DIGITAL STEM EDUCATOR

PROGRAM

> PREPARES DIGITAL STEM EDUCATORS FOR THE DEMANDS OF 21ST CENTURY EDUCATION AND WORKFORCE.

MmyFlowlab™
Education

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I INTRODUCTION

STEM is the global acronym for **Science, Technology, Engineering,** and **Mathematics.** It's a teaching approach combining Science, Technology, Engineering and Math thru a hands-on curricular activity to ignite greater interest in Science and Math related subjects among Learners.

myFlowLab™ STEM education teaching and learning curriculums are designed for learners to apply Science and Math knowledge learnt in classroom incorporating Technology and Engineering elements developing creative and innovative real-world solutions solving real-world problem thru a minds-on and hands on activities.

The activities involve electronics, sensing, motions, actuators, and coding (Algorithm development) in building real-world functional prototype systems and project models from LED to Robotics, AI and Internet of Things, collecting, Storing and analysing real world data. The outcome is to develop learners' practical skill and Tech Savy with greater interest in Science

and Math as well as to enhance their skills in Problem Solving abilities, Computational Thinking, Design Thinking, Creativity, Communication, Collaboration, Data Literacy, Digital Literacy, Computer Science.

myFlowLab™ Digital STEM education plays a crucial role in preparing learners for a sustainable and life-long learning journey. We at myFlowLab™ defines STEM as - **S** for Research, **T** for Thinking Process, **E** for Arts, **M** for Analytics.

S	**Research**	Pursuit of New Discovery
T	**Thinking**	Technological Evolution
E	**Art**	Integration of Artistry & Culture
M	**Analytics**	Precision in Decision Making

Our STEM Education curriculums are designed and developed based on the above definition.

Following are some of the key benefits of digital STEM education for Students:

A

Enhances critical thinking skills: STEM education emphasizes problem-solving, analytical thinking, and reasoning skills, which are essential in all aspects of life.

B

Prepares students for future careers: STEM careers are growing rapidly, and STEM education provides students with the skills and knowledge they need to excel in these fields.

Promotes innovation and creativity: STEM education encourages creativity and innovation by challenging students to think outside the box and develop new and improved ways of doing things.

Fosters teamwork and collaboration: STEM education emphasizes teamwork and collaboration, which are critical skills in both academic and professional settings.

Improves technological literacy: STEM education helps students become more technologically literate, allowing them to navigate and leverage technology to solve problems and communicate effectively.

Addresses real-world problems: STEM education provides students with the knowledge and tools they need to address real-world problems, such as climate change, cybersecurity, and healthcare.

Career readiness: Digital STEM education can prepare Students for the demands of the 21st-century workforce, as it can provide them with the skills and knowledge needed to succeed in STEM-related careers.

JUSTIFICATION TO PRODUCE
DIGITAL STEM EDUCATORS

Producing Digital STEM Educators is essential for improving STEM education quality, advancing technology integration, and preparing learners for the demands of the future. By investing in Digital STEM Education and producing more qualified educators, we can help ensure that all learners have access to the knowledge and skills they need to succeed in the 21st century.

Following are several crucial reasons why there are needs to produce digital STEM educators:

1

MEETING THE DEMAND FOR STEM EDUCATION :

As the demand for STEM education increases, there is a growing need for more qualified STEM educators who can teach these subjects effectively. Producing more digital STEM educators can help meet this demand.

2

IMPROVING STEM EDUCATION QUALITY :

Digital STEM education requires specialized skills and knowledge that many traditional educators may not possess. By producing more digital STEM educators, we can improve the quality of STEM education and provide students with the best possible learning experience.

3

ADVANCING TECHNOLOGY INTEGRATION :

Digital STEM educators can help advance the integration of technology in education, which is critical for preparing students for the demands of the 21st-century workforce.

4

FOSTERING INNOVATION AND CREATIVITY :

Digital STEM educators can encourage innovation and creativity in students by introducing them to new tools, technologies, and approaches to problem-solving.

5

PROMOTING EQUITY AND ACCESS :

Digital STEM educators can help promote equity and access to high-quality STEM education by providing students in underserved communities with the same opportunities as those in more affluent areas.

TRAINING OVERVIEW

The myFlowLab™ Digital STEM (Science, Technology, Engineering, Math) Educator program curriculum was designed and developed with sole purpose to prepare an aspiring individual to become a Digital STEM educator for the demands of 21st century education and workforce with strong STEM mindset. It is 60 hours of fundamental hands-on and minds-on activity-based fun classroom learning of Technology and Engineering blending with Science, Math, and Art. It is delivered in 2 phases, where learners learn individually and in group to acquire the following hard and soft skills which will enable them to empower their fellow learners thru series of modular STEM lesson plans which they can deliver after being certified as Digital STEM Educator: -

HARD SKILLS :

Fundamental of IR4.0 technology drivers - to become a Tech savvy educator.

Internet of Things

System Integration

Digital to Real World Applications

Robotic Applications

Digital Literacy

Data Literacy

Sensor Technology

Algorithm Programming

Computer Science

Artificial Intelligent - System and Algorithm

SOFT SKILLS :

5 Cs - The employability skills in employment.

Creativity

Communication

Critical Thinking

Complex Problem Solving

Collaboration

The training delivery methodology during the training session develops the learners' abilities in the Computational and Design thinking processes, as they carry out each activity as they progress through the program learning journey coached by the Trainers and facilitators.

The knowledge and skills gained by the learners are assessed thru various assessments and a final project R&D. They will work as a team, communicating and collaborating to show case their creativities and competencies by completing a fully functional prototype model solving a real-world problem based on a theme given, reference to the 17 pillars of Sustainable Development Goals by the United Nation.

The project will be documented in hard document and video presentation format; and submitted for final evaluation and certification to become a certified myFlowLab™ Digital STEM Educator.

Certified Trainers that have completed the 60 hours of myFlowLab™ STEM Educator program able to adopt the STEM Classes @centers to monetise (Freelancers or STEMpreneurs) by conducting MODULAR (Foundation, Learn, Build, Makers) STEM programs as illustrated below. The details if this program and the module's training outline will be offered during Educator Session.

