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A PROPOSED TEACHER RETOOLING PROGRAM IN ROBOTICS FOR THE BASIC EDUCATION TEACHERS IN JAPAN

(Review article)

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Abstract

Japan's Robotics curriculum is embedded in science, technology, engineering, and math (STEM) based programs designed to create a better living. This retooling program is designed as a 3-week program for Basic Education Teachers of the Department of Education in the Philippines. The program aims to be grounded on observing and making prototype, accurate, useful and reliable programs. This retooling program isplanned to be conducted in Japan. As such, Japan is known as one of the world's leading robotics industries, has a long history of robotics research, and has a robust research network in universities and industries. The retooling program is expected to encourage, inspire, and enhance not only the robotics curriculum in the school level, division level, moreover, this might help our country have foresight on future programs that enhance the Philippine's current curriculum.

Keywords: Philippine Education; DepEd Philippines; Philippine Robotic Education; Robotics Curriculum

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1. Introduction

Robot innovation has existed since the mid-19th century, with mechanical manipulation, sensor-based controls, and now autonomous robots. Intelligent robots are one of the technological standards of the Industrial Revolution (4.0); these are called AI or artificial intelligence robots, which are emerging now in this generation (Palconit et al., 2020). Surviving in this fast-facing world is important to the emerging need for globalization and technological advancement. When referring to technological advancement, western countries are good innovators. Moreover, in Asia, Japan is well-known for advancing Science, Technology and Innovation in their country.

Philippines' Department of Education (DepEd)

DepEd's Mission and Vision is to protect and promote the rights of every Filipino to quality, equitable - cultured –based and complete basic education and build competencies, values that enable them to reach their full potential and contribute to building the nation. With regards to the Mission and Vision, DepEd started integrating Robotics to the curriculum in 2016; this was included in the National Science and Technology Fair (NSTF) (DepEd Memo No. 176 s, 2016) in that activity robotics is part of innovation and creativity. Robotics will enhance students' analysis, problem-solving, critical thinking, discipline, and creativity (designs), and the program will sum up the soft-skills needed to be acquired. Moreover, the Department of Education is a centralized government agency that is divided into regional and division offices, among the offices on Region IV-A, this program selected DepEd Division of Santa Rosa City to be recipient and start the program of retooling in Robotics.

DepEd Division of Santa Rosa City

The Division of Santa Rosa City is one of the youngest divisions in CALABARZON, this is a 10-year-old division with 18 Elementary Schools and 10 Junior High Schools, 6 Senior High Schools all of these schools are supplied with Robotics Kit by the LGU. Moreover, the LGU supports the division on the part of every competition. Recently, the division has won 1st Place in the Robotics Competition of Romania last January 2023. Robotics program for the whole division is a partnership of LGU and Division of Santa Rosa

on the ANGAT program, the program is focused on enhancing technology on the division. Therefore, this division has chosen to be the recipient because of the division's goal and the strong partnership and support of the LGU. Moreover, in Region IV-A Santa Rosa City is well known as Lion of the South in which also the city has one of the largest technopark in the south, and lastly, the city is also known as one of the highly urbanized cities in Region IV-A. Nevertheless, choosing a program school recipient is even crucial, the division has 18 Elementary Schools and Dita Elementary School is one of them.

Dita Elementary School

Dita Elementary School is located at Purok 2, Barangay Dita Santa Rosa City, Laguna beside the Barangay hall and in front of Old national Highway. The school was established in 1965 and is now currently considered as one of the mega schools in Sta Rosa, the school is known as the first SPED center of Laguna and one of the most active schools on implementing innovations, technology in the division of Santa Rosa City. Dita is one the most competitive schools in the Division, the school always holds awards when competing academically, sports or even on technology, in December 2019 Dita Elementary School has won 1st place on National Competition of Robotics in overall categories, last year it also won 4th place on the division competition on two different categories, recently, this month the school won 4th place on environmentally friendly category. Moreover, the school has not stopped competing in robotics competition and has also integrated into some activities of the school. This is because the school has one goal on implementing innovations and enhance education, therefore, Dita Elementary School has created an acronym of DITA ES with the meaning of "Dream and Inspire through Technology Adaptability for Excellent Sustainability of education", objective is to sustain our excellent educational services through the strengthened ICT integration which we believe will enhance the learning and skills of students. Therefore, this retooling program will strengthen the objective of the school for Technology, Excellent Sustainability of education. As an observer to DepEd's Mission and Vision, Sta Rosa has done consecutive activities related to ICT integrations, Robotics, and others. Moreover, the ICT integration and Retooling Program will focus on Robotics and strengthen the skills of teachers through various activities that will be applied during the retooling program.

