

State of Engineering for Global Development



Latin America

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Executive Summary & Disclaimer

To E4C's knowledge, this is the first report of this kind to attempt to list out all the definitions, views, programs and faculty who work in Engineering for Global Development in Latin America. We recognize that there will likely be missing information in this first edition. If you identify any programs or professors that you believe should also be included in this report, please email us at research@engineeringforchange.org.

Introduction

Engineering for Global Development (EGD) is a growing field in which technology and design are utilized to support communities around the world and improve quality of life. EGD as defined by Engineering for Change (E4C) is an interdisciplinary practice that aims to improve the living conditions of underserved communities worldwide through the design and delivery of technology-based solutions combined with the building of local capacity. E4C believes that to do this effectively, practitioners must integrate their technical training with an understanding of economics and business, social science and politics to benefit people living in poverty.

In the Latin American region there has been an increased interest in the practice of EGD. Despite its abundant natural resources, thriving economies and growth potential, poverty and inequality exist across the region. The region encompasses 26 countries and dependencies, comprises almost 13% of the Earth's surface area and has a population of nearly 650 million as of 2018¹.

The region still faces significant gaps in access to adequate systems of health, education and basic services such as energy and drinking water. As a consequence of the lack of efficiency and quality of the services provided by the State in the region, the privatization trend of public services has been seen contributing to the relational segregation². Although the measures to combat poverty and inequality in the region proposed so far are essentially political solutions, inequities still persist. Latin America is the most urbanized region on the planet with a proportion of people living in cities above 80%³, and approximately 160 million people representing 25% of the region's urban population live in slums lacking access to basic services and formal housing titles. Moreover, it remains the most unequal region in the world, with 10% of the richest people having accumulated 71% of the region's wealth by 2014, which according to Oxfam's calculations, in just six years, if this trend continues, will have increased to the richest 1% of the region having more wealth than the remaining 99%⁴.

Nevertheless, the cultural, economic and social similarities in the Latin American countries indicate that they could address the challenges they face in health, education and basic services with shared methods influenced to a large extent by science, technology, education and Innovation. The access to basic human needs can be tackled through the development or implementation of appropriate technologies and methods,

¹ [World Population Prospects: The 2017 Revision](#), Custom data acquired via website. United Nations, Department of Economic and Social Affairs, Population Division, 2017.

² [Privilegios que niegan derechos. Desigualdad extrema y secuestro de la democracia en América Latina y el Caribe](#). OXFAM Internacional, 2015.

³ [World Urbanization Prospects: The 2018 Revision](#). United Nations, Department of Economic and Social Affairs, 2018.

⁴ Bárcena, A. & Byanyima, W., [América Latina y el Caribe es la región más desigual del mundo. ¿Cómo solucionarlo?](#), OXFAM Internacional, 2016.

that take into account the need for a convergence of economic feasibility, sustainability, ethics, cultural sensitivity and technical excellence. To achieve this, the participation of academia is essential to evaluate the priority needs of the region and the ways in which they can be met.

This report aims to analyze the state of Engineering for Global Development in Latin American through the examination of the way Engineering for Global Development is viewed and implemented by different academic institutions across the region. This report attempts to comprehensively highlight the many definitions, programs (undergraduate courses, masters, postgraduate and innovation centers, etc.) and professors and research groups dedicated to this work in different countries with the intention to further connect and understand the state of EGD-related programs across the continent. It is our goal that this report will be used by students interested in pursuing EGD opportunities as well as by members of institutions hoping to connect, collaborate, and share knowledge.

Method

A list of institutions with EGD programs was generated by a team of volunteers and E4C staff. Professors conducting graduate-level research were identified from this list of institutions and relevant conference proceedings. Data from these institutions and professors were collected via phone and email interview. Only those programs and conferences that defined themselves under the umbrella of engineering for global development or its different names or denominations (that will be shown later on) and were directly part of or linked with universities/ academic institutions were included in the present report. Independent Innovation centers or organizations that also work under the EGD umbrella alongside or independently from universities were also included in this report. Notably, there are many centers (for research and innovation) in specific areas such as water, agroecology, energy or in the process of developing their programs that we are aware of but that were not included in this initial document.