FOSTERING WINNING STUDENTS

myFlowlab™ Education

www.myflowlab.com

STEM Education Programs

One Time Materials Fee

LEARNING PACKAGE
PROGRAMMING SOFTWARE
EXPLORATION KIT
STUDENT WORKBOOK

$XXX

FOUNDATION

Computational and Critical thinking actvities from Algorithm programming to complex Problem solving with fundamental Engineering & Technology.

MONTH 1ST	MODULE 1 (8 SESSIONS)	FEES $XXX
MONTH 2ND	MODULE 2 (8 SESSIONS)	FEES $XXX

EXPLORERS

Prototype and re-inforce building Real-World Digital applications using Computational Thinking and Design Thinking approach.

MONTH 3RD	MODULE 1 (8 SESSIONS)	FEES $XXX
MONTH 4TH	MODULE 2 (8 SESSIONS)	FEES $XXX
MONTH 5TH	MODULE 3 (8 SESSIONS)	FEES $XXX

INNOVATORS

Design, innovate build intelligent Real-World prototype models applying Design Thinking and Creativity from IOT to Robotics.

MONTH 6TH	MODULE 1 (8 SESSIONS)	FEES $XXX
MONTH 7TH	MODULE 2 (8 SESSIONS)	FEES $XXX
MONTH 8TH	MODULE 3 (8 SESSIONS)	FEES $XXX

MAKERS

Design and Build Real-World project solvng real-world problems thru collaboration with reference to the 17 Sustainable Development Goals.

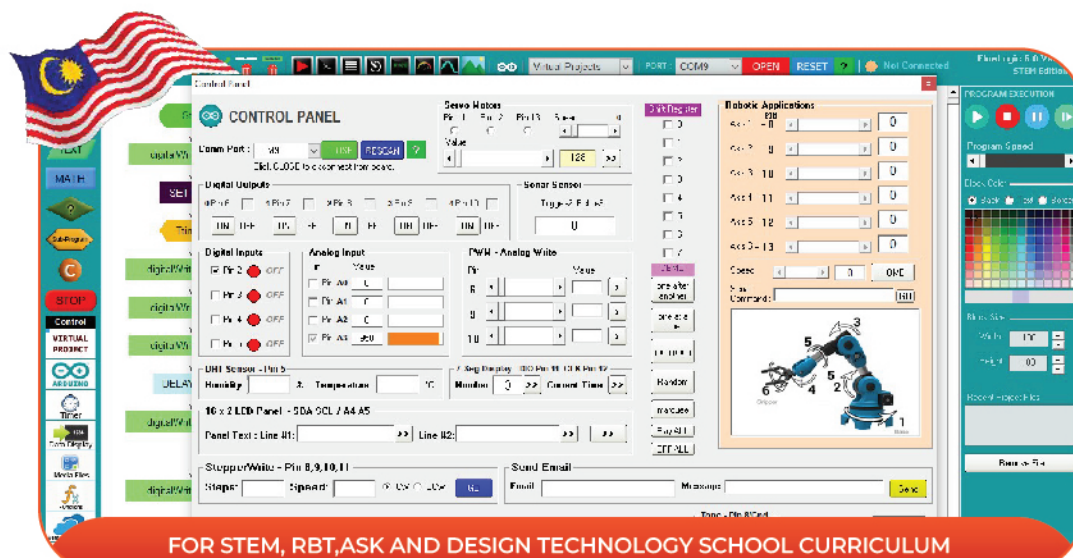|		
MONTH 9TH	MODULE 1 (8 SESSIONS)	FEES $XXX
MONTH 10TH	MODULE 2 (8 SESSIONS)	FEES $XXX
MONTH 11TH	MODULE 3 (8 SESSIONS)	FEES $XXX

CLASSES ON

WEEKDAYS
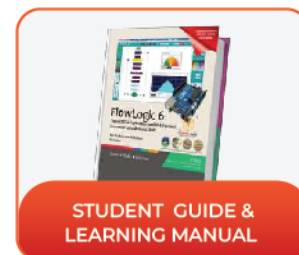1 Hour (2 Sessions)

PRE-REGISTER AT
www.xxxxxxxxx.com

WEEKENDS
2 Hour (1 Sessions)

DIGITAL STEM EDUCATORS' LEARNING TEACHING TOOLS AND RESOURCES

FOR STEM, RBT,ASK AND DESIGN TECHNOLOGY SCHOOL CURRICULUM

STUDENT GUIDE & LEARNING MANUAL

CUSTOM IR 4.0 , STEAM & DIGITAL LITERACY EXPLORATION KIT.

FLOWLOGIC 6   **AN AWARD - WINNING ALGORITHM DEVELOPMENT DIGITAL TOOL FOR STEM EXPLORATION**

The Digital STEM Educator program very focus on the Employability skills development thru various technical activities (Hard Skills) applying STEM (Science, Technology, Engineering, Math) blending with Arts, Language and Cultural values. Following are the hard skills real-world project activities, each participant will carry out the following mind-on and hands-on activities during the training utilising the above resources:

1. ALGORITHM DEVELOPMENT
2. DIGITAL & ANALOG COMMUNICATION
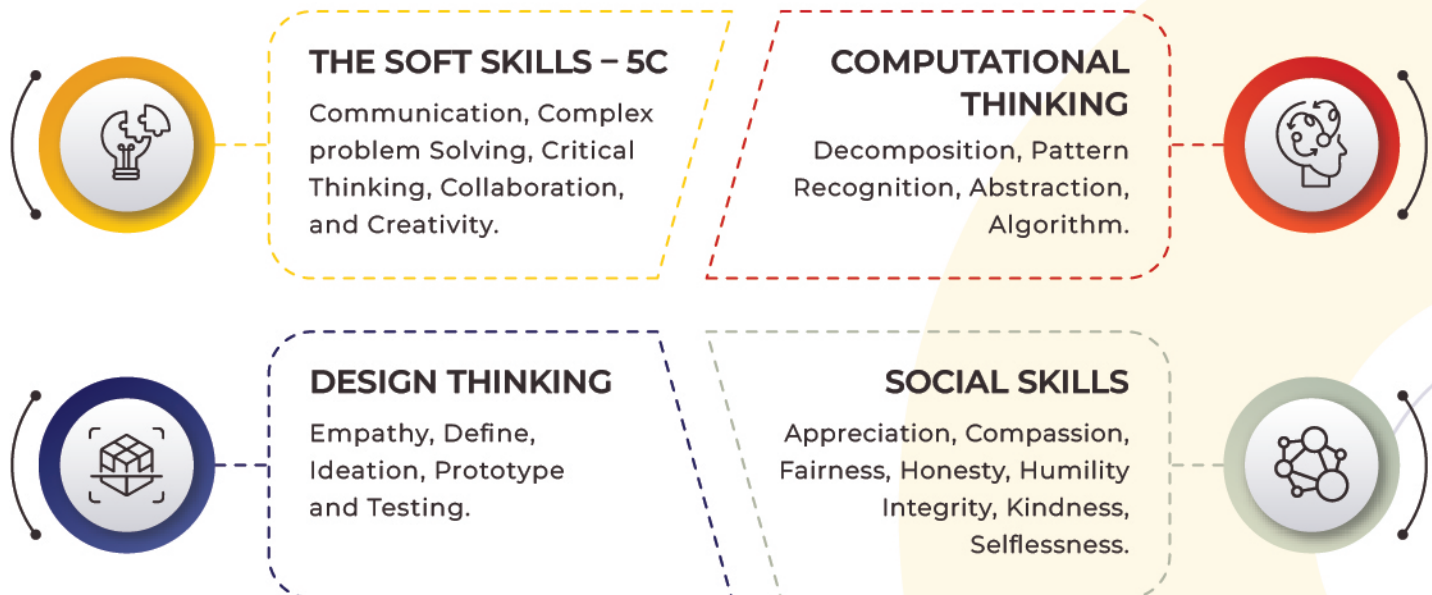3. SENSOR SYSTEMS
4. AI FUNDAMENTALS
5. ROBOTICS APPLICATIONS
6. INTERNET OF THINGS
7. SYSTEM INTEGRATION
8. DATA & DIGITAL LITERACY
9. COMPUTER SCIENCE

THE SOFT SKILLS – 5C

Communication, Complex problem Solving, Critical Thinking, Collaboration, and Creativity.

COMPUTATIONAL THINKING

Decomposition, Pattern Recognition, Abstraction, Algorithm.

DESIGN THINKING

Empathy, Define, Ideation, Prototype and Testing.

SOCIAL SKILLS

Appreciation, Compassion, Fairness, Honesty, Humility Integrity, Kindness, Selflessness.

TRANSVERSE SKILLS DEVELOPED
DURING THE TRAINING

IN THE TRAINING SESSION, THE EDUCATORS WILL DEVELOP FURTHER LIFE SKILLS AND ATTITUDES THRU THE FOLLOWING ENGAGEMENTS IN THE TRAINING:

WORKING AS A TEAM

- Develops their adoptability, collaborative and communication skills.

GROUPS DISCUSSION

- To inculcate 7 hats of leadership ability.
- Each team member will take roll of a Coach, Executor, an Expert, Planner and Conductor.

INTERPERSONAL SKILLS

- Communicating, Collaborating, and Interacting with Educators of different background and study.

INTRAPERSONAL SKILLS

- The Minds-ON STEM activities induce the high ability of confidence which the Educators can reflect themselves in facing conflict or problems.

DESIGN THINKING

- The real-world innovative projects the Educators carry out during training develops skills for life on human interaction, being empathy and passion in solving real-world problems.

COMPUTATIONAL THINKING (CT) ABILITY

- The activities that Educators carry out during the training applying the CT processes makes them become an organised person in executing any task and solving any complex problems.

PASSION FOR
TEACHING

The myFlowLab™ Digital STEM Educator training curriculum and the Final project will primarily focus on development around knowledge, skills, attitudes, and abilities towards producing a teacher with passion for teaching.

The training will produce teachers with passion for teaching thru an engaging fun activity, successfully completing every activity in the training that they will be able to celebrate their achievement. We believe this celebration will lead to passion for teaching.
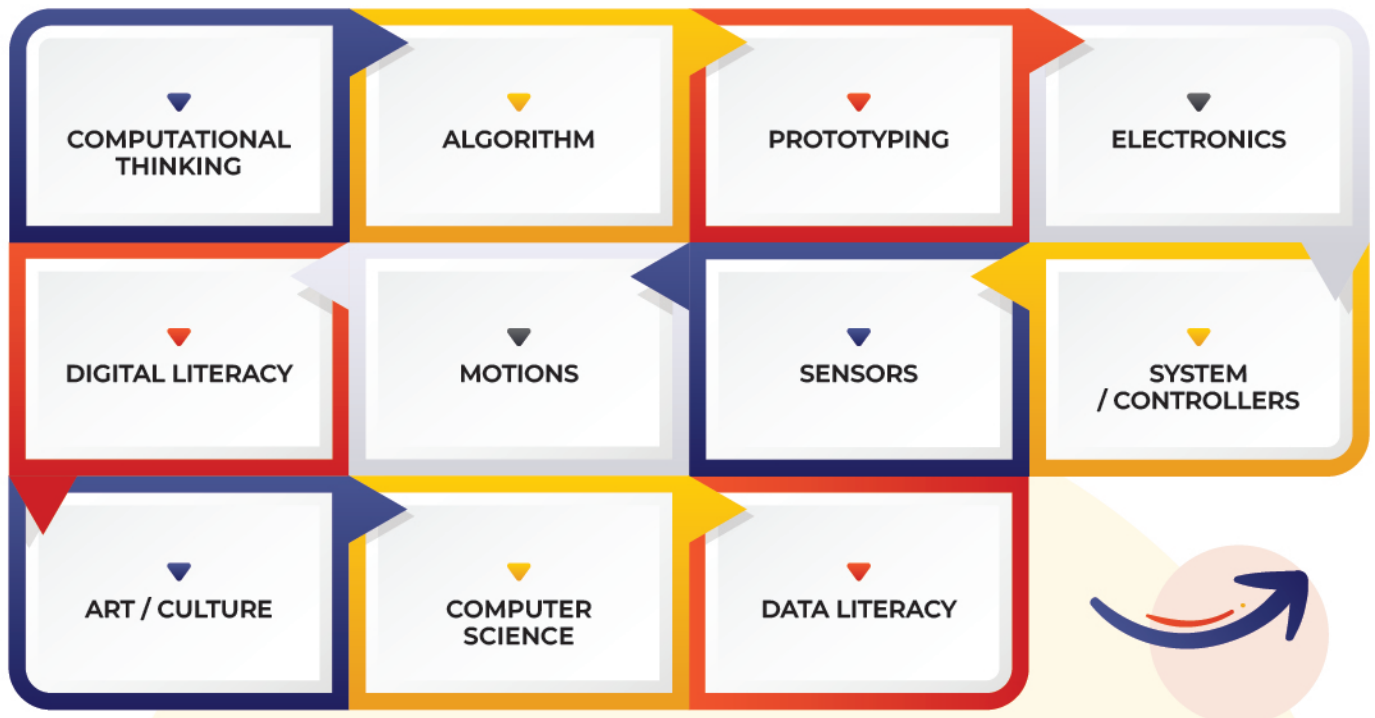
TRAININGS
MODULES AND FLOW