Furthermore, this program will associate the function of ICT to other subjects and as well as the advancement of technology integration in DepEd. Thus, DepEd and the Philippine government started its advancement to ICT integration in PDP 2011 to 2016 under the administration of Former President Benigno Aquino Jr. the plan focuses on the development of ICT infrastructure that facilitates the digitalization of the country. Technology innovation and digitalization has a significant role in creating soft-skills, research and development that will address the needs of the market, industries, and government. Moreover, government has laws and policies that may facilitate the adoption of robotics:

- RA 10844 - Department of Information and Communications Technology Act of 2015 (2016)
- RA 11293- Philippine Innovation Act (2019)
- RA 10055 - Philippine Technology Transfer Act of 2009

The above laws that are generally related to technology need to be revised and strengthened. Lastly, this program will help to view the significance of technology and innovation specifically on DepEd curriculum under Robotics Education and assessment of utilizing technology in other areas of the government.

Japan's revised Information and Communication Technology (ICT) curriculum

The Japanese government has implemented curriculum reforms to incorporate programming and coding under revised information and communication technology (ICT) courses starting from 2020. The reform is implemented by the Ministry of Education, Culture, Sports, science, and Technology (MEXT) and the Ministry of Internal Affairs and Communication (MIC). The two agencies collaborated to implement and oversee the necessary changes and initiatives in the education system. Programming education became compulsory in elementary education starting from 2020, and the new national curriculum with revised ICT and programming for junior high school in 2021 and senior high school in 2022 (MEXT official Website).

Shibaura Institute of Technology (SIT)

The Shibaura Institute of Technology (SIT) is a private university located in Tokyo, Japan. SIT was established in 1927 as the Tokyo Higher School of Industry and Commerce. It became a university and was renamed as Shibaura Institute of Technology in 1949. It has two campuses, the Toyosu Campus, Tokyo and the Omiya Campus, Saitama. The Toyosu Campus is the main campus, offering a wide range of engineering, sciences, humanities, and management programs. SIT is renowned for its emphasis on engineering and technology education, especially in robotics engineering. SIT Robotics Department offers undergraduate and graduate programs with well-equipped robotics laboratories. The university also supports and sponsors student teams in robotics competitions, such as RoboCup and the World Robot Summit. SIT ranked 28th in Time Higher Education, Japan University Ranking 2022 (SIT, Official Website).

In 2017, SIT Toyosu Campus integrated the “Shibaura Institute of Technology Junior and Senior High School" in its education system. This integration provides a seamless education pathway from junior high school to university. Most students from this integrated junior and senior high school are interested in the field of science, technology and engineering. According to its official school website, seventy-five (75) percent of the graduates choose to pursue further education in the field of science and technology. Students from STEM programs have two-hour hands-on classes called “Joy of Engineering" and "Fundamentals of Robot Science." These classes are taught by a team of basic education teachers and college professors working together to deliver robotic education. In addition to programs to develop technical skills, the school also incorporates language and culture programs into its curriculum. These programs such as cultural exchange and homestay programs, aim to develop the students' language proficiency, communication skills, and soft skills.

By including these programs in the curriculum, the school aims to develop well-rounded individuals who possess both technical expertise and the interpersonal skills and soft skills necessary to succeed in today’s global economy.

SIT is actively engaged in internationalization efforts as part of its commitment to the “Centennial SIT Action, 2027”. The institution has been proactively pursuing initiatives to

foster global engagement and has successfully formed 212 partnerships with universities and academic institutions across the globe. Among SIT's partner universities from the Philippines are Cebu Technology University and the University of San Carlos. As of 2022, SIT has attained a rank of sixth place among Japanese private universities in terms of internationalization. With a clear objective, SIT aims to be in the top one position in this aspect by the year of 2027.

Establishing an international partnership between Shibaura Institute of Technology and Dita Elementary School in Sta. Rosa in Laguna: "Teacher Retooling Program in Japan," holds great significance for SIT. This partnership marks the first collaboration between SIT and the Philippine basic education sector and supports the centennial SIT Action of promoting global internationalization and engagement goals. This program will also enhance cross-cultural understanding and provide opportunities for students and faculty to enhance their English communication skills by engaging with the participants from the Dita Elementary School.

