

KINGDOM OF CAMBODIA
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Report of Kampot Enrichment in Science, Technology & Innovation

KAMPOT
KESTI

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Kampot Enrichment in Science, Technology & Innovation



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List of Abbreviations

CLMV	Cambodia, Lao PDR, Myanmar, and Vietnam
DHE	Department of Higher Education
FDI	foreign direct investment
IDP	Industrial Development Policy
MAFF	Ministry of Agriculture Forestry and Fisheries
MEF	Ministry of Economy and Finance
MISTI	Ministry of Industry, Science, Technology & Innovation
MLVT	Ministry of Labour and Vocational Training
MOEYS	Ministry of Education Youth and Sports
MOH	Ministry of Health
MPTC	Ministry of Post and Telecommunications
PoE	Provincial Office of Education
QIP	Quick impact projects
SME	small and medium-sized enterprises
STEM	science technology engineering and mathematics
STI	science, technology and innovation
TVET	technical and vocational education and training

1. Project Overviews

1.1. Quick Impact Project

Quick Impact Projects (QIPs) are small-scale, low-cost projects that aim to provide fast and effective development assistance in areas such as education, water resources, health, etc. The projects are based on the needs of the local communities and are planned and implemented within a short time frame¹. QIPs focus on short-term and high-visibility projects that have a normal duration of up to one year and that bring direct and immediate benefits to the local communities. The projects under QIP cover the creation or improvement of physical infrastructure such as roads or local community centers, and social infrastructure (including capacity building) such as education, health, sanitation or community development².

India launched QIPs in CLMV (Cambodia, Lao PDR, Myanmar, and Vietnam) countries at the 6th Mekong Ganga Cooperation (MGC) Ministerial Meeting in New Delhi on September 4, 2012. India set up an India-CLMV QIPs Revolving Fund with an annual contribution of US\$1 million, which was later raised to US\$1.25 million in 2018 after the India-Cambodia Joint Statement and to US\$2 million in 2020 after the India-Vietnam Summit. Each QIP project has a maximum cost of US\$50,000/-.

Since FY 2015-16, 105 QIP projects have been approved. 78 of these projects have been completed and 27 are still in progress. Cambodia, Vietnam and Lao PDR have received 48, 46 and 11 QIP projects respectively. Out of these, Cambodia has completed 34, Vietnam has completed 37 and Lao PDR has completed 7 QIP projects.

1.2. Kampot Enrichment in Science, Technology & Innovation (KESTI)

1.2.1. Cambodia's STI Roadmap 2030

The National Policy on STI 2020-2030 aims to foster Science, Technology & Innovation (STI) as a key driver for inclusive and sustainable socioeconomic development in order to achieve the country's Vision 2050 of becoming an upper-middle-income country by 2030 and a high-income economy by 2050, as well as attaining national goals for sustainable development. The policy's objective is to enhance the STI foundation, improve the enabling ecosystem, create an STI culture for sustainable development and improve the quality of life for all people and sectors. The policy strives to accomplish these objectives by adopting and adapting technologies and fostering further innovation.

The promotion of STI is also embedded in the Rectangular Strategy Stage 4, the Royal Government of Cambodia's Vision 2050, the National Strategic Development Plan 2017–

¹ <https://www.orfonline.org/research/india-and-clmv-countries-investments-development-cooperation-and-sustainable-development-51608/>

² <https://mgc.gov.in/qip>

2023 and the Industrial Development Policy 2015–2025. The strategies of the line ministries all include specific objectives for science, technology, engineering and mathematics (STEM) and innovation. The Cambodia's STI Roadmap 2030 was designed to guide the implementation of the National Policy on STI. STI will be a pivotal driver to shift the economic development pathway from a focus on traditional growth to support for inclusive and sustainable growth. STI will enable and accelerate the structural transformations required to increase national prosperity, peace, safety and socioeconomic development and to improve quality of life. Cambodia's STI Roadmap 2030 targets five main pillars: governance, education, research and development, collaboration and networking and enabling ecosystem. These pillars are aligned with other national policies and master strategic plans, such as the National Rectangular Strategy Phase IV, the National Strategic Development Plan 2019-2025, National Policy on STI 2020-2030, Industrial Development Plan 2015-2025 and others. The second pillar of this Roadmap is Education, which focuses on building human capital in STI. Current demand for innovation is low and there is a limited scientific and entrepreneurial culture. It will be critical to promote scientific, digital and entrepreneurial literacy, and the technological readiness of the youth, starting in basic education. Teaching STI from an early age will help create a new generation of scientists and innovators. Skills in STEM will also need to be promoted in higher education. In addition, there is room for strengthening teaching and collaboration with the private sector in technical and vocational education and training (TVET) institutions. Strategic development of human resources is at the foundation of promoting STI.

Building human capital in science, technology & innovation

Cambodia aims to become an upper-middle-income country by 2030 and develop an industrial-based economy. To achieve this goal, it will need qualified human resources in STEM-related fields. These fields are essential for attracting foreign direct investment (FDI) and nurturing local industries, especially in technology-intensive sectors that can create more value-added jobs (see section 3.5.). They are also important for exporting goods and services to the global market. Therefore, improving the skills of the current and future workforce in STEM fields is crucial. However, there is a mismatch between the enrolment rates in STEM and non-STEM-related fields in higher education. Many students choose to study non-STEM fields such as business, management, economics, humanities and accounting. This leads to a shortage of graduates who can use, develop and transfer technologies to the market. Besides engineers and scientists, Cambodia also needs skilled technicians who can be trained through TVET institutions.

In the medium to long term, Cambodia will require more skilled human resources who can teach, research and innovate in STEM fields. To ensure the availability of such skills, it will be important to promote a scientific culture in the society and to strengthen the STEM education through TVET and higher education. This will require coordinated policies

among various ministries, such as Ministry of Education Youth and Sports (MOEYS), Ministry of Labour and Vocational Training (MLVT), Ministry of Agriculture Forestry and Fisheries (MAFF), Ministry of Health (MOH), Ministry of Post and Telecommunications (MPTC) and Ministry of Industry, Science, Technology & Innovation (MISTI).

The following are the specific targets to promote a scientific culture, increase STEM knowledge transmission and measure progress:

- Increase the proportion of STEM graduates to at least 50 per cent by 2030³
- Ensure that at least 40 per cent of STEM graduates are women by 2030⁴.
- Develop master and PhD curricula in collaboration with the private sector before 2024. Set up technology platforms (laboratories with equipment such as robots, sensors, imagery) at the university and TVET level for teaching purposes by 2023 and use them by 500 students. Establish two science museums (or science education centers) to promote science education to children across the country by 2030, starting with one in a city location (Phnom Penh) by 2023.
- Organize 20 innovation days and 20 innovation forums by 2030, reaching 10,000 citizens, 5,000 small and medium-sized enterprises (SMEs) and 1,000 government employees.
- Open three science libraries to the public across the country by 2030, starting with one in a city location (Phnom Penh) by 2023.

1.2.2. MISTI and Embassy of India Sign MoU on KESTI Cooperation

Cambodia and India have signed various agreements and Memorandum of Understanding (MoU) in the fields of bilateral cooperation, trade and commerce, cultural exchanges, capacity building, concessional loans for developmental projects and restoration and conservation of old temples in Cambodia. India and Cambodia are expanding their bilateral relations on the sidelines of the ASEAN Summit.

The MISTI of Cambodia and the Embassy of India have signed a MoU for a project on “Kampot Enrichment in Science, Technology & Innovation (KESTI)”. H.E. *Kitti Settha Pandita* CHAM Prasidh, Senior Minister, Minister of MISTI and H.E. Dr. Devyani Khobragade, Ambassador of India to Cambodia were the signatories at an official ceremony held at MISTI on March 29, 2022.

³ Statistics compiled by Department of Higher Education 2010–2016, MOEYS (2016) show that in 2016 out of 220,000 student graduates from higher education institutions, only 20 percent were in STEM (i.e., 44,000 students). Source: Sovansopha, Kao and Kinya Shimizu (2020). A Review on STEM Enrolment in Higher Education of Cambodia: Current Status, Issues, and Implications of Initiatives. 26. 123–134.

⁴ In 2016 STEM graduates were 14 percent female and 84 percent male

The project supports the national platform of promoting human resources in STEM, as stated in the Cambodia National Development Plan. This project will benefit not only the students and teachers at selected public high schools in Kampot province, but also the local community in terms of potential job opportunities. H.E. *Kitti Settha Pandita* CHAM Prasidh thanked the Government of India and the Embassy of India for considering the project and signing the MoU in a short time. He expressed his hope that this would help the students in STEM education and conveyed that his Ministry is also keen to submit another proposal under the QIP Scheme of the Government of India soon. As the project would be completed in one year, H.E. Dr. Devyani Khobragade affirmed the Embassy's willingness to support another project to help students in STEM education. She also suggested a formal mechanism in the form of a Joint Working Group on Science & Technology between India and Cambodia so that subject experts can brainstorm various ideas to work together in the field of science and technology and also explore opportunities for having institutional linkages between the two countries.

