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Progress of ICT in Education in Cambodia: Challenges and Recommendations

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This paper aims to discuss and describe the challenges of information communication technology (ICT) adoption in Cambodia's education. Before the challenges are pointed out, the paper provides information on Cambodia's educational context, which includes the need for ICT integration and the existing policies and activities that have been done as well as their progress.

The following section is a detailed explanation on the challenges that Cambodia's education sector is currently facing in ICT adoption. The data and information obtained will be based on both government and nongovernment sources. Since there is limited statistical data in government sources, most of the data retrieved are from nongovernment websites and reports. On the other hand, qualitative information are retrieved from both government and public sources; however, priority is given to nongovernment sources (academic articles, journals, news articles, and reports) to maintain the neutrality of this paper. In the last part of this

paper, we sum up the main points and challenges and recommend feasible solutions.

Cambodia's education and the need for ICT educational reform

Since 1979, Cambodia's school system has been changed three times, and as a result of the latest change in 1996, general education is now categorized into three levels, consisting of 12 grades, including primary school (grades 1 to 6), lower secondary school (grades 7 to 9), and upper secondary school (high school, grade 10 to 12). Nine years of study, from grade 1 to 9, are compulsory education; after this, students may either continue to the upper secondary level or apply to any public or private vocational training course. Starting in 1979, the Ministry of Education, Youth, and Sports (MoEYS) has engaged in the advancement of the quality of education through the reform of the formal education system, school curriculum, textbooks, and teaching-learning approach. With the current system, the teaching-learning approach has shifted from a teacher-centered to a student-centered approach (MoEYS, 2018).

However, several studies conducted found that there were many barriers to implementing student-centeredness in Cambodia. A variety of obstacles such large class sizes, shortage of school materials, teachers' time constraints, and low level of teacher capacity in successfully helping students to apply the method were mentioned as the main issues to be resolved to achieve a student-learning approach. In 2019, the study by Corrado and his team indicated that the adoption of ICT in the education system would be an effective solution to the identified problems. The use of ICT offers powerful teaching environments to teachers to reduce their workload and conveniently connect to the students (Corrado et al., 2019). Moreover, ICT supports the student-centered approach by transforming the learning process so that students can deal with knowledge in an active and self-directed way. The knowledge that can be found in an old form of classroom materials, such as textbooks, could be replaced by the information that can be delivered and accessed using ICT.

The inclusion and promotion of digitalization in education policy has captured the Cambodian government's attention, not only because it enables student-centeredness as a way to improve the quality of education but also because digital capacity has become a substantial requisite for social and economic development.

Cambodia's current state of digital education poses serious challenges to the nation's development, along with its ramifications to the Cambodian ability to effectively compete for job opportunities at the regional level (Bredenberg, 2018). Data dating back to 2001 on ICT access and use show that Cambodia ranked eighth out of the 10 countries in the Association of Southeast Asian Nations (ASEAN) in terms of e-infrastructure, e-society, e-commerce, and e-government based on the ASEAN Readiness Assessment conducted in 2001. Thus, it was defined as an "emerging readiness" country, with the need to build basic ICT infrastructure and ICT-literate human resources (MoEYS, 2004).

Still, Cambodian youths continue to stay behind their fellows from other countries in the region in terms of technical capacity. The mismatch between the demand for ICT knowledge in the labor force and ICT supply in the current education system is a

challenge for Cambodian students to be prepared for and ready to compete with in the ASEAN economic community. The level of job-skill mismatch is high, with only 31% of youth in Cambodia in jobs that match their qualifications (ILO, 2019). Based on the Asia Development Bank (ADB) analysis and report in 2018, the education policy and system are recommended to be tailored towards the inclusion of 21st-century skills, mainly focusing on incorporating ICT into the curriculum (ADB, 2018).

Over the past years, Cambodia's economy has depended largely on the traditional "export-led" growth model. However, it is perceived by the public that in promoting further economic development in Cambodia in the 21st century, a change must be made from the traditional model to the digital economy. A substantial progress of the digital economy will require more than basic digital-technology knowledge. The United Nations' global adoption index ranked Cambodia in the lower group in comparison with the wider Asia-Pacific region for the digital-transition readiness that is plagued by the low digital-literacy gap (Ngov, 2019). Cambodia's inadequately educated workforce has been found to be the second most-severe obstacle to the operation of manufacturing enterprises, according to the 2016 World Bank Group Enterprise Survey. The World Development Report 2018 further elaborated that an investment in digital education and skills is crucial to ensure that workers can learn new skills and make the most of new opportunities from the innovation of digital technology. Cambodia aims to convert into a predominantly digital economy by 2023, with key priorities including the development of digital literacy in the basic education system as well as new services in areas such as mobile finance and e-commerce (World Bank, 2018).