2. Method

The process of education is a never-ending process. It continues even after obtaining a degree and beginning a career. Career-minded people can continually advance their abilities and excel at employment by pursuing continuing education. School administrators in the K–12 education administration field must support teachers in pursuing professional development to ensure the best learning outcomes for their students and help them be more successful and satisfied in various other aspects of their work. Teachers can adapt their lecture styles and curricula to meet the requirements of their students better when they learn new teaching tactics through professional development and return to the classroom. Due to the delayed implementation of these improvements, they are difficult to evaluate. By introducing educators to new delivery techniques, evaluation styles, and record-keeping techniques, professional development for instructors increases their effectiveness in their presentations and course evaluations. Training sessions are required to help teachers acquire or develop new teaching tactics to pique students' attention and promote learning. The pupils' use of the concepts they learn in class is another factor that needs to be considered. The teachers must also develop

strategies for practical learning, which benefits students in the real world more than theoretical learning, which only helps pupils in terms of grades.

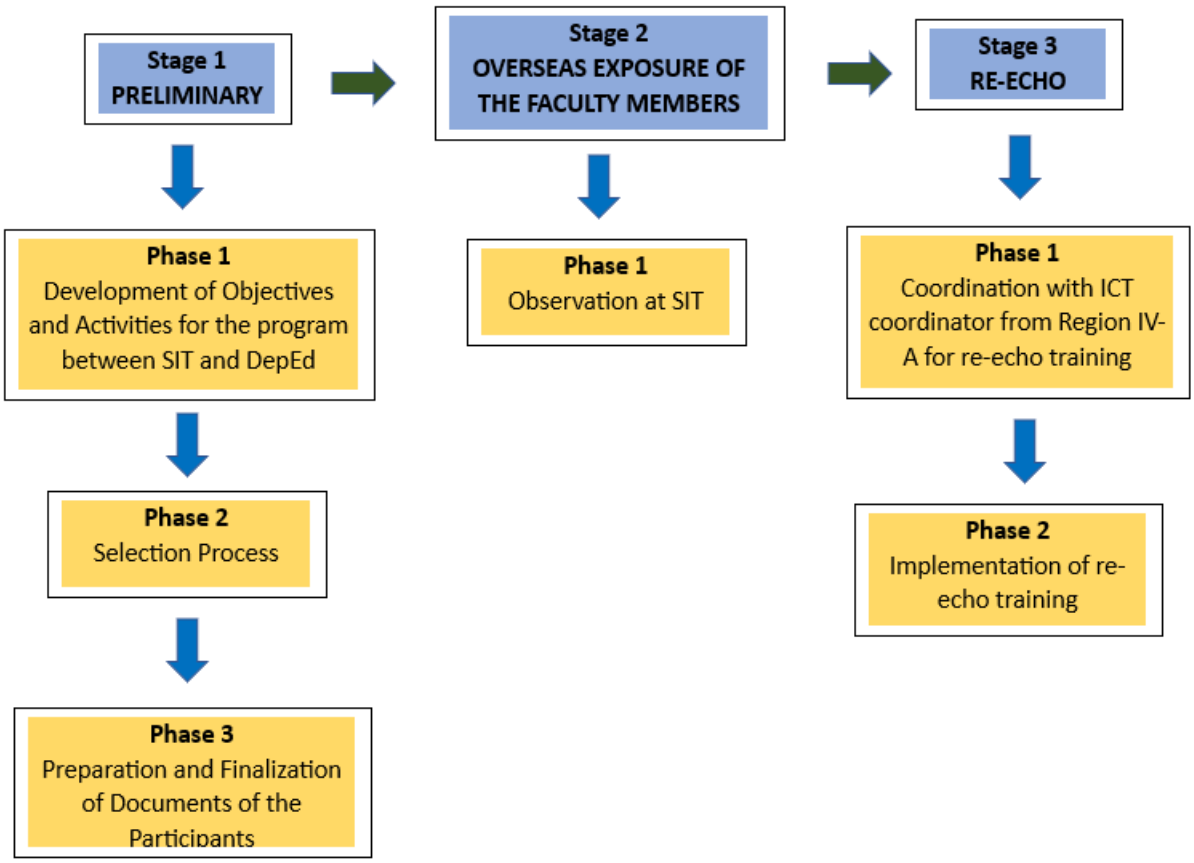


Figure 1. Framework for the teacher retooling program in Japan

The program goal is divided into three parts, namely, (1) preliminary, (2) overseas exposure of the faculty members, and (3) re-echo. The preliminary stage of the program includes the development of objectives and activities for the program between SIT and Dita Elementary School, the selection process, and the preparation of documents for international training in Japan. On the other, the second stage is the program proper, which involves the overseas exposure of the basic education faculty, specifically, the training, observation, and trial run of the mechanical output of Dita Elementary School faculty members at Shibaura

Institute of Technology (SIT) University, Junior and Senior High School, Toyosu, Tokyo, Japan. The exposure program will be at Junior and Senior High School classes at SIT University. Lastly, the re-echo happens when the faculty members return to the Philippines and share their knowledge and experiences with fellow faculty back in the Philippines.