STEM
SCIENCE   TECHNOLOGY   ENGINEERING   MATHEMATICS
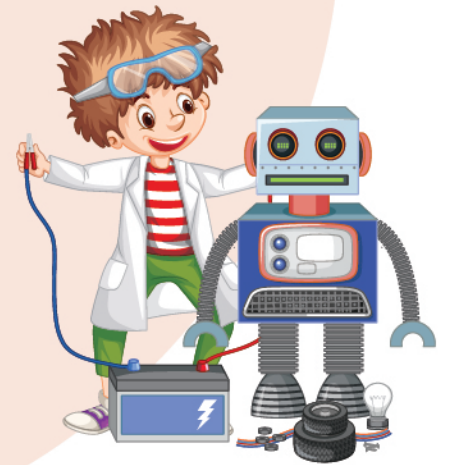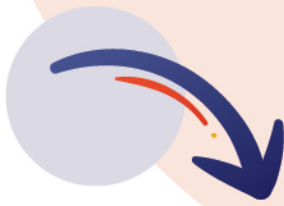
4.0
INDUSTRIAL REVOLUTION
4WARD EDUCATION SERIES

PHASE #1 - THE FUNDAMENTALS.

FOUNDATION/EXPLORERS & LEARN

Explores minds-on and hands-on the following activities.

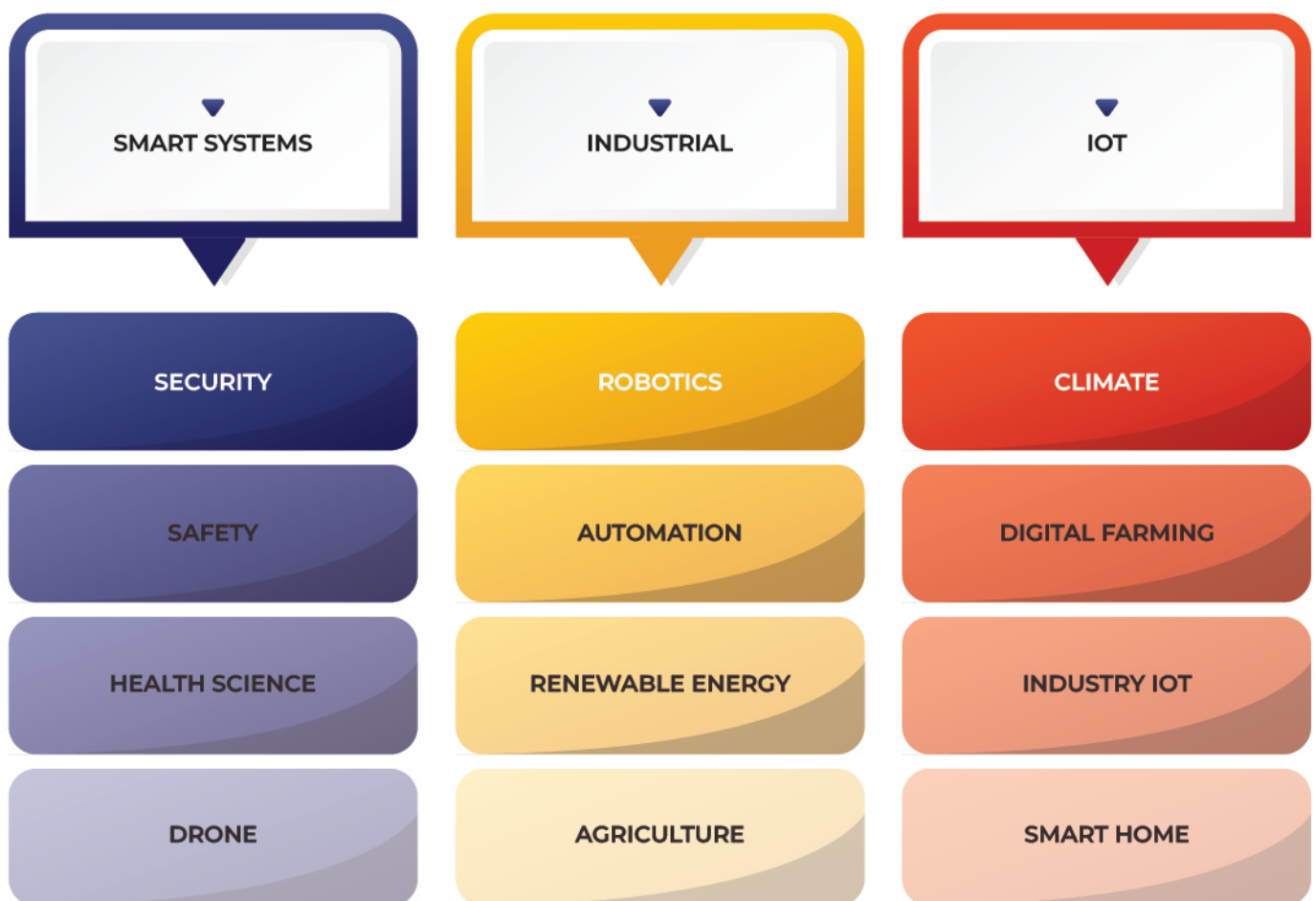| COMPUTATIONAL THINKING	ALGORITHM	PROTOTYPING	ELECTRONICS
DIGITAL LITERACY	MOTIONS	SENSORS	SYSTEM / CONTROLLERS
ART / CULTURE	COMPUTER SCIENCE	DATA LITERACY	

PHASE # 2 - INDUSTRY BASED PROJECT COACHING.

INNOVATOR/MAKER

Innovate and Build prototype real-world application projects models in any of following areas.