Reforms in Cambodia's education system with ICT integration is necessary for the adoption of student-centered learning and the advancement of local human resources and economic performance, which would enable Cambodia to work side by side with other ASEAN countries.

The ongoing initiative: The Education Strategic Plan 2019-2023

The Education Strategic Plan (ESP) 2019–2023 was initiated by the MoEYS as a continuation of the ESP 2014-2018. The overall purpose of the ESP 2019-2023 is to implement education reforms and create a robust base for education in the 21st century. As a national education policy, this strategic plan was made to align with the vision of Cambodia's socioeconomic development and reform program of Cambodia's Education 2030 Roadmap, which was drafted by MoEYS in 2019. This roadmap navigates the formation and implementation of the ESP 2019-2013 as an essential part in helping Cambodia achieve its status as a high middle-income country by 2030 and a high-income country by 2050 (Khmer Times, 2021). The strategic plan applies subsector structural-management approaches in addressing rational relationships between subsector objectives, strategic frameworks, main activities, resource requirements, monitoring and evaluation, and mechanisms for constant quality improvement. As stated in the ESP 2019-2023, the MoEYS is committed to attaining the objective of quality education, science, and technology by focusing on teacher qualifications and promoting technical education at upper secondary schools and skills education for the job market (MoEYS, 2019).

There is not yet a formal assessment and data available on teachers' qualification in all levels of Cambodia's education from the ministry. However, according to a recent

report conducted by United Nations Children's Fund (UNICEF) on Cambodia's education performance during COVID-19, only 13% among 5592 teachers and school directors in secondary level education felt they had enough capacity to perform their functions during school closures (UNICEF et al., 2021). The most frequently cited capacity-development needs of all teachers are developing distance-learning lesson plans and material, utilizing social media to support distance learning, and using online-learning platforms. Therefore, it could be seen that after four years of ESP implementation, teachers' qualification is still a challenge that needs to be paid attention to and the capacity development required heavily depend on the knowledge of using ICT.

With a specific target of promoting ICT in upper secondary schools, MoEYS has implemented the Second Upper Secondary Education Sector Development Program (USE-SDP2) with financial support from Asia Development Bank (ADB). USE-SDP2 has provided hardware and software (laptop and video conferencing applications) to 137 upper secondary schools throughout all provinces in Cambodia. Currently, the renovation of classrooms into science rooms and upgrading of ICT rooms is ongoing. About 50 secondary resource schools and upper secondary schools to be supplied with solar panels have been identified. Due to COVID-19, the training on examination design, which is the main activity in the USE-SDP2's third output, was unable to be implemented as the international specialists could not travel during the pandemic. However, amid the pandemic, the Department of Information Technology of the MoEYS conducted workshops on experimental-video production for grade 10 and 11 science, technology, engineering, and math (STEM) subjects with limited participants, who were able to produce and post videos on USE STEM subjects. The videos also served as very helpful students' learning tools during COVID-19 (Phal et al., 2022).

Unemployment in Cambodia is very low, but that is because the vast majority of the population works in the informal sector, accounting for 63% in 2019 as reported by the World Bank. Last year, Cambodia received and approved 195 new investment projects and 43 production-expansion requests that could create more than 150,000 jobs. A recent update from the Council for the Development of Cambodia (CDC) mentioned that they have approved four investment projects worth almost $24 million USD that are expected to create 2,376 jobs in the clothing and fashion industry (Lee, 2022).

The remaining concern is the lack of high incometcareer, as most of these jobs are labor jobs or low-skill jobs in the factory. Young Cambodians expressed their frustrations over a lack of decent jobs in the country; however, the transformation of the 10-member ASEAN into a single market could offer better employment opportunities. It is believed that future job availability in STEM is huge, as society is moving towards Industry 4.0. Therefore, to ensure younger Cambodians are ready to compete for better jobs in the ASEAN region, the government has focused on the promotion and strengthening of STEM education. There could be many policies, but whether the policy would bear results depends on significant funding. According to the ministry's educational-planning specialist, Onn Sivutha, there was still no money allocated, numbers of teachers to be hired, nor timeframes, and it could take years for the policy to have an effect (Amaro, 2016).