Institutions that host Engineers Without Borders (EWB) Chapters as their only EGD-related program are not included in this list. However, specific EWB chapters that do offer courses through academic institutions have been included. Likewise, only those IEEE SIGHT with active projects within universities were included.

The present report is based on the following definitions:

Engineering for Global Development (EGD) - EGD is an interdisciplinary practice that aims to improve the quality of life of underserved communities worldwide through the design and delivery of technology-based solutions combined with local capacity-building. To do this effectively, practitioners must integrate their technical training with an understanding of economics, entrepreneurship, social science and politics to benefit people living in poverty. Engineering education programs that support this definition are found at many institutions throughout Latin American. Program-specific aims and goals may be broader or further specialized than the definition presented here. Likewise, terminologies and titles vary - such as "global engineering", "humanitarian engineering", "engineering for international development" or "development design"; among others. Regardless of a lack of terminology-consensus in this field, this report includes those programs that E4C has identified as supporting our overarching definition of "EGD."

Undergraduate degree (BS/BA) - Associate's or bachelor's degrees offered at an institution of higher education, such as a university or college.

Graduate degree (MS/PhD) - Advanced academic degree programs, such as Master's and doctoral degrees offered at an institution of higher education, such as a university or college.

Minor - A curricular program offered at many institutions of higher education that allows students to a second academic discipline, in addition to their main course of study (major). However, minors do not exist in Latin America and therefore are not included.

Courses - Curricular units of teaching that typically last one academic term. In this report, we include both graduate and undergraduate level coursework under this definition.

Experiential Opportunities - Experiential opportunities take place outside of a traditional classroom setting including fieldwork, internships, immersions, and study abroad.

Research - In this report, research is defined as practices that systematically investigate EGD-related topics, which lead to new conclusions and developments. These efforts are led by academic faculty members including professors, assistant professors, associate professors, and research professors.

Overview

Results from our exploration show that 28 higher-educational institutions in Latin America now offer a variety of EGD opportunities for students through curricular, co-curricular and extra-curricular programs and research. From these 28 institutions, the following EGD-related programs are available:

- Undergraduate degree: 4 institutions
- Graduate degree (masters): 3 institutions
- Courses: 20
- Research and innovation centers: 15+ institutions
- Experiential opportunities: 21 institutions

The programs included in this report range in size, sector of interest, and opportunities available.

This report highlights the many opportunities available for students to conduct research, complete coursework, receive degrees, and participate in experiential opportunities at institutions across the United States and Canada in EGD. The number of programs is continuing to grow and is gathering pace. These opportunities not only prepare students for future careers in EGD, but also allow students to develop engineering design, teamwork, and project management skills. EGD teaching in universities often focuses on a collaborative approach in their relationships and partnerships with developing communities and economies.

There remain several opportunities for curricular EGD program growth and development in Latin America. Of the 25+ institutions included in this report, only five currently offer bachelors or masters degrees in related fields. Additionally, many institutions offer introductory and capstone classes, but lack vertical integration within their EGD programs, leading to curricular gaps for students in their second and third years. Institutions with EGD programs have the opportunity to provide a context for engineering to teach the necessary skills and competencies that have not been traditionally included in engineering curriculum, which will ultimately prepare the next generation of engineers to innovate for the benefit of the common good.

EGD defined

Several countries in the region have ventured into this practice of engineering. However it has not been until recent years that the conversation has begun to define this field and establish specific processes for it through undergraduate courses, masters, postgraduate and innovation centers. In order to gain an understanding of the practices in the region, we have contacted researchers, practitioners and directors of social innovation laboratories in countries such as Peru, Colombia, Panama, Brazil, Nicaragua, Paraguay and Guatemala. In the following table the proposed definitions and comments from these countries can be found.

