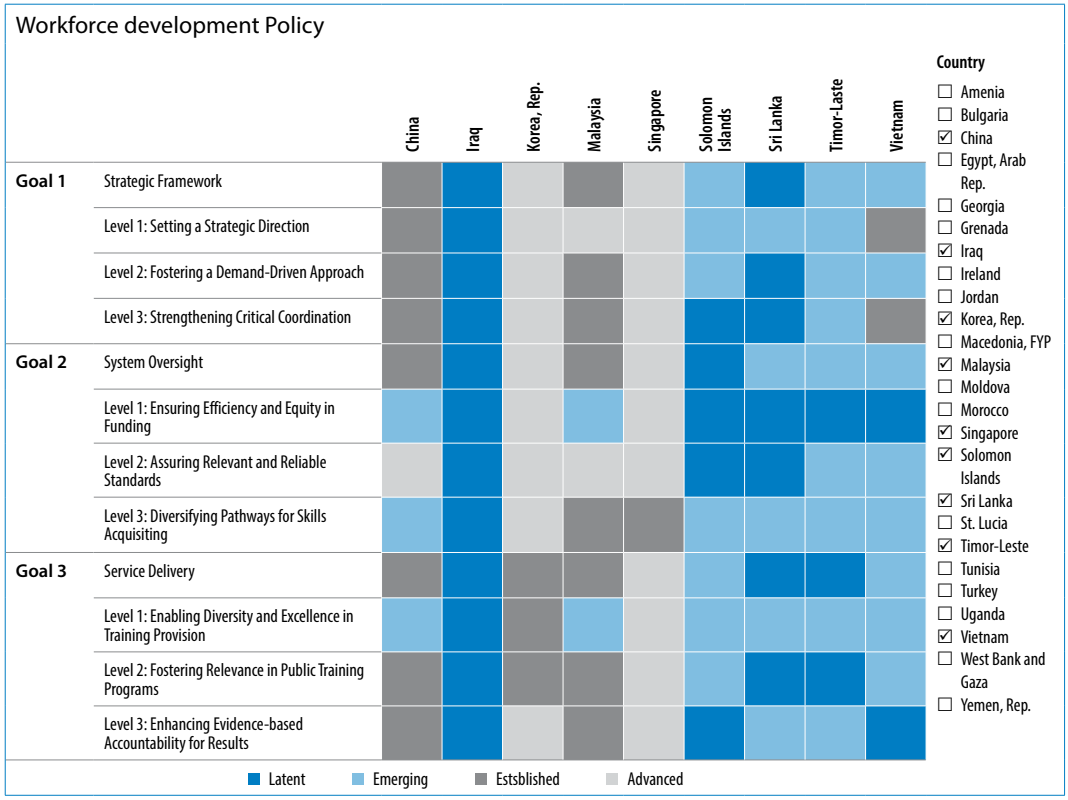
	Pre-primary (ANER)	Primary (ANER)	Lower secondary (ANER)	Upper secondary (ANER)	Tertiary (GER)
Top 5	1. Republic of Korea (92%) 2. Japan (90%) 3. New Zealand (90%) 4. Malaysia (86%) 5. Cook Islands (84%)	1. Kazakhstan (100%) 2. Japan (100%) 3. Palau (99%) 4. Tonga (99%) 5. Islamic Republic of Iran (99%)	1. Kazakhstan (100%) 2. Japan (100%) 3. Mongolia (100%) 4. Republic of Korea (99%) 5. Australia (99%)	1. Palau (98%) 2. Japan (97%) 3. New Zealand (96%) 4. Kazakhstan (95%) 5. Republic of Korea (94%)	1. Republic of Korea (95%) 2. Australia (87%) 3. New Zealand (81%) 4. Islamic Republic of Iran (66%) 5. Mongolia (64%)
Bottom 5	1. Tajikistan (9%) 2. Cambodia (19%) 3. Myanmar (23%) 4. Samoa (26%) 5. Lao PDR (30%)	1. Pakistan (73%) 2. Federated States of Micronesia (87%) 3. Nauru (87%) 4. Papua New Guinea (87%) 5. Bhutan (89%)	1. Pakistan (52%) 2. Myanmar (56%) 3. Afghanistan (65%) 4. Lao People's Democratic Republic (79%) 5. Cambodia (83%)	1. Pakistan (33%) 2. (Myanmar (39%) 3. Tonga (44%) 4. Tuvalu (47%) 5. Nauru (47%)	1. Turkmenistan (8%) 2. Afghanistan 9%) 3. Pakistan (10%) 4. Bhutan (11%) 5. Bangladesh (13%)
Number of countries with data available	25 countries	33 countries	27 countries)	27 countries	29 countries

Source: UNESCO, 2016b

Target 4.4 (skills for work)

In 2013 the World Bank launched the Systems Approach for Better Education Results (SABER) tool for assessing workforce development systems. The tool proposes the analysis of three functional dimensions of workforce institutions, policies and praxes. The three dimensions are: (a) the strategic framework, which sets the direction for workforce development in relation to national goals for economic growth and productivity, and defines its authorizing environment; (b) the system oversight, which relates to the governance of the workforce development system and the arrangements that support its operational functions; and (c) the service delivery, which pertains to the management of the provision of services, whether by public or private provider, to achieve desired workforce development outcomes on the ground (World Bank, 2013). Nine Asia-Pacific countries provided data for analysis using the SABER tool. As depicted in Figure 7, the SABER tool ranked the Republic of Korea and Singapore at advanced and established levels, while it ranked Iraq, Sri Lanka, Solomon Islands and Timor-Leste at latent and emerging levels.

Figure 7: Workforce development



* Year of data collection: 2012 (Singapore, Viet Nam), 2013 (Iraq, Republic of Korea, Malaysia, Timor-Leste), 2014 (China, Solomon Islands, Sri Lanka)

Source: World Bank (n.d.)

Table 4 shows the percentage of adults aged 25 years and over who have attained at least primary, lower secondary, upper secondary, post-secondary non-tertiary and tertiary education. It shows that the proportions of adults in Bhutan, Cambodia, Pakistan and Viet Nam who have attained each level of education are lower compared to those in other countries of the Asia-Pacific region.

Table 4: Percentage of adults aged 25 years and over who have attained education, by level

Caucasus and Central Asia					
Kyrgyzstan	98	96	88	27	18
Uzbekistan	100	100	92	.	...
East and South-East Asia					
Cambodia	36	16	6	2	…
China	…	65	22	…	9
Indonesia	77	47	31	.	9
Japan	100	…	81	…	35
Malaysia	91	68	51	16	…
Mongolia	95	85	68	36	24
Philippines	84	70	58	33	27
Republic of Korea	94	83	73	.	35
Singapore	85	79	70	51	42
Thailand	61	41	29	17	17
Viet Nam	…	65	26	12	7
The Pacific					
Australia	…	91	71	39	35
Marshall Islands	96	92	70	17	...
New Zealand	…	100	69	46	31
Samoa	99	…	72	15	…
Tonga	96	88	54	17	6
South Asia					
Bhutan	20	10	6	5	5
Islamic Republic of Iran	…	68	46	21	21
Pakistan	49	35	26	…	8
Sri Lanka	…	74	…	30	14
Caucasus and Central Asia	**99**	**97**	**90**	**39**	**28**
Eastern and South Eastern Asia	**88**	**68**	**51**	**20**	**21**
Pacific	**…**	**…**	**…**	**…**	**…**

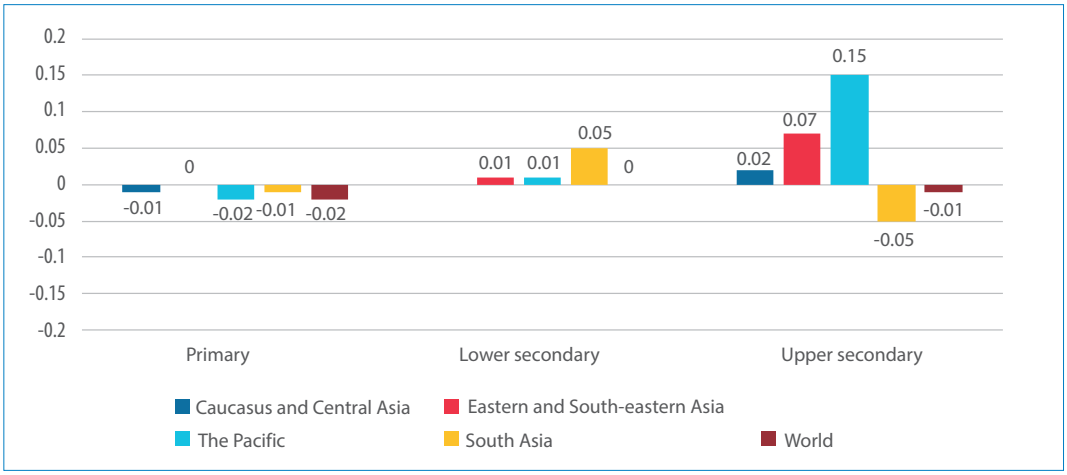
	Primary education ISCED (level 1 to 8)	Lower secondary education ISCED (level 2 to 8)	Upper secondary education ISCED (level 3 to 8)	Post-secondary non-tertiary ISCED (level 4 to 8)	Tertiary education ISCED (level 5 to 8)
South Asia	…	…	…	…	…
Europe and Northern America	99	89	74	31	29
Latin America and the Caribbean	82	57	40	…	…
Northern Africa and Western Asia	…	…	…	…	…
Sub-Saharan Africa	…	…	…	…	…
World	91	69	54	…	21

Source: UNESCO, 2016b

Target 4.5 (equity)

The researchers examined the Gender Parity Index (GPI) for each Asia-Pacific country, by education levels. When the GPI (Female/Male) is greater than 1, the enrolment ratio for females is higher than for males, and when the index is lower than 1, the enrolment ratio for males is higher. As shown in Figure 8, for primary education, overall gender disparity was not high, which indicates that girls and boys have equal access to education at that level. At the lower secondary and upper secondary levels, however, there is some disparity. For example, the data indicate that in South Asia the proportion of males enrolled in upper secondary education is significantly higher than that of females.

Figure 8: GPI (F/M) of primary, lower secondary, and upper secondary ANER in Asia-Pacific



Source: UNESCO, 2016b

Equity can also be measured using the location parity index and wealth parity index. The location parity index is the ratio of the completion rate of students living in rural areas to that of their urban counterparts. The wealth parity index is the ratio of the completion rate of students living in the poorest 20 per cent of households to that of the students living in the wealthiest 20 per cent. If the value is 1, it means there is equity. The smaller the value, the greater the inequity. Inequity tends to rise with the education level. Overall, inequity was found to be high in Afghanistan, Bhutan, Lao PDR and Pakistan. The location and wealth parity indices are shown in Table 5 (only countries with available data are shown).

Table 5: Location parity index* and wealth parity index**across education levels, by sub-region

Caucasus and Central Asia						
Kazakhstan	1.00	1.00	1.00	1.00	0.95	0.89
Kyrgyzstan	1.00	1.00	0.99	1.01	0.90	0.92
Tajikistan	0.99	0.98	0.95	0.88	0.77	0.66
East and South-East Asia						
Cambodia	0.80	0.46	0.57	0.27	0.28	0.09
China	0.93	0.91	0.81	0.71	0.47	0.49
Indonesia	0.95	0.88	0.78	0.55	0.54	0.26
Lao People's Democratic Republic	0.72	0.35	0.35	0.05	0.26	0.03
Mongolia	0.97	0.94	0.72	0.54	0.47	0.29
Philippines	0.94	0.70	0.82	0.40	0.81	0.36

Country or territory	Primary		Lower secondary		Upper secondary	
	Location	Wealth	Location	Wealth	Location	Wealth
Timor-Leste	0.71	0.39	0.56	0.33	0.41	0.13
Viet Nam	0.98	0.89	0.88	0.57	0.68	0.21
The Pacific						
Australia		…	…	0.97	…	0.80
South Asia						
Afghanistan	0.51	0.30	0.41	0.17	0.36	0.10
Bangladesh	0.99	0.70	0.94	0.40	0.63	0.14
Bhutan	0.58	0.32	0.40	0.14	0.27	0.05
India	0.94	0.87	0.87	0.76	0.54	0.39
Maldives	0.99	0.98	0.92	0.85	0.94	0.92
Nepal	0.86	0.64	0.74	0.41	0.55	0.15
Pakistan	0.71	0.27	0.62	0.14	0.42	0.07
Caucasus and Central Asia	**1.00**	**1.00**	**0.99**	**0.99**	**0.95**	**0.89**
East and South-East Asia	…	…	…	…	…	…
The Pacific	…	…	…	…	…	…
South Asia	**0.86**	**0.64**	**0.74**	**0.40**	**0.54**	**0.14**
Europe and Northern America	…	…	…	…	**0.91**	**0.82**
Latin America and the Caribbean	…	…	…	…	…	…
Northern Africa and Western Asia	…	…	…	…	…	…
Sub-Saharan Africa	**0.60**	**0.37**	**0.36**	**0.12**	**0.19**	**0.05**
World	…	…	…	…	**0.55**	**0.30**

* Location parity index is the ratio of completion rate of students living in rural areas to that of their urban counterparts.

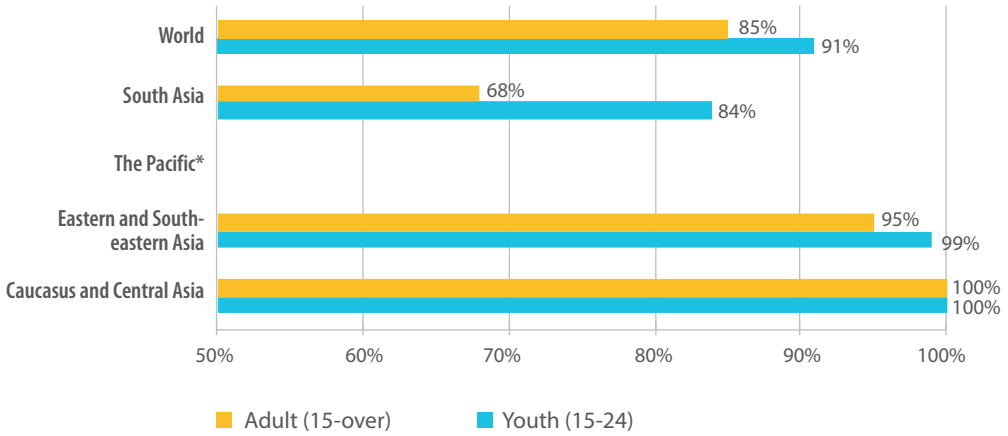
** Wealth parity index is the ratio of completion rate of students living in the poorest households to that of their richest counterparts.

Source: UNESCO, 2016b

Target 4.6 (literacy and numeracy)

Analysis of the data relating to literacy and numeracy found that the countries in the Asia-Pacific with the lowest literacy levels among youth (15-24 years) were: Afghanistan (47 per cent), Pakistan (72 per cent) and Papua New Guinea (67 per cent), and those with the lowest adult (15 and over) literacy levels were: Afghanistan (32 per cent), Bhutan (57 per cent), Nepal (60 per cent), Pakistan (56 per cent) and Timor-Leste (58 per cent). Analysis of the data by sub-region indicates that the literacy level in South Asia is significantly lower than the world average (see Figure 9). Not enough data was available for analysis of functional literacy and numeracy skills.

Figure 9: Literacy in the Asia-Pacific region



* No data from the Pacific

Source: UNESCO, 2016b

Target 4.7 (sustainable development and global citizenship)

The researchers investigated issues and identified overall patterns relating to the inclusion of education relating to sustainable development and global citizenship in the national curricula of each Asia-Pacific country. Specific topics included gender equality, human rights, sustainable development and global citizenship. As Table 6 shows, on the whole, Asia-Pacific countries' national curricula have included issues of sustainable development and global citizenship at a low level.

Table 6: Inclusion in national curricula frameworks of issues relating to sustainable development and global citizenship

No inclusion	11 countries (50%)	3 countries (14%)	3 countries (14%)	4 countries (18%)	24%
Low	8 countries (36%)	10 countries (45%)	9 countries (41%)	14 countries (64%)	47%
Medium	3 countries (14%)	6 countries (27%)	8 countries (36%)	4 countries (18%)	24%
High	-	3 countries (14%)	2 countries (9%)	-	6%
Data available	22 countries (/46 AP countries)				100%

* Inclusion level is assessed according to how many of items of the issue were covered in curricula.

Key terms included are a) gender equality, b) gender equity, c) empowerment of girls/women, d) gender sensitive(ity) and e) gender parity. The degree of inclusion of the issue in curricula is assessed as LOW if 1 or 2 of the 5 items are covered, MEDIUM if 3 are covered and HIGH if 4 or 5 are covered; 0 indicates no inclusion of any items.

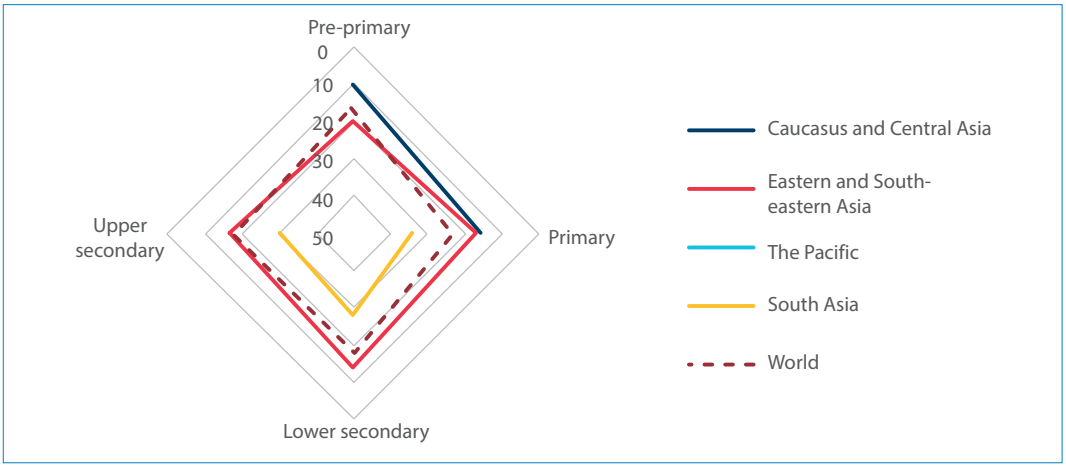
Source: UNESCO, 2016b

No specific data was available to examine the current status for **Target 4.B** (scholarships).