H.E. Ambassador emphasized the positive impact of QIP projects on enhancing the overall bilateral relationship and goodwill between the people of India and Cambodia. This year, the focus of QIPs will be on health, tourism development, education-digital education with a special focus on women literacy.

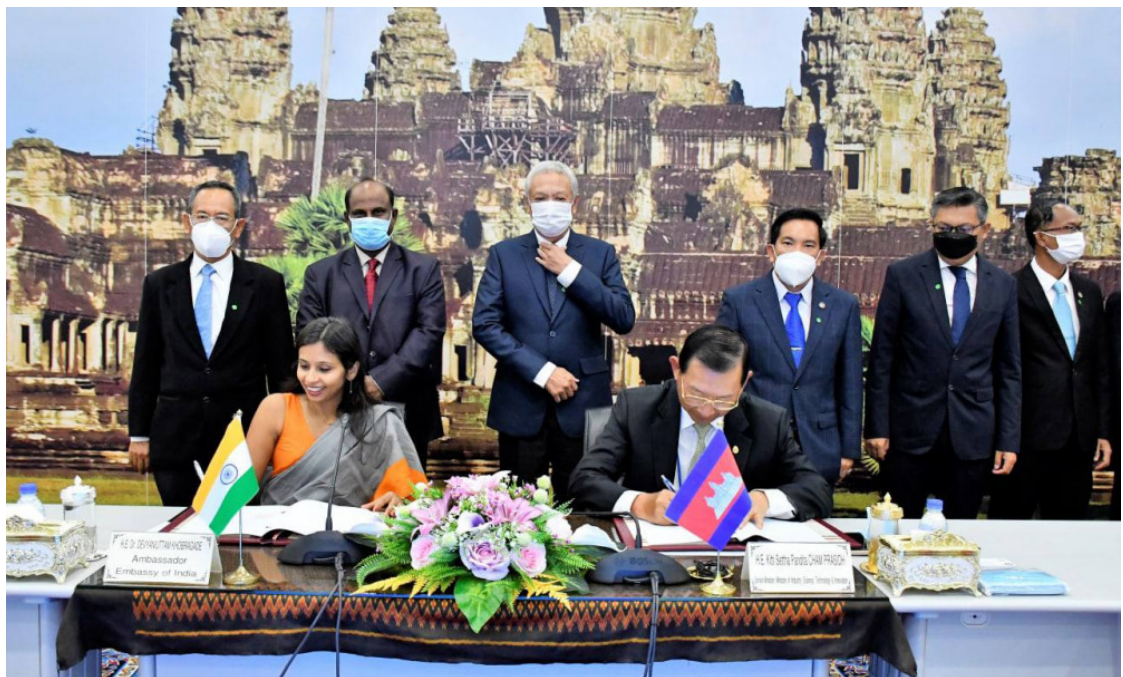


Figure 1: Memorandum of Understanding between MISTI and Embassy of India

KESTI is a part of the Government of India's Quick Impact Project (QIP) Scheme under the framework of the Mekong Ganga Cooperation. The Government of India cooperates with the Royal Government of Cambodia (RGC) on many grants assistance programs that

contribute significantly to the socio-economic development of the people of Cambodia. Under the QIP Scheme, the Government of India implements 10 projects every year in Cambodia by providing funding of up to US\$50,000 for each project. Since 2015-16, the Government of India has approved 46 projects in the fields of IT, agriculture, health, sanitation, women's empowerment, child welfare, rural development, social infrastructure (including capacity building), environment, etc. Out of 46 projects, 21 projects have been completed and the remaining 25 projects are at various stages of execution. These projects have received an overwhelming response and created a distinct and visible impact not only among the beneficiaries but also in the larger community.

1.2.3. Kick-off ceremony for KESTI

On May 23, 2022, the MISTI and the Embassy of India held a kick-off ceremony for the implementation of the QIP entitled “Kampot Enrichment in Science, Technology & Innovation” in Kampot province, Cambodia.



Figure 2: Kick of Ceremony of KESTI at Kampot Province

1.2.4. Rationale and overall purpose

The RGC has a vision of becoming an upper-middle-income country by 2030 and a high-income country by 2050. To achieve this vision, it has transformed the three main

economic pillars of garments, tourism, and construction into an industry-oriented economy⁵. This requires human resources in the fields of STEM to be more competitive in the region and the world. Therefore, STEM Education Policy was developed with an emphasis on 21st-century skills⁶. Moreover, MoEYS has adopted a strategy to increase the overall enrollment in STEM fields in both public and private higher education institutions⁷. However, the percentage of students enrolled in STEM fields remains low according to the data compiled by the Department of Higher Education (DHE) of MoEYS. In 2015, Cambodian Development Resource Institute (CDRI) found that not many students chose STEM-related fields while most of them preferred non-STEM fields⁸. It is very important to increase STEM enrollment by creating a STEM ecosystem that covers not only education and training but also employment. Otherwise, the Industrial Development Policy (IDP) 2015–2025 and the vision of 2030 or 2050 set out by the RGC could not be realized. Likewise, on a smaller scale of Kampot province, this project aims to: a) enrich STI through STI-STEM education instruction for STEM teachers, and b) promote STEM education and opportunities among students.

MISTI's overall mandate is to serve and work for the development of STI in Cambodia. STI development in the country directly links to human capital development nationwide. As one of the four pillars of Cambodia's STI roadmap 2030, education is an essential sector to strengthen and invest more. It aims to have 50 per cent of university students graduate in the STEM field, of which 40 per cent are women by 2030. In the education sector, MISTI works on governance and coordination to ensure the realization of the country roadmap and vision 2030. This project is innovative in nature as it is a new creation of MISTI from 2020. The project impact will be sustainable due to its practical design. It provides the ability for further implementation by stakeholders.

1.2.5. Summary of outcomes, outputs and activities

Outcome / Expected Result N°1: At least 10 trainings on “STEM Education Instruction/Pedagogy or How to Teach STEM Subjects” were provided to 20-25 STEM teachers from 5 public high schools in Kampot province.

Activity 1: Recruit at least 3 STEM teacher trainers⁹ who will (1) design teaching content, aligned with the STEM national curriculum of Cambodia, on “STEM Education or How to

⁵ Royal Government of Cambodia (RGC) 2015. Cambodia industrial development policy 2015-2025.

⁶ Ministry of Education, Youth and Sport (MoEYS) 2016. Policy on science, technology, engineering and mathematics (STEM) education. Phnom Penh, Cambodia.

⁷ Ministry of Education, Youth and Sport (MoEYS) 2014. Higher education vision 2020-2030.

⁸ Cambodia Development Resource Institute (CDRI) 2015. Cambodia education 2015: Employment and empowerment?

⁹ The 3 STEM Teacher's Trainers will be sourced from credible STEM and Education institutions such as (i) MISTI, (ii) university lecturers like those at Institute of Technology of Cambodia and (iii) Regional Teacher Education Training

Teach STEM in low-resource public schools” and (2) deliver the training throughout the 12-month period.

Activity 2: Request the Provincial Office of Education (PoE) to facilitate the project activities at public schools in their territory.

Activity 3: Create a school partnership/engagement plan (based upon consultation with PoE for their suggestions) and secure at least 5 partnerships as soon as the request is endorsed by the PoE.

Activity 4: Recruit passionate and committed STEM teachers from the partner schools.

Activity 5: Conduct focus group discussions to test and adjust the training curriculum/materials.

Activity 6: Kick off the official training.

Activity 7: Conduct ongoing monitoring and evaluation of the training throughout the project period.

Outcome / Expected Result No. 2: 10 Student STEM Clubs are created (two from each school), active, and functioning with a mentor and clear mandate (timeline and project).

Activity 1: Design a Student STEM Club initiative with a clear structure, roles, and activities.

Activity 2: Coordinate with the teachers who are under training to collaborate and recruit at least 20 students to create STEM clubs in their school.

Activity 3: Assign teachers to be mentors of the Student STEM Club in their school with a mandate and a role.

Activity 4: Students with their club members from each of the five schools supported by the mentors, work on a STEM project to produce a STEM product (process/protocol/prototype/activities related to STEM) for exhibiting, representing their schools, displaying in libraries or any events

Outcome / Expected Result No. 3: At least one STEM education promotion campaign outreach (STEM University, STEM Career, STEM successors) is conducted in each of all the public schools (upper secondary level) within 20 kilometers of proximity of Kampot town. Or at least 3,000 upper secondary school students are reached.

Activity 1: Create high-quality STEM education promotion materials both printed and digital.

Activity 2: Survey the exact number of schools within the 20-kilometer proximity of Kampot town and create an outreach plan accordingly.

Center (specifically those training STEM teachers). All must hold at least bachelor’s degree in STEM majors and have teaching/training plus STEM content design experiences.