Panama

“Engineering at the service of social innovation: the application of engineering towards the improvement of the living conditions of communities by involving the users in the process and leveraging the power of local.” (Dania Montenegro, Universidad Tecnológica de Panamá, 2020)

Guatemala

“Engineering for Development is the application of engineering to find solutions to the problems faced by communities and people with limited resources” (Victor Hugo Ayerdi Bardales. Universidad del Valle. Personal communication, 2018)

Nicaragua

“We define it as a social service or community support” (Carlos Seballos. Universidad Centroamericana. Personal communication, 2019)

Colombia

“Sustainable Engineering is an engineering that is aligned with the SDGs and complies with the indicators from the training” (María Catalina Ramírez. Ingenieros Sin Fronteras Colombia. Personal communication, 2018)

“Engineering for Development or Engineering for Vulnerable Communities falls short for many things that need to be done. Basically what you have to do is change the way we do engineering, look for other approaches in how to look at engineering related to social studies of engineering. It is not only working with vulnerable communities but other approaches on how to do engineering. The forms have been purely vertical until now and little participatory space has been available. Whether you are in a company or community, everything is still very technical. It is necessary to stop focusing the engineering a bit on the artifact. In the end what we do is engineering for society and sometimes we lose the way we see it in our own ways. We must work with people from the initial design, who are participants in its design and operation. The information must not be centered only in the artifact, in the engineering design processes there must be more collective participation” (Nicolás Gaitán. Universidad Nacional. Personal communication, 2018)

Brazil

“People’s Engineering is a kind of engineering that tries to work with afflicted social groups which are not usually the focus of traditional engineering. Popular Engineering presents a way to change the look of the

great engineering and focuses on presenting an engineer capable of dialoguing and developing with the afflicted social groups, new ways of engineering.” (Flavio Chedid. Universidade Federal do Rio de Janeiro. Personal communication, 2018)

Peru

“Engineering for Development has to do with innovation and demonstrating how we can benefit and improve the quality of life in societies.” (Juan Antonio Paco Fernández. Pontificia Universidad Católica del Perú. Personal communication, 2018)

“In Engineering for Sustainable Development what we do is solve the problems of society such as water resources, energy access, and others that afflict the poor, through technology.” (Miguel Hadzich. Pontificia Universidad Católica del Perú. Personal communication, 2018)

Paraguay

“The application of engineering in social development is what we call "Humanitarian Engineering" and for us it is the application of applied engineering knowledge in the search for sustainable solutions for problems of underserved communities or in situations of vulnerability, involving the latter empowering them in the process.”(Osvaldo González Acosta. Universidad Nacional de Asunción. Personal communication, 2019)

Argentina

“Civic Technology: projects that combine development, technology, campaigns and data for social transformation.” (Mariano Malia, Wingu, 2020)

Summary Table of EGD Programs in Latin America

Institution & Location	Program Name(s)	BS/ BA	MS	Courses	Research	Experiential Opportunities
Mexico						
Universidad Autónoma de Chiapas	Engineering in Rural Development	X				
Instituto Tecnológico Superior del Sur del Estado de Yucatán	Engineering in Community Development	X				
Guatemala						
Universidad del Valle	Makerspace/Design and Innovation for Development			X		X
Universidad de San Carlos	IEEE Sight					X
Honduras						
Universidad Zamorano	Evaluation Center for Improved Cookstoves				X	
Universidad Nacional Autónoma de Honduras	IEEE Sight					X
El Salvador						
Universidad del Salvador	IEEE Sight					X
Nicaragua						
Universidad Nacional de Ingeniería	IEEE Sight					X
Universidad Centroamericana	IEEE Sight					X
Panama						
Universidad Tecnológica de Panamá	Panama Flying Labs				X	X
Colombia						
Universidad del Valle	Master in Sustainable Development		X			
Universidad de los Andes & Corporación Universitaria Minuto de Dios	Engineers Without Borders			X		X
Universidad Nacional de Colombia	Ingenuity, Science, Technology and Society			X		

Institution & Location	Program Name(s)	BS/ BA	MS	Courses	Research	Experiential Opportunities
Colombia						
Universidad Nacional de Colombia	Lab Campesino				X	X
Universidad de Antioquia	Engineering Projects for Community Service			X		
Universidad de los Andes	Technology and Society			X		
Universidad Sergio Arboleda	Center for Humanitarian Engineering				X	
Universidad El Bosque	IEEE Sight					X
Brazil						
Universidad Federade do Rio de Janeiro	Interdisciplinary Center for Social Development		X	X	X	
Peru						
Pontificia Universidad Católica del Perú	Rural Group			X	X	X
	Rural Telecommunications Group			X	X	X
Universidad Tecnológica del Perú	Peru Flying Labs				X	X
Bolivia						
Universidad Autónoma Tomás Frías	Engineering in Rural Development	X				
Paraguay						
Universidad Nacional de Asunción	Human Ecology Engineering	X				
	IEEE Sight					X
Argentina						
Universidad Nacional de Quilmes	Institute for the Study of Science and Technology				X	X
Universidad Tecnológica Nacional	Engineers Without Borders Argentina			X		X
Universidad Nacional de la Matanza	Engineers Without Borders Argentina			X		X