Target 4.c (teachers)

Figure 10 illustrates the differences between the pupil/teacher ratios at each education level across the sub-regions. The larger the pupil/teacher ratio (the closer to the centre of the graph), the greater the number of students taught by one teacher. Overall, the pupil/teacher ratios in most of the sub-regions of the Asia-Pacific region are comparable or even lower than the world average. The only sub-region in which the pupil/teacher ratio is higher than the world average is South Asia.

Figure 10: Pupil/teacher ratio in the Asia-Pacific region



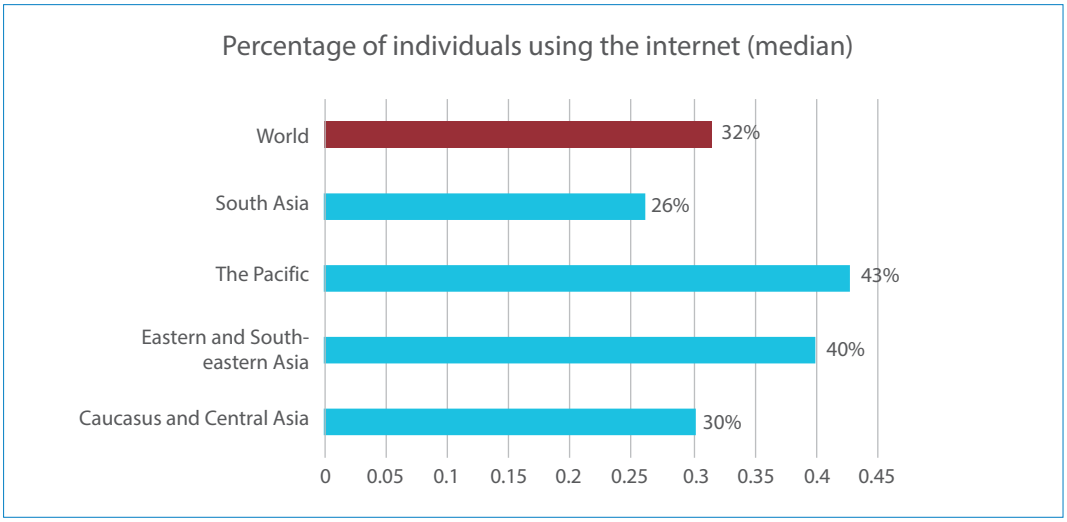
* No data from the Pacific

Source: UNESCO, 2016b

4.2 The current status of ICT infrastructure and integration

To understand the situation regarding basic ICT infrastructure in education in the Asia-Pacific region, the researchers analyzed data on access to the internet and mobile systems, school ICT infrastructure, and teachers' and students' ICT competencies. The researchers found that the percentage of individuals using the internet varies greatly between and within the sub-regions. Figure 11 shows the median percentage of individuals using the internet in each sub-region, compared with the world median. We used the median instead of the mean because of the large variation between countries. For example, while the internet is used by over 80 per cent of the population in some countries: Japan (91.06 per cent), the Republic of Korea (89.65 per cent), New Zealand (88.22 per cent), Australia (84.56 per cent) and Singapore (82.10 per cent), in other countries fewer than 10 per cent of the population use the internet, such as in Papua New Guinea (7.90 per cent) and Afghanistan (8.26 per cent).

Figure 11: The median percentage of individuals using the internet, by region



Source: ITU, 2016

Given that ownership of ICT devices (e.g. mobile telephone and computers) can be a relevant indicator for access to learning resources, the researchers examined access to ICT devices. They found that the 84 per cent of households in Asia-Pacific countries (data available for eight countries) own mobile telephones and, on average, 39 per cent of households own computers (data available for 22 countries). These figures indicate that mobile telephones are more widely used than computers in the region. The Asia-Pacific average for mobile telephone subscriptions per 100 inhabitants was 93 per cent, which is close to the word average, 98.6 per cent. Twenty of the 43 countries with data available had more than 100 mobile-cellular telephone subscriptions per 100 inhabitants.

Target 4.a (education facilities and learning environments)

The researchers examined the status of ICT facilities in schools in the Asia-Pacific region, in the countries with data available. Electricity in schools has not been fully secured in countries such as Bangladesh, Bhutan, Cambodia, India, Lao PDR, Myanmar and Nepal. All schools in Brunei Darussalam, Kazakhstan, Malaysia, Mongolia, Republic of Korea and Singapore were equipped with computers, but fewer than 5 per cent of schools in Cambodia, Myanmar and Nepal had computers. All schools in Brunei Darussalam, Republic of Korea and Singapore used the Internet for pedagogical activities, but much lower usage was seen in countries such as the Islamic Republic of Iran, Kyrgyzstan, the Maldives and Sri Lanka. Table 7 shows the current status of ICT facilities (electricity, internet and computers) in the countries with data available.

Table 7: Percentage of schools with ICT facilities

Caucasus and Central Asia												
Kazakhstan	…	…	…	…	…	…	…	…	100	100	100	100
Kyrgyzstan	100	100	100	100	6	…	…	…	86	…	…	…
East and South-East Asia												
Brunei Darussalam	…	…	…	…	100	100	100	100	100	100	100	100
Cambodia	…	7	…	…	…	…	…	…	3	…	…	…
Indonesia	…	80	80	…	…	…	…	…	…	…	…	…
Lao People's Democratic Republic	…	19	39	74	…	…	…	…	…	…	…	…
Malaysia	100	100	100	100	91	90	97	95	100	100	100	100
Mongolia	91	…	…	…	…	…	…	…	100	100	100	100
Myanmar	…	7	3	8	…	…	…	…	5	1	7	48
Philippines	…	83	95	…	…	4	28	…	…	41	87	…
Republic of Korea (South Korea)	100	100	100	100	100	100	100	100	100	100	100	100
Singapore	100	100	100	100	100	100	100	100	100	100	100	100
Thailand	…	99	100	89	98	99	99	89	98	99	100	89
The Pacific												
New Zealand	100	100	100	100	…	…	…	…	…	…	…	…
South Asia												
Bangladesh	…	55	70	71	…	-	…	…	…	…	…	…
Bhutan	…	67	88	100	66	…	…	…	…	…	…	…
India	…	45	63	87	…	…	…	…	…	…	…	…
Islamic Republic of Iran	…	99	100	100	32	11	26	45	72	46	60	90
Maldives	100	100	100	100	40	…	…	…	40	…	…	…
Nepal	…	6	11	47	…	…	…	…	3	-	1	8
Sri Lanka	82	…	…	…	18	…	…	…	60	…	…	…

Source: UNESCO, 2016b

Target 4.4 (skills for work)

There was no data regarding the percentage of youth and adults with ICT skills in most Asia-Pacific countries. Only three countries: Kazakhstan, Singapore and Islamic Republic of Iran had such data. The data available referred to the following ICT skills: being able to send emails with

attached files, use basic arithmetic formulas in a spreadsheet and find, download and configure software. As shown in Table 8, the data indicate that high percentages of youth and adults lack these ICT skills.

Table 8: Percentages of youth and adults with ICT skills, by skill type

Country or territory	Adults (15 and over)		
	Sending email with attached files	Using basic arithmetic formulas in a spreadsheet	Finding, downloading, installing and configuring software
Kazakhstan	48	17	19
Singapore	55	24	23
Islamic Republic of Iran	9	3	11

Source: UNESCO, 2016b

The researchers also attempted to examine the ICT competencies of primary and secondary teachers in the Asia-Pacific. Data on ICT-qualified teachers (those with basic computer skills) was available in 11 countries for primary teachers and in 12 countries for secondary teachers (see Table 9). The percentage of ICT-qualified teachers was high in countries such as Thailand and Singapore, but low in countries such as Kyrgyzstan, Malaysia, Mongolia and the Philippines.

Table 9: ICT skills: primary and secondary teachers

	Primary teachers				
	ICT-qualified teachers (basic computer skills or computing) (%)	Teachers currently teaching basic computer skills or computing (%)	Teachers trained to teach subject(s) using ICT facilities (%)	Teachers currently teaching subject(s) using ICT facilities (%)	Ratio of pupils to teachers trained to use ICT to teach (%)
Caucasus and Central Asia					
Kyrgyzstan	…	-	-	…	…
East and South-East Asia					
China	…	2	35	…	48
Malaysia	31	31	100	100	12
Mongolia	…	-	…	…	…
Myanmar	…	…	2	…	>500
Philippines	1	…	1	1	>500
Singapore	100	100	100	100	19
Thailand	86	85	77	77	27
South Asia					

Islamic Republic of Iran	…	-	58	48	28
Maldives	3	3	…	…	…
Sri Lanka	-	-	11	11	225

	Secondary teachers				
	ICT-qualified teachers (basic computer skills or computing) (%)	Teachers currently teaching basic computer skills or computing (%)	Teachers trained to teach subject(s) using ICT facilities (%)	Teachers currently teaching subject(s) using ICT facilities (%)	Ratio of pupils to teachers trained to use ICT to teach (%)
Caucasus and Central Asia					
Kyrgyzstan	…	-	-	…	…
East and South-East Asia					
Cambodia	…	2	…	…	…
China	…	2	44	…	35
Malaysia	11	11	100	100	10

	Secondary teachers				
	ICT-qualified teachers (basic computer skills or computing) (%)	Teachers currently teaching basic computer skills or computing (%)	Teachers trained to teach subject(s) using ICT facilities (%)	Teachers currently teaching subject(s) using ICT facilities (%)	Ratio of pupils to teachers trained to use ICT to teach (%)
Mongolia	1	5	…	…	…
Myanmar	…	2	2	…	…
Philippines	5	…	5	5	…
Singapore	100	100	100	100	15
Thailand	90	88	81	81	21
South Asia					
Bangladesh	…	7	…	…	…
Islamic Republic of Iran	1	1	63	37	18
Sri Lanka	2	7	50	50	36

* Data collected in 2012; depending on the country, data refer to maximum three years prior to the reference year

Source: UNESCO-UIS, n.d.

5 Survey

5.1 Survey goals and methods

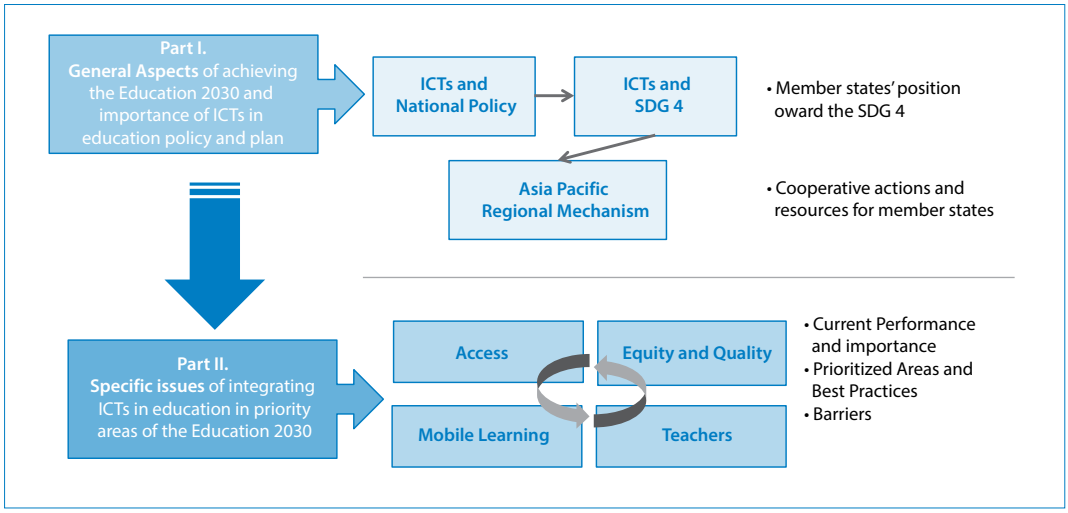
The main goals of the survey were: to identify the availability and importance of ICT in education in the region and to identify required cooperative actions and applicable resources to achieve SDG4, with supporting evidence. The research team prepared a survey containing 20 questions in two parts (see Appendix III for the complete survey). Part 1 of the survey covered general aspects of achieving the Education 2030 goals and the importance of ICT in education policies and plans, while Part 2 covered specific issues relating to integrating ICT into education for the priority areas of Education 2030 (see Figure 12).

The main goal of Part 1 was to assess the current status of achieving the Education 2030 goals in Member States across three dimensions of integrating ICT in education: national policies and plans, SDG4 and ICT, and potential regional mechanisms. The section on national policies and plans captures the current status of ICT readiness among Member States in terms of levels of education and financial resources. The questions about SDG4 were designed to identify the current performance and future plans of each Member State to integrate ICT into education in pursuit of the SDG4 targets. The section on potential regional mechanisms asked respondents to specify the types of support and regional coordination mechanisms that would enable Asia-Pacific Member States to engage in effective and sustainable collaboration for achieving the SDG4 targets.

The main goal of Part 2 was to measure the current performance and importance of integrating ICT into education in order to identify the priority areas that need coordinated action in the Asia-Pacific region over the five years from 2017 to 2022, in order to reach the SDG4 targets. The situational analysis indicated that the region faces challenges in the areas of access, equity,

quality of education and teachers. The questions in Part 2 were designed to identify best practices and any particular barriers that Member States have experienced in integrating ICT into diverse education settings, from policy aspects to teaching and learning practices in schools.

Figure 12: Survey design framework



5.2 Data collection and analysis

The survey was sent out to 46 Member States in the final week of March 2017. Of these 46 Member States, 26 submitted complete responses. Table 10 presents the Member States that submitted survey responses, along with their ICT Development Index (IDI) values. The IDI is an indicator, with values ranging from 0 to 10, showing the general level of ICT development in a country. It covers ICT access (40 per cent), ICT use (40 per cent) and ICT skills (20 per cent). In 2016 the global average IDI was 4.94 (SD= 2.22).

Table 10: IDI values and rankings of the Member States that responded to the survey, by sub-region

Caucasus and Central Asia	1	Kyrgyzstan	3.99	113
(n=2)	2	Tajikistan	-	-
East and South-East Asia	3	Cambodia	3.12	125
(n=9)	4	China	5.19	81
	5	Lao People's Democratic Republic	2.45	144
	6	Philippines	4.28	107
	7	Republic of Korea (South Korea)	8.84	1
	8	Singapore	7.95	20
	9	Thailand	5.18	82
	10	Timor-Leste	3.05	128
	11	Viet Nam	4.29	105
The Pacific	12	Cook Islands	-	-
(n=9)	13	Fiji	4.41	102
	14	Kiribati	2.06	152
	15	Marshall Islands	-	-
	16	Palau	-	-
	17	Samoa	2.95	130
	18	Solomon Islands	2.04	153
	19	Tuvalu	-	-
	20	Vanuatu	3.08	127
South Asia	21	Afghanistan	1.73	164
(n=6)	22	Bangladesh	2.35	145
	23	Bhutan	3.74	117
	24	Islamic Republic of Iran	4.99	89
	25	Maldives	5.04	86
	26	Sri Lanka	3.77	116

* IDI: ICT access (40%), ICT use (40%), ICT skills (20%)

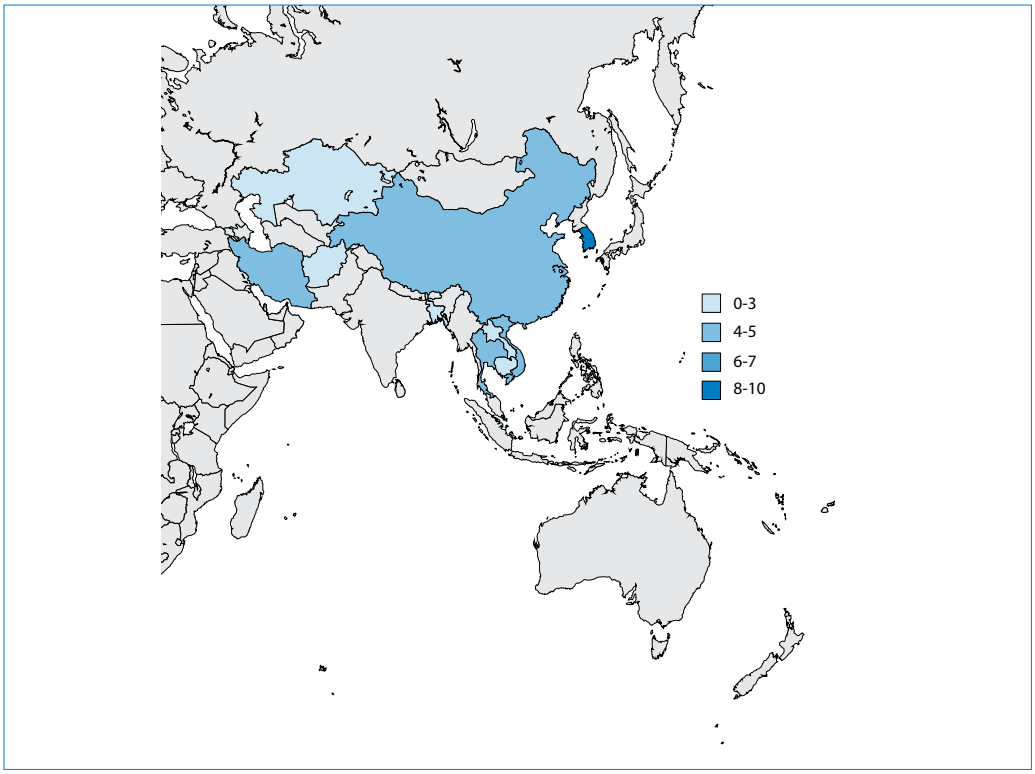
1. Access sub-index: This sub-index captures ICT readiness, and includes five infrastructure and access indicators (fixed-telephone subscriptions, mobile-cellular telephone subscriptions, international Internet bandwidth per Internet user, households with a computer, and households with Internet access).
2. Use sub-index: This sub-index captures ICT intensity, and includes three intensity and usage indicators (individuals using the Internet, fixed-broadband subscriptions, and mobile-broadband subscriptions).
3. Skills sub-index: This sub-index seeks to capture capabilities or skills which are important for ICTs. It includes three proxy indicators (mean years of schooling, gross secondary enrolment, and gross tertiary enrolment).

As these are proxy indicators, rather than direct measures of ICT-related skills, the skills sub-index is given less weight in the computation of the IDI than the other two sub-indices.