- Activity 3:** Conduct actual outreach activities at the determined schools (activities can be setting up booths in the schools, class shoutouts, leaflet distributions, fun games about STEM, etc.).
- Activity 4:** Create a Facebook Page for Kampot STEM Education Promotion Campaign and boost to reach the target audiences.
- Activity 5:** Create a communication plan with key targeted messages for the Facebook Page and update the page accordingly.

1.2.6. Implementation Strategy

The project outcomes will be achieved by (1) providing direct STEM education training on instruction, in which the content/curriculum design and delivery will be conducted by experienced STEM teacher trainers to the selected STEM teachers, and (2) conducting STEM promotion outreaches in all upper secondary schools within 20 kilometers of Kampot town. Our key strategy in enriching and promoting STEM education is to reach all target audiences ranging from students, teachers, Provincial Office of Education (PoE), school administrators and even parents in this project.

The project team, including the STEM teacher trainers, will consist of 60 per cent female and 40 per cent male members, which will demonstrate/model to the key stakeholders and beneficiaries that women and girls have the potential to succeed in STEM and anything else equally to men. Secondly, in recruiting STEM teachers into the training program on STEM instruction, female teachers will be given priority if they have similar qualifications and experiences as male teachers.

A fully appointed/recruited team will carry out the project activities as stated in the project plan throughout the 12-month period. The project team consists of (1) a project manager, whose role is to oversee the overall project implementation and navigate high-level partnerships/relationships with key implementing partners and stakeholders, (2) a project coordinator, whose role is to coordinate the project activities with involved stakeholders, including the internal project team, implementing school partners, teachers and students, (3) project officers (provincial office), whose role is to implement STEM education promotion outreaches and create STEM education promotion communication materials, and (4) STEM teacher trainers, whose role is to design the STEM teaching content and deliver the training to the selected teachers.

1.2.7. Stakeholders, beneficiaries, and partners

The direct beneficiaries of this project are students and teachers at selected public high schools in Kampot. Key partners during the initial stage of the project include relevant parties such as the MoEYS and the PoE of the Department of Education Youth and Sport

in Kampot Province. During the implementation stage, we will work more closely with several stakeholders, mainly public high schools in Kampot. Trainers, school directors, and teachers will be involved in the project design and delivery during the different stages of project activities (listed in the summary of outcomes, outputs, and activities).

1.2.8. Sustainability

The sustainability of this project can be maintained by the trained teachers and the student STEM club in the project area, who can carry on the activities independently after the completion of the project through outcomes No. 1 and No. 2. During the project, all teachers are trained to shift their mindset that STEM is not only for well-equipped schools but can also be practical at low-cost. In outcome No. 1, materials and videos will be handed over and distributed to all trained teachers and also placed in each school library. All materials and videos will be documented, materialized and adopted by high-school teachers and shall be agreed upon at the beginning of the project communication. Moreover, we will encourage to have all materials uploaded into the online system of MoEYS, which is a knowledge base for future use and enables to expand nationwide. The STEM modules are designed to adapt to the further operation of trainees even after the project completion. Trainees are responsible to deliver enriched knowledge from these series of training to students. Similar outputs after the project completion are secured because trainees are those who work as local high-school teachers. In outcome No. 2, STEM club activities are designed at the lowest budget operation plus basic materials provided, which allows students belonging to the club to take ownership and lead the STEM Club work by expanding their members.

2. STEM Training Enrichment (Component 1)

In support of KESTI for promoting STI in Kampot province, the Component 1 was designed to provide ten trainings to high school teachers who had been recruited from the STEM stream at five public high schools in Kampot. Due to the limited capacity of the project, the teachers are recruited from only three subjects, namely Mathematics, Chemistry, and Physics. The training aims to equip these STEM teachers, who have been teaching Mathematics, Chemistry, and Physics, with digital pedagogy, new teaching approaches, skills, knowledge, and experience for supporting their future STEM teaching at their own schools respectively after the KESTI project ends. The Component 1 is divided into four stages: STEM Trainer Recruitment, STEM Training Module Development, STEM Teacher Training, and STEM Teacher Training Evaluation.

2.1. STEM Trainer Recruitment

The recruitment process began in June 2022 following the KESTI Project Steering Committee (PSC)'s decisions on various key activities and timelines for each component. The announcement was circulated through various communication channels between July and August 2022. Several applicants applied for the vacancy and some were shortlisted for technical interviews. Finally, three STEM trainers, whose majors are Mathematics, Chemistry, and Physics, were recruited and further approved by the PSC. All STEM trainers were required to sign the contract before the actual operation of the module development and training.

The qualifications of the trainers were chosen based on some basic principles, which include the academic field background, experience of teaching STEM subjects either at university or at high schools, passion for STEM education, degree of academic background, and basic personal skills in delivering the task. The terms of reference (TOR) for the recruitment of the STEM Education trainers are in [Annex I](#). The TOR was passed by a series of discussions by the project management unit before announcing to the public. The main objective of this recruitment is to get the qualified individuals who can develop teaching STEM modules, possess knowledge about education technology (EduTech), and have the ability to deliver effectively the developed teaching modules.

2.2. STEM Module Development

The training module development took up to a month for all the trainers between August and September 2022. There are ten modules to be designed and each module lasts for eight hours. These hours are divided by three subjects accordingly. Therefore, all trainers were asked to spend at least a month at the General Department of Science, Technology & Innovation (GD/STI) to discuss and develop the modules. The process of module development was assisted by experts from GD/STI to ensure that the developed modules are aligned with the objectives set in this KESTI project. One training includes all three subjects within a period of eight hours. The interconnection of pedagogy, teaching approaches, techniques, digital skills and experiences is promoted among the three subject trainers. The isolation between the three subjects is not expected or encouraged. Therefore, the three trainers worked inclusively and collaboratively from the beginning to the end of the project. Notably, before the training began, a pre-project study was conducted with school principals and STEM teachers selected among the three subjects – Mathematics, Chemistry, and Physics. The results of the survey (attached in [Annex II](#)) provided some key insights to the trainers as the foundation for developing the training modules.

The ten modules were developed based on the objective of this KESTI project and the principle of learning outcome development, in which the knowledge, skill, and participation were embedded in the content of the module. In principle, the maximum engagement of STEM trainers was kept in mind in the process of development. The details of the ten modules of

training are given in [Annex III](#). Moreover, the expected outcomes of the training are to ensure that the trainees are equipped with critical thinking on supervising STEM Club. It is noted that this training will help STEM Teachers (trainees) support and nurture student teams who will be involved in STEM Student Club.



Figure 3: Meeting amongst STEM trainers to discuss on the development of training material

2.3. STEM Teacher Training

Twenty-five trainees were finally recruited from the five public high schools in Kampot province. For each subject, there were five trainees selected from each school. After the administrative work and inter-ministry work was completed, the training began. The actual training at the site of Kampot province was generally conducted on the weekend, based on the availability of the trainees, trainers, and the supporting staff of GD/STI. Each training consisted of theoretical background, digital technology support in teaching and learning, group discussion, presentation after the group discussion, and comments/suggestions by participants. The training venue varied from meeting hall of provincial department of education, youth and sports to hotels. The arrangement of the table and chairs was made to create an environment that allowed participants to have free flow of ideas, discussion, and freedom. LCD projectors, sound systems, whiteboards, and basic office supplies were made available for the trainers and trainees. Moreover, there were also a few supporting staff from GD/STI at every training.

At the same time, the media system was also installed to record and take pictures for STEM promotion purposes. The activities of the training are necessary for video creation of the project from the beginning till the end of the project. These trainings were provided as shown the table below:

Activities	Contents	Dates
Pre-training survey	Need-analysis survey	30 Oct – 02 Nov, 2022
Trainings		
Modules		
1	STEM Education, Constructive Learning, Inquiry-based Teaching and Learning, Problem-based Learning, and Trainee's Presentation	15 Dec 2022
2	STEM-based Teaching Methodologies and How to prepare the assignment for STEM students	16 Dec 2022
3	Using technology for teaching and learning, using images for teaching and PTT, creating video contents by using open-source software, Preparing PTT and video recording, and Trainee practices	24 Dec 2022
4	Preparing work paper/assignment by using mind-map and Trainee practices	25 Dec 2022

5	Problem-based Methodology and problem-based assignments, Using Libre Office for assignment	14 Jan 2023
6	flip classroom, creating videos for flip classroom, group discussion and Trainee's PTT	15 Jan 2023
7	Using Kahoot, Using technology for classroom assessment and evaluation (Google)	29 Apr 2023
8	Promoting interaction and update assessment, Group Presentation, Entrepreneurship, E-STEM Entrepreneurship, Business Canvas, and Group Presentation	30 Apr 2023
9	Lesson-study Methodology and Group Discussion	06 May 2023
10	Group Presentation: Group 1, Group 2, and Group 3; Post-evaluation survey	07 May 2023
Post-survey	Training Evaluation Survey	07 May 2023



Figure 4: Survey and visit to 5 target schools



Figure 5: Activity of STEM teacher during training



Figure 6: Closing session of the training

2.4. STEM Teacher Training Evaluation

The pre and post surveys were conducted for monitoring and evaluation purposes. The project management unit developed the survey questions as seen in [Annex IV](#). The questionnaires were developed by experts from GD/STI staff, focusing mainly on the learning aspects of the training. The draft of the questionnaires was sent to the project management unit for comments before deploying the questionnaires to the trainees.