Institution & Location	Program Name(s)	BS/ BA	MS/ PhD	Courses	Research	Experiential Opportunities
Chile						
Bernardo O'Higgins University	Chile Flying Labs				X	X
Pontificia Universidad del Valparaiso	IEEE Sight					X
Universidad de Chile	Indigenous Peoples Program			X	X	X
Dominican Republic						
Instituto Tecnológico de las Américas	Dominican Republic Flying Labs				X	X

EGD Program Descriptions

The following list includes programs in universities, related Innovation centers & labs, student led associations/orgs and regional partnerships.

[Engineering in Rural Development](#), Universidad Autónoma De Chiapas, Mexico

Undergraduate: Degree focused on rural food security and sustainable development through the implementation of solutions based on community participation, environmental, economic and financial feasibility.

[Engineering in Community Development](#), Instituto Tecnológico Superior del Sur del Estado de Yucatán, México

Undergraduate: Degree focused on providing students ways to transform current social realities of rural populations through the development of strategic programs to alleviate poverty, boost economic development and generate social welfare.

[Design and Innovation for Development](#), Universidad del Valle, Guatemala

Undergraduate: Selective course on design and innovation for development through which undergraduate students work on the theme of Sustainable Homes, addressing problems of unattended communities related to water, waste, food and cooking.

External collaborations: Massachusetts Institute of Technology (MIT) D-lab.

[Evaluation Center for Improved Cookstoves \(CEEM\)](#), Universidad Zamorano, Honduras

Research: Center that provides evaluation services related to new cookstove technologies technical performance and feasibility of adoption. The center implements international evaluation protocols such as Water Boiling Test (WBT), Kitchen Performance Test (KPT), Controlled Cooking Test (CCT) and both security protocols and adoption studies.

External collaborations: TPW Energy Collaborative, Global Alliance for Clean Cookstoves, Colorado State University, University of California, Helps International, Stove Team International, RLCCL (Latin American and Caribbean Network of Clean Kitchens)

[Masters in Sustainable Development](#), Universidad del Valle, Colombia

Graduate: Interdisciplinary masters program aimed to seek solutions relevant to socio-environmental problems faced by Colombia and the Latin American region. Throughout the program students participate in sustainable development projects and activities that require the design and/or implementation of both new and existing technologies. The focus sectors of the projects are sustainable management of aquatic ecosystems, comprehensive risk management, management of public water services and environmental sanitation, food sovereignty and environmental health.

External collaborations: Andean Postgraduate Network in Integrated Water Resources Management.

[Engineers Without Borders Colombia](#), Universidad de los Andes, Corporación Universitaria Minuto de Dios, Colombia

Undergraduate: Two courses aimed to contribute to the development of vulnerable communities through the implementation of applied engineering. Through the courses students need to take into consideration sustainability, economical feasibility and cultural restraints into the project development.

Graduate: One mid-year course on the role of engineering as a promoter of community development, during the course students engage in theoretical analysis, laboratory technology development and field work.

Experiential: Yearly seminar gathering students, professors, national and international guests, to explore specific topics around the improvement of the quality of life of marginal communities in Colombia through the development of engineering projects.

External collaborations: Politecnico di Milano (Italy) and Colorado School of Mines (United States of America).

[Ingenuity, Science, Technology and Society](#), Universidad Nacional de Colombia, Colombia

Undergraduate: Semester elective course focused on providing undergraduate students the necessary tools to develop projects in communities in need, the topics discussed during the course range from basic sciences and engineering to cultural perspectives and elements of public policies. The course is developed in the Engineering Department but is open to all enrolled university students. The main objective of the course is to reframe the role of basic sciences and engineering as necessary areas to achieve social and sustainable development.

External collaborations: Aalborg University (Denmark), Universidade Federal do Rio de Janeiro (Brazil), Colorado School of Mines (United States of America).