It is still a bit too soon to say or evaluate if Cambodia could achieve its status by becoming a high middle-income country by 2030. Data on results of each

educational initiative or activity is not yet available, but the current progress shows that to turn into a middle-income country by a set date, Cambodia needs to put more effort and commitment in terms of financial allocation from the state's budget.

Challenges of ICT adoption in cambodia's education

Despite Cambodia's progress to integrate ICT into its education system, much needs to be done to cope with the challenges. The following are policy challenges that continue to be highlighted as obstacles.

Lack of material and infrastructure

The lack of technology in the classroom hinders literacy and students learning opportunities. In Cambodia, one of the major challenges for secondary level education is insufficient learning materials and infrastructure. According to the ESP (2019-2023), 62.4% of schools had access to electricity, internet, and computer for pedagogical purposes at the secondary level in 2018. The percentage is expected to rise to 80.1% in 2023 (MoEYS, 2019). However, based on many reports and news articles, almost all public secondary schools and high schools, especially those in rural areas, are in need of computers for students. A deputy director from one provincial high school said that the school had six computers for use but were already old and broken. "Having a computer is very important because nowadays in my school we need one to manage and store students' scores and other administrative work," he said (Khmer Times, 2018).

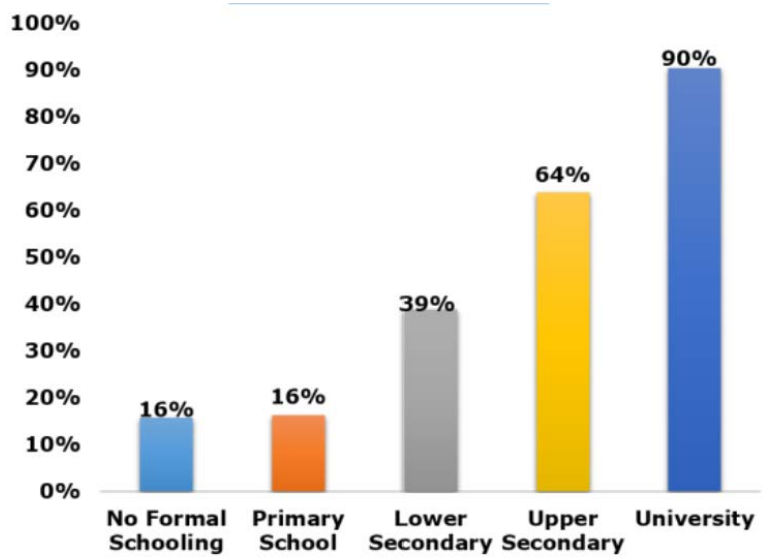
In addition to the inadequacy of computer hardware and software, other teaching/learning devices, and electrical power in many remote schools, the high internet cost is another primary constraint accrued to the users. Also, 3G or 4G internet penetration in rural areas is limited, and slow connectivity often generates ineffective use of e-learning modalities. These costs and limited connectivity make it difficult for teachers and students to make use of the online education activities initiated by the MoEYS and other education providers.

Currently, it seems to be impossible for the government to provide free or better internet service to schools in rural areas, as in reality, even some ministries and departments in the capital city also face the problem of poor internet connection. During COVID-19, to allow the possibility of virtual meetings to be conducted, some government departments have asked NGO partners for support in providing high-speed internet and video-conferencing equipment. Moreover, based on the comparison of the cost of living between Cambodia and Thailand, the monthly internet cost is around 36 USD for the former, while the latter costs only 17 USD with the same speed and data provided (Numbeo, 2022). What the government is doing in responding to the issue is to attract more internet providers to operate in Cambodia. If there is strong competition, internet users, including the students in rural areas, could possibly find a cheaper and better connection.

A research study on internet use in Cambodia in 2016 indicated that up to 64% of upper secondary students have used the internet through their own phones. The percentage of people using the internet dramatically increased with education level affirmed the significance of internet access in schools as shown in Figure 1 (Phong et al., 2016).

Figure 1.

Usage of the Internet on Phone by Level of Education



Source: Phong et al. (2016).