Source: ITU, 2016

As shown in Figure 13, the Asia-Pacific region is diverse in terms of levels of ICT infrastructure and development. It includes countries with high IDIs, such as the Republic of Korea and Singapore, and countries with low IDIs, such as Afghanistan, Kiribati and the Solomon Islands.

Figure 13: **IDI values of the Member States that submitted survey responses**



Source: ITU, 2016

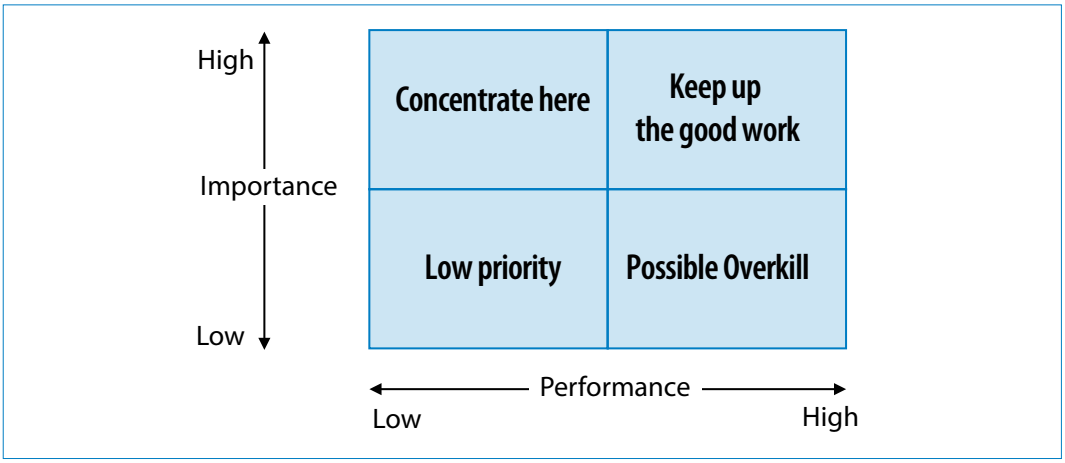
The researchers analyzed data on the region-specific nature of integrating ICT into education for achieving SDG4. Then the key findings were synthesized to identify areas of priority in view of SDG4 and to identify the availability and necessity of resources and regional actions.

Descriptive statistical analysis was conducted for each survey item to identify the current situation in the Asia-Pacific countries. In addition, Importance-Performance Analysis (IPA) was performed to identify the areas among the various SDG4 targets requiring priority action. IPA is a useful technique to identify the strengths and weakness of the current performance, and to prioritize areas that need more urgent effort for future planning. IPA is a technique for extracting elements with high priority by analyzing the discrepancies between the performance

and importance scores (Matilla and James, 1977). Respondents rate the degree to which they perceive each item is currently performing (Performance) and how important it is (Importance). Then the differences between the importance and performance scores are analyzed. In this study, the survey items concerning IPA were measured on a 5-point scale from 1 (low) to 5 (high). Quantitative data obtained through the survey was presented in various visual ways to illustrate the current situation in Asia-Pacific countries.

As shown in Figure 14, when IPA is performed, a four-quadrant matrix is derived. Items with high importance and low performance should receive concentrated efforts, whereas items with low importance and high performance can be considered to be over-investments so should be avoided in future. On the other hand, items with both high importance and high performance should be kept at the current level, while those with low importance and low performance should remain a low priority.

Figure 14: Importance-Performance Analysis



Source: Matilla and James, 1977

The survey also included a section on 'feasibility', which measured how feasible it was to achieve each target through the use of ICT. The purpose of the section was to examine the potential and priorities of integrating ICT into education for the achievement of each SDG4 target, from Member States' perspectives.

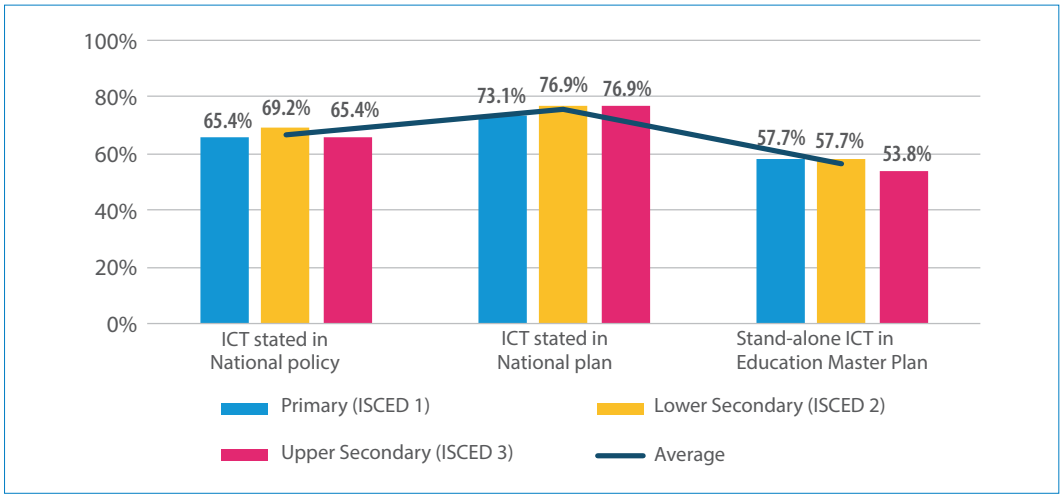
6 Results

6.1 General aspects of ICT and SDG4

6.1.1 National policy and ICT

The survey asked whether each country had a national policy or plan to promote and/or implement the integration of ICT into education. As shown in Figure 15, about 66.7 per cent (n=17.3) of the countries reported that ICT was mentioned in a national policy, and about 75.6 per cent (n=19.7) noted that ICT was mentioned in a national plan. About 56.4 per cent (n=14.7) of the countries reported having a stand-alone ICT in education master plan.

Figure 15: National policy or plan for the integration of ICT into education (n=26)



Over two-thirds (69.2 per cent) of the Member States had budget estimates based on an implementation plan. More than a half of the Member States (61.5 per cent) indicated that the ICT in Education implementation plan was reflected or allocated in the government budget.

6.1.2. Importance-performance analysis of SDG4 targets

The research team measured how each Member State perceived the importance and the current performance of each SDG4 target. A t-test was conducted to determine whether the discrepancies between importance and performance (I-P) scores were statistically significant. As shown in Table 11, The I-P values were significant for all SDG4 targets, indicating that Member States perceived that the level of importance of each target was significantly higher than its current performance.

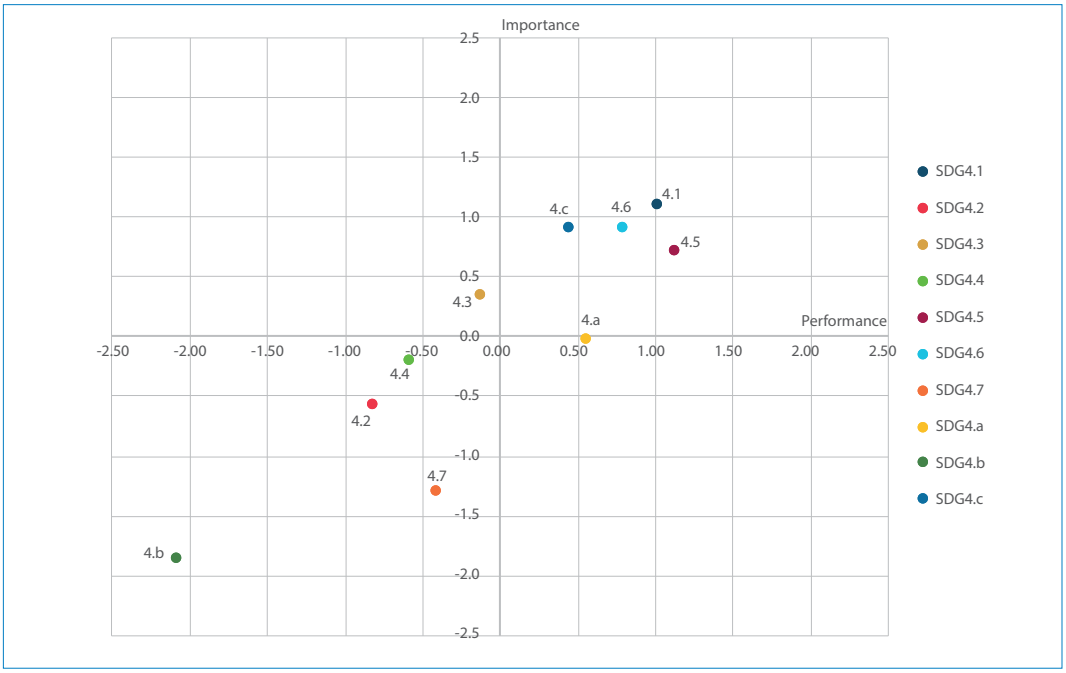
Table 11: The result of IPA about SDG4 targets (n=26)

	Importance			Performance			Importance-Performance		
	M	SD	n	M	SD	n	I-P	t	p
SDG4.1	4.65	0.69	26	4.00	1.10	26	0.65	3.74*	0.00
SDG4.2	4.31	1.16	26	3.38	1.27	26	0.92	4.82*	0.00
SDG4.3	4.50	0.71	26	3.62	0.98	26	0.88	4.54*	0.00
SDG4.4	4.38	0.75	26	3.46	0.99	26	0.92	5.28*	0.00
SDG4.5	4.58	0.64	26	4.04	0.96	26	0.54	2.78*	0.01
SDG4.6	4.62	0.70	26	3.92	0.93	26	0.69	3.80*	0.00
SDG4.7	4.16	1.03	25	3.52	0.96	25	0.64	3.72*	0.00
SDG4.a	4.42	0.81	26	3.85	0.83	26	0.58	3.43*	0.00
SDG4.b	4.04	1.30	24	2.96	1.23	24	1.08	3.61*	0.00
SDG4.c	4.62	0.70	26	3.81	0.90	26	0.81	3.76*	0.00

* $p < .05$

To more accurately identify the priority areas among various SDG4 targets, importance and performance values were converted into Z scores and displayed in a quadrant (Figure 16). Overall, the SDG4 targets that the Member States perceived to be important showed high levels of performance. Target 4.3 (TVET) was the exception. While it was perceived as being important, the current performance was relatively low, indicating a need for greater efforts.

Figure 16: Importance and performance of SDG4 targets (n=26)



Importance-performance analysis was conducted for each sub-region in the Asia Pacific, with consideration of the diversity within and across sub-regions. However, the Caucasus and Central Asia sub-region was excluded from this analysis because only two countries in this sub-region (Kyrgyzstan and Tajikistan) had responded to the survey. As presented in Figures 17, 18 and 19, the priority areas in each sub-region were as follows:

- East and South-East Asia (n=9):

  Target 4.2 (early childhood), Target 4.3 (TVET and higher education) and Target 4.4 (skills for work)

- The Pacific (n=9):

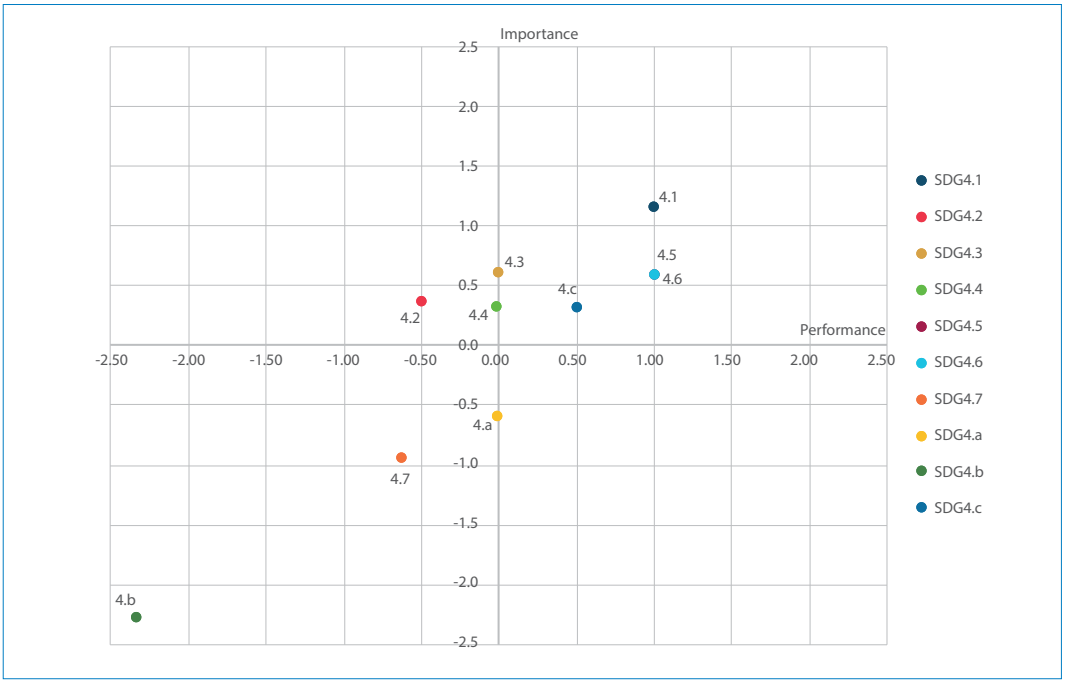
  Target 4.3 (TVET and higher education)

- South Asia (n=6):

  Target 4.b (scholarships)

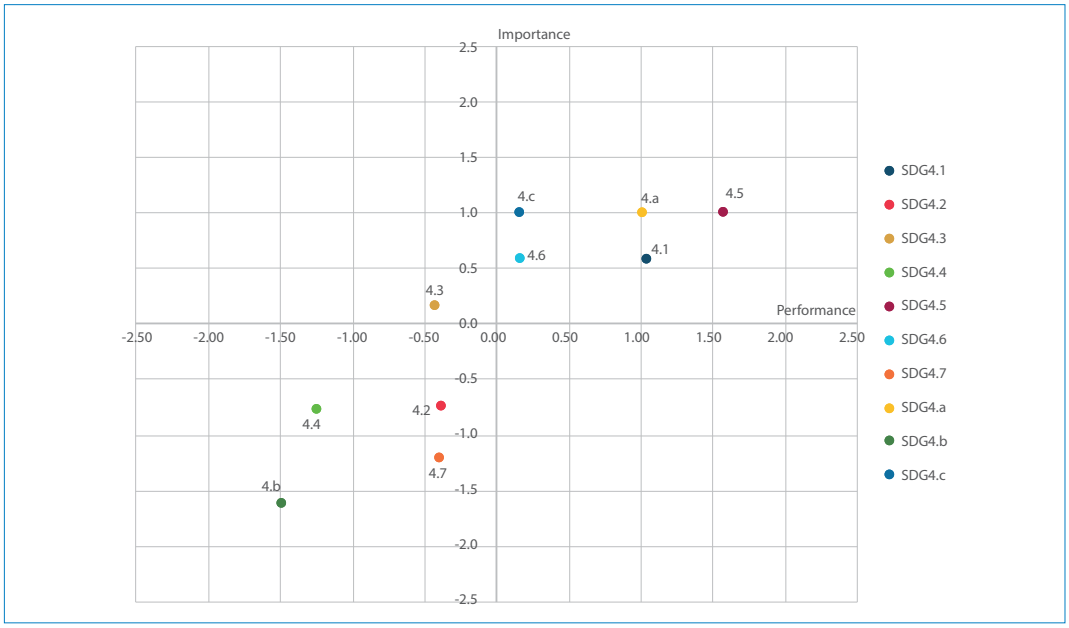
It should be noted that since the sub-regional analysis was based on a small number of countries, caution should be taken in the interpretation of these priority areas, and the findings need additional support from other data sources.

Figure 17: Importance and performance of SDG4 targets in East and South-East Asia



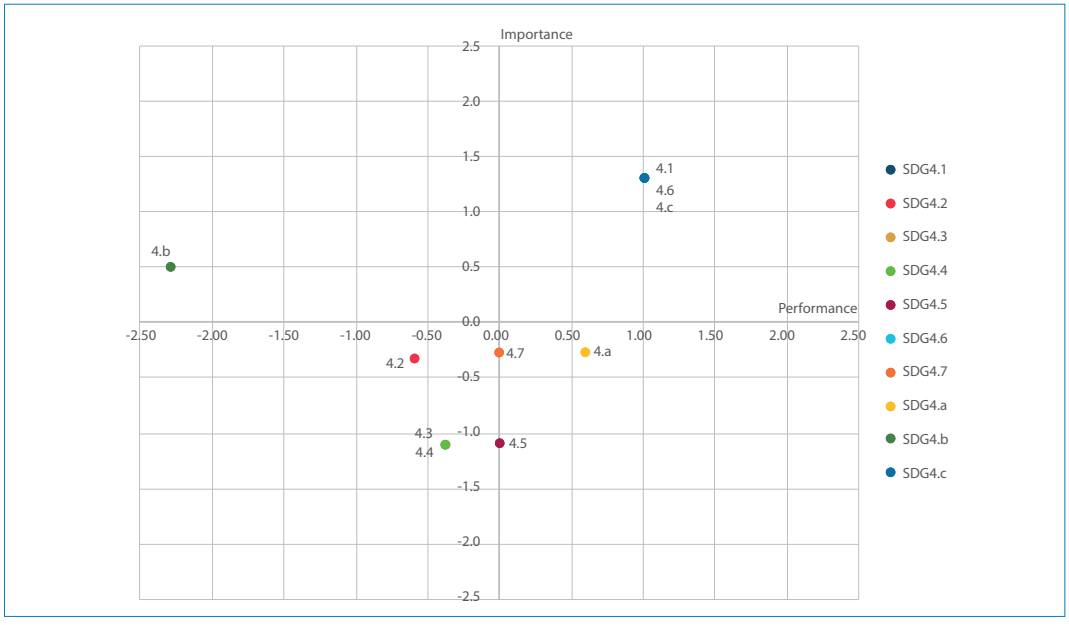
*n=9, Cambodia, China, Lao People's Democratic Republic, Philippines, Republic of Korea, Singapore, Thailand, Timor-Leste and Viet Nam

Figure 18: Importance and performance of SDG4 targets in the Pacific



* n=9, Cook Islands, Fiji, Kiribati, Marshall Islands, Palau, Samoa, Solomon Islands, Tuvalu and Vanuatu

Figure 19: Importance and performance of SDG4 targets in South Asia

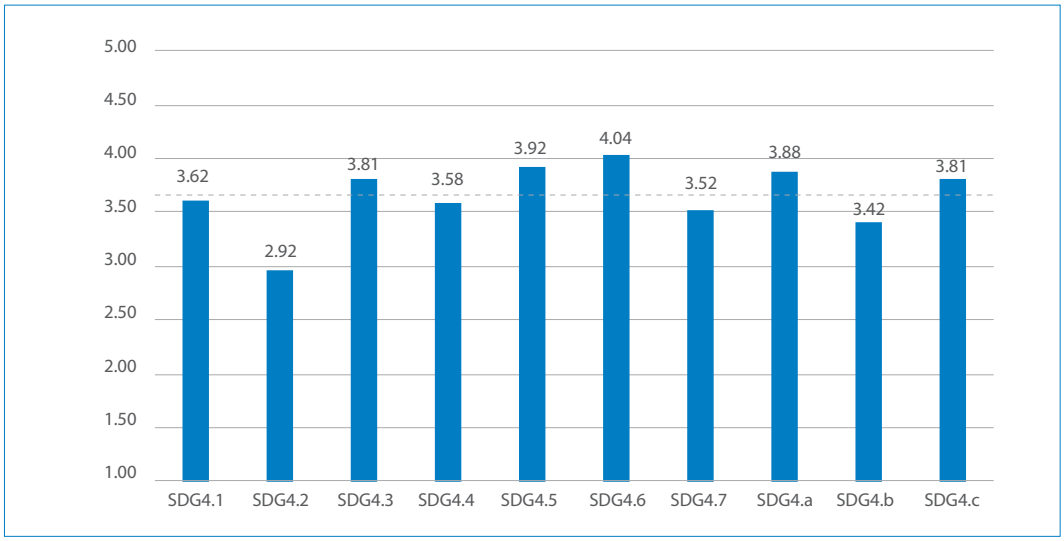


* n=6, Afghanistan, Bangladesh, Bhutan, Islamic Republic of Iran, Maldives and Sri Lanka

6.1.3. Feasibility of ICT integration and a regional mechanism for SDG4

The research team identified the feasibility of integrating ICT into education with regard to each SDG4 target. As shown in Figure 20, the feasibility of ICT integration was perceived to be the highest for Target 4.6 (literacy and numeracy), followed by targets 4.5 (equity), 4.a (education facilities and learning environments), 4.3 (TVET and higher education) and 4.c (teachers). The feasibility of ICT integration was lowest for Target 4.2 (early childhood).

