

Country Focus:
Mexico and Brazil



Two institutions have been collaborating for the past year within the ITEN Project Team framework to advance STEM teacher education across both North and South America: the **Mexican Physics Society** and the **University of the State of Amazonas** (Brazil).

in 2020, the executive board of the Mexican Physics Society voted to **establish a new division for physics education**, opening up the society to include physics educators and alongside research physicists.

With the support of an ITEN Seed Grant, the Mexican Physics Society has established a series of activities to support physics educators in Mexico, specifically, and to advance evidence-based pedagogies for STEM education across the region through collaborations with partner institutions, such as the University of the State of Amazonas in Brazil, which hosts its own set of activities through the Latin American Science Education Research Association (LASERA).

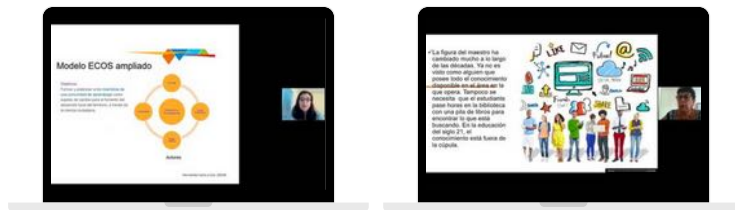
With the creation of the new division on education, the Mexican Physics Society has adopted the following objective to contribute to the pre-service and in-service education of physics teachers in STEM methodologies by:

- Establishing an online academic network to offer free courses focused on new trends in science teaching
- Carrying out a seminar on new trends in physics teaching
- Producing bibliographic materials in digital format that is freely accessible to teachers
- Create a virtual repository of supports for physics teachers
- Host monthly webinars about physics and STEM teaching

ITEN Seed Grant funds have supported the execution of various virtual activities to help achieve these goals.



Visit the page to see activities.



3,000+

teachers have participated in the online webinars live and through social media.

Events partially funded by the ITEN Seed Grant include the following:

8th Manaus Latin American Science Education Research Association (international, based in Brazil), held 24 September 2021, with the theme, "Science Education Experiences with Active Methods: STEAM and Cultural Diversity in Modern Times." The event included **115 contributions from educators.**



1,400+

teachers attended the symposium.



National Physics Conference (Mexico), held 3-8 October 2021, which for the first time permitted contributions on physics education. A total of **77 posters on physics education** were presented, as well as numerous plenary presentations specifically focused on matters of teacher education. Contributors included educators from Mexico and Brazil.



El Congreso Nacional de Física de la Sociedad Mexicana de Física® reúne anualmente alrededor de 2000 investigadores, estudiantes y docentes de la física de todo el país. El Congreso consiste de una serie de pláticas plenarias sobre problemas de frontera en diferentes campos de la física, mesas redondas donde se discute la política científica actual así como de exposiciones orales y murales de los trabajos de investigación realizados por la comunidad en las disciplinas de:

- Astrofísica
- Ciencias de la Tierra
- COVID-19
- Dinámica de Fluidos
- Enseñanza
- Estado Sólido
- Física Atómica y Molecular
- Física Nuclear



2021 Regional Conference of the Latin American Science Education Research Association, held 27-29 October 2021, with the theme, "Science Teaching with STEAM in the World Pandemic."



A final event, the annual meeting of the Education Division of the Mexican Physics Society, will take place on December 16 and 17.

Additionally, two members of this Project Team received ITEN Teacher Leadership Funds to carry out independent activities to advance their leadership in STEM teacher education.

César Eduardo Mora Ley, a professor at the National Polytechnic Institute, and **Josefina Barrera Kalhil**, a professor at the University of the State of Amazonas in Brazil, collaborated throughout the the Project Team period to develop an approach to teaching called **Philosophy for Children and STEAM for Science Teaching**.

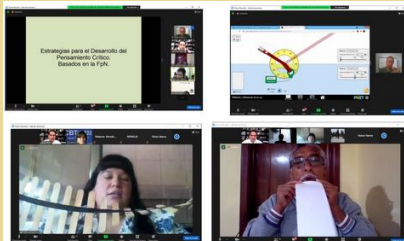
The "Philosophy for Children and STEAM" approach to teaching emphasizes the process of creating scientific knowledge, how scientific knowledge and practice is different from other fields, and promotes act of metacognition (thinking about thinking) that is inherent to complex learning and problem-solving.

César and Josefina collaborated to implement and test their approach to science teacher education in their own contexts in unique ways:

César collaborated with his doctoral student, **Domingo Villamil**, to develop a workshop on Philosophy for Children and STEAM over three days.

The workshop served the pre-service teachers from Center for Technical, Industrial, and Service Undergraduate Studies No. 222 (CBTIS 222 Plantel Pachuca) of Mexico.

As part of the workshop, teachers shared how they plan to apply the approach.



Josefina developed an 8-hour workshop to accompany her university's Physics I, II, and III courses for in-service physics teachers earning their graduate degree.

Teachers used the Philosophy for Children approach to teach STEM subjects with:

- Arduino
- Tinkercad
- 3-D printers
- low-cost materials



Other master's and doctoral students from the university were invited to see participating teachers' final projects and share their learning.



Sociedad Mexicana de Física
División de Enseñanza

Taller de Filosofía para
Niños y STEAM para la
enseñanza de las ciencias

28 de junio - 2 de julio

Cesar Eduardo Mora Ley

Domingo Villamil

30

teachers participated in this extended workshop from 28 June to 2 July 2021.

30

teachers took this face-to-face workshop on 27 August 2021 as a special part of their graduate program.