[Engineering Projects for Community Service \(EPICS\)](#), Universidad de Antioquia, Colombia

Undergraduate: Semester's elective introductory course on collaborative engineering design for communities in need. During the course, students identify problems of people living in poor communities or in informal settlements and work with them to develop a potential solution.

External collaborations: Purdue University (United States of America).

[Technology and Society](#), Universidad de los Andes, Colombia

Undergraduate: Seven courses intended to teach students the influence of technology in society with special studies on Colombia's regional context and the potential contributions technology can make to the country's poor communities. The topics of the courses are technology and society, technology and globalization, history of technology, systematic thinking tools and technocultures in Latin America.

Graduate: [Postgraduate in Design and Social Management of Technology](#). The program offers students tools and effective methodologies for the analysis of the design and contextual management of technology, as well as technological problems associated with organizations and the role of innovation in integral solutions that bring social, technological and environmental concerns in Colombia.

[Course on Participatory Design for Social Technology Management](#). Students study the relations between technology and society to understand the influence that the effective incorporation of innovative technological solutions may have to solve problems within public or private organizational environments. The course is based on the study of concepts, methodologies and the analysis of successful cases of technology insertion in different organizations. During the course, students look at the main tools of participatory design for the social management of technology.

External collaborations: Interdisciplinary Center for Social Development - NIDES (Brazil), Network of technologies for Social Inclusion - Red de tecnologías para la Inclusión Social (Argentina).

[Lab Campesino](#), Universidad Nacional de Colombia, Colombia

Research: Laboratory for the development of agroecology projects focused on the adaptation to climate change in Colombia. The laboratory aims to empower small agroecological producers through open access technologies and collaborative creation dynamics. The laboratory focuses on organic production, organic markets, production of biofertilizers and rural pedagogies.

[Center for Humanitarian Engineering, Universidad Sergio Arboleda, Colombia](#)

Research: Development projects of social impact where the work of the academia connects with the reality of both rural and urban vulnerable communities, taking into consideration academic, empirical and ancestral knowledge.

[Interdisciplinary Center for Social Development \(NIDES\), Universidade Federal do Rio de Janeiro, Brazil](#)

Graduate: Master's program in Technology for Social Development. The focus sectors of the projects developed through the program are energy, food security, sustainability and natural resources management.

Research: Supplementary body of the UFRJ Technology Center, focusing on the development of technologies through participatory methods and with an interdisciplinary approach. The aim of the center's projects are to promote social development and to contribute to the development of public policies.

External collaborations: Universidad de los Andes, Colombia.

[Rural Telecommunications Group, Pontificia Universidad Católica del Perú, Peru](#)

Undergraduate: Course within the speciality of telecommunications engineering called rural telecommunications. The course is aimed at showing the characteristics, problems and technological alternatives existing in the telecommunications sector for the rural areas of the country and by extension, for those in developing countries.

Research: Multidisciplinary research group developing projects related to the assessment and dissemination of Information and Communication Technologies (ICT), appropriate to contribute to the improvement of the quality of life of marginal rural communities that lack or have limited access to communication technologies.

[Rural Group, Pontificia Universidad Católica del Perú, Peru](#)

Educational: Five practical courses and workshops open to the public: design and selection of photovoltaic systems, technologies for ecological houses and hotels, construction of small water hammer pumps, rural electrification projects with solar energy, design and installation of lightning protection and its grounding.

Research: Development projects in favor of rural communities, related to applied scientific research, technological innovation knowledge transfer, dissemination and promotion of appropriate technologies and environmental conservation activities. The main areas of study of the group are biomass energy, wind power, hydraulic energy and solar energy.

[Engineering in Rural Development, Universidad Autónoma Tomás Frías, Bolivia](#)

Undergraduate: Degree through which students learn how to properly use technological innovations and the local knowledge to produce adequate changes of the agricultural environment and the rural society.

[Human Ecology Engineering, Universidad Nacional de Asunción, Paraguay](#)

Undergraduate: Degree which looks at the possibilities the application of the Sciences has on giving global and specific answers to the problems related to rural and urban poverty. The program is focused mainly in rural food security and sustainable agricultural practices.