This paper proposed a program for the basic education teachers from Dita Elementary School in Sta. Rosa in Laguna, who teaches robotics. They will be sent to Shibaura Institute of Technology (SIT), Toyosu, Tokyo Japan, for teachers' training. The goal of this program is to (1) encourage the visiting faculty members to observe classes and teaching methods at the host institution, which they can apply when they return to the Philippines, (2) foster collaboration and knowledge exchange between educational institutions in the field of robotics, and (3) enhance students' understanding and skills in robotics and automation through exposure to different educational approaches.

Another consideration for this proposal is that the proponents believe that Robotics involves designing, building, and programming robots to perform specific tasks. It requires students to think critically and solve problems hands-on and interactively. By engaging in robotics activities, students learn to break down complex problems into smaller components, analyze them, and find creative solutions. Robotics encourages students to think outside the box and develop innovative solutions. Designing and building robots involves creativity in engineering, aesthetics, and functionality. Students learn to experiment, iterate, and improve their designs, fostering an entrepreneurial mindset and nurturing their creative abilities.

Robotics has the potential to address various societal challenges, including automation in manufacturing, healthcare assistance, environmental monitoring, and disaster response. Retooling faculty members in robotics equips them with the knowledge and skills to develop innovative solutions that can improve the quality of life, sustainability, and safety in society. Retooling faculty members in robotics ensures that universities remain at the forefront of technological advancements, align their curriculum with industry demands, foster innovation through research, and provide students with relevant education and opportunities. It strengthens the university's reputation, produces skilled graduates, and contributes to societal and economic development.

Stage 1. Preliminary

Development of Objectives and Activities for the Program between SIT and Dita Elementary School

This stage will ensure that the school, partner schools, and faculty members have a say in developing the proposed program's objectives. The proponents believe that participation among the faculty members plays an important role in ensuring the program's success.

Teachers are on the front lines of education. They have first-hand knowledge of their student's needs, abilities, and challenges. Their expertise and experience in the classroom provide valuable insights into what works and what doesn't. Involving teachers in decision-making ensures that the decisions made at the administrative and policy levels are grounded in practicality and a deep understanding of the educational context. Teachers bring diverse perspectives, expertise, and insights to the table. Their involvement in decision-making allows for a more comprehensive and well-rounded examination of issues. By tapping into the collective wisdom of teachers, decisions can be made with a better understanding of their potential impact on teaching and learning.

This stage also includes the funding for the program. The initial plan is to collaborate with the nearby schools and ask for a financial pledge for the program since they will also benefit from it. Also, financial help from the mayor and another politician will be considered because if the program becomes successful, Dita Elementary School will not only gatekeep the victory and pride but also shares it with the whole city of Santa Rosa.

Adequate funding allows schools to provide quality education to students. It ensures that schools have sufficient resources to offer a variety of extracurricular activities. High-quality education is essential for students to develop their skills, knowledge, and abilities, preparing them for future success. Funding allows schools to invest in innovative teaching methods and technologies, such as interactive whiteboards, computer labs, and online learning platforms. These tools enhance the learning experience and enable educators to employ creative instructional approaches that cater to diverse learning styles. By staying current with

technological advancements, schools can better prepare students for the demands of the modern workforce, especially in robotics.

Selection Process

As part of the teacher retooling program, the faculty selection phase of the program is a crucial part of the process. All the robotics faculty should be sent out to Japan. However, the budget plays a big role in the program's success. Since the school will shoulder all the finances for the retooling program, one of the considerations for the selection is the subject handled by the faculty members. Usually, robotics faculty are Science teachers, Math teachers, ICT teachers, and Computer Science teachers. Aside from the handled subject, the primary address and familiarity of the faculty members within the vicinity of the school also plays a big role in the selection process.

It was mentioned that the primary address and familiarity of the faculty members near the school also play a big role in the selection process. The reason for this is that since the Philippines has limited access to materials and equipment for robotics, the available materials used for the retooling program in Japan might not be available in the Philippines. As part of the material and equipment canvassing, the selected faculty members will have a meeting and immersion to assess the vicinity of the school for the readily available metals and materials to be sent out in Japan as well.

