Empowering Public Schools through Computer Programming
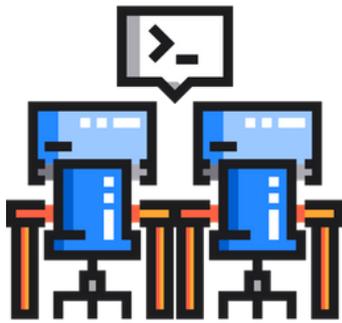
Background

Industry 4.0Technology has been growing at rocket speed over the last few years and the discussion of industry 4.0 in ASEAN has become a hot topic. Cambodia has taken industry 4.0 as the sole focus to prepare the next generation to be ready. In fact, over the last few years the term STEM has been brought into common discussion and there have been a number of projects conducted to help Cambodians prepare for their future, including STEM festivals, extracurricular tech education, equipping computer labs in schools across Cambodia and more. To date, according to the website of Ministry of Education Youth and Sports, there are 141 computer labs located in 8 different provinces[1] across Cambodia and the numbers are still rising every year. According to one Khmer Times news piece published on January 21, 2019[2] another 20 computer labs will be set up within 2019.
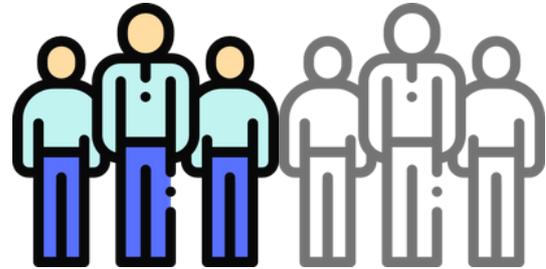
ChallengeEven though different activities have been initiated in Cambodia, there are some key challenges that need to be addressed: There is still a gap in tech knowledge between public and private high school students. An increasing number of projects have been launched in public schools to help improve knowledge and understanding of basic coding and computer programming, but the impact only reaches a small number of public school students who can get access to those courses. With only a limited number of students able to access extracurricular courses outside of the classroom, the gap in ICT knowledge is still an issue even between the students in the same public school. Even though equipping computer labs in schools are an exciting step towards modernizing the classroom, an important question to consider is whether the teachers in all the schools equipped with computer labs have the capacity to fully use and teach the tech resources to its maximum potential value.

[1] https://www.moeys.gov.kh/index.php/en/general-secondary-education.html#.XUlvWJMzYWo
[2] https://www.khmertimeskh.com/50570602/computer-lab-project-announced/

114+ Computer labs
nationwide

Teacher capacity
is still limited

Solution

To ensure the full use of existing computer labs in schools and close the knowledge gap between public and private high schools InSTEDD together with Kampuchean Action for Primary Education (KAPE) piloted the 'Computer Programming' project in New Generation Schools in Kampong Cham, Kandal and Phnom Penh. This project focused on building the capacity of ICT teachers on basic coding and computer programming. These teachers will then pass down their knowledge to the ICT students in their class. The 'Computer Programming' project not only ensures the sustainability of Computer Programming but also better prepares Cambodia for Industry 4.0.

The Computer Programming pilot was conducted in four New Generation Schools - public schools that were already equipped with computer labs. The teachers joined a series of training sessions that included an introduction to the lessons, concept and in-depth practice before passing down the knowledge to their students. The students were then grouped together in their extracurricular clubs and created their own projects under close supervision by the Technology Developers from InSTEDD. The products, as the outcome of these projects, were showcased during the Parental Night Show in all four New Generation Schools.

Technology Use

The curriculum was adopted from the international curriculum of code.org. The curriculum was extracted and altered to adapt to the current Cambodian context and the ability of the teachers. There were a wide variety of international curriculums available, however, the decision was based on the sustainability approach that InSTEDD adapt to all of their projects. Since an Open Source platform is a more sustainable approach that can be used and applied in the public school setting, the trainers chose code.org to introduce teachers to basic coding and other ICT concepts.
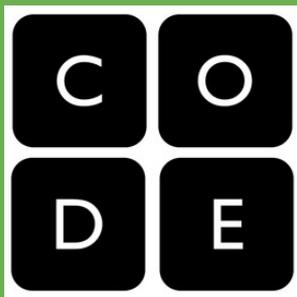

Partnership

New Generation Schools are public schools that are being implemented by KAPE as a government project that focuses on ICT advancement, with the existing computer labs in schools. Working with KAPE to build the capacity of ICT teachers in these schools was a more practical approach as teachers could immediately apply their knowledge from the Computer Programming training with the equipment already available in their computer lab. The program chose 12 teachers from the four New Generation Schools to participate in this series of Computer Programming training.

Result

In the initial pilot stage of the program, 12 teachers from New Generation Schools completed the training. Teachers who went through the training had to teach their own students in school straight after they completed each of the sessions. This would make it more practical for the teachers and they could give immediate feedback to the trainers .

The programme aimed to build the capacity of the teachers to enable them to introduce new ICT lessons in the class, so that the students and hence the next generation would be better prepared for industry 4.0. Through the program 2,435 students in all four schools went through the new coding curriculum and at least two student groups from each school worked on their individual projects as part of their extra curricular activity. The projects were later displayed during Parental Night in each of the schools.

12 Teachers have gone through Computer Programming Training
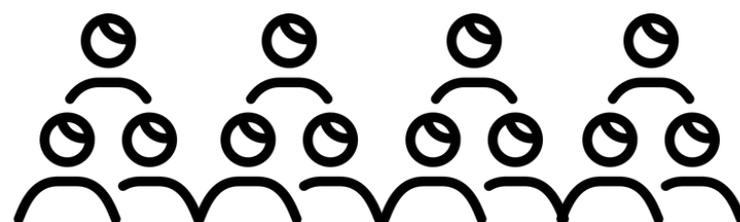
2435
Students have gone through new ICT lessons within the first year

Lesson Learned

There were two important lessons that the implementation team learned from the first pilot of the project.

1. Getting a specific time and date locked by the group of teachers for the training and 100% commitment to the training sessions was a difficult task. Since different schools have different schedules , the time that was initially set at the start of the project had to be altered over time adjusting to the teachers' schedules. As teachers are heavily loaded with a range of tasks, including preparing lesson plans, teaching, and grading student papers, the teacher's focus and priority can change from time to time. Locking consecutive days for the training session will help teachers focus on the training where they will not have to be concerned about their own teaching duties the following day.
2. The number of sessions and the content in each session needs to be adjusted to fit with the speed of knowledge absorption from the teacher. The knowledge absorption speed in this context refers to how much lessons teachers can catch up per full day session, making it sometimes a challenge for trainers to keep every teacher attending the training interested in the lesson.

Future

The next question would be how to expand the impact and in what way? Would a similar model conduct in the other parts of the country work? and how much time it will take to influence the change in ICT education in Cambodia? Having conducted the training for group of teachers will be a time consuming process if aiming to work on a bigger scope as to improve the whole ICT education in Cambodia. It will need a lot of time from the trainer and a large amount of budget both for training itself, the time that everyone has to gather together for the series of training, and equipment for more schools out there that does not have a computer lab in their school. With the struggle, the concept that struck is to train the trainers and working more on a curriculum level. The approach is seen to be more sustainable and can produce more impact that conduct training to teachers from one school to the others.

How might we multiply the impact on a national scale?