After ten modules were provided, on the afternoon of the last day, a post-training survey was conducted among all trainees. When asked to what extent the work prepared by trainers suited their needs, 70 per cent of the trainees reported that it was matching. When asked how relevant the training was to their priorities, only 55 per cent of the trainees reported that it was relevant. However, 80 per cent of them reported that the objectives of the trainings were achieved. When asked how effective the ten modules were, 70 per cent of them agreed that the ten modules were effective. The other results of the post-training survey are attached in [Annex IV](#).

3. STEM Clubs Models (Component 2)

3.1. Objective of STEM Student Club

The STEM Student Club is a great opportunity for students who are interested in STEM subjects. In this project, the creation of a STEM club consisting of 10 students is the main output among the three outputs. Two student clubs from each high school are created based on the selection of the responsible teacher and the motivation and voluntary participation of the students. Each group consists of five students with at least one female member.

The purpose of this activity is to foster teamwork and build relationships among students and between students and teachers. MISTI will serve only as the coordinator and facilitator to ensure maximum results and benefits of the STEM products. The MISTI team is responsible for presenting innovative product orientation, checking product development progress, providing recommendations, and giving final approval for the STEM product to the 10 clubs.

3.2. STEM Student club selection procedure

The STEM club activities are designed to operate at a low budget of \$250 per group, allowing students belonging to the club to take ownership and lead STEM Club work by expanding their membership. There are many benefits for students and teachers as follows:

- Helping students develop their interest in science.
- Improving their academic performance and understanding of science.
- Providing valuable skills to students such as problem-solving, critical thinking, and teamwork.
- Cultivating soft skills among students.
- Fostering a sense of belonging and can help them be part of a bigger community.
- Creating an environment of collaboration between students and teachers.

3.2.1. Criteria of selection

- Eligibility: Students who are interested in joining the STEM student club must meet the following eligibility criteria:
 - Be enrolled in grades 9-12.
 - Have a strong interest in STEM subjects.
 - Be able to commit to attending regular club meetings and events.
 - Have at least one female student in the club.
- Application: Students interested in joining the STEM student club must submit an application form as a group to their schools.
- Selection Process: The STEM student club selection committee (teachers) will review all applications and select students who they believe would be a good fit for the club. The selection committee will consider the following factors in their decision:
 - Student's academic record.

- Student's interest in STEM subjects.
- Student's extracurricular activities.
- Student's commitment to the club.

3.2.2. STEM Student Club development

The figure below shows the procedure for selecting members of the STEM Student Club and showcasing their product.

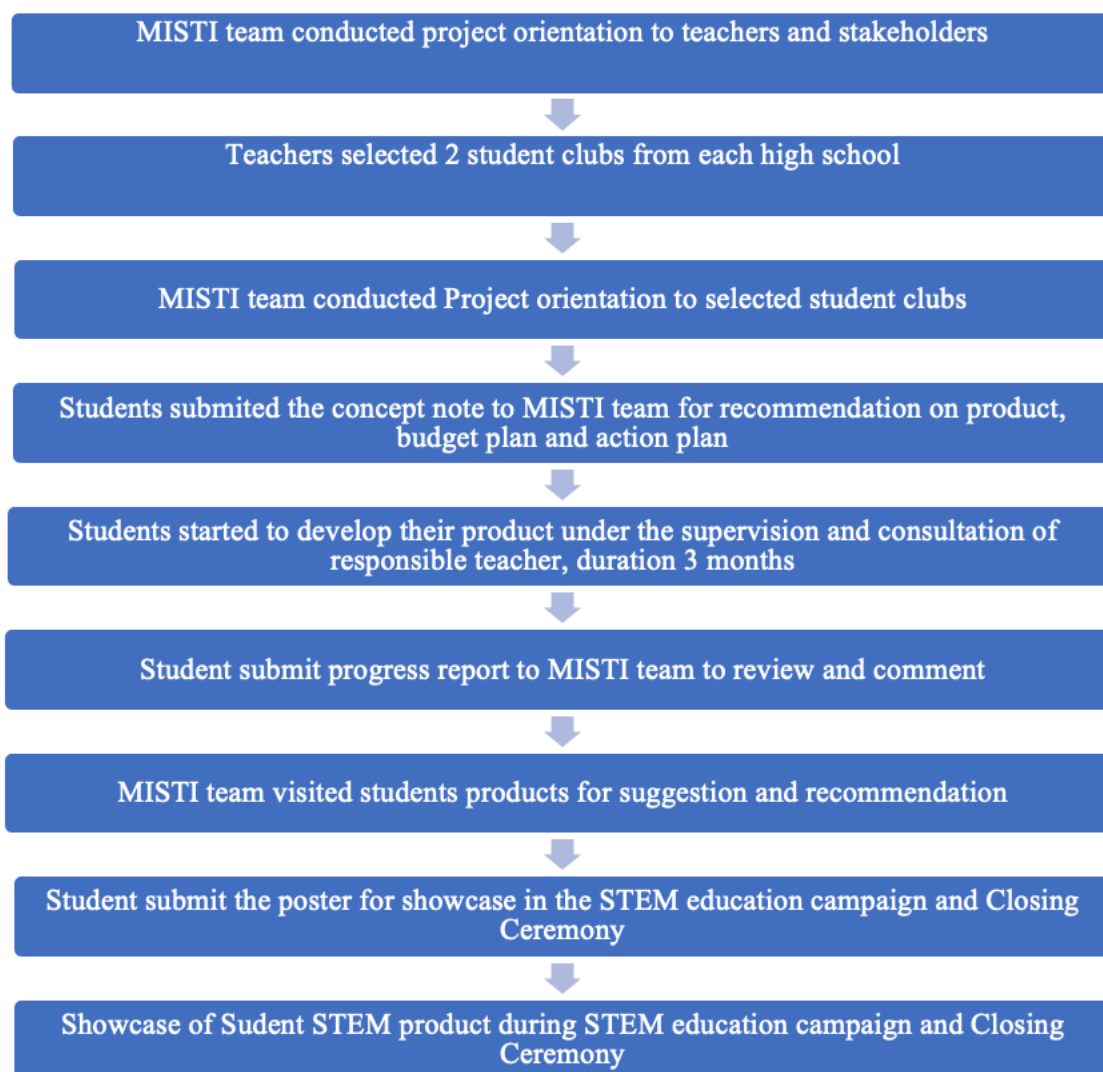


Figure 7: The main schema of the process of creation student STEM Clubs and products



Figure 8: The first meeting with the Provincial Department of ISTI, the Provincial Department of YES, and teachers from five high schools was held to introduce and orient them to the purpose of the project and their expected involvement.

In order to understand the context and availability of facilities and resources of schools, the MISTI team visited the five schools and had a meeting with the Provincial Department of Industry, Science, Technology & Innovation and Provincial Department of Youth, Education and Sport.



Figure 9: the MISTI team visited five high schools to assess the context, situation, and available facilities.

A team from MISTI conducted an orientation on the process of product development for teachers and students who are members of the STEM Student Club. The seminar was attended by approximately 70 teachers and students. The presentation aimed to provide information on the criteria for selecting products and the definition of an innovative product.

The presentation began with an overview of the product development process. The speaker then discussed the criteria for selecting products, which include the product's marketability, feasibility, and sustainability with the budget provided. The speaker also defined what an innovative product is and discussed the characteristics of innovative products.

The presentation concluded with a question-and-answer session. The teachers and students were able to ask the speaker questions about the product development process and the criteria for selecting products.

Each student in the STEM Student Club submitted a progress report to the MISTI team. The report includes the student's name, the project they are working on, the challenges they have faced, and photos of their progress. Figures below show some of their activities.



Figure 10: the MISTI team conducted project orientation to selected student club.



Figure 11: Various activities that students engaged in while creating their products.

A delegation from MISTI visited Kampot province to observe the final presentation of the STEM Student Club. The delegation was led by Dr. Ly Sokny, who has years of expertise in biotechnology and agro-industry, and who is also the director of department of STI Cooperation. They gave constructive feedback and suggestions on how to improve the students' projects.

The MISTI delegation was impressed by the students' creativity and enthusiasm for STEM education. They praised the students for their hard work and offered advice on how to refine their projects. They also motivated the students to pursue further STEM studies and careers, and to prepare to showcase their products during the STEM education Campaign.



Figure 12: the MISTI delegation observed the students' presentation and gave constructive feedback and suggestions.

The visit from the MISTI delegation was a valuable opportunity for the STEM Student Club. The students received feedback from experts in the field and learned about the latest trends in STEM education. They were also inspired to continue their STEM studies and to make a positive impact the world.