Preparation and Finalization of Documents of the Participants

For this retooling program, confirming the flight ticket information, lodging bookings, and automobile rental arrangements is crucial. The school administration will also have copies of their travel plans and bookings to make the trip more smoothly. It's an easy way for faculty members to maintain track of their travel arrangements and can help resolve any concerns arising upon check-in at the airport or hotel. Travel documents are typically provided in booklet form so that foreign governments can insert visas and entry and departure stamps into them and guarantee other governments that the holder may return to the issuing country. They can either have paper copies of these or utilize one of the many online tools or apps for travel planning. It's also important to consider transportation purchases like taxi rides.

Stage 2. Overseas Exposure of Faculty Members

International exposure can provide faculty members access to unique research opportunities, facilities, and funding sources that may not be available in their home country. It allows them to collaborate with international experts in their field, gain access to different datasets, and conduct comparative studies that can contribute to advancements in their research area. Robotics is a rapidly growing field with increasing demand in various industries, such as manufacturing, healthcare, agriculture, and transportation. By retooling faculty members in robotics, universities can produce graduates with the skills and knowledge needed to meet industry demands and fill the workforce gap in this emerging field. Retooling faculty members in robotics enables them to conduct cutting-edge research and contribute to technological advancements in the field. By staying informed about the latest research, methodologies, and applications, faculty members can engage in impactful research projects, publish influential papers, and collaborate with industry partners. This fosters innovation, expands knowledge boundaries, and helps universities establish themselves as leaders in robotics research.

Before the retooling program in Japan, Dita Elementary School partnered with Shibaura Institute of Technology (SIT) to schedule the assigned Japanese to mentor the Dita Elementary School faculty members.

The plan ensures that after every week of class observation and training, the chosen faculty members will present their lesson plan contextualized for the elementary students. This will be a great avenue for the faculty and mentors from SIT to share and collaborate with ideas. Also, this will enable the mentors from SIT to learn the Filipino view on lesson planning and contextualization, which can also be helpful for their careers.

Collaborating with faculty from different countries and cultures brings diverse perspectives and experiences to academic research and teaching. It broadens the understanding of various issues, challenges, and solutions in other parts of the world. International collaboration allows for a more comprehensive and nuanced approach to problem-solving, as it incorporates different viewpoints and expertise. International faculty collaboration offers opportunities for networking and professional development. Collaborative projects often

involve attending conferences, workshops, and seminars in other countries, allowing faculty members to establish connections with colleagues worldwide. These connections can lead to future collaborations, joint publications, and shared resources. Additionally, working with international partners enhances individual professional growth, broadens academic networks, and opens doors to new career opportunities.

Stage 3. Re-echo

Since the program is expected to have a limited budget, it is expected that not all faculty members will be sent out to Japan for the retooling program. When returning to the Philippines, the selected faculty members will re-echo the training to their co-faculty.

Re-echo training allows participants to identify and address skill gaps or areas needing further development. It provides an opportunity to clarify misunderstandings, seek clarification on complex topics, and receive additional guidance from trainers or subject matter experts. This iterative learning process helps participants improve their proficiency and competence in their respective fields. Re-echo training helps reinforce the knowledge and skills acquired during initial training sessions. It is a refresher, reminding trainees of important concepts, techniques, and procedures. By revisiting and reinforcing the material, participants are likelier to retain and apply the knowledge effectively in their work.

The plan is to meet with the ICT leaders and coordinators of schools within the vicinity when the faculty members return to the Philippines. Afterward, the ICT leaders and coordinators of respective schools will re-echo the learnings to their faculty.