SMART SYSTEMS	INDUSTRIAL	IOT
SECURITY	ROBOTICS	CLIMATE
SAFETY	AUTOMATION	DIGITAL FARMING
HEALTH SCIENCE	RENEWABLE ENERGY	INDUSTRY IOT
DRONE	AGRICULTURE	SMART HOME

In the myFlowLab™ Digital STEM Educator program, the Educators will be trained on contents of Foundation and Explorers modules to gain Knowledge, Interest, Skills, and Confidences then proceed to Innovate and Build Real-World STEM projects solving real-world problems.

ADD-ON
TRAINING MODULES

The myFlowLab™ Digital STEM Educator program for educators will also focus on the followings ADD-ON modules to enhance further, their teaching content development abilities and delivery.

Computational Thinking skill application method enables these educators to teach the subject matters to students using the four (4) processes which are Decomposition, Abstraction Pattern recognition and Algorithm. The competencies and Know-how gained in these session enables the educators to apply a non-instructional, inquiry based and systematic teaching approach to guide their students mastering any subject matter easily allowing their student to learn deeper and sustainably.

Design Thinking training session enables educators to gain competencies and know-how to apply the 5 processes of design thinking (Define, Empty, Ideate, prototype and Test) on developing students' abilities to be Creative and Innovative in applying the knowledge of the subject matter thought into producing sustainable real-world solutions and services that are demanding, to meet global technological advancement.

Modular Training Lesson Plan Development: This training activities session provides educators a hands-on development of presentation slides of teaching & learning contents for a modular training program applying computational and design thinking method which will enables the educators engaged with their students effectively in classroom or even via online. They will be also thought to utilise circuit design software tool to design circuit diagrams for the activities that they want to teach their students.

Video Based Lesson Plan Development: This training session provides educators a hands-on development of teaching & learning plan and contents applying computational and design thinking method which will enable the educators to engage with their students effectively via online. They will be coached to use open-source Audio visual software tools to develop the video-based lesson plan contents. This video can be uploaded to YouTube, LMS or custom website for their students to learn remotely and anywhere and anytime.

TRAINING OBJECTIVES
AND OUTCOME

The myFlowLab™ Digital STEM Educator program for educators will also focus on the followings ADD-ON modules to enhance further, their teaching content development abilities and delivery.

▶ To develop a pool of Educators and Entrepreneurs in Digital STEM Education to support Communities aspiration to be inclusive in a developed nation.

▶ To produce Educators to ignite students' communities toward embracing a culture of learning Technology, Innovation and Digital technology contents with lot of fun innovating real-world solutions.

▶ To produce Educators to ignite students towards Industry relevant work-based learning to create innovative and industry relevant projects and products during their studies.

▶ To provide Educators with new skillset (Soft and Hard(technical) skills) so that they could infuse it as a project base learning approach into their teaching.

▶ To empower Educators with Computational and Design thinking processes know-how, so that they can coach their students to see the connection between the content they are studying and the application of that content in authentic and relevant ways.

▶ To provide Educators in-depth knowledge, skills, and confidence in the fundamental of System integration, electronics, sensors, motion and IOT thru a hands-on and minds-on activities to develop strong skill in Problem Solving abilities, Creativity, Data literacy, Digital literacy and innovation incorporating research and experience-based learning.

▶ To coach Educators to design and develop video based online learning contents which they able to host into their own YouTube channel and website, preparing them for the digitalisation age and fundamental 4IR (Fourth Industrial Revolution) teaching.

▶ To enable Educators with Knowledge and Skills to develop STEM KITS and Modular Lesson plan to carry out modular STEM programs for their students physically and video based.

THE CORE TECHNOLOGY THAT POWERED
OUR TRAINING SOLUTIONS

Our proposed STEM fundamental education involves hands-on and minds-on activities in the fundamental development of Technology and Engineering blending with Science and Mathematics curriculum learned, incorporating electronics, sensing, motion and programming

(Algorithm development), prototyping, and building real-world projects models from LED to Robotics applications and Internet of Things; controlling, collecting and analysing real world data from various real-world application (Agriculture, mechatronics, Physical gaming, Medical, safety & Security and many more). The outcome is to produce students with greater interest in Science and Math related subjects as well as enhancing their skills in Problem Solving abilities, Computational Thinking, Design Thinking, Creativity, Communication, Collaboration, Data Literacy, Digital Literacy, Computer Science.

To carry out the above activities to achieve the outcome, we incorporate software and hardware tool such as FlowLogic 6, a simple beginner's visual flowchart-based Algorithm development tools that runs on Windows OS computers and interfaced with Arduino Uno microcontroller, in which various Digital devices, sensors, motion actuators will be connected to it, for learners to carry out engineering and innovation works building prototypes incorporates various STEM elements. The real-world functionality of their innovation will be driven physically by the Algorithm developed (no coding required) using FlowLogic 6 via the Arduino microcontroller connected the computer USB port, the deeper their thinking processes they will be able to develop complex Algorithm to power their Innovation which empowers the Technological Evolution.

FlowLogic 6 software was solely developed to simply STEM exploration intended to cultivate thinking processes such Computational, Critical and design thinking, which is the core for fundamental Engineering and innovation development and enhancement, it is a reinforcement learning strategy we employ as part of our Technology advancement activities for our learners to prepare them for the digitalize world.

We would like to describe the core technology to power our solutions, are the methods we employed in our STEM Education to empower students thru a scaffolding, Problem/project, real-world application development and cultural awareness-based learning via hands-on and minds-on which enable them to cultivate the thinking abilities that make them a technology developer instead as a user. It also will make them active, communicable, and adaptable learners as initiated by the World Economic Forum. An initiative for the 21st century employability and entrepreneurship.