Figure 20: Feasibility of ICT integration in SDG4 on a 5-point scale from 1 (low) to 5 (high)



The survey respondents noted that cost-related issues were the major barrier to ICT integration.

To assess the potential of applying specific ICT innovations, the research team conducted an Importance-Performance Analysis on the types of ICT tools and the areas of ICT application highlighted in the Qingdao Declaration (i.e. OER, basic ICT skills in curricula, MOOCs, big data and monitoring and evaluation). The findings indicate that the differences between importance and performance were statistically significant for all areas, implying that while the importance of each area is high, the current performance tends to be low (Table 12).

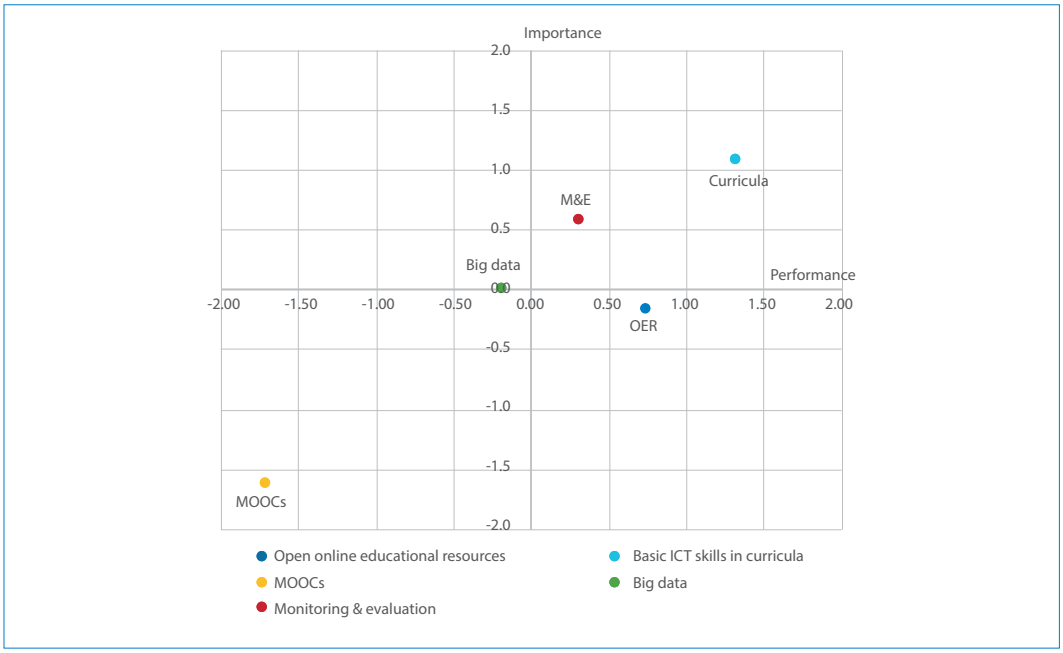
Table 12: IPA for ICT innovations and practice (n=26)

	Importance			Performance			Importance-Performance		
	M	SD	n	M	SD	n	I-P	t	p
Open online education resources	4.04	1.34	26	3.08	1.35	26	0.96	3.25*	0.00
Basic ICT skills in curricula	4.38	0.90	26	3.12	1.21	26	1.27	5.31*	0.00
MOOCs	3.62	1.50	26	2.46	1.39	26	1.15	3.88*	0.00
Big data	4.08	1.26	25	2.84	1.25	25	1.24	4.89*	0.00
Monitoring and evaluation	4.23	0.95	26	2.96	1.22	26	1.27	5.05*	0.00

* p< .05

Figure 21 illustrates the areas with the highest priority.

Figure 21: IPA of ICT innovations and practices highlighted in the Qingdao Declaration (n=26)



The research team examined the types of support that each country can offer and/or need to receive in order to integrate ICT into education so as to achieve the Education 2030 goals. Member States were asked to select up to three types of support, including policy consultation,

capacity building, creating a specialized agency, technical support and financial aid. As shown in Table 13, more Member States want to receive support than offer support. This indicates a need to promote active support for Member States within and across sub-regions.

Table 13: Regional mechanism for integrating ICT in education (n=26)

Types of support	For offering	For receiving
Policy consultation	Tajikistan, China, Lao PDR, Republic of Korea, Thailand, Viet Nam, Cook Islands, Vanuatu, Bangladesh, Islamic Republic of Iran	China, Lao PDR, Philippines, Timor-Leste, Fiji, Kiribati, Palau, Samoa, Tuvalu, Afghanistan, Bangladesh, Bhutan, Sri Lanka, Maldives
Capacity building for officials and administrators	Tajikistan, Singapore, Thailand, Viet Nam, Vanuatu, Bangladesh, Sri Lanka	China, Philippines, Timor-Leste, Cook Islands, Fiji, Kiribati, Marshall Islands, Palau, Samoa, Tuvalu, Afghanistan, Bhutan, Islamic Republic of Iran, Bangladesh, Maldives
Capacity building for teachers	Tajikistan, Republic of Korea, Singapore, Thailand, Vanuatu, Bangladesh, Sri Lanka	Kyrgyzstan, Cambodia, Lao People's Democratic Republic, Timor-Leste, Viet Nam, Cook Islands, Fiji, Kiribati, Marshall Islands, Samoa, Solomon Islands, Tuvalu, Vanuatu, Afghanistan, Bhutan, Bangladesh, Islamic Republic of Iran, Maldives
A specialized agency for ICT in education	Republic of Korea, Thailand	Kyrgyzstan, Tajikistan, Cambodia, China, Timor-Leste, Kiribati, Solomon Islands, Afghanistan, Bhutan, Islamic Republic of Iran, Maldives
Technical assistance in research and benchmarking	China, Thailand	Tajikistan, Cambodia, Philippines, Timor-Leste, Kiribati, Vanuatu, Afghanistan, Bhutan, Islamic Republic of Iran, Sri Lanka, Maldives
Financial aid	Thailand	Kyrgyzstan, Tajikistan, Lao PDR, Timor-Leste, Kiribati, Marshall Islands, Palau, Solomon Islands, Vanuatu, Afghanistan, Bhutan, Islamic Republic of Iran, Sri Lanka, Maldives

6.2 Specific issues relating to integrating ICT into education for the Education 2030 priority areas

6.2.1 ICT and access to education

To identify areas of the Education 2030 agenda in which ICT can be best utilized, an IPA was conducted with regard to integrating ICT into education to enhance access to each level of education. As summarized in Table 14, all I-P values were statistically significant, indicating that the current performance of integrating ICT to enhance access at all school levels is insufficient compared to the level of importance.

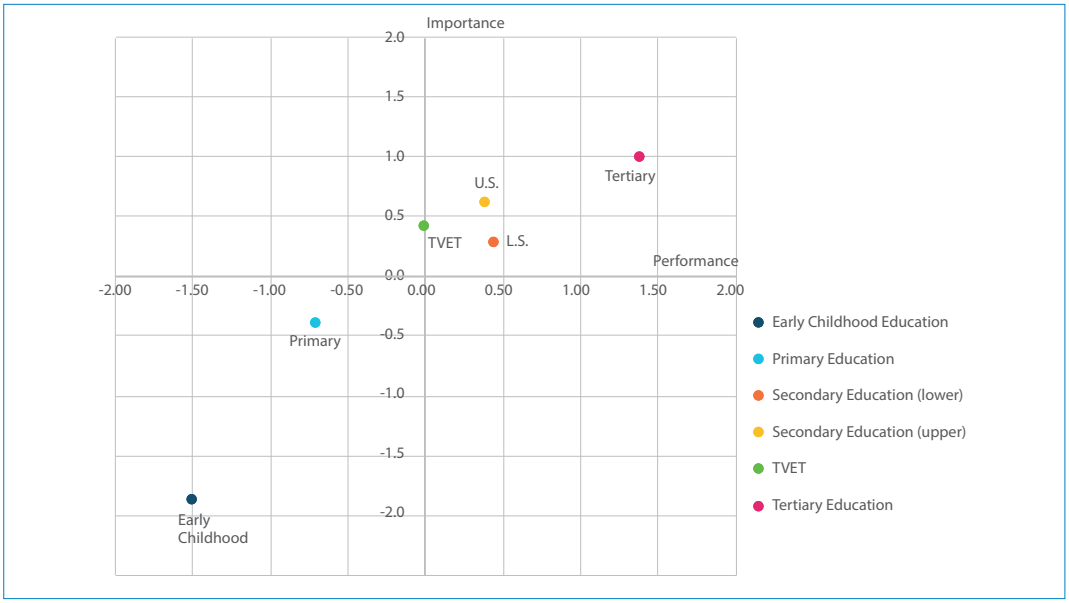
Table 14: IPA about using ICT for enhancing access to education (n=26)

	Importance			Performance			Importance-Performance		
	M	SD	n	M	SD	n	I-P	t	p
Early Childhood Education	3.23	1.39	26	2.31	1.12	26	0.92	2.95*	0.01
Primary Education	3.88	1.09	25	2.64	1.11	25	1.24	4.36*	0.00
Secondary Education (lower)	4.17	1.13	24	3.08	1.10	24	1.08	4.66*	0.00
Secondary Education (upper)	4.32	0.99	25	3.08	1.08	25	1.24	4.77*	0.00
TVET	4.20	1.15	25	2.92	1.15	25	1.28	5.15*	0.00
Tertiary Education	4.48	0.77	25	3.48	1.00	25	1.00	4.80*	0.00

* $p < .05$

While no specific level of education appears to need greater efforts than others, TVET was located closer to the concentrate area than the rest of education levels (see Figure 22).

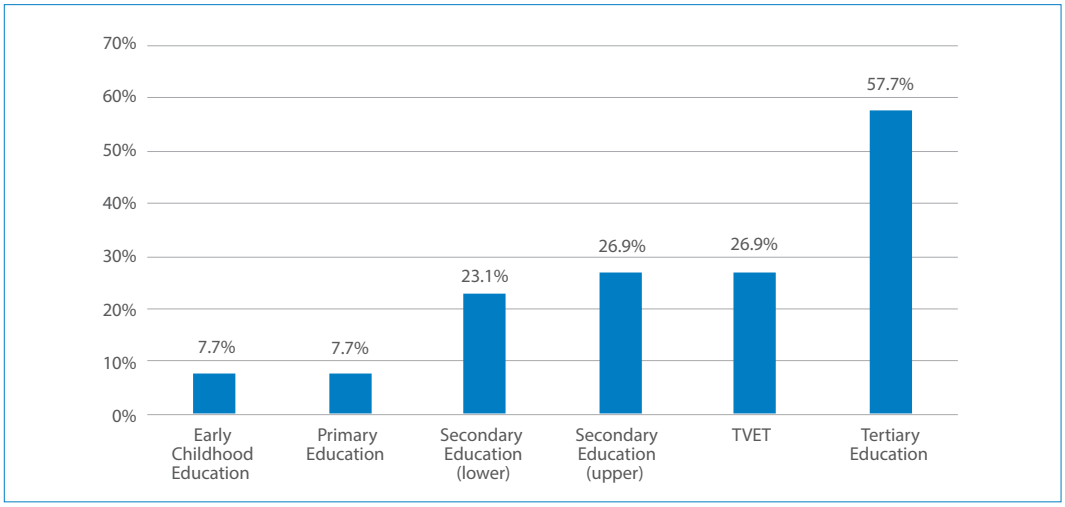
Figure 22: Importance and performance of using ICT to enhance access to education, by education level



When asked to list exemplary ICT initiatives for increasing access to education, the survey respondents noted open educational resources (OER), learning management systems (LMS) for online learning, distance learning using a satellite system, and smart devices such as tablet personal computers. Some respondents also listed barriers and challenges limiting the use of ICT to enhance access to education. Major barriers included lack of funding, lack of internet connectivity, low teacher competence and motivation and lack of appropriate education content.

The researchers examined the current status of utilizing ICT for the provision of alternative schooling opportunities, such as virtual school systems (mostly online learning). As seen in Figure 23, overall, the provision of virtual school systems is the highest in tertiary education (57.7 per cent), followed by TVET (26.9 per cent) and upper secondary (26.9 per cent).

Figure 23: Virtual school systems for each education level (n=26)



6.2.2. ICT for equity and quality of education

Overall, the data indicate that many countries in the Asia-Pacific region are using ICT in ways that seek to reduce inequality between urban and rural areas in terms of education opportunities. For instance, Kyrgyzstan, with the support of the World Bank, implemented a project titled 'Rural Schools', which aimed to provide rural schools with ICT equipment. Similarly, the Philippines provided computer packages to off-grid rural schools powered using solar energy. Other countries, including the Cook Islands, Lao People's Democratic Republic, Maldives, Republic of Korea, Samoa, Thailand and Vanuatu reported that they have built ICT systems to support online and virtual learning. Other initiatives to promote equity in education include projects in Islamic Republic of Iran and Sri Lanka to improve overall ICT infrastructure, a national online database system in Viet Nam and a pilot project in the Solomon Islands to improve teachers' pedagogical approaches. China reported that they have attempted to enhance the quality of education in rural areas through establishing smart learning platforms.

The research team also examined whether Member States have implemented ICT in ways that aim to address gender disparity issues in education. Four of the respondent countries (Kyrgyzstan, the Solomon Islands, the Islamic Republic of Iran and the Maldives) reported that they have used ICT in ways that seek to address gender disparity issues in their countries.

Since the Educational 2030 Agenda and Framework for Action state that mobile technology holds great promise for improving literacy and numeracy skills in basic education, the research team examined the level of mobile learning activities for each educational subsector. As shown in Table 15, the higher the school level, the more mobile learning is used. That is, mobile learning activities tend to be more widely used in tertiary education compared to lower levels of education.

Table 15: The level of use of mobile learning activities for each educational subsector (n=26)

	Primary education (ISCED 1)		Lower secondary (ISCED 2)		Upper secondary (ISCED 3)		Post-secondary/ not tertiary (ISCED 4)		Tertiary (ISCED 5)	
	n	%	n	%	n	%	n	%	n	%
Non-existing	9	34.6%	6	23.1%	6	23.1%	7	26.9%	7	28.0%
Low	15	57.7%	18	69.2%	16	61.5%	15	57.7%	10	40.0%
High	1	3.8%	1	3.8%	3	11.5%	3	11.5%	6	24.0%
Very high	1	3.8%	1	3.8%	1	3.8%	1	3.8%	2	8.0%

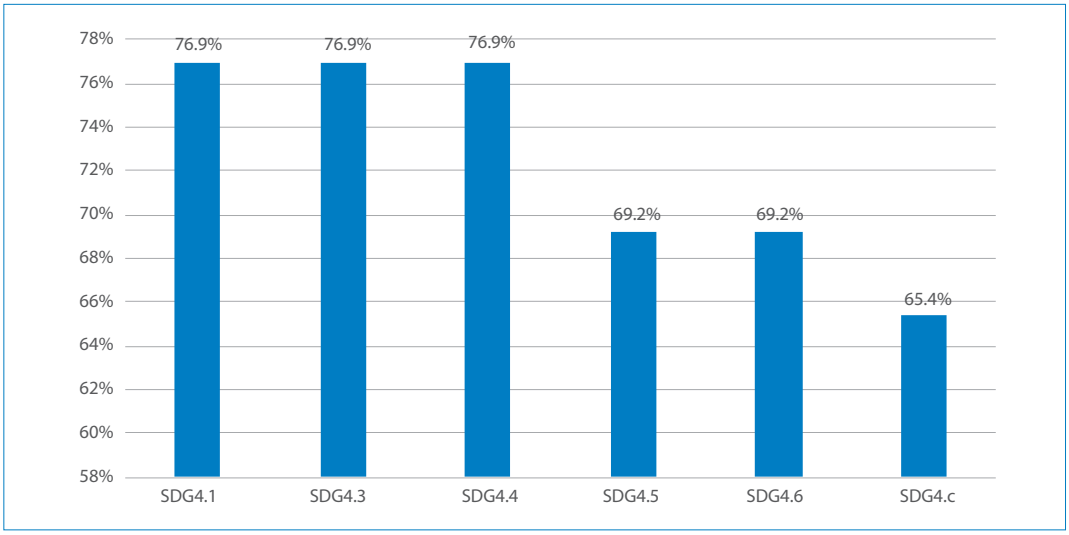
* Low: there is some activity, but just in an early stage of development, probably with scattered activities rarely going beyond one particular school or institution.

