

# STE(A)M IT STORIES OF IMPLEMENTATION

## Title of your Story

Light up Future Homes

## Keywords

Project Based Learning; Sustainability; Robotics; Programming; Arduino; Electrical Power Consumption Efficiency

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## The Learning Scenario Implemented

Add below the link to the learning scenario you implemented in your class. The link must directly point to the resources on Scientix Repository and STE(A)M IT Website.

<http://steamit.eun.org/light-up-future-homes/>

<http://www.scientix.eu/resources/details?resourceId=28402>

## The Implementation Context

Briefly describe the context of your implementation, specifying what subject(s) you chose to implement the learning scenario in, how those subjects relate to STEM careers, what was the students' age(s), the size of the group, previous familiarity with real life scenarios, what real-life questions did you choose to address, etc. We aim to gather stories of **classroom implementation**, so the context must appropriately reflect this. (maximum 300 words).

We implemented the “Light up future homes” Learning Scenario within our GPSI course (Management and Programming of Computers' Systems), a professional course. The class had seventeen students with an average age of seventeen years.

This kind of scenarios, involving different subjects with teachers from different departments, allows a wider approach to the daily/real life situations were matters from different subjects come together. So, this is a way to “bring” our students to real-life situations and it can be an efficient method for our students to better assimilate different subjects. In this particular case we started from the real-life question: Is it possible to save energy with automatic light control at home?



We were not used to resort to this type of interdisciplinary integration and the students were reluctant at first, because they were not familiar with this kind of approach. However, once they started to get their hands on the project, the enthusiasm was great.

They could relate with careers such as: computer programming; electrical engineering; architecture; energy efficiency.

## The Narrative

**What did you do?** Describe how you used the selected learning scenario in your teaching. For example, what was the structure of the lesson activities; did you make any adaptations to the resources? Did you include any online activities in the implementation? (maximum 200 words).

We picked the “problem” of efficient lightning of a house and used an Arduino-based solution where light sensors (LDR) were implemented and used to determine if the light of a house room (kitchen, living room, hall, bedroom, drycleaner, etc..) should be turned on or off according to that room’s light level. We sent these values to the Arduino and it would turn on or off the LEDs of each room, individually, according to the thresholds we defined.

Most of our activities were aimed at determining the optimal values (thresholds) for light conditions that would determine when to turn the lights on or off.

We used Tinkercad Circuits to help with Arduino based simulations to our project, which was our online activities. We also did some extents to the initial LS: we expanded the original LS activities by adding temperature and humidity control, as well as motion detection sensors, controlled by an alarm setup.

We used knowledge previously acquired in subjects as Mathematics, Physics and Computer Science to implement and improve the Learning Scenario.

## The Collaboration Process

**How did the collaboration with other teachers go?** Please, describe how was working together with the other teachers and what was the approach to carry out the lesson(s). (maximum 150 words).

To make effective use of a Learning Scenario created to support the integrated STE(A)M approach, teachers and students should carefully articulate the learning sequence to better explore the inherent skills and further develop the practical approach.

The experience in collaborating with teachers of other departments is very enriching because it allows an integrated view of the application of the various contents – which is different from traditional teaching.



## Learning Outcomes

**What did you achieve?** Describe the main learning outcomes you achieved with the implementation of the Learning Scenario. Tell your reader about anything that supports your case for achieving these learning outcomes. For example, students' view, or any other evidence<sup>1</sup> that illustrates the benefits and impact of using this Learning Scenario? (maximum 300 words)

The students to whom this LS was applied appreciated it so much that some of them wanted to make it their final course project.

The students accomplished all the objectives set, in terms of essential learnings and skills.

As they built the house and analysed the illumination issues, they integrated positively the knowledge of the different subjects while solving real life questions.

The learning outcomes are summarised in the photographic record of the project development presented below. Also, the final Course Projects are presented publicly at the term of the school year. A copy of their work will become available then.



<sup>1</sup> Remember to refer to the point 6 of the guidelines.



## Teaching Outcomes

*What did you, as a teacher, get out of teaching with a STE(A)M IT Learning Scenario and resources? How did the usage of the STE(A)M IT Learning Scenario go? What should teachers and students watch out for to make effective use of a Learning Scenario created to support the integrated STEM approach? Please also describe your experience in collaborating with teachers of other subjects. What was different from traditional teaching? What advice would you give to another teacher planning to implement the same Learning Scenario about the achievement of the desired learning outcomes? (maximum 300 words).*

The implementation of the learning scenario went quite well.

The main differences were basically focused on our teaching methods: instead of students being mere recipients of knowledge, they were introduced to more practical ways of handling a question. The students responded positively to this approach, which was somewhat expected, mainly for two reasons: on one hand they belong to a generation of some degree of immediatism, and they prefer learning by experiment; on the other hand, they were students of a Professional Course which is, in its essence, much more practical and less theoretical.

We would recommend other teachers that are planning to implement the same Learning Scenario to achieve the desired learning outcomes let their students “play” with Arduino for a while before they engage in full activity, in order that they can explore it and get interested in robotics, showing them that robotics can indeed be fascinating and have a very practical way of dealing with real-life situations. The interest and the will to participate in STE(A)M approaches will be then become natural to the students.

The assessment of the work is done by the Final Course Project’s grade, which includes continuous formative evaluation and its public presentation.

## Challenges

*Did you face many challenges? If yes, how did you address them? Tell us more about your implementation issues, obstacles (practical or in relation to your school’s organization/resources/environment), communication and planning issues, lack of knowledge, attitude towards STEM, etc. What did you do to overcome these challenges? (max. 200 words)*

The acquirement of physical resorts, due to administrative requirements, is somewhat time-consuming which slows a bit the availability of all the required materials.

**Thank you!**