Following the *ICT in ASEAN Education: Challenges and New Opportunities*, by comparing the progress in integrating ICT in ASEAN education, in 2012, all schools in Malaysia, Singapore, and Brunei had utilized some form of computer-assisted instruction. Nevertheless, the proportion of schools with computer-assisted instruction in Cambodia, the Philippines, and Thailand were 3%, 49%, and 98% respectively (The Head Foundation, 2017). The proportion of schools with internet access in the same year can be seen in Table 1.

There were 13.44 million internet users in Cambodia, data as of January 2022. At the beginning of 2022, Cambodia's internet-penetration rate stood at 78.8% of the overall population. Kepios[1] analysis reveals that internet users in Cambodia increased by 177,000 (plus 1.3%) between 2021 and 2022 (Kepios, 2022). Although the data on schools with internet access is not available in recent years, we could assume that the proportion of internet usage in Cambodia's schools is increasing due to the growth of internet users.

[1] Kepios is a strategy consultancy that helps organisations all over the world to make sense of people's evolving digital behaviours, and understand what these changes mean for ongoing success. https://kepios.com

Table 1.

Proportion of Schools with Internet Access in 2012

Country	Schools with Internet Access (%)
Cambodia	7
Philippines	12
Indonesia	42
Malaysia	91
Thailand	98
Singapore	100
Brunei	100

Source: The Head Foundation (2017).

Inadequacy in teachers' ICT knowledge and capacity

Another matter concerning the adoption of technology in the education system is the teachers' capacity in applying and transferring digital technology to students. In a 2009 research on providing ICT skills to teacher trainers in Cambodia, 17 teachers were interviewed about the motivators and inhibitors for them in using ICT skills in their teaching. The result showed that the lack of an adequate number of computers was the most pervasive inhibitor, accounting for 57.9%, followed by a lack of electricity and repair challenges, each at 36.8%. Teacher trainers who rejected adoption or discontinued the use of the ICT skills often reported that using the required skills was too difficult and they were not given adequate guided practice opportunities to master the skills (Richardson, 2009).

The 2022 study on Cambodian secondary-school teachers' readiness for online teaching has shown that only 43.5% of teachers who received initial teacher training were trained to use ICT hardware or software. Furthermore, only one fifth (19.6%) of the teachers reported they were taught how to integrate technology into teaching activities during their training, and less than 18% confirmed that they had used technology to enhance their teaching methodology (Phal et al., 2022). In an interview with 687 secondary-school teachers, results show that only 38.4% of them had used computers (either desktops or laptops) for at least one hour in the last seven days for teaching purposes (Phal et al., 2022). The given condition of teachers' limited competency in using digital devices hinders the improvement of the quality of education and the incorporation of technology into the system.

Table 2.

ICT Skill and Training at Teacher Training (by Total and by Institute)

	All	PTTC	RTTC	NIE	Others
Were trained how to use ICT hardware and software	43.6%	25.0%	36.2%	69.1%	8.3%
Were trained how to use technology for teaching activities	19.6%	6.3%	12.4%	40.2%	0.0%
Were able to use technology to enhance learning teaching	17.7%	4.7%	11.9%	35.3%	0.0%
Adequate PRESET to switch to online teaching	5.5%	0.0%	3.2%	12.3%	0.0%
Observations	674	64	370	204	36

Source: Phal et al. (2022).

Table 3.

Teachers' Access to Digital Devices and Services

	At Home			At School		
	Use	Access Only*	No Access	Use	Access Only*	No Access
Desktop computer	6.7%	3.9%	89.4%	9.8%	74.1%	16.2%
Laptop computer	42.9%	8.4%	48.6%	2.2%	37.1%	60.7%
Wi-Fi	37.3%	0.7%	62.0%	32.3%	47.9%	19.8%
Cellular Internet	92.1%	1.3%	6.6%	0.0%	0.0%	0.0%
Smartphone	98.3%	0.4%	1.3%	0.1%	1.9%	98.0%
Tablet	6.3%	1.9%	91.8%	1.7%	17.0%	81.2%
Printer	16.4%	2.5%	81.1%	31.0%	60.6%	8.4%
Cloud storage	32.3%	3.1%	64.6%	4.9%	20.2%	74.8%
Computer lab	-	-	-	14.0%	65.4%	20.7%
Video recording equipment	-	-	-	3.8%	32.0%	64.2%

* Had access but did not use it in the past month (October 2021). The number of observations is 687.