* High: there are programmes or activities that have reached a critical mass of schools or learners, as to become publicly noticeable.

* Very high: there are programmes or activities that can be said to be widely used by schools or learners.

Mobile learning was perceived to be promising for achieving Target 4.1: increasing access to primary and secondary education (76.9 per cent); Target 4.3: increasing access to Technical, Vocational and Tertiary Education, including university (76.9 per cent); and Target 4.4: improving skills for employment, decent jobs and entrepreneurship (76.9 per cent). Figure 24 shows the percentages for each of the SDG4 targets.

Figure 24: Countries' perceptions of mobile learning as a means of achieving the SDG4 targets, by target



* Target 4.1. Increasing access to primary and secondary education
Target 4.3. Increasing access to Technical, Vocational and Tertiary Education including university
Target 4.4. Improving skills for employment, decent jobs and entrepreneurship
Target 4.5. Improving gender parity at all levels of education and vocational training
Target 4.6. Improving Literacy and numeracy skills
Target 4.c. Increasing the number of qualified teachers

The respondents identified the main barriers to mobile learning as: lack of financial support, lack of capacity building, and insufficient mobile content. These are, therefore, important considerations for designing and implementing mobile learning.

6.2.3. ICT and teachers

The researchers examined the importance and the current status of teachers' ICT competency. As shown in Table 16, IPA values were statistically significant for both pre-service and in-service teachers, indicating that the ICT competencies of both groups of teachers do not match their importance, with performance lagging behind.

Table 16: IPA values for teachers' ICT competency, by type of teacher

	Importance			Performance			Importance-Performance		
	M	SD	n	M	SD	n	I-P	t	p
Pre-service teachers	4.56	1.00	25	2.96	1.21	25	1.60	6.53*	0.00
In-service teachers	4.50	1.06	24	2.92	1.25	24	1.58	6.21*	0.00

* p< .05

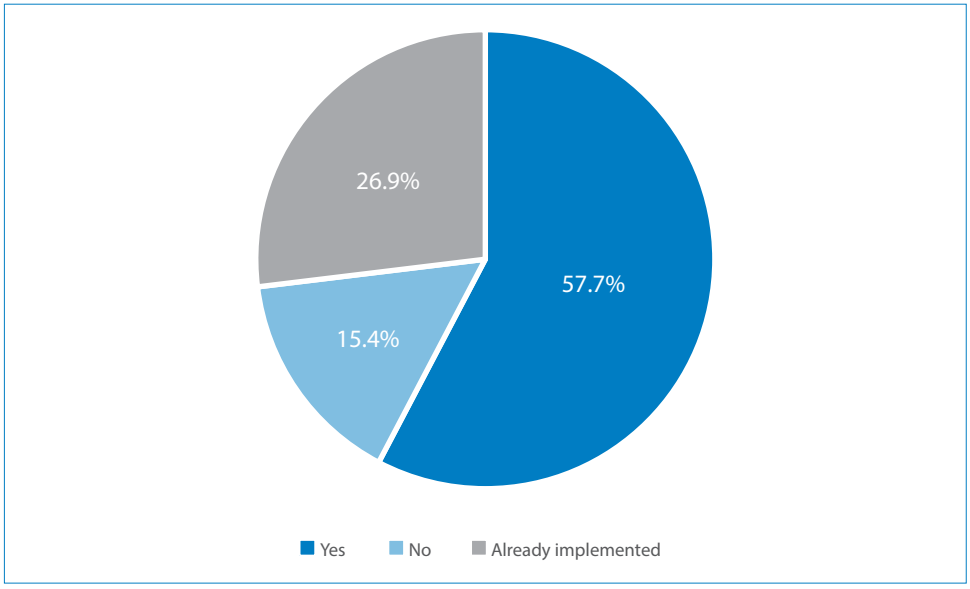
The research team also examined how ICT is used to deliver teacher education and training. As shown in Table 17, pre-service teacher education/training is delivered via face-to-face instruction (50 per cent) and via blended learning (50 per cent), while in-service teacher education/training uses blended learning more often than face-to-face instruction (64 per cent vs 36 per cent). None of the respondents reported delivering teacher education/training via only e-learning or online learning.

Table 17: Delivery method of teacher education/training (n=26)

	Pre-service		In-service	
	n	%	n	%
Only face-to-face	12	50	9	36
Only e-learning/online	0	0	0	0
Blended learning including both face-to-face and online learning	12	50	16	64

The researchers examined whether the countries of the region had plans to deliver teacher education and training via ICT in the future. Over half of the respondents (57.7 per cent) reported that their countries had a plan to deliver teacher training via ICT in future. A small percentage (15.4 per cent) indicated that they did not have any specific future plans in this regard (see Figure 24). Over a quarter (26.9 per cent) reported that they already used ICT in teacher education/training.

Figure 25: Countries with a plan to deliver teacher education/training via ICT in the future



7 Priority areas for the next five years

Analysis of the data revealed that while the Asia-Pacific region has been successful in expanding overall educational opportunities, it is necessary to increase access to secondary education and enhance the quality of that education, while also removing inequalities in education, especially for girls and women and those residing in rural areas. The responses to the survey indicate that several Member States in the Asia-Pacific region prioritize integrating ICT for the achievement of Target 4.3 (TVET and higher education) and for improving teacher quality in line with Target 4.c. Furthermore, the findings of this study highlight the necessity of utilizing ICT in monitoring and evaluation systems and of collecting data to measure ICT-related indicators for ongoing monitoring and evidence-based decision-making.

Based on the findings of the survey and situational analysis, the research team recommends the following five priority areas for the integration of ICT with a view to achieving the Education 2030 agenda:

- ICT for transforming and expanding TVET and higher education
- ICT for improving teacher quality
- ICT for improving access to and quality of secondary education
- ICT for enabling inclusive and equitable learning
- ICT for monitoring and evaluation

The recommendations of this study are not target-bound, but provide a starting point for discussions and plans for concrete actions by the Member States.

7.1 ICT for transforming and expanding TVET and higher education

The changing landscape of the global and regional economy demands individuals who possess creative and innovative competencies as well as basic work-related skills, and individuals who can continually upgrade their knowledge and skills (ADB, 2009). Currently, however, youth in South Asia, South-East Asia and the Pacific lack such skills and are four to six times more likely than adults to be unemployed. Furthermore, among the 358 million youth globally who are not in school, training or employment, 220 million reside in the Asia-Pacific region (UNDP, 2016, Asia-Pacific Human Development Report). In view of these challenges and needs, the research team suggests that TVET should receive high priority at the regional and national levels.

TVET is a means of empowering individuals with adequate skills and enhancing their employability and chances of getting decent work. ICT can be utilized as a tool to meet the emerging needs for expanding and transforming TVET systems (Latchem, 2017). Most importantly, ICT can function as an enabler to provide open, online and flexible learning opportunities in TVET. Moreover, ICT is viewed as a critical means to increase access to education for girls, women and vulnerable groups. ICT is particularly useful in expanding access for learners in rural, remote and socio-economically disadvantaged areas.

In addition to increasing access to TVET, the potential of ICT lies in the provision of high quality and relevant content that matches the knowledge and skills needed by the labour market. Various ICT tools can be used to deliver quality content for on-demand training and retraining. Open Educational Resources (OER) and Open Courseware (OCW) can naturally support the distribution of Massive Open Online Courses (MOOCs) offered by universities and content providers, where learners access and self-learn various topics of courses that meet their needs (ADB, 2009; Latchem, 2017). Moreover, emerging technologies such as virtual reality (VR), augmented reality (AR) and 3D printing can enhance pedagogical approaches. For instance, VR/AR-based applications that combine virtual and real environments can help learners acquire complex knowledge and skills that are challenging to learn with traditional two-dimensional media (Latchem, 2017). The design of such on-demand and learner-centred environments should be supported by collaborative efforts between governments, institutions, companies and civil society. It is also critical to allocate financial and human resources in order to build and maintain a mechanism that allows information flow between TVET institutes and industries (Allen, n.d.; Latchem, 2017).

An Importance-Performance Analysis of the survey responses indicated that Target 4.3 (TVET and higher education) was the respondents' priority SDG4 target. In their responses to the survey, several Member States reported ICT-integrated initiatives such as OER, Learning Management Systems (LMS) and the use of smart mobile devices as being useful. As such, the research team suggests that Member States leverage existing ICT-enabled initiatives and infrastructure to enhance flexible access to TVET systems. In particular, OER and OCW hold great promise in providing digital formats for course materials, placed in the public domain or online and openly licensed for enhancing accessibility and reducing the costs of producing and distributing course materials.

In the Asia-Pacific region, Open Polytechnic in New Zealand presents an exemplary case of using ICT for TVET. Open Polytechnic provides technical and vocational training and higher professional and continuing education, through distance and online learning courses, for more than 31,000 students annually. It delivers 100 qualifications and 1,200 courses from certificate to degree levels. As of 2014, 60 per cent of enrolled students were employed and 56 per cent were female.[2] The programmes are approved and accredited by the New Zealand Qualifications Authority and supported by professionals and industry bodies. Their resource-based approach harnesses technology in proactive learning processes rather than relying on lecturers. The system is regarded as providing cost-effective, scalable and accessible education to students. It was reported that learners at Open Polytechnic tend to easily accept online-only learning experiences. They engage in both online learning and blended learning, using online and offline learning methods and materials (Latchem, 2017).

Concerning higher education, Asia has a gross tertiary enrolment ratio of 27.48 per cent, which is below the world average of 32.15 per cent (UNESCO-UIS 2014a, 2014b). Although gross enrolment ratios for bachelor's programmes are on the rise, the quality of higher education is threatened in many Asian countries. For example, in several countries, the student-instructor ratio has increased considerably, which has the potential to reduce the quality of higher education (UNESCO-UIS, 2014a).

In order to satisfy the needs of quality and equity in higher education, the Asia-Pacific region has been initiating and supporting Open and Distance Learning (ODL) approaches and some countries recently launched national branded MOOCs such as K-MOOC (in Korea), J-MOOC (in Japan) and so forth (Jung, 2007; Kim, 2015). K-MOOC (http://www.kmooc.kr) has been operation since 2015 in line with the nation's innovations in higher education and establishment of a lifelong learning foundation. As of 2016, 140 courses from 10 leading universities in Korea were participating in the K-MOOC initiative (K-MOOC, n.d.). J-MOOC (http://www.jmooc.jp/en/) began in 2013 with the participation of top-ranking Japanese universities, based on three official platforms: gacco OpeN Learning Japan and OUJ MOOC, and had provided 47 courses as of January 2015 (Yamada, 2015). In the case of China, the government developed 1,000 national courses in 2006 and launched a MOOC policy in 2013 with the catchphrase 'MOOCs Start-Up Year'. As of 2015, the Chinese MOOC (mooc.guokr.com) had provided courses for 40,000 learners (Ying, 2015).

7.2 ICT for improving teacher quality

The SDG4-Education 2030 agenda emphasizes that teachers are at the core of education quality. This was confirmed by the responses to the survey. The findings indicate, however, that the Asia-Pacific region needs to strive to improve the quality of teachers and overcome challenges relating to improving basic education systems and preparing future learning environments. Several Member States in the region face the persistent issue of low teacher quality as well as a shortage of qualified teachers in rural areas, difficulty in retaining high quality teachers and issues in providing continuous professional development.

2 Open Polytechnic website. https://www.openpolytechnic.ac.nz/

Teachers should be adequately equipped to deal with the changes and challenges of new technologies and the shift in the educational paradigm through being provided training in the relevant competencies and skills. In this regard, it is highly recommended that Member States develop ICT competency standards and frameworks for teachers, and they reform teacher training and professional development in accordance with competency-based approaches. Standards and frameworks not only support the integration of ICT into education but also support teachers' continuous improvement in their career paths. Thus, competency standards and frameworks should not only focus on improving technological skills but also on ensuring pedagogical needs are aligned with societal change and development. Member States can develop ICT competency standards in various ways based on their unique contexts and needs, including adapting existing standards or developing new ones (UNESCO, 2016a).

UNESCO's ICT Competency Framework for Teachers addresses all aspects of a teacher's work using three approaches to teaching: 'technology literacy' for more efficient teaching and learning and the achievement of education goals such as increased school enrolments, high-quality educational resources for all and improved basic literacy skills; 'knowledge deepening' for gaining in-depth knowledge of school subjects and applying that knowledge to solve complex problems in the real world; and 'knowledge creation', which enables citizens and workforces to create the knowledge required for more harmonious, fulfilling and prosperous societies (UNESCO, 2011).

Various ICT tools can be leveraged as tools to train and/or re-train teachers considering varying education conditions and demands. Use of online and mobile-supported mechanisms is a cost-effective and flexible way to support teachers to develop adequate ICT competencies and appropriate pedagogical approaches. Support for teacher communities and networks that enable teachers to share knowledge, ideas and experiences about integrating ICT into education promote the diffusion of innovative ICT-integrated practices (Trucano, 2016). At the same time, school leaders also need to learn how to integrate ICT into education and to articulate the availability and readiness of ICT competency standards in diverse educational settings.

7.3 ICT for improving access to and quality of secondary education

Despite a growing demand for secondary education that prepares young people to participate as productive and responsible citizens, a large percentage of children and youth lack access to secondary education. In view of this situation in the region, the research team recommends the expansion of opportunities to secondary education through various ICT-enabled approaches such as online learning, mobile learning and social media, which can overcome barriers faced in traditional teaching and learning environments.

In response to the emerging needs of learners and teachers in a knowledge society, secondary education can be redesigned and restructured to promote innovative teaching and learning practices.

Firstly, ICT-based solutions reduce geographical and cost barriers. Technological developments such as big data, social media, the internet and mobile technology, for example, enable learning environments to become flexible, facilitating learning beyond formal school settings. Secondly, ICT applications can enhance the quality of secondary education by shifting the culture of learning from knowledge reproduction to knowledge creation. Promoting diverse approaches to secondary education via ICT solutions will inevitably lead to the issue of accreditation and credentials of non-formal secondary education, which needs future discussion, dialogue and agreement among multiple stakeholders. Thirdly, when learners improve their ICT competencies they are better able to meet the requirements of post-secondary education and TVET.

An exemplary case of applying ICT to enhance access to secondary education is the Republic of Korea's Open Secondary School system, which was originally established in 1974 to provide learning opportunities to adult learners who could not complete secondary education in their youth. More recently, the Open Secondary School system has expanded to serve diverse learner groups, including children who drop out of school, maladjusted students, the disabled, teenage defectors from the Democratic People's Republic of Korea and students from multicultural families. Using a blended learning approach, students attend two face-to-face classes per month at Open Secondary Schools and also learn via accessing an online learning portal, accessed through their PC and mobile devices. The system has had over 240,000 graduates since its establishment. A high percentage of graduates advance to higher education, with 23.7 per cent of the students who graduated from the Open Secondary School in 2016 entering a four-year university.[3]

7.4 ICT for enabling inclusive and equitable learning

The study findings indicate that gender disparity in the Asia-Pacific region is significantly more challenging in upper secondary education than in primary education, implying that girls and women have comparatively fewer opportunities to participate in TVET and tertiary education. ICT can assist in enhancing the competencies of girls, women and vulnerable groups and can help to ensure that no one is left behind. For example, online and ICT-enabled channels can expand informal and non-formal education opportunities (CSR Asia and Huawei, 2017).

ICT can also be used to support community-based learning approaches, which enable learners in rural and disadvantaged communities to access education. For example, digital resource repositories and technical centres in communities. For the disabled, adaptive and assistive ICT can expand education opportunities.

7.5 ICT for monitoring and evaluation

According to the study's findings, many Member States face challenges with regard to monitoring and evaluation, particularly in terms of collecting adequate data and ensuring data match the specifics of SDG4 targets and their respective indicators.

3 Open Secondary Schools website. http://openschool.kedi.re.kr/eng/index.jsp

ICT can assist in various ways. A comprehensive online Education Management Information System (EMIS), for example, would facilitate the collection, storage, analysis and dissemination of data and information, thus enabling Member States to monitor the progress towards each Education 2030 target. In addition, EMIS platforms can support evidence-based decision-making, including among multiple stakeholders who may have different interests and expertise regarding ICT in education. For sustainable and scalable system development, the Member States and various stakeholders need to collaborate in building EMIS systems that adequately consider accessibility, connectivity and inclusiveness as well as the particular requirements and conditions of each sub-region and country. In areas with poor ICT infrastructure, technologies such as SMS can be utilized to collect real-time data at low cost and without high investment. Such a system could be started by tracking the learning outcomes of learners. An effective EMIS is able to disseminate data to various levels of education systems. This can be achieved via various forms of ICT, including the internet and mobile devices. To ensure security and data privacy, EMIS must be based on robust guidelines (Trucano, 2016).

An exemplary case of using ICT for monitoring and evaluation is the Open EMIS project implemented by the Maldives Ministry of Education in line with the global Out-of-school Children Initiative (OOSCI) led by UNICEF and UIS. With the support of the Community Support Foundation, the ministry designed the Open EMIS Portal for the Maldives, which tracks out-of-school children and fosters the collection, management and reporting of key education data, using user-friendly features of dashboards and downloadable tools for disseminating information on key education performance.[4] This portal supports users to access reliable data on key education indicators and relevant information, thereby facilitating monitoring of the performance of individual students and school personnel, and tracking the progress of relevant policies and programmes in timely and systematic ways.[5]

4 Open EMIS Portal. https://mv-moe.openemis.org/portal/

5 Project profile. http://www.communitysystemsfoundation.org

8 Implementation mechanisms

It is clear that ICT can be leveraged to carry out the Education 2030 agenda and to achieve the specific targets under SDG4. The five priority areas highlight how ICT can be used to transform and expand TVET and higher education, enhance teacher quality, provide better access to secondary education and higher quality education, make learning more inclusive and equitable, and improve monitoring and evaluation. Overall, however, new approaches to using ICT in education are needed. As such, ICT must be used not only as a delivery mechanism but also as a catalyst to transform learning systems to become more learner-centred, collaborative and participatory. To achieve this, in view of the overarching implementation mechanism of the regional strategy, it is necessary to mobilize partnerships; improve regional coordination; conduct research, monitoring and evaluation; and engage in capacity building. Prior to applying ICT-integrated approaches in education, it is important to also raise awareness among the stakeholders regarding how ICT can be used to transform education and address obstacles (Means and Olson, 1995; Means et al., 2004).

