Adapting to a New Educational Model. Teaching Science with New Resources.

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The need to quickly adapt to new methodologies arouse during the SARS CoV2 pandemic in 2020. To properly deliver science to a new generation already in training and having to quickly adapt moved us to seek new ways to continue experimentation and prototyping although we were not allowed to use standard facilities, of face to face activities. Teachers, worldwide were suddenly faced with the need to rethink the learning process, upgrade their approach, and provide meaningful experiences to students without the necessary tools and training. The ability to adapt to these trying times included the use of simulated laboratory experiences.

Professors and students alike were able to acquire a new skill set that allowed us to prototype remotely, design circuits and operate remotely equipment to continue our work. We are aware this way of working has been standard international collaboration way of doing for some years, practices not implemented in all universities, particularly for the learning process of experimental sciences.

The traditional models fail to accomplish the appropriation part of the process, mainly because participants are not directly involved and some contents fail also to contextualize the experience, thus, students are not able to connect the contents to the physical phenomena of the external world on a daily basis. The approach used includes, a full program, using declarative contents, hands on experiences online based and international seminars to keep students engaged in the process. The students can take center stage during the activities, giving them a different sense of accomplishment.

Active methodologies, to transition from face to face to an online program allows to avoid disruptions in the educational processes. The methodologies centered on students acquiring skills that will be useful in the long term, allowed to avoid desertion and disappointment on the programs. Students and professors alike had to upgrade their skills to face the challenge and at the same time deal with the content Based curricula from the institutions.

One of such experiences, constitutes the use of simulation software and to be able to uplink equipment with laboratories to provide healthy distance during the sanitary contingence. Using Multisim, Tina and KiCAD we were able to provide meaningful experiences to students, and at the same time, design and construct remotely prototypes that are to be operational in the next days.

Using such software, we were able to simulate, the operation, design and outsource the construction of a Data acquisition board and a High Voltage source. Also, we have designed an instrumentation course remotely. In surroundings where students are not able to share equipment due to limitations in space and equipment, to perform simple tasks from the security of their homes, allowed us to expand the possibilities of new methodologies to deliver content for the teaching of Experimental Sciences.

After 150 days of quarantine, the net result is 5 prototypes, 2 papers presented to international conferences and 4 students interested to participate in international exchange programs. Creatively using external resources allowed us to reach broader audiences and higher standards.