The topics of the innovative projects from each student club are listed in the table below:

No. STEM Club	Highschool name	Grade	Topic
I	Metapheap Cambodia - Japan Kampot Krong	10	Egg Hatching Incubator
II		11	Solar power device
III	Hun Sen Trosek krong	10	Production of hormone fertilizer
IV		11	alcohol production from cassava
V	Preah Reachsomphea	10	Soap production from used vegetable oil
VI		11	production of fragrance candle
VII	Preah Norodom Ranariddh	10	production of detergent from pineapple skin
VIII		11	Production of biogas
IX	Hun Sen Chhuok	10	Smart farming
X		11	production of soap from coconut oil

3.2.3. Social engagement of STEM Student Club

GDSTI-MISTI hosted the ASEAN-India Grassroots Innovation Forum 2022 in Phnom Penh, Cambodia. This was a great opportunity to involve student clubs and other students in the event. Four student clubs were selected to join the Student Innovator Competition, which was open to students from all 10 ASEAN member states and India. Additionally, 100 students and 10 teachers were invited to attend the activities and exhibition in Phnom Penh. The involvement of student clubs and other students in the ASEAN-India Grassroots Innovation Forum 2022 provided many benefits. The students had the opportunity to:

- Showcase their innovative ideas to a wider audience
- Compete with other students from across the region
- Gain valuable experience and learn from others
- Build their confidence and self-esteem
- Network with other students and teachers from the ASEAN region and India

The activities and exhibition at the forum also provided students with exposure to new ideas and technologies. They were able to learn about the latest developments in STEM and see how their own work could contribute to the advancement of the region. The involvement of student clubs and other students in the ASEAN-India Grassroots Innovation Forum 2022 was a valuable experience that will benefit them for years to come. It is an example of how MISTI is committed to promoting STEM education and innovation in the ASEAN region.



Figure 13: The four student clubs participated in the Student Innovator Competition, which was judged by representatives from six countries.



Figure 14: Students showcased their projects at the ASEAN-India Grassroot Innovation Forum, Cambodia. There were 3000 visitors.



Figure 15: A group of 100 students and teachers from Kampot Province participated in the ASEAN-India Grassroot Innovation Forum in Phnom Penh, December 2022.

4. STEM education promotion campaign (Component 3)

STEM education is essential for the 21st century workforce. Jobs in STEM fields are growing faster than jobs in other fields, and there is a shortage of qualified STEM workers. STEM education promotional campaigns can raise awareness of the importance of STEM education and the opportunities available in STEM careers, and help to ensure that the next generation of STEM workers is prepared to meet the challenges of the 21st century. STEM education also teaches students critical thinking, problem-solving, and teamwork skills that are essential for success in any field.

However, there are a number of challenges that hinder the development of STEM human resources in Cambodia, such as the lack of awareness of STEM careers and the lack of access to quality STEM education. These challenges have an impact on the driving workforce in Cambodia. Some of the evidence for these challenges are:

- **Lack of awareness of STEM careers:**
 - According to a survey report on human resource development for industrialization in the education sector in the Kingdom of Cambodia, Final Report¹⁰ showed “the majority of Cambodians are not aware of STEM careers and the opportunities they offer. Only 10% of respondents said they were aware of STEM careers, and only 5% said they would like their children to pursue a STEM career.”
 - A Review on STEM Enrollment in Higher Education of Cambodia: Current Status, Issues, and Implications of Initiatives¹¹ shows that “the lack of awareness of STEM careers among students and parents is a major barrier to STEM education in Cambodia. Many students and parents do not see STEM as a viable career option, and they may have misconceptions about the difficulty of STEM subjects.”
- **Lack of access to quality STEM education:**
 - The same survey report¹² show that the quality of STEM education in Cambodia is generally low. Only 20% of respondents said they were satisfied with the quality of STEM education in Cambodia, and only 10% said they believed that their children would be able to get a good STEM education in Cambodia.”
 - A data publication on how STEM education can help stimulate economic growth in Cambodia¹³ states that “the quality of STEM education in Cambodia is generally low. This is due to a number of factors, including the lack of qualified teachers, the lack of resources, and the lack of emphasis on STEM in the curriculum.”

¹⁰ <https://openjicareport.jica.go.jp/pdf/12092227.pdf> (page 42)

¹¹ https://www.researchgate.net/publication/339815574_A_Review_on_STEM_Enrollment_in_Higher_Education_of_Cambodia_Current_Status_Issues_and_Implications_of_Initiatives (page 3)

¹² <https://openjicareport.jica.go.jp/pdf/12092227.pdf> (page 43)

¹³ https://www.researchgate.net/publication/308725757_How_Can_STEM_Education_Help_Stimulate_Economic_Growth_in_Cambodia (page 10)

4.1. Objective of STEM Education promotion Campaign

The objective of this STEM education promotion campaign is to increase the percentage of students who choose STEM majors for university, enhance the awareness of STEM careers, and improve the readiness of high-school students by providing more information on STEM education. The practical elements of this campaign include: an onsite STEM education promotion event, an online STEM education promotion media platform, and a guidebook on science, technology, and innovation.

4.2. Onsite STEM Education promotion Campaign

The onsite STEM education promotion campaign was conducted twice. The first onsite campaign was combined with the opening ceremony of the project, which was held on May 23rd, 2022. The second onsite campaign was combined with the closing ceremony of the project, which was held on June 29th, 2023. Both campaigns took place at Kampot City Hall. Detailed agendas are attached in Annex V and Annex VI.

The project KESTI was launched with an official opening ceremony on May 23, 2022, from 8:00 am to 12:00 pm at the meeting hall of the Kampot provincial administration. The ceremony was presided over by His Excellency Dr. Chem Kieth Rethy, Minister delegate attached to the Prime Minister and Secretary of State of the MISTI, representing H.E *Kitti Settha Pandita* CHAM Prasidh, Senior Minister and Minister of Industry, Science, Technology and Innovation, and Her Excellency Dr. Devyani Uttam Khobragade, Ambassador of India to Cambodia.

Along with the launching event, the event consisted of a promotional session for a total of 700 participants, including teachers, mentors, students and youth from seven high schools and foundations located in Kampot and Kep provinces. The activities included presentations and an exhibition from tech companies and universities such as Lastmile, International University (IU), Cambodia University of Technology and Science (CAMTECH). The event also included a panel discussion with high-profile leaders from Cambodia under the theme “Meet Scientist”, and a question-and-answer session about basic STEM for high-school students.

As a result, the dissemination of the implementation of the project “Enrichment in Science, Technology and Innovation in Kampot Province” received a lot of attention from students and youth who gained a clear understanding of the importance of STEM education. Moreover, the provincial authorities in Kampot supported and cooperated well in promoting and motivating students and youth to choose STEM education.



Figure 16: Activity during Kick off Ceremony for the project KESTI

After a year of implementing the component 1 and component 2, MISTI organized a STEM Education Promotion Campaign and the Closing Ceremony of the Project Enrichment in Science, Technology and Innovation in Kampot Province on June 29th, 2023. The event was attended by Lok Chumteav Chea Ratha, representing H.E *Kitti Settha Pandita* CHAM Prasidh, Senior Minister and Minister of MISTI, H.E Ung Chhay, Deputy Governor of Kampot Provincial Board of Governors, and Mr. Richhpal Singh, representing the Ambassador of the Republic of India to the Kingdom of Cambodia. The event took place at Bokor Hall of Kampot Provincial Administration from 8:00 am to 5:00 pm. The event also included a representative of the Embassy of India in Cambodia, Undersecretary of State of MISTI, Director of Kampot Provincial Department of Education, Youth and Sports, Director of Kampot Provincial Department of Labor and Vocational Training, Director of Kampot Provincial Department of Industry, Science, Technology & Innovation, His Excellencies Lok Chumteav, Local Authorities at Commune/Sangkat level, teachers and 750 Secondary and High School students. The objectives of the closing ceremony were to:

- Disseminate the work, activities and achievements of the project.
- Encourage and cultivate students' interest in choosing STEM at the professional or higher education level.
- Showcase the university and the innovative work of students.



Figure 17: Student Participation in STEM Education Promotion Campaign



Figure 18: Closing Ceremony of the Project KESTI

The event consisted of a panel discussion from female leaders on the theme “How to make STEM fun for girls” and presentations from 8 public and private universities on their potential in STEM fields. The universities that attended the event also exhibited their STEM majors and enrollment opportunities during the event. The universities that exhibited in the event were:

- Royal University of Phnom Penh (RUPP)
- University of Health Science (UHS)
- Institute of Technology of Cambodia (ITC)
- Royal University of Fine Art (RUFA)

- American University of Phnom Penh (AUPP)
- Paragon International University (PIU)
- Pannasastra University of Cambodia (PUC)
- Cambodia University of Science and Technology (CAMTECH)
- International University (IU)

In addition, 10 student STEM clubs from component 2 also had the opportunity to showcase their innovative products to the public during this campaign.



Figure 19: A display of students' innovation products during the STEM Education Promotion Campaign.