Source: Phal et al. (2022)

Unclear education policies and lack of systematic monitoring and evaluation

The problem with ESP 2019-2023 itself is that the policy is setting high expectations without putting in place clear support mechanisms to achieve the objectives. In the ESP 2019-2023, there is no published policy mentioning a devoted budget for ICT professional development nor plans/activities to obtain external support. MoEYS has overlooked the importance of establishing a mechanism for obtaining and increasing stakeholder involvement; thus, continuous support cannot be expected from these resources. The given condition would be problematic with regard to sustainability. In addition, the policy precisely notes for immediate actions to respond to the need for

digital technology in education. However, present data indicate that the interventions are not being thoroughly planned, allowing the implementation to be ad hoc (Richardson, 2008). ICT cannot compensate for inadequate or ill-drafted pedagogical policies.

MoEYS does not have a clear action plan for both the short and long term regarding the steps to be undertaken to incorporate ICT into the education system. This need is linked to the initiative on effective monitoring and evaluation strategies in tracking ICT in education projects to ensure all aspects of the action plan are addressed in the most efficient manner. For instance, one of the most crucial aspects that need an assessment is professional development for policymakers, school leaders, and teachers—a critical component of the holistic approach to integrating ICT into the system (Richardson, 2011).

Financial constraints

Despite recent achievements over the years, Cambodia remains one of the poorest countries in Asia, with an average annual rate of over 8% of GDP growth (The Borgen Project, 2017). The country's current economic status has continued to prevail in Cambodia, which may restrict the government in terms of capacity to spend on education reforms.

Financial allocation in supporting digital education has become the center of discussion and debate between the government and its partners. Several development partners like the Swedish International Development Cooperation Agency (SIDA) and the European Union still focus on the improvement of primary-education enrolment and quality. Concurrently, a large percentage of the MoEYS budget has been allocated to maintain and ensure primary education operations and standards (Save the Children, 2015). Due to Cambodia's limited national budget, the MoEYS sought ADB's financing assistance in their digital secondary-education reform, which was estimated to cost 53.5 million USD for the overall program. ADB agreed to invest in the Second Upper Secondary Education Sector Development Program (USE-SDP2). The investment happened in the form of a policy-based loan of 15 million USD and a project loan of 35 million USD while the government could fund 3.5 million USD from the central budget (ADB, 2018). In this program, minimum service standards such as school infrastructure, personnel, and teaching and learning resources were set for secondary resource schools.

External-aid flows from public and private sources and through multilateral organizations and bilateral arrangements are crucial in the development of Cambodia's education. It could be seen that most of the projects run under the financial support of major donors such as the World Bank, ADB, and the European Union. It is expected that the NGOs' support is still going on, as ADB has made a statement on, and is committed to, achieving prosperous, inclusive, resilient, and sustainable education development in Asia by providing funding in the form of loans or grants. In addition, since becoming a member of the Global Partnership for Education (GPE)[2] in 2006, Cambodia has received GPE grants twice—57.4 million

[2] The Global Partnership for Education (GPE) is a multistakeholder partnership and funding platform that aims to strengthen education systems in developing countries in order to

USD for 2008–2012 and 38.5 million USD for 2014–2017 periods respectively (Ashida & Chea, 2017). Due to Cambodia's current status as a developing state, the country is still eligible to apply for and receive grants from GPE.

It is true that as an independent country, Cambodia's education development cannot forever rely on foreign funding. However, at this point in time, external support, either financial or technical, are significant. Therefore, when the matter of sustainability is being discussed, the question should be how Cambodia could still obtain external support rather than how the country could financially help itself. Reaching targeted and promised results is obviously one of the factors to obtain ongoing support. However, there are also other aspects, such as political regime, that are determinants for international donors to consider in keeping the support.

Social and political instability

The "ICT in Cambodia's Education Reform" study in 2008 revealed the failed interconnection between politics, economics, and policies, resulting to an ICT-in-education reform that has yet to be fully embraced in Cambodia (Richardson, 2008). If Cambodia's current political and social situation does not improve, the risk of losing further aid is great, and with misappropriation of funds, limited resources that may be earmarked to support ICT-in-education reform may never be allocated to the intended efforts.

