MEDELLIN Valle_del software

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OBSERVATORIO de Sapiencia

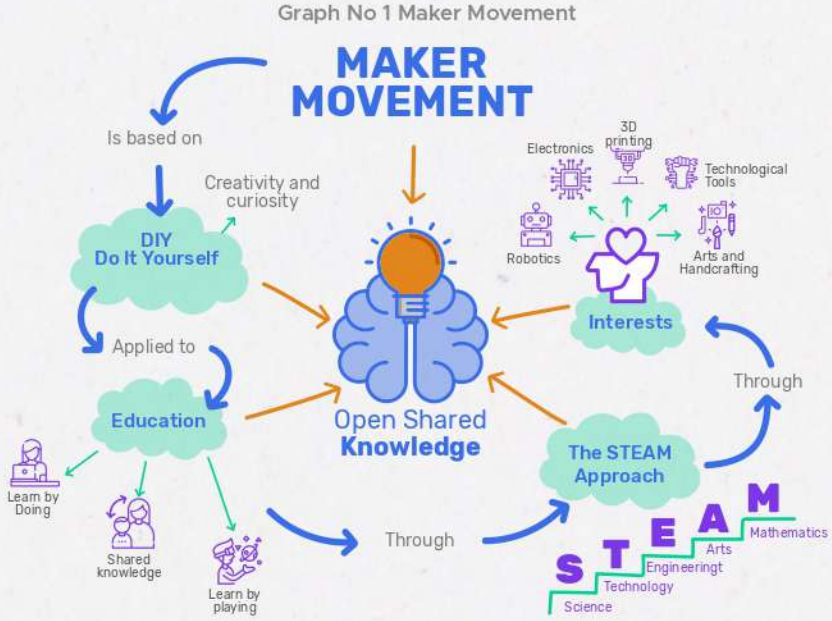
The District's MAKER`S community

A strategy for learning
the XXI century skills

The Maker community is a stream of people and groups that create collaborative spaces to promote innovation and progress, where creativity, experimentation, learning and coordination with others are vital to achieve it. Among its most important mottos are Do it Yourself-DIY- and Doing-with others-DIWO- reflecting the curious, entrepreneurial and collaborative spirit, and the desire that knowledge . is disseminated in society so that it becomes innovative learning. Here it is common to find technologies and instruments that promote creation such as 3D printers, laser cutters, electronic programming, carpentry and metalworking tools, among others.

The objective of this community is to create innovative solutions to different social and environmental problems, based on experimentation, open and shared knowledge.

Graph No 1 Maker Movement



Source: Adapted based on a TECH Maker Space chart (n.d.) as cited in eTwining (2016)

Sapiencia, as one of the entities that promotes the democratization of knowledge and the insertion of the District's population in Fourth Industrial Revolution issues, has created a space for the Maker Community of Medellín (known as makerspaces) that functions as a laboratory within the **Citadel of the Fourth Revolution, the Transformation of Learning-C4TA**, located between communes 12 and 13.

This laboratory is focused on Maker education, promoting the integration of STEAM (Science, Technology, Engineering, Arts and Mathematics) areas and training in 21st century skills such as curiosity, initiative, technological practices, numeracy, critical thinking, creativity, among other; and technical skills that characterize the members of the Maker community such as: 3D modeling, carpentry, electronics, 2D design, microcontrollers and textiles. From this experience, research and innovation activities are promoted on four fronts:

1. **Robotics**
Discipline that deals with the design, operation, manufacturing, study and application of robots.

2. **Automation**
It consists of using technology to perform everyday tasks with very little human intervention.

3. **Precision Farming**
It includes the application of new technologies to agricultural production in order to improve crop productivity and reduce environmental impact.

4. **Environmental measuring**
Process for measuring and recording meteorological variables. These data are used to prepare predictions from numerical models for climate studies.