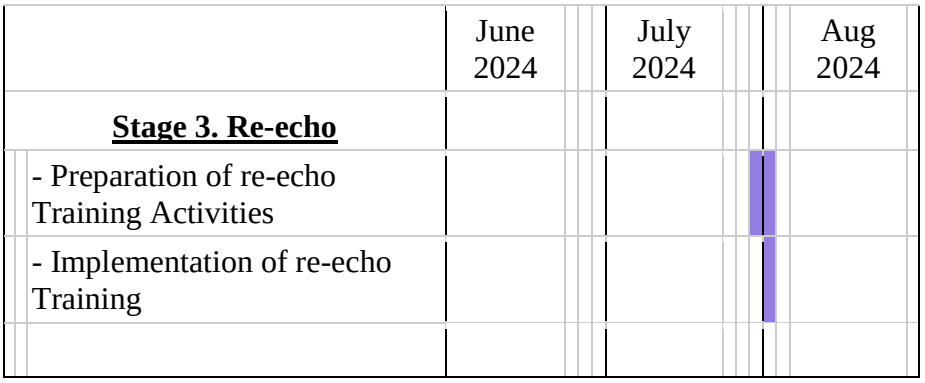
3. Results

The international partnership program comprises three (3) stages within a nine-week timeframe. The preliminary stage with a span of five weeks is dedicated for the planning and organizing the overseas exposure of four (4) teachers from Dita Elementary School to SIT Junior and Senior High School in Japan. On the second stage or the actual overseas exposure of faculty members with a span of three weeks, the selected elementary school teachers will actively engage in the “Fundamentals of Robot Science” classes at junior senior high school. This stage aims to facilitate the learning, exploration, and exchange of knowledge between

Dita Elementary School and SIT Junior and Senior High School in the field of robotic education. The program concludes with a two-week re-echo stage.

Table 1: Work Plan of the Proposed International Partnership

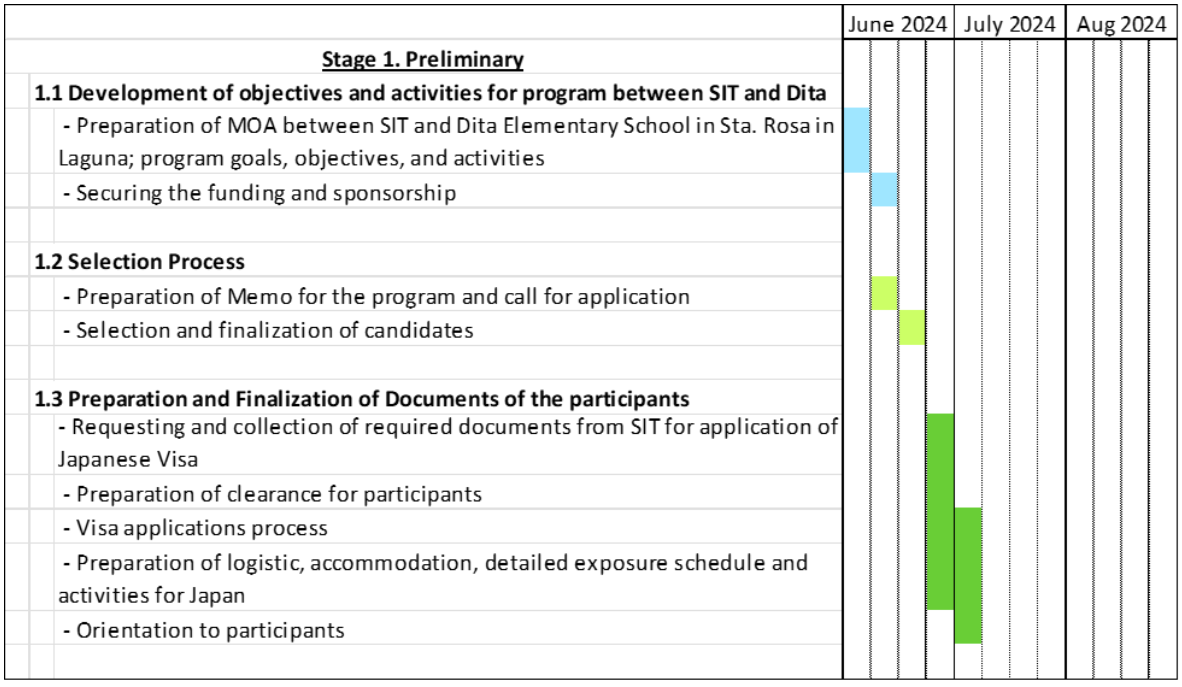
	June 2024	July 2024	Aug 2024
Stage 1. Preliminary			
1.1 Development of objectives and activities for the program between SIT and Dita			
- Preparation of MOA between SIT and Dita Elementary School in Sta. Rosa in Laguna; program goals, objectives, and activities			
- Securing the funding and sponsorship			
1.2 Selection Process			
- Preparation of Memo for the program and call for application			
- Selection and finalization of candidates			
1.3 Preparation and Finalization of Documents of the participants			
- Requesting and collection of required documents from SIT for application of Japanese Visa			
- Preparation of clearance for participants			
- Visa applications process			
- Preparation of logistic, accommodation, detailed exposure schedule and activities for Japan			
- Orientation to participants			
Stage 2. Overseas Exposure of Faculty Members			
2.1 Observation at "Shibaura Institute of Technology Junior and Senior High School"			
- Exposure and preparation of lesson plans for re-echo			



Stage 1. Preliminary

During the preliminary stage, there are three key phases of the work plan: Development of objectives and activities; selection process; and preparation and finalizing of documents of the participants.