In the last several years, Cambodia's commitment to the rule of law, human rights, and the diminishing of corruption has deteriorated. Since 2018, with the announcement of aid cancellation by the United States and the European Union, Cambodia has been developing cemented ties with and receiving aid from China instead. Having a good relationship with China, the Cambodian government has allowed a huge flow of Chinese investments into Cambodia. Along with positive economic progress, engagement with Chinese firms and investors has also yielded negative outcomes concerning human trafficking—an emerging issue that is strongly associated with corruption. Another worrisome issue currently threatening Cambodia's social stability is cybercrime, connected mostly to Chinese nationals. Such issues occur because the law is not strongly enforced. In 2019, Cambodia was ranked second to the bottom in adherence to rule of law among 113 countries surveyed by the World Justice Project (World Justice Project, 2019).

Due to issues of corruption and political instability, in 2006, the World Bank announced the cancellation of 43 contracts worth 11.9 million USD of aid to Cambodia (World Bank, 2006). The cutdown of aid has significantly affected MoEYS's efforts in the integration of ICT in education, as the educational funding anticipated a 26.75 million USD shortfall. In 2018, the United States announced the suspension of military assistance to Cambodia, worth about 8.3 million USD, over its concerns with setbacks to democracy in the country (Herman, 2018). Later in 2020, the European Commission decided to partially withdraw Cambodia's duty-free, quota-free access to the European market, massively affecting selected garment and footwear products and all travel goods and sugar. The United States and the European Union claim to continue financial support in the areas such as health,

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increase the number of children who are in school and learning. https://www.globalpartnership.org/

education, and agriculture, which directly benefit the Cambodian people. However, the concern of losing further aid and the possibility of paralyzing future ICT-in-education efforts are currently quite great as the violation of human rights within the country does not have positive improvement yet.

Recently, the matter of human trafficking is a new, sensitive issue, strongly linked to corruption, in Cambodia. Currently, according to many international news and reports, Cambodia is known to be a destination country for human trafficking and has been downgraded to tier 3 in the 2022 Trafficking in Person Report released by the U.S. Department of States. The implication of this undesirable result is Cambodia would face foreign-aid rejections, according to the Trafficking Victims Protection Act. These aid restrictions include nonhumanitarian and non-trade-related assistance, funding for cultural and educational exchange, and more (Smith, 2022). In addition, being placed in tier 3 could affect the country's reputation and the decision of international investors who plan to invest in Cambodia's education sector, fear that the country is not safe, and the law and government are not trustworthy.

Conclusion and recommendations

In recognizing the important role of digitalization for human resources and economic development, Cambodia's government has put an effort into the development of ICT in the education system. After a few years of the integration of the ICT action plan and project, some progress could be seen through the installation of ICT equipment in Cambodian schools. Up to the present, ICT accessibility is seen to be improving specifically in Cambodia's upper secondary schools, and students are reported to be benefitting from this progress. Along with the progress, ICT-adoption reforms in the Cambodian education system have been limited due to a few noticeable challenges in regard to human-resource capacity, financial availability, and social and political instability.

As a developing country, an insufficient national budget still remains the main challenge in program implementation, causing the country to rely largely on foreign aid, which will not be sustainable in the long run. Cambodia's political situation, especially corruption, had caused major donors such as the World Bank to withdraw funding, with the decision conceivably affecting the education sector's development. Additionally, the unclear definition, activities, and in charge agency in the ICT adoption program have been noted as another challenge.

Based on the challenges presented above, two recommendations could be made for a better result in ICT integration in Cambodia's education.

Secure aid and promote investments

With a solid connection between social and political situations and financial sources, either foreign aid or investment, the government should consider addressing social issues of human-rights violation and corruption. For instance, the country should put more effort and commitment into solving emerging human trafficking issues that currently affect the country's reputation in getting funding.

Although the government understands the importance of education, it is understandable that they hesitate to commit budget allocation due to scarce

resources. The total annual expenditure on education and training increased from 1,300.7 billion KHR in 2011 to 2,065.7 billion KHR in 2015, an increase of approximately 79.7% over the period. However, the total government budget for the MoEYS has remained at around 13% on average over the same period, which indicates the necessary need for external funding (ADB, 2022). A recent study on the constraints of ICT adoption in Cambodia's education illustrated that most of the new programs in the education sector, particularly those driven by ICTs, tend to be externally funded and project-based due to a big amount of financing needed (Som et al., 2021). A large amount of the costs are associated with the purchasing and installation of ICT teaching and learning materials, such as computers, projectors, and modems in schools. Moreover, in the ESP 2019-2021, there is no financial allocation stated to implement the activities, so foreign funding is crucial at this stage to support Cambodia in achieving the mission and vision outlined in the strategic plan, which seeks to "establish and develop human resources that are of the very highest quality and are ethically sound in order to develop a knowledge-based society." Therefore, external funding remains significant for Cambodia's education advancement.