[The Institute for the Study of Science and Technology \(IESCT\), Universidad Nacional de Quilmes, Argentina](#)

Experiential: Capacity building in technologies for social inclusion programme, focused on creating capacity for strategic planning, project formulation, implementation, management and evaluation of technologies for social inclusion.

Research: Center dedicated to issues of science, technology, innovation and development through an interdisciplinary approach in the areas of research, teaching, outreach, extension and technical

assistance. One of their sectors of study, Social Studies of Technology and Innovation, aims to understand the interaction between artifacts, actors and the socio-cultural context for technology development. The lines of research of this specific sector of the institute are design, production and implementation of Technologies for Inclusive and Sustainable Development; Technology and Circular Economy; production of knowledge-intensive technologies; Information and Communication Technologies (ICT), intellectual property and accumulation dynamics; Philosophy applied to new technologies.

[Indigenous Peoples Program, Universidad de Chile, Chile](#)

Courses: Elective courses related to the culture of the indigenous groups of Chile, different topics are discussed such as indigenous languages, culture, and politics.

Research: Students can carry out thesis projects through the program. Through the program students get integrated into the indigenous communities, identify a problem and evaluate how they could solve it. For this they stay in the community; then, following the ethnographic and scientific methods for gathering background information, a hypothesis would be proposed and a methodology would be sought to evaluate the problem and propose solutions that should be validated together with the community, all under the tutelage of a teacher while taking into consideration the aspects that are relevant to the indigenous community (worldview, nature, culture, etc.).

Experiential: Students can get involved with a field experience program that lasts from 1 to 3 months. During this time they get integrated into the community and looking into challenges the community is facing. Students can seek to contribute to solving these challenges through their respective departments at the university.

[Engineers Without Borders Argentina, Universidad Tecnológica Nacional, Universidad Nacional de la Matanza, Universidad Nacional de La Plata, Universidad Católica de Córdoba, Universidad Nacional de General Sarmiento, Argentina](#)

Undergraduate: Online course on sustainable development as a tool for social projects management.

Graduate: Two courses: strategic management of social projects and sustainable development as a tool for social projects management. Postgraduate on energy and sustainable development.

Experiential: Students can get involved in projects focused on local development of communities in vulnerable situations through engineering projects.

[IEEE Special Interest Group on Humanitarian Technology \(SIGHT\), Universidad Nacional Autónoma de Honduras \(Honduras\), Pontificia Universidad Católica del Valparaíso \(Chile\), Universidad ECCI \(Colombia\), Universidad El Bosque \(Colombia\), Universidad del Salvador \(Nicaragua\), Universidad de San Carlos \(Guatemala\), Universidad Centroamericana \(Nicaragua\), IEEE Ecuador and IEEE Paraguay.](#)

Experiential opportunity: Volunteering program through which students develop projects related to problems identified in specific target communities. Projects aim to solve a wide range of problems, from food security to energy access.

[Flying Labs, Universidad Tecnológica de Panamá \(Panamá\), Instituto Tecnológico de las Américas \(Dominican Republic\), Universidad Tecnológica del Perú \(Perú\), Bernardo O'Higgins University \(Chile\)](#)

Experiential: Global network of local knowledge hubs that aim to accelerate the positive impact of local aid, health, development and environmental projects with appropriate robotics solutions. These knowledge hubs work as local training centers for the use of robotics technology (specially aerial and aquatic drones), responsibly and effectively to accelerate and scale social good solutions.

External collaborations: WeRobotics.

Innovation Centers or organizations (independant from Universities)

University presence in these areas is supported by certain NGOs and networks that are relevant to mention in this report. Efforts include but are not limited to the following examples. **We recognize that this list may not be comprehensive and will naturally change overtime, please contact us at research@engineeringforchange.org if you know of an organization missing from this list.**

[IDIN Innovation Center Partners](#), C-Innova (Colombia), Vila Nova Esperança (Brazil) and Makerspace (Guatemala)

Description: Community-based organizations that connect members of various communities with resources, learning and teaching opportunities, infrastructure, mentoring and an ecosystem that leads to the development of technologies that have a positive impact on society, particularly in vulnerable communities.

[Wingu](#), Argentina, Colombia and Mexico

Description: Non-profit civic technology organization focused on promoting social projects through digital transformation and the implementation of innovative technological developments.