LEARNING AND
ACTIVITY CONTENTS

		DAY 1	
MODULE	**ACTIVITY**	**LEARNING OUTCOME**	**DURATION**
1.	STEM Pedagogy. Theoretical and hands-on Group activities and sharing with the class.	Educators will gain knowledge in the approach of teaching Science, Technology, Engineering, and Mathematics (STEM) subjects in an integrated and interdisciplinary way as well as understanding of Technology, Engineering and Scientific literacy.	4 Hours

MODULE	ACTIVITY	LEARNING OUTCOME	DURATION
		Thru these activities the Educators able enhances their Communication, collaboration, critical and design thinking abilities.	
2.	Woking with AI tool for productive tool in teaching. Theoretical and hands-on Individual Activities and sharing with the class.	Educators will gain knowledge and ability to use this AI tool as a productive digital tool to assist them to source for effective resources fast and accurately which enables them to create more engaging teaching contents and access to research material to support their own learning. Thru these activities the Educators able enhances their Communication, collaboration abilities.	1 Hour
3.	Introduction to the 5 processes of Design Thinking. Theoretical and hands-on Activities in group and sharing with the class.	Educators will gain the knowledge and ability to solve problem creatively (think out of Box). They too will develop skills in innovating ideas and prototyping solutions to deliver content and engage students in experiential ways. Thru these activities the Educators able enhances their Communication, collaboration abilities.	2 Hours

DAY 2

MODULE	ACTIVITY	LEARNING OUTCOME	DURATION
4.	Prepare Software tool for Algorithm development. Individual hands-on Activities to prepare asset for learning.	Educators will gain knowledge and expertise in the installation and setting up of FlowLogic 6 software tool as well as applying it to design and develop solutions via algorithm to carry out real-world computational tasks.	2 Hours
5.	Computational Thinking activities via Virtual System programming. Individual hands-on Activities.	Educators will gain the fundamental knowledge and skill in Algorithm and programming design and development. Educators will also develop an attitude to solve problem using the Computational thinking processes.	2 Hours

MODULE	ACTIVITY	LEARNING OUTCOME	DURATION
6.	Computational Thinking activities via Console programming. Individual Activities hands-on to submit for Assessment #1. Project: "Electricity Bill System algorithm"	Educators will gain the advance knowledge, skill and confidence in Algorithm design and development. They gain competency in applying critical thinking in solving complex computational real-world tasks.	2 Hours
7.	Fundamental of Physical computing Devices, Technology and Engineering. Theoretical and hands-on Individual hands-on STEM Activities.	Educators will gain the fundamental knowledge in electronic devices, engineering, technology, and computer science to build an interactive real-world integrated elements of STEM applications systems.	1.5 Hours

DAY 3

MODULE	ACTIVITY	LEARNING OUTCOME	DURATION
8.	STEM prototyping activity working with a LEDs, a digital Output device. Individual Hands-on STEM Activities.	Educators will gain knowledge on Digital output devices and scientific principles; and skill in developing STEM integrated elements building real-world applications and programming algorithm solving problems which will further, thru the activity enhances their problem solving, creativity, critical, computational and design thinking abilities.	2.75 Hours
9.	STEM prototyping activity working with a RGB LED, a digital Output and Analog device. Individual Hands-on STEM Activities.	Educators will gain knowledge on Digital and Analog output devices and its scientific principles; and skill in developing STEM integrated elements building interactive real-world artistic applications and programming algorithm which will further, thru the activity enhances their problem solving, creativity, critical, computational and design thinking abilities.	2 Hours

EXHIBIT "A"- EDUCATION 4.0- DIGITAL STEM EDUCATOR

MODULE	ACTIVITY	LEARNING OUTCOME	DURATION
10.	STEM prototyping activity working with a Light Sensor, an Analog Input device. Individual Hands-on STEM Activities.	Educators will gain knowledge on Analog sensor technology and its scientific principles; and skill in developing STEM integrated elements building interactive real-world detection-based applications and programming algorithm which will further, thru the activity enhances their problem solving, creativity, critical, computational and design thinking abilities.	2 Hours
11.	STEM prototyping activity working with a Data Sensor, a Data Input device. Individual Hands-on STEM Activities.	Educators will gain knowledge on Data sensor technology and its scientific principles; and skill in developing STEM integrated elements building interactive real-world measurement-based applications and programming algorithm which will further, thru the activity enhances their problem solving, creativity, critical, computational and design thinking abilities.	2 Hours

DAY 4

MODULE	ACTIVITY	LEARNING OUTCOME	DURATION
12.	STEM Model prototyping activity working with Servo Motion device. Individual Hands-on STEM Activities.	Educators will gain knowledge on Servo motor technology and its scientific principles; and skill in developing STEM elements integrated mechatronic real-world system applications and programming algorithm which will further, thru the activity enhances their problem solving, creativity, critical, computational and design thinking abilities.	2 Hours
13.	STEM prototyping activity working with Digital Input device. Individual Hands-on STEM Activities.	Educators will gain knowledge in Digital Input device and its scientific principles; and skill in developing an integrated Machine Learning real-world system applications and programming algorithm which will further, thru the activity	2 Hours

MODULE	ACTIVITY	LEARNING OUTCOME	DURATION
		enhances their AI knowledge, complex problem solving, creativity, critical, computational and design thinking abilities.	
14.	STEM Model prototyping activity working with DC Motion device. Individual hands-on STEM integrated Model development Activities to submit for Assessment #2. Gamed Based project: "Wheel of Learning prototype model"	Educators will gain knowledge on DC Motion device and its scientific principles; and skill in developing STEM elements integrated Game based real-world system applications and programming algorithm which will further, thru the activity enhances their complex problem solving, creativity, critical, computational, design thinking abilities and Cultural sensitivity awareness.	3.5 Hours

DAY 5

FOSTERING CREATIVITY IN THE FOURTH INDUSTRIAL REVOLUTION (4IR)

MODULE	ACTIVITY	LEARNING OUTCOME	DURATION
15.	Intricacies of Fourth Industrial Revolutions. Group research activities and presentation.	The Educators will be fully aware of current era of technological advancement and transformation, where digitalisation empowering their workplace and understand the positive and negative impact of each of technology drives and how they can benefit and overcome from it. Thru these activities the Educatorss able enhances their Communication, collaboration, critical and design thinking abilities as well develop a positive attitude toward technology advancement.	2 Hours
16.	Working with the technology drivers of 4IR – Edge Computing safety detection and prevention system. Individual fundamental 4IR prototype activities.	Educators will gain knowledge on Edge computing technology and Safety sensor – Gas Sensor and its scientific principles; and skill in developing STEM/4IR integrated real-world localise safety prevention system applications and programming algorithm which will further, thru the activity enhances their complex problem solving, creativity, critical, computational and design thinking abilities.	2 Hours