Table 2. Preliminary Stage



1.1 Development of objectives and activities for program between SIT and Dita Elementary School

During this phase (1st week to 2nd week of June 2024), the focus will be on preparing a Memorandum of Agreement (MOA) between the SIT and the Dita Elementary School. Furthermore, efforts will be made to secure the necessary funds to support the successful implementation of the program.

A clear understanding and agreement of the program objectives and outcomes are crucial for effective collaboration between SIT and Dita Elementary School. This work plan will be processed in the 1st week of June 2024. The program coordinators and members from both institutions will meet virtually to establish a shared understanding and agreement on the collaboration purpose, the program's objectives, and desired outcomes of the collaborative effort. Furthermore, both institutions will develop the concept note, determine the required resources and responsibility of both parties, identify the qualifications criteria for the participants of the teacher retooling program, determine the selection criteria of the applications, selection process, and selecting committee and activities included in the program. The final output of this work plan activity is a Memorandum of Agreement of the program.

At the 2nd week of June 2024, program team from Dita Elementary school will coordinate with local government agencies, local suppliers of robotic component such as Eridanus Learning Center for Robotics and communicate with prospective basic education institutions in Santa Rosa that express interest in participating in the re-echo program, seeking opportunity for sponsorship and contribution. Furthermore, the team will liaise with SIT to ensure that SIT pledge to cover all expenses incurred in Japan, during the three weeks of exchange exposure period.

1.2 Selection Process

The selection process consists of two key work activities: preparation of a Memo for the program and the call for the application; and the selection and finalization of candidates. These activities will be accomplished from the 2nd week of June 2024 to the 3rd week of June 2024.

Preparation of memo for the program and calling of participants

In the 2nd week of June 2024, the person in-charge from Dita Elementary School will coordinate with the Regional DepEd for the issuance of Memo informing about the retooling program. Once the memo is processed and approved, it will circulate within the Dita Elementary School, along with the applicant qualification criteria, selection criteria, and other relevant information. Subsequently, the school will start accepting applications from prospective participants.

Selection of applicants and finalization of candidates

Starting from the 3rd week of June 2024, the program coordinator team will collect and file the submitted applications and will then be forwarded to the selection committee for evaluation, shortlisting of applicants and call for interviews. The selection committee will finalize and decide on the final list of participants for the program at the end of the said week.

1.3 Preparation and Finalization of Documents of the Participants

This part of the work plan includes preparing all the documents needed for the participants going to Japan and arranging the logistics, accommodation, and orientation. These activities will be done within the 2-week period.

In the 4th week of June 2024, the Dita Elementary program coordinator and the team will collaborate with SIT to obtain the documents required for the Japanese visa application. In that same week, the selected participants will process the clearance from DepEd.

The visa application process will commence once the document is completed which is expected by the end of 1st week of July. Concurrently, throughout these two (2) weeks, from the 4th week of June to the 1st week of July 2024, the Dita Elementary coordinator and SIT team will prepare the necessary logistics and accommodation for the participants. These logistic and accommodation arrangements include international flights, accommodation at the Toyotsu campus Dormitory, transportation, meals, and allowances. The detailed plan for this arrangement must be completed by the end of the 1st week of July 2024. Once the arrangements are in place, orientation with the participants regarding the logistics and

accommodation arrangements, detailed overseas exposure schedules and activities, and expected outcomes from the program will be conducted.

Stage 2. Overseas Exposure of Faculty Members

Table 3. Observation at "Shibaura Institute of Technology Junior and Senior High School

	June 2024	July 2024	Aug 2024
Stage 2. Overseas Exposure of Faculty Members			
2.1 Observation at "Shibaura Institute of Technology Junior and Senior High			
- Exposure and preparation of lesson plans for re-echo			

2.1 Exposure and preparation of lesson plan for re-echo

Participants from the Philippines will participate in the "Fundamentals of Robot Science " class activity of SIT Junior and Senior High School from the 2nd week of July to the 4th week of July. During the 2nd week of July, activities will primarily focus on building and assembling robot parts. The 3rd week of July will involve activities related to the wiring of Robot parts, while the 4th week will concentrate on programming the Robot. At the end of each week, the participants will present the teaching strategies and best practices they have learned from that week's activities. Further, participants from the Philippines can also provide feedback to teachers and faculty members at SIT based on their teaching experience and observation during this activity.