[ONGAWA](#), Nicaragua and Guatemala

Description: Non-Governmental Organization focused on Engineering for Human Development by putting technology at the service of human development with the mission to build a more just and supportive society. The primary sectors of interest of the organization in the Latin American region are access to clean water and sanitation services.

[Practical Action](#), Bolivia and Peru

Description: Development charity focused on both developing and implementing appropriate technologies to solve problems in the sectors of energy, food security, water, risk management, climate change adaptation and sanitation in poor communities.

[Diversa](#), Colombia

Description: Non-profit Organization focused on using co-creation as a mechanism to reduce inequality gaps in Latin American societies. Their activities are centered around developing connections and learning experiences through the application of Challenge-Based Learning (CBL), Co-creation, and Creative Capacity Development (CCD) methodologies. Diversa created an artificial intelligence digital platform named [RETOS](#) that intends to connect universities with rural communities to respond to current needs in the Colombian countryside.

[Link4](#), Guatemala

Description: Social enterprise focused on fostering local innovation and sustainable development through design, capacity building and social impact experiences.

[Invento Institute](#), Brazil

Description: Non-profit organization that collaborates with rural and urban communities to develop sustainability and resiliency projects through education, development, co-creation, adaptation and dissemination of appropriate technologies.

[Oaxacan Innovation Center \(OAXIN\), Mexico](#)

Description: Local innovation center focused on implementing and designing innovation programs through participatory tools and processes in different communities of the State of Oaxaca.

[Bici-tec, Guatemala](#)

Description: Social Enterprise focused on developing culturally appropriate bike-technologies that promote sustainable rural development in Guatemala and around the world. Bici-tec has a bicycle shop, a workshop to manufacture bike-technologies and a school specialized in Appropriate Bike Technologies.

[From the Lab to the Field \(Del Lab al Campo\), Colombia](#)

Description: Non-profit corporation focused on promoting sustainable development and the betterment of the quality of life in vulnerable communities through science, technology, and innovation projects that allow the application, generation, and appropriation of knowledge.

EGD Conferences

The following list presents some of the top conferences with an EGD focus or an available EGD-related track, listed in order of antiquity.

Conferences	Location	Years active	Description
Encontros de Engenharia e Desenvolvimento Social (ENEDS and EREDS - National and Regional Meetings of Engineering and Social Development)	Brazil	15	The role of engineering in the development of a more just and egalitarian society. Topics discussed: low-cost social technologies and low environmental impact; solidarity economy; participatory methodologies; local development; etc.
Conferencia Internacional de Ingeniería, Justicia Social y Paz (International Conference on Engineering, Social Justice and Peace)	Colombia	15	Thematic: the role of engineering on the extension of social justice and peace.
Mexican Humanitarian Technology Conference	Mexico	Biennial event active since 2015.	Technologies developed to solve some of the most pressing problems of populations affected by poverty, including energy access, health, disaster risk management, environmental monitoring, E-Services, etc.
Festival de Innovación y Tecnología Social (FITS - Festival of Innovation and Social Technology)	Argentina, Mexico, Costa Rica, Colombia	5	Development of simple ICT solutions with existing technological tools for civil society organizations in the Latin American region.
Congresso Brasileiro dos Engenheiros sem Fronteiras (CBESF - Brazilian Congress of Engineers Without Borders)	Brazil	5	Discussion about the experiences and ongoing projects of the Engineers Without Borders chapters in Brazil.
Encuentro Colombiano de Ingeniería y Desarrollo Social: "Ingeniería, Tecnología y Tejido Social" (Colombian Encounter of Engineering and Social Development: "Engineering, Technology and Social Tissue")	Colombia	2	Thematic: the role of engineering and social development.
International Development Design Summit (IDDS)	Colombia, Guatemala, Brazil	Brazil ('12, '14, '16), Colombia ('15- '18), Guatemala ('17).	Hands-on design experience developed to create low-cost and practical innovations that could benefit the lives of people living in poverty.

Regional Networks

[Rede de Engenharia Popular Oswaldo Sevá \(REPOS - Oswaldo Sevá Popular Engineering Network\)](#)

Description: Network set to promote dialogue within engineering practices where the struggles of the poor and working class are considered in the development of technologies or engineering implementation projects. REPOS promotes the assistance of engineers to these communities based on the knowledge of contextualized engineering with the social, political, cultural and environmental issues specific to their realities.