MODULE	ACTIVITY	LEARNING OUTCOME	DURATION
17.	Working with the technology drivers of 4IR – IOT (internet of Things) technology – Sensor Data Collection, Cloud based Data visualization and Analytics. Individual fundamental 4IR prototype activities.	Educators will gain knowledge on IOT technology in area of Data literacy, Cloud computing for data visualisation and analytics. They too will gain skills in developing an open-source Cloud based IOT platform and develop algorithm to collect sensor data and sent it to the cloud IOT platform which will further, thru the activity enhances their complex problem solving, creativity, critical, computational and design thinking abilities.	2 Hours
18.	Develop an IOT integrated Climate monitoring station. Individual fundamental 4IR prototype activities.	Educators will gain knowledge and skills in integrating multiple devices and technology to design and develop a real-world application system that solves a real-world problem which will further, thru the activity enhances their complex problem solving, creativity, critical, computational and design thinking abilities. Educators will more. These activities will induce the high ability of confidence which the Educatorss can reflect themselves in facing conflict or problems.	1.5 Hours

DAY 6

DIGITAL STEM LESSON PLAN DESIGN AND DEVELOPMENT

MODULE	ACTIVITY	LEARNING OUTCOME	DURATION
19.	Prepare and Work with System design and development software tool. Individual activities prepare asset for design.	Educators will gain knowledge and competency in using a graphic software tool to design a STEM application system to showcase their learning and teaching ability. Thru this activity, the Educatorss will further enhance their complex problem solving, creativity, critical, computational and design thinking abilities.	2 Hours
20.	Prepare and Work with Audio Visual (AV) software tool. Individual activities prepare asset for design.	Educators will gain knowledge and competency in using an AV software tool to design and produce a STEM application video tutorial to showcase their learning	2 Hours

MODULE	ACTIVITY	LEARNING OUTCOME	DURATION
		and teaching ability digitally. Thru this activity, the Educators will further enhance their complex problem solving, creativity, critical, computational and design thinking abilities.	
21.	Design and Develop a PBL (Project based Learning) lesson plan as per provided template. Group activities, Individuals Assessment #3 submission – "a real-world application solving a real world problem of their choice"	Educators will gain knowledge and Skills and Abilities to design and develop a modular STEM lesson plan for them or others to carry out training and workshops. Thru this activity, the educators will further enhance their Communication and Collaboration skills as well as their complex problem solving, creativity, critical, computational and design thinking abilities.	3.5 Hours

DAY 7, 8 AND 9

FINAL PROJECT DESIGN AND DEVELOPMENT

Each team will complete a final project, research, design and develop from zero a fully functional physical model showcasing solutions solving real-world problems, applying all the knowledge, attitudes, skills, and abilities they have gained throughout the program. They will also produce a 10-minute presentation video with all AV techniques they have learned in the program which they could submit and participate in any STEM or Innovation competition locally and globally.

MODULE	ACTIVITY	LEARNING OUTCOME	DURATION
22.	Project Ideation meet. Group activities to finalise the project contents and management strategy to complete the final project within 3 days for final evaluation and presentation for the Peneraju STEM Challenge 2023.	The Educators will be gaining the knowledge and understanding on how inculcate the 7 hats of leadership ability among the team members to produce desirable outcome. Each team member will take roll of a Coach, Executor, an Expert, Planner and Conductor. Thru this activity, the Educatorss will further enhance their Communication and Collaboration skills as well as their complex problem solving, creativity, critical, computational and design thinking abilities.	2 Hours 9.00am to 11.00am

MODULE	ACTIVITY	LEARNING OUTCOME	DURATION
23.	Project design and Development. Group activities, free and easy with all project materials provided for each team to design and develop their projects. Facilitator will be at their disposal to continuously coach and guide each team in endeavours.	Educators Working as a team in design and developing the project, develops their adoptability, collaborative and communication skills as well as the following skills and attitudes: - ▶ **Interpersonal Skills** Communicating, Collaborating, and Interacting with Educatorss of different background and study. ▶ **Intrapersonal Skills** The Minds-ON STEM activities induce the high ability of confidence which the Educatorss can reflect themselves in facing conflict or problems. ▶ **Design Thinking Ability** The real-world innovative projects the Educators carry out during the training, develops skills for life on human interaction, being empathy and passion in solving real-world problems. ▶ **Computational Thinking (CT) Ability** The activities that Educators carry out during the training applying the CT processes makes them become an organised person in executing any task and solving any complex problems.	- Hours 11.00am to -

DAY 10

PRESENTATION AND EVALUATION

The Final project presentation video outcome will be measured by the following criteria for judging for the Peneraju STEM Challenge 2023.

▶ Contents Collaboration and communication techniques.

▶ Contents Illustration for a chosen subject matter using STEM elements.

▶ Accuracy of contents delivered.

▶ Time management of contents delivery. ▶ Background music and sound effect applied.

▶ Presenters' delivery techniques and appearance. ▶ Creative Intro and Outro.

EDUCATORS'
ASSESSMENTS

Before commencement of class, each educator will be briefed on the assessment methods and criteria for them to be certified. They will be assessed based on knowledge and skills acquired and commitment during the training. Due the nature of the training is Project based learning; students will be further assessed on their presentation of a final projects that they will complete in a group.

The objective of this student assessment is to ensure each educator apply what they have learned to an in-depth exploration of each module presented in the training.

Following methods will be employed to access the educator.

▶ THREE (3) HANDS-ON ASSIGNMENTS

Educator will be given 3 hands-on assignments to complete, and each assignment will be awarded maximum of 10 marks for each assignment.

FIRST ASSIGNMENT ON THE THIRD DAYS (ALGORITHM CODING)	10 MARKS

Did not Complete.	5	Partially Completed.	5	Completed and Functional.	10

SECOND ASSIGNMENT ON THE FIFTH DAY (PHYSICAL COMPUTING)	10 MARKS

Did not Complete.	5	Partially Completed.	5	Completed and Functional.	10

THIRD ASSIGNMENT ON THE SEVENTH DAY (LESSON PLAN DEVELOPMENT)	10 MARKS

Did not Complete.	5	Partially Completed.	5	Completed and Functional.	10

FINAL GROUP PROJECT

Educator will be completing a final project in a group which carries a maximum of 40 marks of the total score for each student. Each student in the group will take turn to present their project and the group will be accessed based on the followings: -

NO	EFFORTS	MAX MARKS
1.	Novelty	5
2.	Functionality	5
3.	SDG references	5
4.	Diversity of Material STEM Elements Applied	5
5.	Creativity	5
6.	Collaborations	5
7.	Documentation	5
8.	Project Presentation video	5
TOTAL MARKS		40

Our aim of this group project assessment is to provide an opportunity for educator to work together in collaboration as a team toward a common goal, seeking solutions and solving problem, conflict that arises during the development of the project of a real-world which will provide a better retention of knowledge learned.

