



DigiEduHack Solution
Argentina - Education reimaged: a greener EU-Mercosur future
Challenge: Argentina - Education reimaged: a greener EU/Mercosur future Challenge 2020

Remote Matter Labs

Solution to use a real lab (non virtual) remotely for student

Technical careers require the use of labs facilities for knowledge accreditation, many young people are excluded from these careers because they live far from big cities, remote labs allow access to these students and institutions of vulnerable areas that could never have many of today technologies

Team: DiBSiP Innovations

Team members

Diego Hugo Barrera, Silvina Carla Prieto

Members roles and background

DIEGO HUGO BARRERA

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Solution Details

Solution description

"Remote Matter Labs" are labs modules prepared to be operated remotely, as they are real laboratories, not virtual ones, they allow more features than the simulators that are usually used to overcome shortcomings in laboratory equipment. These remote labs contribute to sustainability by reducing the mobility of students to and within large urban centers and provide accessibility to high-cost technologies and knowledge to students and institutions with fewer resources, also allowing access not only to equipment but to advice by specialists on the subject, achieving a real democratization of STEM careers.

Digital education is currently based on digital content: wikis, digital platforms, simulators, etc. Which are very useful for theoretical careers or subjects or simulated (virtual) demonstrations, but the laboratory experience is irreplaceable since physical phenomena are often unrepeatably (even with the most powerful simulators on the planet), we bring a laboratory (of any kind) to the student's home through remote access via PC or mobile

Success can be easily measured by the degree of expertise developed by the students, of these careers, with the acquisition of new knowledge and technical skills, then comparing them with who attend in person to laboratories.

Solution context

The COVID19 pandemic has exposed certain problems already established and has challenged us to develop different solutions to overcome the restrictions and continue with the different activities to which we were used to. One of the activities that has been most affected by the pandemic was education and within education, the access to STEM career practices, but this was already a problem in a country like Argentina with more of 3M km² in extension with very marginal areas that certain technologies never arrive.

The main challenge we solve is related to the mobility (travel and stay) of low-income students from marginal areas of this vast territory who cannot attend in person to educational institutions in technical areas (since high school to universities) generally located in large cities, making technical careers exclusive for them, generating unequal access due to place of birth and socio-economic condition. Our solution allows anyone from any remote location on the planet to access the latest technology available in laboratories and if they are installed in specialized institutions, have the support (maintenance), and expertise of that institution and its staff. In addition, the care of the laboratory elements is improved, since there is no way that they were damaged or stolen by those who use them (which is a recurring problem in the laboratories of universities or institutes when working without proper supervision).

Solution target group

The target group is low-income students and institutions, or far from the metropolis.

Solution impact

The impact is educational inclusion at levels never seen before, careers of any kind can be studied remotely and with the latest technology, collaborating between large regions with complementary developments, such as Mercosur and the European Union.

It is measured by the degree of expertise developed by the students, with the acquisition of new knowledge and technical skills, then comparing them with who attend in person to laboratories. And mainly by the rise in number of students of these careers

Solution tweet text

Work in real laboratories, with latest technology, remotely from anywhere, in the same way that today is done with laboratories on Mars but on earth, for students and institutions less favored by resources or distance and with a simple PC or mobile

Solution innovativeness

The idea is original and different from everything known for its low implementation cost and adaptability to existing facilities there are countless virtual simulators on the market with excellent performance (including virtual reality or augmented reality), but none of these can simulate all the physical and chemical phenomena that are generated in nature, for this reason the physical laboratory is irreplaceable, but what is not impossible is its remote control that is the basis of the idea that we propose and implement in classes dictated during the COVID19 pandemic.

In the market there is only something similar in space agencies, where complete laboratories have been set up for space exploration (for example Curiosity on Mars), or in a more limited way in the nuclear industry with radiopharmaceuticals or radiochemistry that have to be operated remotely for radiation protection of the operator, but in the educational field it is absolutely original.

Solution transferability

The solution can revolutionize the entire laboratory system as we know it today, they can be assembled in universities and research centers specialized in a certain area, with experts who assist or perform maintenance, allowing a better use of educational resources throughout the world, almost a "timeshare" of high-tech laboratories, in the same way that today is done with supercomputers in the scientific area. Even can be used to give accessibility to technology for I+D to startups for entrepreneurs.

The concept of remotely managing a laboratory is applicable from physics, chemistry, the most expensive engineering in terms of laboratory assembly (aeronautical, nuclear, electronics, civil, electrical, mechanical), as in technical schools and institutes that need to accredit hours laboratory and do not have them or are of very low performance (poor areas of the planet)

Solution sustainability

The plan consists of assembling various equipment (some of which we already have working and being used by students), for technical schools affected by the pandemic, then use these modules for schools that have not been able to access this technology due to economic reasons or availability problems of adequate place to install a laboratory, and finally in the long term, begin to adapt the

laboratories of universities and institutions that have real working laboratories (with staff in charge and specialists) to which they can be used remotely by the educational system that requires it, creating protocols of "good practices for the use of remote laboratories" as well as interfaces that are standardized (and do not change constantly as happens in the software market), to be more inclusive in their use, since these platforms may include people with different disabilities who for safety reasons currently could not even enter to the real laboratories that we intend to adapt.

Solution team work

Between the two team members we have accumulated more than twenty years of technical-educational training and we have both worked and created different startups where we have always worked as a team, we know the importance of consolidating work teams promoting complementarity, especially knowing that our project It will necessarily have a multidisciplinary impact as we will be working with different types of laboratories in different parts of the world, teamwork is crucial. And we also work on educational field.