8.1 Partnerships

Achievement of the SDG4 targets requires effective cross-national and sectoral partnerships. Addressing the priority areas of the regional strategy involves taking into account diverse views and approaches from multiple stakeholders and establishing partnerships. For instance, partnerships between education institutions and employers can enable TVET institutions to provide on-demand training. Such training can use OER and online-based approaches, so as to improve access to training opportunities. Likewise, partnerships at the secondary education level can help to ensure learning content is relevant and of high quality. Partnerships between

the pedagogical and technological sectors can help to ensure that ICT is integrated into teacher training and professional development and that training is provided to improve the ICT competencies of teachers.

8.2 Regional coordination

The study found that the various sub-regions of the Asia-Pacific region differ in their levels of progress towards the SDG4 targets and in their use of ICT in education. For the regional strategy to be successful, it is necessary to coordinate the Member States, in view of the vast disparities in political, socio-cultural, and technological development in the Asia-Pacific region. This requires the establishment of regional coordination mechanisms. The findings of the study suggest the following two strategies for promoting regional coordination:

- Supporting regional-level associations and consortiums with experts, academia and senior officials to actively support implementation strategies and to continuously monitor progress in each of the priority areas stated in the Regional Strategy.
- Establishing sub-regional networks and meetings for tackling common challenges in collective and sustainable ways.

8.3 Research, monitoring and evaluation

Research, monitoring and evaluation enable Member States to identify locally-appropriate methods and approaches, measure progress towards the targets and share lessons learned. Research enables Member States and other stakeholders to collect the data required for making evidence-based decisions, while ongoing monitoring and evaluation makes information and data available in a timely fashion to refine policies and programmes as well as ensuring progress is recorded. Initiatives relating to using ICT in education should be accurately monitored and evaluated so as to measure the return on investment and justify the significant financial support they require (Latchem, 2017).

8.4 Capacity building

Member States and other stakeholders should cultivate key actors' capacities, including supporting teachers to learn new technologies and related pedagogical approaches and building the capacity of school leaders and education officials to gather, analyze and use various types of data for making evidence-based decisions and taking appropriate action. In addition, it is critical to build the capacities of policy-makers in establishing ICT in education master plans and in integrating ICT into other education policies and initiatives.

9 Conclusions

Learning environments vary significantly between the Member States, along with perspectives and plans. All educational systems are changing, however, in response to globalization and technological advancements. Such changes are essential to meet the evolving needs of the labour market (WEF, 2017). At the same time, the global community, including the countries of the Asia-Pacific region, faces issues relating to access to education and the quality of education, and needs to address these issues through coordinated efforts (UNESCO, 2015c). In the next five years it is necessary to re-think how education systems can meet the challenges and maximize the opportunities.

The findings of the literature review, data analysis and survey provided evidence to support recognition of the catalytic role of ICT in education for Asia-Pacific Member States in their efforts to attain the SDG4 targets. Furthermore, the study resulted in the identification of five priority areas for action relating to integrating ICT into education, along with related strategies and implementation mechanisms for carrying out the directions and recommendations of Education 2030 over the five years: 2017-2022. The five priority areas are: TVET and higher education, teacher quality, secondary education, inclusive and equitable learning and monitoring and evaluation. Action in these prioritized areas, based on common interests and coordinated efforts by the Member States in the Asia-Pacific region, is essential for transforming education environments and achieving the SDG4 targets.

One limitation of this study was the limited data available, which made it difficult to compare the Member States and accurately assess their progress towards achieving SDG4. The wide disparities in the education conditions in the various Member States also made comparison difficult. Future research that considers their diverse levels of ICT infrastructure would be useful. Another limitation was the nature of the survey, which relied on the perceptions of the respondents. Furthermore, this study lacked the time and resources to gather information on concrete pathways for translating policies into practice. Further research into how Member

States can formulate their own strategies while staying aligned with the overall goals of the Regional Strategy and the Education 2030 agenda would be valuable.

Transformation of education systems using ICT is part of the long-term vision pursued under SDG4. Further studies are needed on how to foster collective actions by the Member States, while recognizing their differing educational contexts and ICT infrastructure readiness, as these contextual dimensions strongly affect the use of ICT in education.

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Appendix I: Asia-Pacific Regional Strategy on Using ICT to Facilitate the Achievement of Education 2030

Asia-Pacific Ministerial Forum on ICT in Education 2017
11-12 May 2017, Seoul, Republic of Korea

PREAMBLE

1. We, Ministers, high-level government officials, representatives of key stakeholders and experts, responsible for and working in Information and Communications Technology (ICT) in Education from Asia-Pacific UNESCO Member States, met at the Asia-Pacific Ministerial Forum on ICT in Education 2017 (AMFIE 2017) in Seoul on 11-12 May 2017, co-organized by the Ministry of Education of the Republic of Korea and the UNESCO Asia and Pacific Regional Bureau for Education.

2. Under the AMFIE 2017 theme of "Shaping Up ICT-supported Lifelong Learning for All", the Asia-Pacific Regional Strategy on Using ICT to Facilitate the Achievement of Education 2030 (Regional Strategy) was discussed and regional, sub-regional, and country-level actions were formulated to leverage the full potential of ICT in line with SDG4, Education 2030 and the Qingdao Declaration.[6]

3. Since 2000, Member States have made significant progress in integrating ICT into education under the Education for All (EFA) agenda. In view of SDG4-Education 2030, it is imperative to revisit and redefine the role of ICT in order to realize the vision of this new agenda. We recognize that the remarkable advances in ICT must be harnessed to transform educational systems and to make learning ubiquitous in the era of lifelong learning. Taking into account the diverse contexts of Asia-Pacific Member States, we commit to ensuring that ICT is harnessed to narrow the persistent learning divides in this region by expanding affordable access to equitable, inclusive, and quality learning opportunities through formal, non-formal and informal education alike.

6 UNESCO. 2015b. Qingdao Declaration, International Conference on ICT and Post-2015 Education. Qingdao, People's Republic of China. http://unesdoc.unesco.org/images/0023/002333/233352E.pdf.

4. We recognize that the transformation of learning through ICT aims to shift the culture of learning towards knowledge creation and being learner-centered, by means of enhancing pedagogy and promoting active learning. Through multi-sectoral engagement, public-private partnerships, and a coherent whole-of-government approach, we seek to ensure that the resources and learning environments necessary to thrive in today's digital world are available to all. We reaffirm that teachers and learners alike must be empowered to be digital citizens who use ICT not only effectively, but also safely and responsibly

5. In consideration of the above, we endorse this Regional Strategy that details priority areas for the integration of ICT in Education as well as action points for stakeholders at all levels.

FOUR PRIORITY AREAS FOR 2017-2022

6. We agree that for the next five years (2017-2022), we will strive to create an enabling environment for ICT in Education as well as collaborate to achieve progress in the following four priority areas:

   1) Secondary Education, Technical Vocational Education and Training (TVET) and Higher Education;

   2) Quality of Teaching and Teaching Practices;

   3) Inclusion and Equality; and

   4) Monitoring & Evaluation.

ICT FOR EXPANDING RELEVANT SKILLS DEVELOPMENT IN SECONDARY EDUCATION, TVET AND HIGHER EDUCATION (SDG 4.1, 4.3, 4.4, 4.5)

7. We recognize that the shift toward digital economies demands a rethink of education systems to ensure quality and relevant skills development throughout life. Considering the region's rising youth unemployment levels, the need to improve the quality of and expand access to secondary education and TVET, with consideration towards higher education, has never been greater. Quality and accessible secondary education and TVET will promote a smoother transition to higher learning pathways, which include the higher education opportunities that have expanded beyond institutional confines and national boundaries through ICT. We stress then that inclusive, equitable and quality secondary education, TVET and higher education in formal, non-formal and informal sectors should be a high priority at the regional, sub-regional and national-levels.

8. We recognize that ICT-based solutions enable the provision of alternative, open and flexible pathways to secondary education, TVET, and higher education, allowing learning to take place anytime, anywhere. The open education movement, such as Open Education Resources (OERs) and Massive Open Online Courses (MOOCs), can play a critical role in supporting affordable, on-demand and lifelong skills development to prepare learners for the rapidly changing world of work. ICT tools can facilitate, participatory, learner-centered approaches that foster transversal skills for communication, collaboration and problem-solving. ICT should also be used to strengthen partnerships between industries and TVET institutes to ensure learning stays relevant to labour markets' needs.

ICT FOR IMPROVING THE QUALITY OF TEACHING AND TEACHING PRACTICES (SDG 4.c)

9. We highlight that the quality of an education system depends upon the quality of its teachers. Teachers play a critical role in supporting learners to face challenges and seize opportunities in the digital world. We recognize Member States' efforts to address this persistent concern.

10. We reaffirm that ICT can provide all teachers, including women teachers, with flexible learning opportunities for their professional development from pre-service education to in-service training. Distance and blended learning platforms at the national and regional levels can be used to train teachers and support their continuous professional development. We reiterate that the development of teachers' ICT competencies should focus on transformative approaches to pedagogy enhancement.

ICT FOR ENABLING INCLUSION AND EQUALITY IN EDUCATION (SDG 4.5)

11. We reaffirm that ICT is a catalyst to ensure inclusive, equitable and quality learning opportunities for all, including disadvantaged and vulnerable groups, those with special needs, disabilities, those in rural areas, women and girls, nomads as well as indigenous peoples. We support user-oriented ICT solutions to increase disadvantaged groups' access to quality education and skills development, while ensuring gender-responsive policies to address gender disparity in ICT-supported learning.

12. Open learning environments and well-considered resource deployment are essential to reduce the widening disparity in the quality of education between rural and urban areas, diverse socio-economic groups and disadvantaged groups. Using ICT, such as mobile technology and OERs, it is increasingly possible to improve access to and equality of educational opportunities for all.

ICT FOR MONITORING AND EVALUATION

13. Data-driven monitoring and evaluation is critical for guiding, planning, and assessing policy actions towards SDG4-Education 2030 and provides the evidence-base for sharing best practices. We acknowledge the importance of establishing a comprehensive Education Management Information Systems (EMIS) and strengthening existing EMIS to facilitate the collection, organization and analysis of data for monitoring SDG4 indicators, especially in the Four Priority Areas. A comprehensive EMIS that leverages on the potential of new technologies, such as cloud computing and big data, will enable improved evidence-based decisions on education policies, particularly focusing on school management, school performance, and student learning outcomes.

14. In addition to the Four Priority Areas, we call for including the ICT-related SDG4 indicators into national EMIS, namely SDG4.4.1, proportion of youth and adults with ICT skills and SDG4.a.1 proportion of schools with access to the Internet, as well as proportion of schools with access to computers for pedagogical use.

IMPLEMENTATION STRATEGIES FOR 2017-2022

15. The Four Priority Areas set the immediate focus for action at the national, sub-regional and regional levels. We recognize that ICT offers two parallel and interrelated approaches: (i) as a catalyst to transform learning ecosystems to become more learner-centered, collaborative, and participatory, and (ii) as an innovative and flexible tool to enhance access to and equality in educational opportunities.

16. Moving forward, we call for the following action points to achieve progress in the Four Priority Areas in close alignment with SDG4-Education 2030. We call for UNESCO's continued support and commitment to Member States in the following action points:

I. Member States to develop ICT in Education policies that are an integral part of sector-wide national education plans and aligned with the national ICT strategy.

II. Member States to engage in cooperation and partnerships across the Four Priority Areas, with the support of sub-regional and international organizations, to set up platforms for localized educational solutions, initiate research, and share good practices from the progress and lessons learned on common challenges.

III. On Secondary Education, TVET and Higher Education, Member States to allocate resources to maximize the full potential of ICT tools to expand flexible access to and enhance the quality and relevance of secondary education, TVET and higher education in formal, non-formal and informal sectors.

IV. On the Quality of Teaching and Teaching Practices, Member States to develop competency standards for teachers towards ICT-integrated transformative pedagogies, and establish learning spaces and communities of practices to support teachers and share innovations.

V. On Inclusion & Equality in Education, Member States to take explicit and concrete measures in their national ICT in Education policies to tackle the learning divide, unleashing the potential of assistive technology, mobile technology, OERs, open and distance learning platforms.

VI. On Monitoring & Evaluation, Member States, in coordination with the SDG4-National Coordinators, to closely monitor progress of the Four Priority Areas using the potential of new technologies, such as mobile technology, cloud computing and big data, and to develop SDG4-targeted EMIS.

Appendix II: Asia-Pacific key statistics relating to SDG4

Table 1: Primary, lower secondary, and upper secondary adjusted net enrolment ratios (ANER) and completion rates

Caucasus and Central Asia						
Kazakhstan	100	100	100	99	95	93
Kyrgyzstan	98	100	92	97	57	86
Tajikistan	98	98	...	89	...	60
Turkmenistan	...	...	...	...	...	...
Uzbekistan	...	...	...	...	...	...
East and South-East Asia						
Brunei Darussalam	...	...	98	...	86	...
Cambodia	95	67	83	41	...	19
China	...	94	...	81	...	43
Democratic People's Republic of Korea	...	...	...	...	...	...
Indonesia	93	95	86	78	70	51
Japan	100	...	100	...	97	...
Lao People's Democratic Republic	95	73	79	35	50	27
Malaysia	95		90	...	55	...
Mongolia	96	98	100	84	89	65
Myanmar	95	...	56	...	39	...
Philippines	97	90	96	75	80	72
Republic of Korea	96	...	99	...	94	...
Singapore	...	...	...	...	...	...
Thailand	92	...	...	...	...	...
Timor-Leste	98	55	90	45	73	27
Viet Nam	98	96	...	81	...	55

Country or territory	Primary		Lower secondary		Upper secondary	
	ANER %	CR %	ANER %	CR %	ANER %	CR %
The Pacific						
Australia	97	…	99	…	91	85
Cook Islands	98	…	90	…	86	…
Fiji	97	…	96	…	74	…
Kiribati	98	…	…	…	…	…
Marshall Islands	…	…	…	…	…	…
Federated States of Micronesia	87	…	…	…	…	…
Nauru	87	…	87	…	47	…
New Zealand	98	…	99	…	96	…
Niue	…	…	…	…	…	…
Palau	99	…	…	…	98	…
Papua New Guinea	87	…	…	…	…	…
Samoa	97	…	95	…	86	…
Solomon Islands	…	…	…	…	…	…
Tonga	99	…	89	…	44	…
Tuvalu	96	…	87	…	47	…
Vanuatu	…	…	…	…	…	…
South Asia						
Afghanistan	…	35	65	25	48	14
Bangladesh	…	80	…	56	…	23
Bhutan	89	56	84	25	66	5
India	98	88	85	76	52	35
Islamic Republic of Iran	99	…	98	…	77	…
Maldives	…	99	…	90	…	63
Nepal	97	77	…	61	55	42
Pakistan	73	61	52	46	33	20
Sri Lanka	97	…	95	…	…	…
Caucasus and Central Asia	**94**	**100**	**96**	**99**	**84**	**93**
East and South-East Asia	**96**	**…**	**91**	**…**	**77**	**…**
The Pacific	**94**	**…**	**98**	**…**	**66**	**…**
South Asia	**94**	**77**	**80**	**56**	**50**	**23**
Europe and Northern America	**97**	**…**	**98**	**…**	**92**	**83**
Latin America and the Caribbean	**94**	**94**	**92**	**73**	**76**	**51**

Country or territory	Primary		Lower secondary		Upper secondary	
	ANER %	CR %	ANER %	CR %	ANER %	CR %
Northern Africa and Western Asia	89	…	86	…	67	…
Sub-Saharan Africa	80	55	66	31	43	15
World	91	…	84	…	63	53

* Weighted average
** Median
Source: UNESCO, 2016b

Table 2: Differences in adjusted net enrolment ratios (ANER) in primary and secondary education

Difference	Countries
Large (Z score < -.5)	Tonga (-55)*, Myanmar (-55), Tuvalu (-49), India (-46), Lao People's Democratic Republic (-45), Nepal (-42), Kyrgyzstan (-41), Pakistan (-40), Nauru (-40), Malaysia (-39)
Medium	Timor-Leste (-25), Fiji (-23), Indonesia (-23), Bhutan (-23), Islamic Republic of Iran (-22)
Small (Z score > .5)	Philippines (-16), Cook Islands (-12), Samoa (-12), Mongolia (-7), Australia (-7), Kazakhstan (-5), Japan (-3), New Zealand (-2), Republic of Korea (-2), Palau (-1)

* ( ) = upper secondary adjusted net enrolment ratio (%) – primary adjusted net enrolment ratio (%)
Source: UNESCO (2016b)(processed)

Table 3: Pre-primary adjusted net enrolment ratios (ANER)

Caucasus and Central Asia		The Pacific (cont.)	
Kazakhstan	74	Fiji	...
Kyrgyzstan	34	Kiribati	...
Tajikistan	9	Marshall Islands	...
Turkmenistan	...	Federated States of Micronesia	...
Uzbekistan	...	Nauru	69
East and South-East Asia		New Zealand	90
Brunei Darussalam	69	Niue	...
Cambodia	19	Palau	74
China	...	Papua New Guinea	...
Democratic People's Republic of Korea	...	Samoa	26
Indonesia	79	Solomon Islands	...
Japan	90	Tonga	...

Country or territory	ANER (%)	Country or territory	ANER (%)
Lao People's Democratic Republic	30	Tuvalu	...
Malaysia	86	Vanuatu	56
Mongolia	67	South Asia	
Myanmar	23	Afghanistan	...
Philippines	...	Bangladesh	...
Republic of Korea	92	Bhutan	...
Singapore	...	India	...
Thailand	60	Islamic Republic of Iran	38
Timor-Leste	33	Maldives	...
Viet Nam	78	Nepal	61
The Pacific		Pakistan	56
Australia	80	Sri Lanka	...
Cook Islands	84		
Caucasus and Central Asia*	**27**	**Europe and Northern America***	**90**
East and South-East Asia*	**68**	**Latin America and the Caribbean***	**78**
The Pacific*	**...**	**Northern Africa and Western Asia***	**54**
South Asia*	**...**	**Sub-Saharan Africa***	**25**
Asia-Pacific*	**67**	**World***	**69**

* Median
Available data = 25 countries
Source: UNESCO, 2016b

Table 4: Gross enrolment ratios (GER) in tertiary education

Caucasus and Central Asia		The Pacific (cont.)	
Kazakhstan	46	Fiji	...
Kyrgyzstan	46	Kiribati	.
Tajikistan	26	Marshall Islands	43
Turkmenistan	8	Federated States of Micronesia	...
Uzbekistan	...	Nauru	...
East and South-East Asia		New Zealand	81
Brunei Darussalam	32	Niue	...
Cambodia	...	Palau	62
China	39	Papua New Guinea	...
Democratic People's Republic of Korea	...	Samoa	...
Indonesia	31	Solomon Islands	...