PRE AND POST TRAINING SELF-ASSESSMENT SURVEY

This Pre and post training Self-Assessment survey carried out by educators via Google form by answering 10 objective Questions on the first day and last of the training. This survey is to identify educator's pre and post training knowledge, Attitude, and Skills. The Google Link QR Code will be displayed on the presentation screen for student to access the link to complete the questionnaire.

PRE AND POST TRAINING SURVEY QUESTIONNAIRE

1 What percentage of your knowledge about STEM Education?

2 How much do you know about Arduino Microcontroller?

3 What percentage do you know about Flowchart?

4 How much do you know about Algorithms?

5 What percentage of your knowledge about Electronic Components?

6 What percentage of your knowledge about Sensors?

7 What percentage of your knowledge about digital circuit sketching tools?

8 What percentage do you know about Audio/Visual Software?

9 How much confidence do you have in building digital equipment?

10 What percentage of achievement do you want to achieve for this training program?

ANSWERS FOR ALL QUESTIONS:

5%	15%	25%	50%	75%	100%

EXHIBIT "A"- EDUCATION 4.0- DIGITAL STEM EDUCATOR

TRAINING
ADMINISTRATIVE DETAILS

What percentage of your knowledge about STEM Education? ?

Any Individuals who aspire to become an entrepreneur and an educator in Digital STEM Education field. This program is also suitable for any individuals from any industry and education institutions to boost the employability and entrepreneurships.

Pre-Requisites ?

- ▶ 17 year and above.
- ▶ Owns a computer with Internet connection.
- ▶ Proficiency in computer usage.

Training Duration based on Hours ?

- ▶ 60 Hours – 2 Phases
- ▶ 30 Hour per Phase

Training Duration based on Days ?

- ▶ 10 Days - 2 Phase
- ▶ 5 Days per Phase

No of Participant per Session ?

- ▶ 15 (Min) – 25 (Max) participants per class.

Certification ?

- ▶ Will be awarded by: **Established 5 STAR University "Certificate of Competency"**

Facilitator per Session

- 1 Lead Trainer
- **2 Facilitator**

Training Resources

Each participant will receive the following: -

- 1 unit of STEM & 4IR Exploration kit (All the required components for the 10 days of Training and Final projects- Microcontroller, Electronics, Sensors, I2C bus field devices, modules, and Accessories).
- **FlowLogic 6** Software tool - Visual Flow Chart based algorithm programming software tool.
- Microcontroller activation code.
- Application development tools.
- Training Guide (Softcopy).
- STEM Pedagogy Booklet.
- Project and hands-on activity materials.
- Access to Online IOT Platform for Data Monitoring and Analytics..
- Access to Mobile Device for Data monitoring.
- Access to Remote Server for data storage.

Training Delivery - Physical Classroom

- Tutorials.
- Lab Works.
- Slide Presentation.
- Video Presentations.
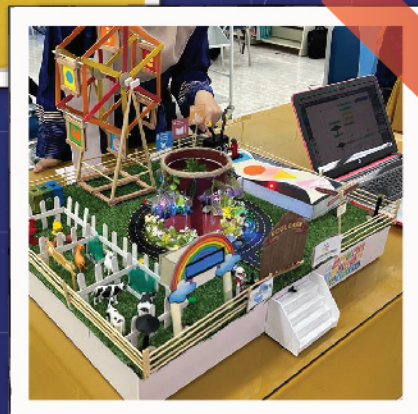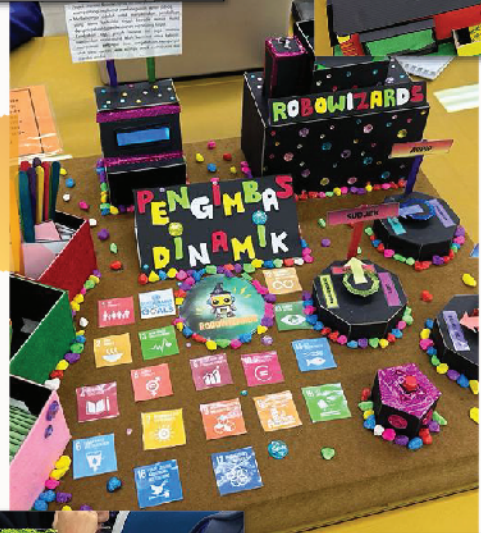- Real-World Case Study.
- Individual Hands-On Activities.

Training Facility Required

- Power outlet for each tabletop for each.
- Each participant brings their own Laptop.
- HDMI Projector.
- Whiteboard with Stand and Marker.
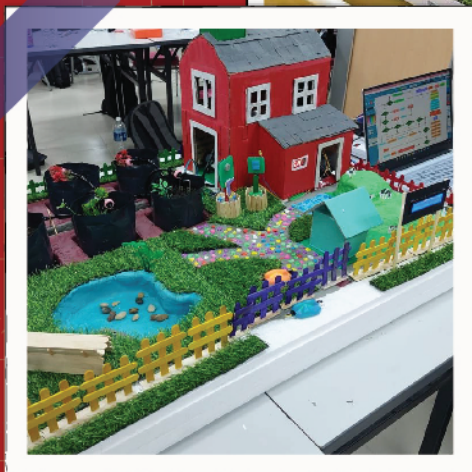- Recommended Layout - Student sit in a group 5.

Final STEM Projects

DESIGNED AND DEVELOPED THRU TEAM COLLABORATION

Final STEM Projects

DESIGNED AND DEVELOPED THRU TEAM COLLABORATION

Design and developed by:

MyFlowLab Inc.

A9147, Robinson St #1G,
Overland Park, KS 66212,
United States of America.

913-660-0550
Roger Thang

Malaysia Office:

A28-01, Ativo Suites,
Damansara Avenue,
52200 Kuala Lumpur,
Malaysia.

+60 19 357 0206
Loganathan Alagan

Get In Touch

inquiry@myflowlab.com

www.myflowlab.com

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Education