Additionally, the participants are required to prepare lesson plans and contents, including the required teaching materials based on the knowledge and insights gained from their exposure experience in Japan. These lesson plans will be utilized during the re-echo activity and in the Dita Elementary School when they return to the Philippines. These lesson plans and required teaching materials must be reported back to the committee team for re-echo training. They will also share their prepared lesson plans for the re-echo program with the SIT counter participants and seek input for improvement. This will allow for the exchange of knowledge, showcase effective teaching methodologies, and promote collaborative learning of both parties. Hence, this will contribute to the mutual benefit of both parties involved in this partnership.

Stage 3. Re-echo

Table 4. Re-echo

Preparation of re-echo Training Activities

During the 4th week of July and 1st week of August 2024, the Dita Elementary program team will coordinate with the exposure team for the re-echo lesson plan, including the preparation of the required teaching materials for the training activities in the Philippines. The Dita Elementary School program team will coordinate with ICT coordinators from the DepEd division of Santa Rosa, Laguna to organize the re-echo training. It involves tasks such as identifying the participants and venue, preparing the training venue, and arranging logistics and accommodations for the participants.

Implementation of Re-echo seminar.

In the 1st week of August 2024, the faculties from the overseas exposure program will conduct a re-echo training to share the lesson plans, teaching techniques, classroom management strategies, and student engagement methods with the participants from the DepEd division of Santa Rosa Laguna. This activity aims to disseminate the knowledge and experiences gained from the overseas exposure program for possible implementation in the Philippines' robotic education.

4. Conclusions and Future Scope

The proposed teacher retooling program in robotics for the basic education teachers at Dita Elementary School and the SIT presents valuable opportunities for the participating SIT junior and senior high school students to improve their language communication skills and interpersonal skills. As mentioned earlier, Japan has recently integrated the revised ICT and Programming curriculum in 2021 and 2022. Hence, the feedback from Dita elementary school

teachers can greatly assist SIT in improving the delivery of lessons and overall educational experience. This collaboration also contributes to its broader goal of achieving internationalization, aligning with the institution's "Centennial SIT Action, 2027".

The retooling program will inspire all learners and teachers to integrate robotics into the whole division. Moreover, this can be part of policies and other activities modification on division and on the part of LGU; hence, a program for sustainable development can be applied in developing robots to help the environment and the city itself. Lastly, this retooling program can be a ground for further research and development to integrate robots in the education field and the whole city.

The retooling program of DepEd for Basic Education will encourage curriculum developers to reassess DepEd's curriculum and policies regarding ICT integration. Furthermore, this will help to advance technology and innovation in Basic Education through the incorporation of robotics, innovation, and research. Moreover, it allows the faculty members to acquire new knowledge, develop their skills, gain exposure to best practices, foster collaboration, and contribute to their professional growth in robotics and ICT education for the Philippines.

References

Ministry of Education, Culture, Sports, Science and Technology (MEXT) Japan, Curriculum Guideline, Retrieved on June 6, 2023 from https://www.mext.go.jp/a_menu/shotou/newcs/index.htm

Ministry of Education, Culture, Sports, Science & Technology (MEXT) Japan. (2017). Junior High School Curriculum Guide. Japan Ministry of Education, Culture, Sports, Science & Technology Retrieved on June 6, 2023, from https://www.mext.go.jp/component/a_menu/education/micro_detail/__icsFiles/afieldfile/2019/09/26/1413522_002.pdf.

Shibaura Institute of Technology, "Centennial SIT Action", Shibaura Institute of Technology. Retrieved on June 10, 2023, from https://www.shibaurait.ac.jp/about/summary/centennial_sit_action.html.

Shibaura Institute of Technology," Partner Universities and Institutes Overseas". Shibaura Institute of Technology. Retrieved on Jun 8, 2023, from https://www.shibaurait.ac.jp/en/about/activities/partner_universities.html.

Shibaura Institute of Technology. "Shibaura Institute of Technology Junior and Senior High School" . Shibaura Institute of Technology. Retrieved on June 6, 2023, from https://www.shibaura-it.ac.jp/en/about/campuses/ijh.html.

Yokozo mirai, August 4, 2021. "When will elementary school programming education become compulsory? What grade do you start learning from? Yokozo Mirai. Retrieved on June 5, 2023, fromhttps://mirai-tc.com/program-school year/?fbclid=IwAR31BCo1DWiC8tP2z_IAo_32Iernz5bTMyMrKHECkrbewTJapKH5N e3pWG8