Country or territory	GER (%)	Country or territory	GER (%)
Japan	62	Tonga	...
Lao People's Democratic Republic	17	Tuvalu	...
Malaysia	30	Vanuatu	...
Mongolia	64	**South Asia**	
Myanmar	14	Afghanistan	9
Philippines	36	Bangladesh	13
Republic of Korea	95	Bhutan	11
Singapore	...	India	24
Thailand	53	Islamic Republic of Iran	66
Timor-Leste	...	Maldives	...
Viet Nam	30	Nepal	16
The Pacific		Pakistan	10
Australia	87	Sri Lanka	21
Cook Islands	60		
Caucasus and Central Asia*	**24**	**Europe and Northern America***	**75**
East and South-East Asia*	**39**	**Latin America and the Caribbean***	**44**
The Pacific*	**62**	**Northern Africa and Western Asia***	**37**
South Asia*	**23**	**Sub-Saharan Africa***	**8**
Asia-Pacific*		**World***	**34**

* Weighted average
(Available data = 29 countries)
Source: UNESCO, 2016b

Table 5: GPIs (F/M) of primary, lower secondary and upper secondary adjusted net enrolment ratios (ANER)

Caucasus and Central Asia			
Kazakhstan	1.00	...	...
Kyrgyzstan	0.99	1.00	0.98
Tajikistan	1.00	...	...
Turkmenistan	...	...	...
Uzbekistan	...	...	...
East and South-East Asia			
Brunei Darussalam	...	...	1.01
Cambodia	0.98	0.96	...
China	...	...	...

Country or territory	Primary	Lower secondary	Upper secondary
Democratic People's Republic of Korea	...	...	...
Indonesia	0.99	1.03	0.92
Japan	1.00	...	1.02
Lao People's Democratic Republic	0.98	0.96	0.87
Malaysia	...	...	...
Mongolia	0.99	...	1.11
Myanmar	...	...	...
Philippines	1.04	1.06	1.11
Republic of Korea	0.99	...	0.99
Singapore	...	...	...
Thailand	0.99	...	...
Timor-Leste	1.03	1.00	1.03
Viet Nam	...	...	...
The Pacific			
Australia	1.00	...	1.04
Cook Islands	...	1.01	1.02
Fiji	1.03	...	1.10
Kiribati	...	...	...
Marshall Islands	...	...	...
Federated States of Micronesia	1.03	...	...
Nauru	0.95	1.02	1.16
New Zealand	1.00	1.00	1.03
Niue	...	...	...
Palau	...	...	...
Papua New Guinea	0.92	...	...
Samoa	1.02	1.01	1.14
Solomon Islands	...	...	...
Tonga	1.00	1.08	1.25
Tuvalu	1.03	1.14	1.61
Vanuatu	...	...	...
SouthAsia			
Afghanistan	...	0.61	0.55
Bangladesh	...	...	...
Bhutan	1.03	1.10	1.10
India	1.01	1.06	0.97

Country or territory	Primary	Lower secondary	Upper secondary
Islamic Republic of Iran	...	0.99	1.00
Maldives	...	...	...
Nepal	0.98	...	1.13
Pakistan	0.85	0.83	0.75
Sri Lanka	0.98	1.01	...
Caucasus and Central Asia*	**0.99**	**...**	**1.02**
East and South-East Asia*	**1.00**	**1.01**	**1.07**
The Pacific*	**0.98**	**1.01**	**1.15**
South Asia*	**0.99**	**1.05**	**0.95**
Europe and Northern America*	**1.00**	**1.00**	**1.01**
Latin America and the Caribbean*	**1.00**	**1.01**	**1.03**
Northern Africa and Western Asia*	**0.97**	**0.93**	**0.96**
Sub-Saharan Africa*	**0.95**	**0.94**	**0.85**
World*	**0.98**	**1.00**	**0.99**

* Weighted average

Source: UNESCO, 2016b

Table 6: Literacy and basic skills acquisition by youth and adults

Caucasus and Central Asia						
Kazakhstan	100	100	...	...	...	...
Kyrgyzstan	100	99	...	...	...	...
Tajikistan	100	100	...	...	...	...
Turkmenistan	100	100	...	...	...	...
Uzbekistan	100	100	...	...	...	...
East and South-East Asia						
Brunei Darussalam	99	96	...	...	...	...
Cambodia	87	74	...	...	...	...
China	100	95	...	...	...	...
Democratic People's Republic of Korea	100	100	...	...	...	...
Indonesia	100	95	...	...	...	...
Japan	...	...	100	99	99	99
Lao People's Democratic Republic	84	73	...	...	...	...
Malaysia	98	93	...	...	...	...
Mongolia	98	98	...	...	...	...
Myanmar	96	93	...	...	...	...

Country or territory	Literacy		Functional literacy		Numeracy skills	
	Youth (15-24)	Adult (15 & over)	Youth (16-24)	Adult (16 & over)	Youth (16-24)	Adult (16 & over)
Philippines	98	96	...	...	...	...
Republic of Korea	...	...	99	98	99	96
Singapore	100	97	99	90	98	87
Thailand	98	94	...	...	...	...
Timor-Leste	80	58	...	...	...	...
Viet Nam	97	94	...	...	...	...
The Pacific						
Australia	...	...	98	97	96	94
Cook Islands	...	...	...	...	...	...
Fiji	...	...	...	...	...	...
Kiribati	...	...	...	...	...	...
Marshall Islands	98	98	...	...	...	...
Federated States of Micronesia	...	...	...	...	...	...
Nauru	...	...	...	...	...	...
New Zealand	...	...	98	97	96	95
Niue	...	...	...	...	...	...
Palau	100	100	...	...	...	...
Papua New Guinea	67	63	...	...	...	...
Samoa	99	99	...	...	...	...
Solomon Islands	...	...	...	...	...	...
Tonga	99	99	...	...	...	...
Tuvalu	...	...	...	...	...	...
Vanuatu	...	...	...	...	...	...
South Asia						
Afghanistan	47	32	...	...	...	...
Bangladesh	82	61	...	...	...	...
Bhutan	87	57	...	...	...	...
India	86	69	...	...	...	...
Islamic Republic of Iran	98	85	...	...	...	...
Maldives	99	98	...	...	...	...
Nepal	85	60	...	...	...	...
Pakistan	72	56	...	...	...	...

Country or territory	Literacy		Functional literacy		Numeracy skills	
	Youth (15-24)	Adult (15 & over)	Youth (16-24)	Adult (16 & over)	Youth (16-24)	Adult (16 & over)
Sri Lanka	98	91	...	...	...	...
Caucasus and Central Asia	100	100	...	...	...	...
East and South-East Asia	99	95	...	...	...	...
The Pacific	...	...	...	...	...	...
South Asia	84	68	...	...	...	...
Europe and Northern America	...	...	...	...	...	...
Latin America and the Caribbean	98	93	...	...	...	...
Northern Africa and Western Asia	93	82	...	...	...	...
Sub-Saharan Africa	71	60	...	...	...	...
World	91	85	...	...	...	...

* Weighted average
Source: UNESCO, 2016b

Table 7: Inclusion in national curricula frameworks of issues relating to sustainable development and global citizenship

Caucasus and Central Asia				
Kazakhstan	...	...	...	...
Kyrgyzstan	...	...	...	...
Tajikistan	...	...	...	...
Turkmenistan	...	...	...	...
Uzbekistan	...	...	...	...
East and South-East Asia				
Brunei Darussalam	0	LOW	0	LOW
Cambodia	...	...	...	...
China	...	...	...	...
Democratic People's Republic of Korea	...	...	...	...
Indonesia	LOW	LOW	0	0
Japan	...	...	...	...
Lao People's Democratic Republic	...	...	...	...
Malaysia	...	...	...	...
Mongolia	...	...	...	...

Country or territory	Gender equality*	Human rights**	Sustainable development***	Global citizenship****
Myanmar	0	LOW	LOW	LOW
Philippines	0	0	0	0
Republic of Korea	LOW	LOW	LOW	LOW
Singapore	...	...	...	...
Thailand	LOW	MEDIUM	MEDIUM	LOW
Timor-Leste	...	...	...	...
Viet Nam	...	...	...	...
The Pacific				
Australia	LOW	HIGH	MEDIUM	MEDIUM
Cook Islands	0	LOW	LOW	LOW
Fiji	0	MEDIUM	MEDIUM	LOW
Kiribati	LOW	0	LOW	0
Marshall Islands	...	...	...	...
Federated States of Micronesia	0	LOW	LOW	LOW
Nauru	0	0	LOW	LOW
New Zealand	0	LOW	MEDIUM	LOW
Niue	...	...	...	...
Palau	...	...	...	...
Papua New Guinea	LOW	MEDIUM	MEDIUM	LOW
Samoa	0	LOW	MEDIUM	0
Solomon Islands	...	...	...	...
Tonga	...	...	...	...
Tuvalu	MEDIUM	MEDIUM	HIGH	MEDIUM
Vanuatu	...	...	...	...
South Asia				
Afghanistan	0	LOW	LOW	LOW
Bangladesh	...	...	...	...
Bhutan	MEDIUM	LOW	MEDIUM	MEDIUM
India	LOW	HIGH	HIGH	LOW
Islamic Republic of Iran	...	...	...	...
Maldives	0	MEDIUM	MEDIUM	LOW
Nepal	MEDIUM	MEDIUM	LOW	MEDIUM
Pakistan	LOW	HIGH	LOW	LOW
Sri Lanka	...	...	...	...

* Key terms included are a) gender equality, b) gender equity, c) empowerment of girls/women, d) gender sensitive(ity) and e) gender parity. The degree of inclusion of the issue in curricula is assessed as LOW if 1 or 2 of the 5 items are covered, MEDIUM if 3 are covered and HIGH if 4 or 5 are covered; 0 indicates no inclusion of any items.

** Key terms included are a) human rights, rights and responsibilities (children's rights, cultural rights, indigenous rights, women's rights, disability rights); b) freedom (of expression, of speech, of press, of association or organization) and civil liberties; c) social justice; d) democracy/democratic rule, democratic values/principles; e) human rights education. The degree of inclusion of the issue in curricula is assessed as LOW if 1 or 2 of the 5 items are covered, MEDIUM if 3 are covered and HIGH if 4 or 5 are covered; 0 indicates no inclusion of any items.

*** Key terms included are a) sustainable, sustainability, sustainable development; b) economic sustainability, sustainable growth, sustainable production/consumption, green economy; c) social sustainability (social cohesion and sustainability); d) environmental sustainability/environmentally sustainable; e) climate change/variability (global warming, carbon emissions/footprint); f) renewable energy/fuels, alternative energy sources (solar, tidal, wind, wave, geothermal, biomass); g) ecosystems, ecology (biodiversity, biosphere, biomes, loss of diversity); h) waste management, recycling; i) education for sustainable development, sustainability education, education for sustainability; j) environmental education/studies, education for the environment, education for environmental sustainability. The degree of inclusion of the issue in curricula is assessed as LOW if 1 to 4 of the 10 items are covered, MEDIUM if 5 to 7 items are covered and HIGH if 8 to 10 items are covered; 0 indicates no inclusion of any items.

**** Key terms are a) globalization; b) global citizen(ship)/culture/identity/community; c) global-local thinking, local-global (think global[ly] act local[ly], glocal); d) multicultural(ism)/intercultural(ism) (and hyphenated forms); e) migration, immigration, mobility, movement of people; f) global competition/competitiveness, globally competitive, international competitiveness; g) global inequality(ies)/disparity(ies); h) national/local citizenship/culture/identity(ies)/culture(s)/heritage, global citizenship education; i) education for global citizenship. The degree of inclusion of the issue in curricula is assessed as LOW if 1 to 4 of these items are covered, MEDIUM if 5 to 7 are covered and HIGH if 8 or 9 are covered; 0 indicates no inclusion of any items.

Source: UNESCO, 2016b

Table 8: Qualified classroom teachers* (%) of pre-primary, primary, lower secondary, upper secondary, and technical & vocational education

Caucasus and Central Asia					
Kazakhstan	100	100	...	...	100
Kyrgyzstan	...	74	...	...	...
Tajikistan	89	95	...	...	...
Turkmenistan	...	...	...	...	...
Uzbekistan	...	...	...	...	...
East and South-East Asia					
Brunei Darussalam	30	48	83	88	63
Cambodia	100	100	100	...	...
China	...	...	...	...	...
Democratic People's Republic of Korea	...	...	...	...	...
Indonesia	...	...	...	...	...
Japan	...	...	...	...	...
Lao People's Democratic Republic	48	83	87	61	...
Malaysia	100	100	...	...	99
Mongolia	...	98	...	...	99
Myanmar	...	...	...	...	.
Philippines	...	99	...	...	.
Republic of Korea	...	...	...	...	...
Singapore	...	...	...	...	...
Thailand	...	100	...	...	...
Timor-Leste	...	...	...	...	...
Viet Nam	98	100	99	...	...
The Pacific					
Australia	...	...	...	...	...
Cook Islands	70	95	...	...	...
Fiji	...	...	...	...	100
Kiribati	...	97	92	...	...
Marshall Islands	...	...	...	...	...
Federated States of Micronesia	...	...	...	...	...
Nauru	93	50	...	...	.
New Zealand	...	...	...	...	...
Niue	...	...	...	...	...

Country or territory	Pre-primary	Primary	Lower secondary	Upper secondary	TVE, total secondary
Palau	100	...	...	...	.
Papua New Guinea	...	...	...	...	...
Samoa	100	...	...	57	.
Solomon Islands	68	69	...	...	...
Tonga	...	100	...	...	...
Tuvalu	100	...	...	...	.
Vanuatu	51	70	73	...	...
South Asia					
Afghanistan	...	...	...	...	...
Bangladesh	...	...	98	98	100
Bhutan	...	...	...	...	...
India	...	...	...	...	...
Islamic Republic of Iran	...	100	100	92	...
Maldives	73	86	93	...	...
Nepal	82	94	82	78	...
Pakistan	...	...	...	...	...
Sri Lanka	...	93	89	...	...
Caucasus and Central Asia**	**...**	**100**	**...**	**...**	**...**
East and South-East Asia**	**...**	**100**	**...**	**...**	**...**
The Pacific**	**...**	**...**	**...**	**...**	**...**
South Asia**	**...**	**...**	**...**	**...**	**...**
Europe and Northern America**	**...**	**...**	**...**	**...**	**...**
Latin America and the Caribbean**	**...**	**...**	**...**	**...**	**...**
Northern Africa and Western Asia**	**95**	**...**	**...**	**...**	**...**
Sub-Saharan Africa**	**...**	**87**	**...**	**...**	**...**
World**	**...**	**...**	**...**	**...**	**...**

* Qualified teachers are defined according to national standards.

** Median

Source: UNESCO, 2016b

Table 9. Percentage of trained classroom teachers* by level of education

Country or territory	Pre-primary	Primary	Lower secondary	Upper secondary	TVE, total secondary
Caucasus and Central Asia					
Kazakhstan	100	100	...	...	100
Kyrgyzstan	...	72	...	...	...
Tajikistan	100	100	...	...	...
Turkmenistan	...	...	...	...	...
Uzbekistan	...	...	...	...	...
East and South-East Asia					
Brunei Darussalam	64	87	94	90	71
Cambodia	100	100	...	...	...
China	...	...	...	...	...
Democratic People's Republic of Korea	...	...	...	...	...
Indonesia	...	...	...	...	...
Japan	...	...	...	...	...
Lao People's Democratic Republic	91	98	100	100	...
Malaysia	100	99	...	...	99
Mongolia	94	100	...	...	100
Myanmar	48	100	93	95	.
Philippines	...	100	...	...	.
Republic of Korea	...	...	...	...	...
Singapore	...	...	...	...	...
Thailand	...	100	...	...	...
Timor-Leste	...	...	...	...	...
Viet Nam	98	100	100	...	...
The Pacific					
Australia	...	...	...	...	...
Cook Islands	70	89	...	...	...
Fiji	...	100	100	100	100
Kiribati	...	...	87	...	...
Marshall Islands	...	...	...	...	...
Federated States of Micronesia	...	...	...	...	...
Nauru	...	...	...	...	...
New Zealand	...	...	...	...	...
Niue	...	...	...	...	...

Country or territory	Pre-primary	Primary	Lower secondary	Upper secondary	TVE, total secondary
Palau	...	...	...	...	...
Papua New Guinea	...	...	...	...	100
Samoa	100	...	...	100	...
Solomon Islands	59	65	...	...	.
Tonga	100	97	...	...	...
Tuvalu	75	...	...	...	...
Vanuatu	...	...	67	...	...
South Asia					
Afghanistan	...	...	...	...	...
Bangladesh	...	...	60	56	100
Bhutan	...	...	...	...	...
India	...	...	...	...	...
Islamic Republic of Iran	...	100	100	100	...
Maldives	73	86	...	...	...
Nepal	88	94	81	83	...
Pakistan	...	84	...	...	...
Sri Lanka	...	80	72	...	...
Caucasus and Central Asia**	**93**	**100**	**...**	**...**	**...**
East and South-East Asia**	**...**	**100**	**...**	**...**	**...**
The Pacific**	**...**	**...**	**...**	**...**	**...**
South Asia**	**...**	**86**	**...**	**...**	**...**
Europe and Northern America**	**...**	**...**	**...**	**...**	**...**
Latin America and the Caribbean**	**...**	**85**	**...**	**...**	**...**
Northern Africa and Western Asia**	**93**	**98**	**...**	**...**	**...**
Sub-Saharan Africa**	**49**	**80**	**...**	**...**	**...**
World**	**...**	**...**	**...**	**...**	**...**

* Trained teachers are defined as those who have received at least the minimum organized and recognized pre-service and in-service pedagogical training required to teach at a given level of education. Data on trained classroom teachers are not collected for countries whose education statistics are gathered through the OECD, Eurostat or the World Education Indicators questionnaires.

