

## Technological Education: Introduction to Drones, Robotics and Virtual Reality



Group photo at the end of the training



Participants configuring an engine

OVERVIEW	
<b>Flying Labs</b>	Togo Flying Labs
<b>Location</b>	Lomé, Togo
<b>Date</b>	26th to 30th August, 2024
<b>Length (number of days)</b>	5 days
<b>Sector program (optional)</b>	<a href="#">YouthRobotics</a>
<b>Format</b>	In-Person
<b>Co-organizer if applicable</b>	Not applicable
<b>SDGs</b>	<a href="#">GOAL 4: Quality Education</a>

SCOPE & OUTCOMES	
<b>Type of training</b>	<ol style="list-style-type: none"> <li>1. Introductory drone training (professional drone and programming with Tello Edu)</li> <li>2. Youth/STEM training</li> <li>3. Training in virtual reality and programming with Arduino</li> </ol>

<p><b>Goal of the training</b></p>	<ol style="list-style-type: none"> <li>1. Raise awareness and introduce young people to the use of drones and robotics, exploring their various real-world applications.</li> <li>2. Train and empower young people to become tomorrow's skilled drone workforce.</li> <li>3. Encourage interest in STEM (Science, Technology, Engineering, Mathematics): Stimulate young people's curiosity for science and technology through hands-on, fun activities.</li> <li>4. Introduce young people to the virtualization and programming of Arduino kits.</li> </ol>
<p><b>Expected outcome for participants</b></p>	<ul style="list-style-type: none"> <li>● To acquire practical, fundamental skills in drone piloting, Arduino programming and the use of virtual reality. They yearned to understand how to apply these skills in real-life contexts, particularly in STEM fields.</li> <li>● To strengthen their interest in innovative technologies, while developing their creativity and problem-solving skills.</li> <li>● To take part in stimulations, interactive learning, preparing for future opportunities in the technology field.</li> </ul>
<p><b>Confirmed outcome after training</b></p>	<p>Thanks to this training, participants understood the characteristics of drones, used flight simulators, and acquired practical skills in drone piloting as well as in programming with Arduino, through small projects such as setting up traffic lights and access controls. They also explored the creation of virtual reality environments using Meta's Oculus Quest 2 headsets. In addition, they developed resources such as interactive prototypes and technological projects applicable to their studies or work. These skills will enable them to improve their ability to innovate, solve technical problems and integrate technologies into their day-to-day projects, increasing their productivity and expertise in these emerging sectors.</p>
<p><b>Eventual next steps</b></p>	<p>The next step is to set up a mentoring program for participants interested in deepening their knowledge of technology. This program will help them fully integrate these skills into their studies, while promoting the development of partnerships to make training accessible to all young people.</p>

**PARTICIPANTS**

<b>Profiles and number of participants</b>	13 students aged 6 to 17 years.
<b>Name of participants' organizations</b>	<ul style="list-style-type: none"> <li>● Collège Notre Dame des Apôtres (NDA)</li> <li>● Collège Notre Dame de l'Église (NDE)</li> <li>● Institut Polytechnique du Golfe (IPG)</li> <li>● Groupe scolaire René-Martine (RM)</li> </ul>
<b>Gender ratio</b>	8 Males : 5 Females
<b>Who paid for the training?</b>	Parents and guardians
<b>Participant fee rate (if applicable)</b>	\$25
<b>Scholarships offered?</b>	No.

CONTENT	
<b>Training components</b>	<p><b>Technology overview:</b> Introduction to drones, Arduino, and virtual reality, with their applications and career opportunities. Immersive experience with oculus quest 2: Exploration of virtual reality environments to understand their possibilities.</p> <p><b>Drone flight rules:</b> Mastering safety rules and regulations for safe flight.</p> <p><b>Drone flight simulator:</b> Flight training using a simulator to develop skills without risk.</p> <p><b>Programming with Arduino:</b> Introduction to programming to create interactive projects.</p> <p><b>DroneBlocks for Tello Edu:</b> Simple programming of Tello Edu drones with the DroneBlocks tool.</p> <p><b>Flying professional drones:</b> Learn how to prepare and pilot a professional drone in complete safety.</p> <p><b>Concrete projects:</b> Practical projects such as traffic lights and access control.</p>
<b>Training resources used</b>	<ul style="list-style-type: none"> <li>● Software: Arduino IDE, Tello, DJI Go4, Drone block, Meta horizon.</li> <li>● Hardware: laptops; Tello Edu drone, DJI Phantom 4 proV2 , tablets, Real flight Simulator controller, Oculus Quest 2 virtual headset, Arduino kits.</li> </ul>
<b>Approaches and methods used</b>	<ul style="list-style-type: none"> <li>● The course was adapted for beginners with simple explanations, progressive hands-on activities and</li> </ul>

	<p>interactive tools such as DroneBlocks. Immersive, hands-on projects kept participants interested.</p> <ul style="list-style-type: none"><li>● Learners carried out practical tasks in teams, under the supervision of instructors, after receiving an overview of the course and watching on-screen demonstrations. For drone piloting, they went to the dedicated site to take full advantage of the experience.</li><li>● At the end of the course, learners presented mini-projects and carried out practical demonstrations, which served as a final assessment.</li></ul>
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