Members of the Maker community typically have a creative and entrepreneurial mindset, value experimentation, and share a taste for technology and innovation. In 2012, Dale Dougherty, founder of the technology magazine Make and who is considered the father of this movement, wrote a manifesto for the Maker community that summarizes the principles and values that guide the making of this group. Sapiencia has adapted this manuscript to the characteristics and needs of the local Maker Community, as follows:

C4TA LabMaker Manifesto

1. **Enrich the training of students** by preparing them for a future in which innovation and entrepreneurship play a fundamental role in success.

2. **Stimulate skills** such as logical and creative thinking, critical analysis, the scientific method, digital fluency, computational thinking, problem solving, among others.

3. **Use innovative methodologies** such as Project Based Learning (PBL) and collaborative work in which the students themselves document their work.

4. **4.Promote creativity,** because students become the main protagonists and are responsible for finding the solution to the problem or challenge posed. These attitudes imply a change in mentality and promote
new creations.

5. **Propose recreational activities** where gaming is a basic pedagogical element to develop creative thinking in students.

6. **Generate participation** where the student transcends from being a listener who learns through traditional methodologies to a person who is committed to doing and being also a fundamental part for the achievement of the objectives set.

7. **Provide learning environments** with innovative resources, such as tablets, 3D printers, educational robotics kits, creative electronics materials, virtual and augmented reality, among others.

8. **Allow learning from mistakes** (trial/error learning method), since students are aware of the reality of their creations. Failure is not interpreted as something negative, but rather it allows experiences of reflection that help to avoid making the same mistakes in the future and to open new paths of work and research.

9. **Share ideas,** projects and resources to inspire and train others.

10. **Committ to inclusion and diversity,** we want to achieve accessibility to technology and innovation for all people.

Currently, in Sapiencia there are four projects, some in execution and others about to start, that boost the work of the **Maker laboratory in C4ta** and in the Special District of Science, Technology and Innovation of Medellín:

Image: Juan Pablo Peláez
C4ta Maker Community., 2023

Environmental measurement equipment for document reservation spaces:

It allows analyzing the measurement of humidity and temperature present in the space of an archive, according to the regulations of the General Archive of the Nation to avoid deterioration and guarantee its conservation. This project is in the development phase, and has been implemented in the Sapiencia facilities in the area of document management.

[1] Computerized (CNC). They are cutting, engraving and/or marking equipment, which controls the position and speed of the motors, through a computer that drives the axes of the machine.

Agrobot

Derived from FARMBOT, an open source project that consists of a CNC[1] machine that allows automated planting, irrigation and harvesting. The first phase with the planting beds is completed and the acquisition of electronic components is being managed. The precision agriculture seedbed is the key piece for the development of this project.

Environmental Measurement Stations

By building independent equipment for different measurements of wind, water and land, we are expected to achieve the construction of complete meteorological stations that integrate the independent equipment. The environmental measurements seminar will be in charge of this project, which is in planning for the first half of 2023.

LEGO Robotics

It is projected that, through the use of different brand kits, work will be done with groups from preschool to university level, in strengthening creative and motor skills, until reaching the construction of devices that can be used for different national and international competitions.

Sapiencia promotes these spaces with the opening of the aforementioned seminars that are aimed at students from the three HEIs of the District, but which are expected to expand with the participation of different populations from the communes near the Citadel. In this way, within the framework of Medellín Valle del Software, the Agency joins some initiatives that exist in the city, such as the MAKERON laboratory of the Pascual Bravo University Institution, (focused on engineering), to promote social innovation scenarios. where students who love and are curious about technology can learn and have technological knowledge even without having knowledge of it, helping them develop their own ideas and projects through experiences in the Maker laboratory.

To obtain more information and carry out the registration process for each of the hotbeds, you can consult the managers of the universities that are in the C4TA Citadel, which is located at:

Pedestrian Entrance: 42C street # 95-51, Campoamor in front of the San Javier Public Library.

Bibliography:

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