** Median

Source: UNESCO, 2016b

Table 10: Pupil/teacher ratios* for pre-primary, primary, lower secondary, upper secondary, and technical and vocational education

Caucasus and Central Asia					
Kazakhstan	9	16	...	...	14
Kyrgyzstan	...	25	...	...	9
Tajikistan	14	22	...	...	...
Turkmenistan	...	...	...	...	...
Uzbekistan	...	...	...	...	...
East and South-East Asia					
Brunei Darussalam	17	10	10	9	9
Cambodia	31	45	...	...	...
China	21	16	13	17	...
Democratic People's Republic of Korea	...	...	...	...	...
Indonesia	13	17	15	17	23
Japan	26	17	13	11	10
Lao People's Democratic Republic	19	25	18	19	...
Malaysia	18	11	...	...	12
Mongolia	27	27	...	...	11
Myanmar	28	28	36	23	.
Philippines	...	31	...	...	.
Republic of Korea	14	17	17	15	...
Singapore	...	...	...	...	...
Thailand	...	15	...	...	...
Timor-Leste	...	...	...	...	...
Viet Nam	18	19	...	...	...
The Pacific					
Australia	...	...	...	...	...
Cook Islands	14	17	...	...	...
Fiji	...	28	26	13	8
Kiribati	...	26	...	...	...
Marshall Islands	...	...	...	...	...
Federated States of Micronesia	...	...	...	...	...
Nauru	33	39	29	17	.
New Zealand	9	14	15	13	...
Niue	5	13	...	...	...

Country or territory	Pre-primary	Primary	Lower secondary	Upper secondary	TVE, total secondary
Palau	18	...	...	...	...
Papua New Guinea	...	...	...	...	25
Samoa	11	...	...	...	...
Solomon Islands	33	20	...	...	.
Tonga	12	22	...	...	...
Tuvalu	13	...	...	...	...
Vanuatu	15	23	...	...	...
South Asia					
Afghanistan	...	46	...	...	...
Bangladesh	...	...	37	33	20
Bhutan	11	27	17	11	10
India	...	32	30	32	18
Islamic Republic of Iran	...	26	16	18	...
Maldives	17	12	...	...	...
Nepal	22	23	35	23	...
Pakistan	...	47	18	...	...
Sri Lanka	...	24	17	18	25
Caucasus and Central Asia**	**10**	**16**	**...**	**...**	**...**
East and South-East Asia**	**20**	**17**	**14**	**17**	**...**
The Pacific**	**...**	**...**	**...**	**...**	**...**
South Asia**	**...**	**34**	**28**	**30**	**...**
Europe and Northern America**	**12**	**14**	**12**	**13**	**...**
Latin America and the Caribbean**	**20**	**22**	**18**	**14**	**...**
Northern Africa and Western Asia**	**20**	**20**	**17**	**15**	**...**
Sub-Saharan Africa**	**30**	**42**	**27**	**22**	**...**
World**	**17**	**24**	**18**	**18**	**...**

* Based on headcounts of pupils and teachers.

** Weighted average

Source: UNESCO, 2016b

Table 11. Percentage of individuals using the internet

Caucasus and Central Asia		The Pacific (cont.)	
Kazakhstan	70.83	Fiji	46.33
Kyrgyzstan	30.25	Kiribati	13.00
Tajikistan	18.98	Marshall Islands	19.28
Turkmenistan	15.00	Federated States of Micronesia	31.50
Uzbekistan	42.80	Nauru	54.00*
East and South-East Asia		New Zealand	88.22
Brunei Darussalam	71.20	Niue	79.56*
Cambodia	19.00	Palau	…
China	50.30	Papua New Guinea	7.90
Democratic People's Republic of Korea	0.00	Samoa	25.41
Indonesia	21.98	Solomon Islands	10.00
Japan	91.06	Tonga	45.00
Lao People's Democratic Republic	18.20	Tuvalu	42.70
Malaysia	71.06	Vanuatu	22.35
Mongolia	21.44	South Asia	
Myanmar	21.80	Afghanistan	8.26
Philippines	40.70	Bangladesh	14.40
Republic of Korea	89.65	Bhutan	39.80
Singapore	82.10	India	26.00
Thailand	39.32	Islamic Republic of Iran	45.33
Timor-Leste	13.40	Maldives	54.46
Viet Nam	52.72	Nepal	17.58
The Pacific		Pakistan	18.00
Australia	84.56	Sri Lanka	29.99
Cook Islands	51.00		

* 2011

Source: ITU, 2016

Table 12: Mobile-cellular telephone subscriptions per 100 inhabitants

Country or territory	Per 100 inhabitants	Country or territory	Per 100 inhabitants
Caucasus and Central Asia		**The Pacific (cont.)**	
Kazakhstan	156.88	Fiji	108.20
Kyrgyzstan	132.80	Kiribati	38.84
Tajikistan	98.59	Marshall Islands	29.25
Turkmenistan	145.94	Federated States of Micronesia	21.54
Uzbekistan	73.32	Nauru	67.78**
East and South-East Asia		New Zealand	121.83
Brunei Darussalam	108.13	Niue	…
Cambodia	133.00	Palau	…
China	92.18	Papua New Guinea	46.65
Democratic People's Republic of Korea	12.88	Samoa	62.37
Indonesia	132.35	Solomon Islands	72.66
Japan	126.54	Tonga	69.09
Lao People's Democratic Republic	53.10	Tuvalu	40.34
Malaysia	143.89	Vanuatu	66.25
Mongolia	104.96	**South Asia**	
Myanmar	75.68	Afghanistan	61.58
Philippines	115.75	Bangladesh	81.90
Republic of Korea	118.46	Bhutan	87.03
Singapore	146.53	India	78.06
Thailand	152.73	Islamic Republic of Iran	93.38
Timor-Leste	117.40	Maldives	206.66
Viet Nam	130.64	Nepal	96.75
The Pacific		Pakistan	66.92
Australia	132.80	Sri Lanka	110.59
Cook Islands	55.75*		
Asia & Pacific	**93.0**	**CIS**	**142.8**
Africa	**76.2**	**Europe**	**119.8**
Arab States	**110.5**	**The Americas**	**111.8**
World	**98.6**		

* 2013, ** 2012

Source: ITU, 2016

Table 13: **Proportion of households with mobile-cellular telephones and computers**

Caucasus and Central Asia		
Kazakhstan	...	73.8
Kyrgyzstan	96.5	17.6
Tajikistan	...	...
Turkmenistan	...	...
Uzbekistan	...	43.2
East and South-East Asia		
Brunei Darussalam	...	...
Cambodia	10.4	9.3
China	...	...
Democratic People's Republic of Korea	...	...
Indonesia	...	18.7
Japan	94.6	79.3
Lao People's Democratic Republic	...	...
Malaysia	...	67.6
Mongolia	...	42.6
Myanmar	...	3.1
Philippines	...	24.3
Republic of Korea	98.4	77.1
Singapore	97.4	85.7
Thailand	94.7	29.5
Timor-Leste	...	...
Viet Nam	...	16.0
The Pacific		
Australia	...	80.4
Cook Islands	...	...
Fiji	...	...
Kiribati	...	...
Marshall Islands	...	...
Federated States of Micronesia	...	...
Nauru	...	...
New Zealand	...	77.8
Niue	...	...
Palau	...	...
Papua New Guinea	...	...

Country or territory	Mobile-cellular telephone	Computer
Samoa	...	...
Solomon Islands	...	...
Tonga	...	...
Tuvalu	...	...
Vanuatu	...	...
South Asia		
Afghanistan	...	...
Bangladesh	87.7	5.7
Bhutan	...	16.4
India	...	9.5
Islamic Republic of Iran	92.5	57.4
Maldives	...	...
Nepal	...	7.3
Pakistan	...	...
Sri Lanka	...	22.4

Source: ITU, 2016

Appendix III: Pre-Forum Country Survey

Pre-Forum Country Survey for the Asia-Pacific Regional Strategy on Using ICT to Facilitate the Achievement of Education 2030

Respondent's Information	
Full Name	
Title	
Department/Ministry	
Country	
Email Address	
Phone Number	

Overview of the Survey

Background

SDG4 (or *Education 2030*) pursues quality lifelong learning for all and highlights the need to harness information and communication technologies (ICT) for achieving the goal by 2030. The SDG4 Framework for Action and the Qingdao Declaration call for proactive sector-wide strategies to leverage the power of ICT to transform education. With this backdrop, the Asia-Pacific Ministerial Forum on ICT in Education 2017 (AMFIE 2017) will be held in Seoul on 11 and 12 May 2017 to identify pressing issues and discuss strategic directions and partnerships in the Asia-Pacific region to achieve the Education 2030 agenda.

Survey

This survey seeks to enrich the AMFIE 2017 by providing information and perspectives from each country on their current situation regarding achieving the Education 2030 agenda and the role of ICT. The information collected through this survey will be analyzed and consolidated to identify priority areas and supporting mechanisms, which will be drafted as the 'Asia Pacific Regional Strategy on Using ICT to Facilitate the Achievement of Education 2030', to be announced and endorsed during the AMFIE 2017.

The survey consists of two sections:

1. Investigating general aspects of achieving the Education 2030 agenda and the importance of ICT in the national education policy and plan.
2. Identifying specific issues of integrating ICT into education in relation to the specific targets of Education 2030.

It would be greatly appreciated if your response is received by Friday 24 March 2017.

Part I. General aspects of achieving the Education 2030 agenda and the importance of ICTs in education policies and plans

1 National policy

1.1 Does your country have a national policy or plan to promote and/or implement the integration of ICT into education? (please select boxes that apply for each ISCED level)

	ICT stated in National policy	ICT stated in National plan	Stand-alone ICT in Education Master Plan
Primary (ISCED 1)	☐	☐	☐
Lower Secondary (ISCED 2)	☐	☐	☐
Upper Secondary (ISCED 3)	☐	☐	☐

1.2 Is there a budget estimate based on an implementation plan?

☐ Yes

☐ No

1.3 Is the ICT in Education implementation plan reflected/allocated in the government budget?

☐ Yes

☐ No

If yes, please indicate as a percentage of GDP ☐ %

2 SDG4 and ICT

2.1 Please rate 1) how important each SDG4 target and means of implementation is in your country's education policy and plan, 2) how well your country is currently performing in each SDG4 target and means of implementation and 3) how feasible ICT in Education is to pursue each SDG4 target and means of implementation for the next five years (please put a tick in the appropriate box for each question).

4.1 Access to primary and secondary education①	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

SDG4 targets and means of implementation	How important is each SDG4 target and mean of implementation in your country's education policy and plan?					How well is your country currently performing in each SDG4 target and mean of implementation?					How feasible is ICT in Education to pursue each SDG4 target and mean of implementation for the next 5 years?				
	Low				High	Low				High	Low				High
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
4.2 Access to Early Childhood Care and Education	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
4.3 Access to Technical, Vocational and Tertiary Education incl. university	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
4.4 Skills for employment, decent jobs and entrepreneurship	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
4.5 Gender parity at all levels of education and vocational training	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
4.6 Literacy and numeracy skills	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
4.7 Learning for Sustainable Development including global citizenship and cultural diversity	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
4.a Building and upgrade of learning environment	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
4.b Expansion of scholarships available to developing countries	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
4.c Increasing the number of qualified teachers	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

2.2 If the role of ICT is highly emphasized in your country's education policy and plan, please specify documents and/or websites that we can refer to.

2.3 If the role of ICT is not highly emphasized in your country's education policy and plan, please specify reasons, including any barriers and pressing issues.

2.4 The Qingdao Declaration highlights the following ICT innovations and practices to achieve the 2030 Education agenda. Please indicate 1) how important each ICT area is in your country's education policy and plan, and 2) how well your country is currently performing in each ICT area (please put a tick in the boxes):

Providing open online educational resources (e.g., online portal, e-books, digital textbooks)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Integrating basic ICT skills into primary and/or secondary school curricula	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Providing MOOCs (Massive Open Online Course) to improve access to tertiary education and/or lifelong learning	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Using Big Data in education	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Monitoring and evaluation on learning performance by using ICT	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

3 Regional mechanism

3.1 Please specify the types of support you can offer and/or need to receive for integrating ICT into education in line with the achievement of the Education 2030. Please select up to THREE choices.

Types of support	For offering	For receiving
Policy consultation	☐	☐
Capacity building for officials and administrators	☐	☐
Capacity building for teachers	☐	☐
Specialized agency for ICT in education	☐	☐
Technical assistance in research and benchmarking	☐	☐
Financial aid	☐	☐
None of the above	☐	☐
Others	(Please specify)	(Please specify)

3.2 What would be your recommendation for regional coordination mechanisms on Using ICT to Facilitate the Achievement of Education 2030 in the Asia-Pacific region?

Part II. Specific issues in integrating ICT into education in priority areas of the Education 2030 agenda

1 Priority area 1: Access

1.1 Please indicate the current performance and importance of using ICT for enhancing **access** to the respective educational level in your country (please put a tick in the boxes).

	Importance of using ICT for enhancing access to education in the national education policy and plan					Current performance of using ICT for enhancing access to education				
	Low				High	Low				High
	1	2	3	4	5	1	2	3	4	5
Early Childhood Education	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Primary Education (ISCED 1)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Secondary Education (ISCED 2)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Secondary Education (ISCED 3)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
TVET	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Tertiary Education	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

1.2 Please provide any exemplary ICT initiative for enhancing 'access' to educational opportunities

☐ Early Childhood Education ☐ Primary education (ISCED 1) ☐ Secondary education (ISCED 2) ☐ Secondary education (ISCED 3) ☐ TVET ☐ Tertiary Education
Please tick V one.
Please describe it briefly.

1.3 Please specify any barrier and challenges to use ICT in education for enhancing access to educational opportunities.

☐ Early Childhood Education ☐ Primary education (ISCED 1) ☐ Secondary education (ISCED 2) ☐ Secondary education (ISCED 3) ☐ TVET ☐ Tertiary Education
Please tick V one.
Please describe it briefly.

1.4 In your country, is there any virtual school system (fully or mostly online learning) in each education area? (please put a tick in the boxes)

	Yes	No	If yes, please provide brief descriptions and/or websites that we can refer to
Early Childhood Education	☐	☐	
Primary Education	☐	☐	
Secondary Education (lower)	☐	☐	
Secondary Education (upper)	☐	☐	
TVET	☐	☐	
Tertiary Education	☐	☐	

2 Priority area 2: Equity and quality of education

2.1 Does your country have any ICT-integrated innovations that have attempted to address **the gender disparity issues in education**? If so, kindly provide a brief description of the project, main actors, its objectives, outputs, etc. If this question is not application, please indicate N/A in the response box.

2.2 Does your country have any ICT-integrated innovations that have attempted to address **the disparity in the quality of education between urban and rural areas**? If so, kindly provide a brief description of the project, main actors, its objectives, outputs, etc. If this question is not application, please indicate N/A in the response box.

3 Priority area 3: Mobile learning for achieving SDG4

3.1 SDG4 states that mobile technology holds great promise for accelerating progress toward

improving literacy and numeracy skills for a successful completion of basic education. In the following table, please indicate the level of mobile learning activities for each educational subsector in your country.

- **Low:** there is some activity, but just in an early stage of development, probably with scattered activities rarely going beyond one particular school or institution.
- **High:** there are programmes or activities that have reached a critical mass of schools or learners, as to become publicly noticeable.
- **Very high:** there are programmes or activities that can be said to be widely used by schools or learners.

	Non-existing	Low	High	Very high
Primary education (ISCED 1)	☐	☐	☐	☐
Lower secondary (ISCED 2)	☐	☐	☐	☐
Upper secondary (ISCED 3)	☐	☐	☐	☐
Post-secondary/not tertiary (ISCED 4)	☐	☐	☐	☐
Tertiary (ISCED 5)	☐	☐	☐	☐

3.2 Please indicate whether your country considers mobile learning for achieving the following SDG4 targets.

	Yes	No	If No, please provide brief descriptions about any barriers with reference to the use of mobile phone in education in your country
Target 1. Increasing access to primary and secondary education	☐	☐	
Target 3. Increasing access to Technical, Vocational and Tertiary Education incl. university	☐	☐	
Target 4. Improving skills for employment, decent jobs and entrepreneurship	☐	☐	
Target 5. Improving gender parity at all levels of education and vocational training	☐	☐	
Target 6. Improving Literacy and numeracy skills	☐	☐	
Target C. Increasing the number of qualified teachers	☐	☐	

4 Priority area 4: Teachers and ICT

4.1 Please indicate the current performance and importance of buildings teacher's ICT competency in your country. (please put a tick in the boxes)

	Importance of building teachers' ICT competency in education policy and plan					Current performance of building teachers' ICT competency				
	Low				High	Low				High
	1	2	3	4	5	1	2	3	4	5
Pre-service teachers	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
In-service teachers	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

4.2 How is the teacher education/training delivered? (choose all that apply)

	Pre-service teachers	In-service teachers
Only face-to-face	☐	☐
Only e-learning/online	☐	☐
Blended learning including both face-to-face and online learning	☐	☐
Other, please specify:		

4.3 Do you have a future plan to deliver teacher education and training via ICT such as e-learning and/or mobile learning?

☐ Yes

☐ No

☐ Already implemented

If you chose "yes," please provide brief information about the plan.

[End of the survey]

Thank you very much for your time. Your responses are greatly appreciated.

Appendix IV. SDG4 targets and means of implementation

Target 4.1. By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes.

Target 4.2. By 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education.

Target 4.3. By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university

Target 4.4. By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship.

Target 4.5. By 2030, 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.

Target 4.6. By 2030, ensure that all youth and a substantial proportion of adults, both men and women achieve literacy and numeracy.

Target 4.7. By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and culture's contribution to sustainable development.

Means of implementation 4.a. By 2030, build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all.

Means of implementation 4.b. By 2020, substantially expand globally the number of scholarships available to developing countries, in particular least developed countries, small island developing States and African countries, for enrolment in higher education, including vocational training and information and communication technology, technical, engineering and scientific programmes, in developed countries and other developing countries.

Means of implementation 4.c. By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States.

Education Sector

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Educational, Scientific and
Cultural Organization

UNESCO Bangkok Office
Asia and Pacific Regional Bureau for Education

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