4.3. Online STEM education promotion media

In addition to the onsite STEM education promotion campaign, the project team also disseminated the project activities via social media - Facebook page: [KESTI2022]. This page not only provided updates on the project activities but also offered additional information on the training, workshop, and scholarship opportunities for high-school students.

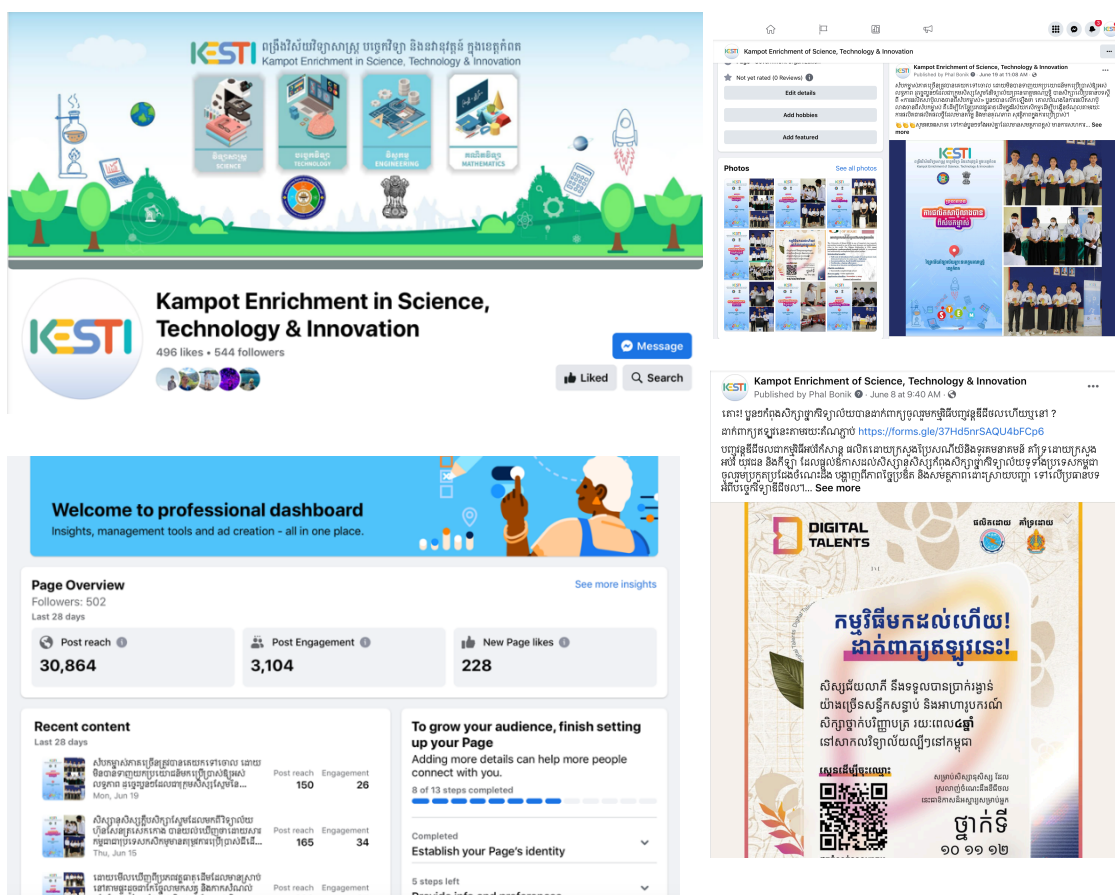


Figure 20: Facebook page of the project KESTI

4.4. Guidebook Science Technology & Innovation (Guidebook STI)

Besides STEM promotion, a “Guidebook on Science, Technology & Innovation” was prepared, printed, and distributed to more than 650 students who participated in the onsite STEM education campaign. This book features the achievements and experiences of STEM students and science and technology experts who have overcome many challenges before reaching their current success. Moreover, the book also highlights STEM subjects, university programs, and roadmaps useful for high-school students who are interested in pursuing a career in the fields of science, technology, and innovation. This booklet is available in both English and Khmer languages via the following links:

- Khmer version: <https://misti.gov.kh/public/file/202308011690880394.pdf>
- English Version: <https://misti.gov.kh/public/file/202308011690880724.pdf>



Figure 21: Content of Guidebook Science Technology & Innovation

5. Media Coverage of Project KESTI

KESTI worked with the media team to produce one project overview video: [KESTI Video](#), including shooting and editing. They also supported other objectives to gather photos and videos of training, STEM club activities, Education Promotional Campaign and success stories to use for Guidebook STI. The team designed many layouts and materials such as: virtual backdrops, I-stand, X-stand, background for KESTI, banners, posters, certificates, reports, cover and graphic design for Guidebook STI, graphic for project's Facebook page, cover of closing report. KESTI stories were disseminated in various channels including Telegram ([STI news](#)), Facebook page: [\[KESTI2022\]](#), Facebook page: [\[GDSTI\]](#) & LinkedIn: [\[GDSTI\]](#) of General Department of Science, Technology & Innovation. Activities were highlighted and published in many local media including STI news, Khmer times, which can be found in the following link:

- <https://www.khmertimeskh.com/501051555/misti-and-embassy-of-india-ink-mou-on-kesti-cooperation/>
- <https://www.misti.gov.kh/page/index?article=សម្ពោធកម្មវិធីដាក់ឱ្យអនុវត្តគម្រោង-«ពង្រឹងវិស័យវិទ្យាសាស្ត្រ-បច្ចេកវិទ្យា-និងនវានុវត្តន៍-ក្នុងខេត្តកំពត»។html>
- <https://cen.com.kh/archives/486646.html>
- <https://www.youtube.com/watch?v=IVC22AoHeHA>
- <https://freshnewsasia.com/index.php/en/localnews/243474-2022-05-24-06-13-01.html>
- <https://youtu.be/QbWTCgFBGEQ>
- <https://www.khmertimeskh.com/501330297/project-boosts-stem-education-and-innovation-in-kampot/>
- <https://www.rasmeinews.com/archives/810831>
- <https://tech-cambodia.com/articles/Kampot-Enrichment-of-Science-Technology-Innovation>
- <https://www.aupp.edu.kh/aupp-joined-the-kesti-program-organized-by-misti-and-the-embassy-of-india/>

6. Concluding remarks and recommendation

STEM Education Enrichment in Cambodia is an unstoppable endeavor for the country's economic and social development. The STEM education in priority sectors requires further synergies among stakeholders. Breaking the silo of work among stakeholders is necessary in the current context of Cambodia. This project, Kampot Enrichment in Science Technology and Innovation by MISTI, is one of the good models to implement for other provinces, in addition to the existing initiatives from MOEYS and other STI players. Based on the implementation of this project, there are more initiatives that could be taken to improve the training of trainers, STEM club, and STEM promotional campaign. Below are some recommendations to improve the STEM club activities:

- Continue to focus on developing innovative solutions to challenges facing their community. The STEM Student Club has a proven track record of developing innovative solutions to challenges facing their community. They should continue to focus on this area and strive to develop even more impactful solutions in the future.
- Partner with local businesses and organizations to gain access to resources and expertise. The STEM Student Club can partner with local businesses and organizations to gain access to resources and expertise that they may not otherwise have. This can help them to develop their projects more effectively and to make a greater impact on their community.
- Invest effectively and efficiently for synergies of all resources to support their projects. The STEM Student Club can seek funding from external sources, such as government grants, corporate sponsorships, and crowdfunding, to support their projects. This can help them to scale up their operations and to reach a wider audience.
- Promote STEM-related conferences and workshops to stay up-to-date on the latest trends in STEM education and innovation. Attending STEM-related conferences and workshops can help the STEM Student Club and Teachers to stay up-to-date on the latest trends in STEM education and innovation. This can help them to develop their projects in a more informed way and to make a greater impact on their community.
- Network with other STEM student clubs, private sectors, and development partners in the ASEAN region and international. Networking with other STEM student clubs and organizations in the ASEAN region and international can help the STEM Student Club to share ideas, learn from others, and build partnerships. This can help them to grow and to make a greater impact on the region.

In terms of enhancing STEM education in Cambodia, Cambodia needs involvement from all stakeholders to work for one common purpose as stated in Cambodia's STI Roadmap 2030 and other related policies. Development partners are to work closely with this development. Some of the ways that development partners can support STEM promotion in Cambodia are:

- Investing in finance and technical assistance for STEM education reforms. "Given the significant STEM skills gap, the project will help to strengthen Cambodia's education

system by upgrading its traditional STEM education to keep up with the growing demand for a highly qualified labor force in STI¹⁴.”

- Collaborating with local stakeholders, such as MOEYS, MISTI, universities, schools, teachers, students, and private sector partners, to promote STEM awareness, interest, and participation among young people¹⁵.
- Helping the government to improve equitable access to basic education, especially for girls and disadvantaged groups, and to respond rapidly to crises affecting the education system, such as the World Bank’s \$69.25 million financing project¹⁶.
- Organizing festivals, programs, and events that showcase STEM activities, projects, and careers, and that inspire and motivate students to pursue STEM education and professions¹⁷.
- Supporting the implementation of the New Generation Schools (NGS) model, which is a public-private partnership that aims to transform public schools into centers of excellence for STEM education, by providing teacher training, curriculum development, and quality assurance¹⁸.
- Advocating for STEM education policies and reforms, and raising awareness among policymakers, educators, parents, and the public about the importance and benefits of STEM education for Cambodia’s social and economic development¹⁹.

