

Implementation Report

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| Date | October 2022 – March 2023 |
| Description | Nikita Maria's "Sustainable Village" scenario is a dynamic educational approach that merges environmental awareness, computational thinking, and programming skills. Targeted at 13-14-year-old students over four teaching hours, the project revolves around illuminating a village responsibly while addressing energy efficiency and light pollution. Students learn to recognize and apply algorithms, troubleshoot programs, and gain competence in imperative programming, all while designing and programming complex robotic devices. The interdisciplinary approach integrates environmental education and informatics, aligning with Sustainable Development Goals. It presents a real-world problem—efficient village lighting—and engages students in activities that encourage critical thinking, collaboration, and the application of IT skills to environmental challenges. In the end, it instills not only computational proficiency but also a sense of environmental responsibility.  The scenario unfolds in phases, with students creating circuits for streetlights and house exteriors that respond to darkness and proximity, respectively. These hands-on activities are supported by resources like worksheets, projectors, computers, Pictoblox software, and Arduino kits. By embracing teaching methods rooted in guided discovery, constructionism, and social constructivism, the "Sustainable Village" scenario empowers students to actively participate in their learning, fostering critical thinking and collaborative skills while addressing real-world sustainability issues. |
| Estimated Reach (students) | Approximately 100 students aged 13-14 years old, divided into groups of three. |
| Results | 1st Phase: Introduction (1st Teaching Hour)  Students were introduced to the concept of light pollution and its environmental impact.  Engaged in a discussion on responsible energy consumption and illumination solutions for a village.  Explored photosensitive resistors and proximity sensors.  Examined a 3D-printed "Sustainable Village" maquette.  2nd Phase: Street Lights Circuit (2nd Teaching Hour)  Students collaboratively created a circuit simulating street lights that turn on in darkness using photosensitive resistors.  Successfully programmed the circuit using Pictoblox.  Conducted testing and debugging to ensure the correct behavior of the circuit.  3rd Phase: Exterior House Lights Circuit (3rd Teaching Hour)  Students collaboratively created a circuit simulating exterior house lights that turn on when someone approaches using IR sensors.  Effectively programmed the circuit using Pictoblox.  Conducted testing and debugging to ensure the correct behavior of the circuit.  4th Phase: Placement on Model and Discussion (4th Teaching Hour)  Students placed LEDs and sensors on the "Sustainable Village" maquette.  Successfully monitored the operation of circuits on the model.  Engaged in a discussion reflecting on difficulties faced, potential improvements, and shifts in their attitude towards programming and circuits.  Overall Observations:  The lesson effectively introduced students to the concept of light pollution and sustainable energy solutions.  Students demonstrated strong collaboration skills during circuit creation and programming.  The use of tangible models (maquette) enhanced understanding and engagement.  The guided inquiry approach facilitated learning of programming concepts.  Students reflected on their learning and demonstrated a positive shift in their attitude towards automation and programming.  Recommendations:  Encourage students to explore additional applications of automation and sensor-based control.  Consider expanding the lesson to simulate more complex scenarios in smart cities.  Offer simulations using Tinkercad for distance learning or classrooms with limited equipment.  Conclusion:  The implementation of the "Sustainable Village" lesson successfully integrated environmental education, computational thinking, and programming concepts. Students engaged actively in circuit creation, programming, and problem-solving, demonstrating an improved attitude towards technology and sustainability. |