However, the aid and support will not last. Thus, to achieve sustainable growth, the country should begin to promote investments in education and set a longer-term vision. MoEYS is advised to be more proactive in developing ICT-in-education action plan. They should prepare an inclusive yet flexible action plan and allow NGOs, international lenders, local businesses, and local communities to take part and determine where best to put their resources and expertise.

The government has to relax its policies and procedures so that investors find it attractive and easier to monetize their capital. For example, the government could try to allow 100% of direct investment in the education sector through the automatic route. This means that any local and foreign company can invest in Cambodia's education sector without approval from the government. For example, investors could construct a building installed with ICT equipment in provincial schools that will allow students to come in and learn with affordable monthly payments. The government could jointly invest in this kind of project to gain investors' trust as well as to show commitment.

Moreover, the government should encourage investments in areas that are closely linked to the success of the education sector, such as network connection and road infrastructure. To promote investments in these areas, the government could provide either one or both kinds of these incentives: (a) fiscal incentives such as tax holidays and reduced tax rates and (b) policy incentives such as the removal of bureaucratic processes and excessive documentary requirements. More or less, the tax exemption would impact the country's national income. Therefore, to offset the loss, Cambodia needs to have well-established investment criteria and an effective monitoring-and-evaluation system to track the compliance of investors. Some suggested criteria for incentives eligibility is having a timeline and proposed location of investment (preferably out of the cities and suburban areas). It has been established that the engagement of the private sector in investing and assisting the development of the education sector potentially harmonizes and sustains the growth (The Head Foundation, 2017).

Limited financing has been identified as the main root cause of the underdevelopment of education in Cambodia. Hence, achieving financial independence in the education sector is expected to not only solve the problem of insufficient ICT materials but also improve teachers' qualifications and commitment to integrating ICT in teaching as well. Having enough funds allows the National Institute of Cambodia[3] to provide necessary and relevant ICT training to the teacher, who is the agent in transferring ICT knowledge to students. The teachers' training should focus both on the advancement of teachers' competency in using ICT skills for self-learning and research and their ability to effectively integrate them into teaching performance. In Cambodia, teachers' salary is low compared to other countries, and there has been many petitions asking for a higher salary base and more incentives and benefits. Cambodia's financial independence in the education sector raises the possibility of increasing teachers' salaries, which could motivate them to commit to learning and performing their duty.

Strengthen government coordination and program ownership

There are multiple stakeholders involved in integrating ICT into the education system. For that reason, once we obtain resources, a good coordination system is required to produce satisfactory results. Effectively integrating the use of ICT in education requires intra- and interministry coordination from top to bottom levels. Richardson's study on sustainable education development in Cambodia illustrated the significant roles of local government units (such as a provincial department of education), school principals, and teachers (Richardson, 2008). As a frontliner in project implementation, the local officers' technical knowledge and understanding of the emergent needs in their community are valuable.

Lastly, for long-term sustainability, MoEYS may need to apply a bottom-up approach by focusing on grassroots and community-level information and education campaigns and advocacy. This will increase local stakeholder knowledge and support, potentially leading to increased ownership of ICT-enabled education reforms. Promoting project ownership involves having each provincial education department taking part and being responsible for the projects and activities designed and implemented in their own respective province.

Budget allocation and distribution to each provincial department could be the next step that MoEYS should commit to achieving. It may not yet be possible for MoEYS to allocate resources to the local levels soon due to insufficient resources and capacity at present, still, the ministry should have a plan to do so. Obtaining financial resources and being able to efficiently manage these resources to respond to the most-pressing needs could encourage the active participation of local authorities. Local budget ownership also helps ensure effective management of resources towards the realization of quality learning through proper maintenance of school facilities, transparency in record of resources generated from donors, improvement of the status and working conditions of teachers, as well as the development of ICT in schools.

[3] The National Institute of Cambodia is Cambodia's only educational institution to train higher-level teachers and education-management officers at all levels. http://www.nie.edu.kh/

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