¹⁴ ADB to Strengthen Upper Secondary STEM Education Reforms in Cambodia. <https://www.adb.org/news/adb-strengthen-upper-secondary-stem-education-reforms-cambodia>.

¹⁵ How STEM Is Modernizing Cambodia’s Education System. <https://kiripost.com/stories/how-stem-is-modernizing-cambodia-education-system>.

¹⁶ <https://www.worldbank.org/en/news/press-release/2022/01/18/world-bank-financing-will-strengthen-learning-access-to-education-in-cambodia>

¹⁷ STEM Cambodia. <https://stemcambodia.ngo/>.

¹⁸ STEM Cambodia. <https://stemcambodia.ngo/about-us/>.

¹⁹ How STEM Is Modernizing Cambodia’s Education System. <https://kiripost.com/stories/how-stem-is-modernizing-cambodia-education-system>.

7. Messages



His Excellency Prof. Dr. Chem Kieth Rethy, a delegate attached to the prime minister and the secretary of state of MISTI, emphasized that the project “KESTI” is very important for contributing to the development of Cambodia as a medium-high income country by 2030 and a high-income country by 2050. To compete in the region and the world, human resources in science, technology, engineering, and mathematics (STEM) are highly demanded. The Ministry of Education, Youth and Sport has issued a policy to increase enrollment in STEM both in public and private institutions. Along with this, MISTI has also created a roadmap for Cambodia’s STI 2030, which clearly defines five strategic pillars: 1. Governance; 2. Education; 3. Research and Development; 4. Partnership; and 5. Ecosystems. One of the key activities among many other activities in this roadmap is to have 50% of university students graduating in STEM fields by 2030, of which 40% are women. Moreover, within the implementation of the project, there are also many young researchers who are not only scientists but also participated in sharing their experiences, knowledge, and studies related to STEM.



Dr. Devyani Uttam Khobragade, the Ambassador of India to Cambodia, also expressed her appreciation for the project and said that India would continue to cooperate with Cambodia on STI through MISTI. She also added that India has highly valued the STI sector for a long time and has become one of the leading countries in the world in STI, especially in information technology and vaccine production.

Her Excellency Chea Ratha, the Undersecretary of State of MISTI, emphasized that the project “Kampot Enrichment in Science Technology & Innovation” is very important to contribute to the development and achieve the vision of Cambodia to become a high middle-income country by 2030 and a high-income country by 2050. She encouraged stakeholders and female students together help achieving “Pillar 2. Education” in Cambodia’s STI roadmap that by 2030, 50% of university students will graduate in STEM Education, 40% of whom will be women. Her Excellency is proud of this project because it is a model that can be implemented in other provinces to participate in capacity development and promote the value of human capital in education to compete regionally and globally.





Mr. Richhpal Singh, the first secretary Embassy of the Republic of India to the Kingdom of Cambodia, attended the event and said that Cambodia and India have a lot of history in science and engineering for the next generation. Therefore, this generation must continue to preserve and make history in this field to grow. He also noted that the great achievements of this project have contributed to community development in Kampot.

His Excellency Ung Chhay, the Deputy Governor of Kampot Provincial Board of Governors, congratulated and expressed his pride in this program, saying that this project has provided a lot of positive results to teachers, students, and many stakeholders in Kampot. He agreed that “This project is very important to help the next generation in Kampot to be creative and entrepreneurial human resources in the future.”



8. Annex

Annex I: ToR of STEM Trainers

Term of Reference (ToR)

“Kampot Enrichment in Science, Technology & Innovation (KESTI)”

Assignment Title	To develop STEM Training Modules and Training
Duration of the Assignment	25 August 2022 – February 2023
Location	Phnom Penh & Kampot, Cambodia
Type of Contract	STEM Teachers
Supervision	General Department of Science, Technology & Innovation; MISTI

I. BACKGROUND

The Royal Government of Cambodia (RGC), toward achieving the vision of becoming an upper-middle income country by 2030 and a high-income country by 2050, has transformed the three main economic pillars of garments, tourism, and construction to an industry-oriented economy. It is paramount important to increase STEM enrollment by creating a STEM ecosystem for not only education and training but also employment, without which the IDP 2015–2025 and the vision of 2030 or 2050 set out by the RGC could not be realized. Likewise, in a manageable scale of Kampot province, this project aims to: a). enrich Science, Technology & Innovation (STI) through STI-STEM education instruction in STEM teachers, and to b). promote STEM education and opportunities amongst students.

Ministry of Industry Science Technology & Innovation (MISTI) overall mandate is to serve and work for the development of Science Technology & Innovation (STI) in Cambodia. STI development in the country directly links to human capital development nationwide. As one of the 5 pillars of Cambodia’s STI Roadmap 2030, Education is an essential sector to strengthen and invest more. It aims to have 50% of university graduates in the STEM field, of which 40% are women by 2030. In the education sector, MISTI works on governance and coordination to guarantee the realization of the country roadmap and vision 2030. This project is innovative in nature to the new creation of MISTI from 2020. The project impact will be sustainable due to its most practical design. It provides the ability of further implementation by stakeholders.

On 29th March, 2022, the MISTI and the Embassy of India signed the MoU for the implementation of the Quick Impact Project titled “Enrichment in Science, Technology and Innovation, Kampot Province, Cambodia” at the Embassy of India in Phnom Penh. To implement the project, the MISTI is recruiting three STEM teachers: one math teacher, one physic teacher, and one chemistry teacher.

II. OVERALL OBJECTIVE

The overall objective of the assignment is to provide at least 10 modules of training on “STEM Education Instruction/Pedagogy or how to teach STEM subjects” to 20-25 STEM teachers from 5 public high schools in Kampot province.

III. WORK ASSIGNMENTS

The recruited trainers are expected to work under the supervision of the General Department of Science, Technology and Innovation, to achieve the following assignments:

Assignment 1	To design teaching contents/modules for three subjects (Maths, Physics, and Chemistry) that are aligned with the STEM national curriculum of Cambodia for training 20-25 STEM teachers selected from 5 low-resource public high schools in Kampot province.
Assignment 2	To deliver 10 pieces of training throughout a period of 12 months to those selected STEM teachers.
Assignment 3	To conduct an assessment and evaluation (summative and formative) on the pieces of training.
Assignment 4	To take part in the Monitoring and Evaluation of the relevant part of the project.
Assignment 5	To write report on the training and submit the report

IV. REQUIREMENT

- A minimum of 5 years’ relevant experience teaching Maths, Physics, and Chemistry.
- licensed teachers well-trained with teaching methodology, pedagogy, educational psychology, and relevance.
- Experienced in providing training to STEM teachers in the areas of teaching methodology, pedagogy, and educational psychology.
- A Master’s or higher-level degree in Maths, Physics, and Chemistry.

Relevant Competencies, Knowledge, and Skills

- Excellent interpersonal skills, including the ability to work in a multi-cultural environment and to establish a harmonious and effective working relationship, at the General Department of Science, Technology and Innovation and at schools.
- Ability to work independently
- Collaboration with teams and supervising body to ensure requirements are met and projects are kept on schedule and deadlines.
- Excellent English writing and communication skills in both Khmer and English are preferred (Optional).

V. PAYMENT PROCEDURES AND TERMS

The trainers shall be paid based on the number of training hours within the range of USD 70 per hour. The payments shall be processed upon the deliverables made by trainers. The payment schedules shall be based on the completion of each deliverable as outlined in the work plan.

VII. SUBMISSION OF APPLICATION

Interested individuals should submit an outstanding CV comprising of education and professional backgrounds together with competencies, knowledge, and necessary skills.

Note: The interested applicant should submit their electronic application to info_GDSTI@misti.gov.kh by 15th August 2022, no later than 5:30 pm local time. Only shortlisted candidates will be invited for further interviews.

For more information:

Department of Science, Technology & Innovation Policy

Mobile: (+855) 77 826 577

Telegram: (+855) 77 826 577

Annex II: Pre-assessment survey

Activity and Result Report of Mission in Kampot Province

Mission in: Kampot Province

From: October 31, 2022 to November 2, 2022

Transportation: Car

1. Introduction

The Ministry of Industry, Science, Technology & Innovation (MISTI), in collaboration with the Embassy of India to the Kingdom of Cambodia, has established a project namely «Kampot Enrichment in Science, Technology & Innovation - KESTI» to promote science, technology and innovation in Kampot province by cultivating ideas to attract and inspire students to choose STEM majors in higher education. The General Department of Science, Technology & Innovation (GDSTI) organised and supported the mission in Kampot Province from October 31, 2022, to November 2, 2022, led by Mr. Ith Hunly, Chief of the Office of Policy Data of GDSTI. In collaboration with the Kampot Provincial Department of Science, Technology & Innovation, the Kampot Provincial Department of Education, Youth and Sport, school management officials, and teachers, trainers of the KESTI Project (Mathematics, Physics and Chemistry trainers) visited five target schools in the mission.