Country: Brazil.

[Red de Tecnologías para la Inclusión Social Argentina \(redTISA - Argentinian Network of Technologies for Social Inclusion\)](#)

Description: Network that aims to organize, articulate and integrate a set of institutions and both public and private organizations with the purpose of contributing to the sustainable development of the country through communication, training and promotion of dissemination and advice for the reapplication of Technologies for Social Inclusion (TIS).

Country: Argentina.

[Red Latinoamericana y del Caribe de Cocinas Limpias \(RLCCL - Latin American and Caribbean Network of Clean Kitchens\)](#)

Description: Network that groups and makes visible the current efforts of public, academic, private and technical cooperation organizations in countries of Latin America and the Caribbean to address the problem of clean energy access for cooking purposes in Latin America.

Countries: Argentina, Bolivia, Brazil, Colombia, Guatemala, Honduras, Mexico, Nicaragua, and Peru.

[Red Colombiana de Ingeniería y Desarrollo Social \(ReCIDS - Colombian Network of Engineering and Social Development\)](#)

Description: Network dedicated to integrating engineering efforts towards the design, implementation and dissemination of conceptual and technological developments that aim to contribute to social development in Colombia.

Countries: Colombia

Journals

[Revista Internacional de Ingeniería, Justicia Social y Paz \(International Journal of Engineering, Social Justice and Peace\)](#)

Description: Journal intended to further the involvement of social justice and peace into the theory and practice of engineering. Publications include engineering practices that improve gender, racial, class and cultural equity. The journal targets practicing engineers, engineering educators and anyone that seeks to better understand the potential of engineering.

[Brazilian Journal of Sustainability](#)

Description: Official scientific publication of the Engineers Without Borders Brazil (ESF - Brasil) devoted to Sustainable Development. The main topics of the journal are: sustainable engineering, energy planning, cleaner production, volunteering, social responsibility, environmental education, climate change, water resources and Sustainable Development Goals.

The State of EGD Research

Faculty included in this section conduct current, graduate-level, EGD-related research at higher-educational institutions in the United States and Canada. Included in the definition of researchers conducting EGD work are engineers, computer scientists, architects, and urban planners. **We recognize that this list may not be comprehensive and will naturally change overtime, please contact us at research@engineeringforchange.org if you know of a faculty member who is missing from this list.**

Researchers

Faculty	Institution	Sectors
Juan Antonio Paco	Pontificia Universidad Católica del Perú, Peru	Rural Telecommunications
Miguel Hadzich Marín	Pontificia Universidad Católica del Perú, Peru	Renewable Energies / Sustainability
Sandra Vergara Dávila	Pontificia Universidad Católica del Perú, Peru	Renewable Energies / Sustainability
Juan Pablo Perez Panduro	Pontificia Universidad Católica del Perú, Peru	Renewable Energies / Sustainability
Jorge Soria Navarro	Pontificia Universidad Católica del Perú, Peru	Renewable Energies / Sustainability
Sergio Jordán	Pontificia Universidad Católica del Perú, Peru	Renewable Energies / Sustainability
Juan David Reina-Rozo	Universidad Nacional de Colombia, Colombia	Communal innovation
Nicolás Gaitán	Universidad Nacional de Colombia, Colombia	Science, Technology and Society
María Catalina Ramírez	Universidad de los Andes, Colombia	Sustainable Development
Mariela García	Universidad del Valle, Colombia	Sustainable Development
Vivian Villavicencio	Escuela Superior Politécnica del Litoral, Ecuador	Energy
Victor Hugo Ayerdi Bardales	Universidad del Valle, Guatemala	Sustainable Homes
Flavio Chedid	Universidade Federal do Rio de Janeiro	Social Development
Arthur James	Universidad Tecnológica de Panamá, Panama	Energy
Humberto Rodríguez	Universidad Tecnológica de Panamá	Robotics
Dania Montenegro	Universidad Tecnológica de Panamá	Robotics
Carlos Leal Seballos	Universidad Centroamericana, Nicaragua	Information and Communications Technology