2. Objectives

1. To discuss and survey the extent of knowledge of teachers in charge of teaching STEM subjects (Mathematics, Physics, and Chemistry) at the target high schools.
2. To observe the teaching methods, techniques, and instructional materials of STEM subjects (Mathematics, Physics, and Chemistry) teaching and learning.
3. To leverage the relationship between teachers and trainers before the upcoming training course on how to establish a research project and provide opportunities for students to compete in research projects.

3. Activities

Trainers of the Kampot Enrichment in Science, Technology & Innovation Project collaborated with the Kampot Provincial Department of Science, Technology & Innovation to visit and learn about teaching methods, techniques and instructional materials at the five target high schools. The mission took place as follows:

- On the afternoon of October 31, 2022, the trainers visited Kampot Krong Cambodia-Japan Friendship High School (Network School). As a result of the study visit and conversation with four officials, including the deputy director and target subject teachers, the trainers noticed that the STEM education knowledge of the teachers was still limited. Teachers used teacher-centred and student-centred methods and conducted a few experiments a year (for physics and chemistry teachers). Some basic instructional materials were either created by the teachers or bought from

the market for teaching and experimentation. The teachers collaborated well with the GDSTI team, and they expected to gain additional knowledge in STEM education in the upcoming training, especially in teaching methods, the use of technology, and instructional material creation.

- On the morning of November 1, 2022, the trainers visited Preah Reach Samphea General Education and Technical High School (Resource School). As a result of the study visit and conversation with five officials, including the director, deputy director, and target subject teachers, the trainers found that the STEM education knowledge of the teachers and the use of experimental materials were still limited. Teachers used teacher-centred and student-centred methods and conducted experiments based on the feasible lesson contents. The teachers collaborated well with the GDSTI team, and they expected to gain additional knowledge in STEM education in the upcoming training, especially in teaching methods and the use of materials in experimentation.
- On the afternoon of November 1, 2022, the trainers visited Preah Norodom Ranariddh High School. As a result of the study visit and conversation with four officials, including the director and target subject teachers, the trainers noticed that the STEM education knowledge of the teachers and the use of experimental materials were still limited. Teachers used teacher-centred and student-centred methods, and they used to participate in the training course of the 5E Instructional Model. The teachers collaborated well with the GDSTI team, and they expected to gain additional knowledge in STEM education in the upcoming training, especially in teaching methods, the use of technology in teaching, and experimentation.
- On the morning of November 2, 2022, the trainers visited Hun Sen Trasek Koang High School. As a result of the study visit and conversation with four officials, including the director and target subject teachers, the trainers found that the teachers used teacher-centred and student-centred methods and had experimental materials. The teachers collaborated well with the GDSTI team, and they expected to gain additional knowledge in STEM education in the upcoming training, especially in teaching methods and the use of materials in experimentation.
- On the afternoon of November 2, 2022, the trainers visited Hun Sen Chhouk High School (Resource School). As a result of the study visit and conversation with six officials, including the deputy director, and target subject teachers, the trainers noticed that teachers used teacher-centred and student-centred methods and conducted experiments according to the lessons. The teachers collaborated well with the GDSTI team, and they expected to gain additional knowledge in STEM education in the upcoming training, especially in teaching methods and the use of materials in experimentation.

4. Results

The summary results of the mission are as follows:

- The extent of STEM education knowledge among teachers is still limited.
- Teachers use teacher-centred and student-centred methods.
- The use of experimental materials and technology in teaching is still limited
- School management team and teachers have a good collaboration with the GDSTI team.

5. Conclusion and Evaluation

Teachers at the five target schools have limited understanding of STEM education. Teachers mostly use traditional teaching methods that require additional training in STEM education, especially STEM teaching methods, the use of technology, and how to use experimental materials to make it easier for students to understand the content of the lesson and to be more interested in the subjects of natural science.

Phnom Penh, November 10, 2022
Signatures of Trainers

Physics



Chum Pharino

Chemistry



Chhom Muyny

Mathematics



Mounh Noy

Phnom Penh, November 10, 2022
Coordinator

Ith Hunly

Annex III: 10 Module of STEM Training of Trainers

The material and document on 10 Module of STEM Training of Trainers is attached in the link below: <https://drive.misti.gov.kh/index.php/s/HoBYjLiB4jGy43R>

Annex IV: Result of evaluation on 10 training

The detailed result of evaluation on 10 Module of STEM training of Trainers is attached in the following link: <https://drive.misti.gov.kh/index.php/s/AtkZAqYmC4izGbb>

Annex V: Agenda Kick-off Ceremony of the Project



**Ministry of Industry, Science,
Technology & Innovation**



Embassy of India

Kick-off Ceremony of the Project
"Kampot Enrichment of Science, Technology & Innovation"
Kampot Provincial Hall, Monday, 23rd May, 2022

AGENDA

Time	Activities	Moderator
08:00 ~ 08:20	Registration	
08:20 ~ 08:25	Arrival of Honorable guest and all	Mr. Suy Vathna Ms. Chin Nita
08:25 ~ 08:30	Opening & National Anthem	
08:30 ~ 08:35	Welcome and opening remarks H.E. Ung Chhay Deputy Provincial Governor of Kampot Province	Mr. Suy Vathna Ms. Chin Nita
08:35 ~ 08:40	Welcome and opening remarks LCT. Dr. Devyani Uttam Khobragade Ambassador of India to Cambodia	Mr. Suy Vathna Ms. Chin Nita
08:40 ~ 08:50	Welcome and opening remarks H.E. Prof. Dr. CHHEM Kieth Rethy Minister Delegate Attached to the Prime Minister, Secretary of State of MISTI	Mr. Suy Vathna Ms. Chin Nita
08:50 ~ 09:10	Photo session	Mr. Oeurm Savann
09:10 ~ 09:25	« Kampot Enrichment in STI » H. E. Dr. Hul Seingheng	Mr. Suy Vathna

	Director General GD/STI	Ms. Chin Nita
09:25 ~ 09:50	MEET THE SCIENTISTS H.E. Prof. Dr. Chhem K. Rethy, Nuclear Scientist H.E. Richard Yim, Robotician H.E. Chhem William Siriwat, AI Scientist Dr. Ly Sokny, Food Scientist Dr. Khieng Sothy, Organizational Science Ms. Heang Omuoy, Computer Science	Mr. Suy Vathna Ms. Chin Nita
09:50 ~ 11:00	Exhibition & Science Experiment Department of STI Cooperation Universities and Private Sectors	Mrs. Chea Chansoma Ms. Be Linda
11:00 ~ 11:50	Questions & Answers Students' comment & Evaluation	Dr. Ly Sokny Ms. Taing Chanreaksmey
11:50 ~ 12:00	Closing remarks	Mr. Suy Vathna Ms. Chin Nita

Note: The agenda is tentative and subject to change if necessary.

Location:



Annex VI: Agenda STEM Enrichment Campaign in Kampot and Closing Ceremony



**Ministry of Industry, Science,
Technology & Innovation**



Embassy of India

STEM Enrichment Campaign in Kampot and Closing Ceremony
Kampot Provincial Hall, Thursday, 29th June, 2023

AGENDA

Size of Event: approximately 700-1000 participants

Time	Activities	Speaker/In charge Person
08:30-09:00	Registration of students	
09:00-10:00	University's presentation	Each university representative
10:00-10:30	<p>Panel Discussion: How to Make STEM fun for Girls</p> <p>Moderator: Dr. Siev Sokly, Deputy Director General, GDSTI, MISTI</p> <p>Panelists: H.E. Chea Ratha, Under Secretary of State of MISTI Dr.Kry Nallis, Deputy Director of GDSTI Mrs. Seng Molika, Director of Department DTM Dr. Ly Sokny, Director of Department of STI Cooperation</p>	Moderators
10:30-11:30	University's booth visit	Students
11:30-13:00	Lunch break	
13:30-14:00	Arrival of Delegates	

14:00-14:15	Summary of Project Implementation Dr. Ly Sokny Director of Department STI Cooperation	MC
14:15-14:30	Video show about project	MC
14:30-14:45	Project Major Result H. E. Dr. Hul Seingheng Director General General Department of Science, Technology & Innovation (GDSTI)	
14:45-14:55	Closing remark H.E. Ung Chhay Deputy Governor of Kampot Provincial Board of Governors	MC
14:55-15:05	Closing Remark Mr. Richhpal Singh Charge d'affaires to ambassador of the Republic of India to Cambodia	MC
15:05-15:15	Closing Remark LCT. Chea Ratha Undersecretary of State of MISTI	
15:15-15:30	Certification for KESTI teachers and students, Photo session	All
15:30-16:30	Booth visit	

Note: The agenda is tentative and subject to change if necessary.

Location:

