PBL for Sustainable Cities. Results of the CITYLAB LA Project

PBL for Sustainable Cities
Results of the CITYLAB LA project

Engaging students with sustainable cities in Latin-America

Academic conference 19th-21st September 2018
Universidad del Rosario
Bogotà - Colombia

Co-funded by the Erasmus+ Programme of the European Union

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Universidad del rosario - Bogotà - Colombia

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https://www.citylab-la.eu
http://www.urosario.edu.co/Citylab/inicio
http://ec.europa.eu/programmes/erasmus-plus/news/first-higher-education-capacity-building-projects-selected_en

Welcome!
PBL for Sustainable Cities Conference 2018

Dear PBL for Sustainable Cities Conference 2018 delegates,
We are proud to present the book of abstracts of the PBL for sustainable cities conference in Bogota, September 19-22, 2018. This book is an important result of the CITYLAB LA project, co-funded by the Erasmus+ programme of the European union. The CITYLAB project brought 12 Latin-American and 5 European partners together around a common goal: innovating the way we teach so that the next generation of urban professionals will be better equipped to make our life in cities more sustainable. Cities provide both challenges and opportunities to deal with global trends such as mass migration, ageing, resource depletion, climate change, degrading environmental conditions and urban poverty and injustice. In dealing with these complex problems, it is increasingly clear that old disciplinary ways of thinking and siloed approaches will not suffice any longer. There is a need for inter- and transdisciplinary approaches that look in a holistic way at these problems. Professionals of the future will therefore need a whole set of hard and soft competences that allow them to find original, out-of-the box and collaborative solutions.
The Citylab LA project aims to innovate teaching for sustainability through the introduction and development of problem based learning methods in the curricula of higher education institutions, in particular in the urban sector. Problem based learning is a pedagogical approach that is suited in education for sustainability education because it focuses on the problems to be addressed and not on the existing knowledge as point of departure. It encourages students to take the learning process in their own hands. It stimulates soft skills such as intrinsic motivation, critical thinking and collaborative problem solving.
The participating universities of the project have each developed Citylab modules in their curricula following the principles of problem based learning, in which students from different disciplines collaborate on

problems of urban sustainability. They have been coached by teachers from different faculties. In order to make the Citylab modules a realistic learning environment also real practitioners from urban governments and other urban actors have been involved. Moreover, the project encouraged teacher mobility through the exchange of experts during the project. In the period between 2015-2018, Citylab modules have run at 15 different universities. The project involved no less than x teachers spread over 15 different campus teams and in total more than 3000 students have been enrolled in the Citylab modules.

This book is not a traditional book of abstracts, but reflects the hybrid nature of the conference. It compiles experiences from different perspectives of the participants of the Citylab project: academics, teachers and students. The first part contains the scientific output of the conference. The keynote speeches address the core issues of the Citylab project. Erik de Graaff from the university of Aalborg is an authority on Problem based learning and addresses opportunities and pitfalls in PBL for sustainanility education. Terry Maguire is director of the national forum for the Enhancement Teaching and Learning in Ireland and focuses in her speech on the competencies for teachers. Rogier van den Berg is project manager of the urban planning and design lab of UN Habitat.

We encouraged academics involved in the project to critically reflect on their teaching experience in the Citylab project and to position themselves in the broader field of sustainability education. The results are reflected in the abstracts which cover 5 different themes: innovation in education for sustainability, collaboration between universities and external actors, implementation of educational innovations, experiences with international expert exchanges and finally sustainable development goals for cities.

The second part describes the results of the Citylab modules. For each Citylab module a description is given on the modalities of the module by the participating teachers. It is the result of the campus teams that have developed and implemented the module at their university. From each module, the best student team has been selected at the

partner universities to present at the conference. Students have worked on urban sustainability problems with the aim of contributing to the sustainable development goals.
We wish you a pleasant lecture of this book and we hope that it can inspire you as a teacher, student or urban professional.

Coordinator of the project
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PBL for Sustainable Cities Conference 2018
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Prof. Dr. Ir. Tom Coppens – University of Antwerp

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Erik de Graaff - K1

Problem Based Learning expert, Aalborg University, Department of Development and Planning, Aalborg, Denmark Programme)

Biography

Erik de Graaff (PhD) is trained as a psychologist and he has been working in educational research and development for about 40 years. After stepping back from a professorship he is now appointed as adjugeret professor at the Aalborg Centre for Problem Based Learning in Engineering Science and Sustainability under the auspices of UNESCO. Throughout his career he contributed to the promotion of knowledge and understanding of higher engineering education with numerous publications and through active participation in professional organizations like SEFI, IGIP, IFEES and ALE . In the course of his career he published over 200 articles and papers and he presented more than 70 keynotes and invited lectures on various topics related to PBL in higher education. He was Editor-in-Chief of the European Journal of Engineering Education January 2008 – January 2018.

Keynote K1

Problem Based Learning

Erik de Graaff
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Problem Based Learning (PBL) was first coined as an educational method at the Medical Curriculum of McMaster University in Canada at the end of the sixties of the last century. Since than this innovative education method has grown and evolved, spreading around the world and covering many different areas of higher professional training.
Common characteristics in the different PBL models are:

- Self directed learning, Students define their own learning goals
- Collaboration in small groups, Students work together on problems from practice
- Thematic curriculum structure, Authentic problems reflect professional practice

Among the advantages that are attributed to PBL are a high level of motivation and the fact that students learn to communicate while they are working in teams.
However, PBL is not a panacea. Using PBL in an academic curriculum will not naturally result in a contribution to sustainable cities. The presentation will explore ways to enhance the development of a sense of responsibility and awareness of sustainability within the context of a PBL curriculum.

Terry Maguire - K2

Director of the National Forum for the Enhancement of Teaching and Learning, Ireland

Biography

Dr Terry Maguire is an Irish educator and senior manager who is actively committed to how teaching and learning can transform individual lives. She has led the development of the National Forum for the Enhancement of Teaching and Learning now regarded as an essential component of the national-level infrastructure for higher education in Ireland. She is the creator of the internationally-renowned initiative Maths Eyes devised to demystify mathematics and demonstrate its importance in everyday life.

Keynote K2

Teaching governance and participatory approach

Terry Maguire
Director of the National Forum for the Enhancement of Teaching and Learning, Ireland
terry.maguire@teachingandlearning.ie

Higher education is often accused of not preparing graduates adequately for their future roles as active citizens and workers in a rapidly-changing world. An emphasis across institutions on the attributes graduates possess demonstrates the importance leaders of learning are placing on ensuring students are capable of working with real-life problems and developing real-life knowledge and skills that are, above all, adaptable and transferable to new contexts.

Research in the Irish context has demonstrated that students learn best when they are engaged, supported, challenged and encouraged by individuals who, themselves, are well equipped personally to deal with the 'messiness' of the real world. Over 4500 texts from students across Irish higher education describing their 'Teaching Heroes' have been analysed and the teaching heroes they identified were interviewed. Based on this data, this presentation will highlight what Irish students have identified as teaching excellence. Students are clear about the need for learning opportunities to be relevant to the real world and to move beyond the traditional classroom to maximise their learning. Further, Ireland's National Student Engagement Programme, which aims to develop both student and institutional capacity to increase engagement and build effective partnerships, will be discussed.

As new modes of learning and contexts for learning emerge, those

who teach and support learning must have opportunities to develop their knowledge, skills and competence to reflect on and evolve their own teaching practice. The National Professional Development Framework for All Staff Who Teach in Higher Education, currently being implemented in all higher education institutions, will be discussed. The Framework has been developed in consultation with the sector and takes an individual, values-based, grounded approach to professional development. Access to the Framework has been supported by the development of a suite of open-access professional development programmes which lead to a National Forum digital badge and improve staff mobility across institutions.

If learning in higher education is to be impactful, such learning must stretch beyond existing knowledge and skills and enable students to learn both about themselves and others and about the nature of learning itself.

Rogier van den Berg - K3

Project manager of the Urban Planning and Design Lab, UN-Habitat (United Nations Human Settlements Programme)

Biography

Rogier van den Berg has been working for over 17 years as an architect, urban planner, managing director, academic, entrepreneur and diplomat. He has a broad experience and knowledge in sustainable urban development and in 'making cities'. He advises national, regional and local governments and private sector industries on urban plans, projects, policies and innovation. Currently he is Head of UN-Habitat's Urban Lab in Nairobi operating in over 50 countries globally. The Urban Lab provides integrated solutions to cities. Rogier manages the global team, works as an urban specialist with cities and is leading global programmes such as the UK Foreign and Commonwealth Office Future Cities Prosperity Programme. Previously he has been: director of Zandbelt&vandenBerg an architecture and urbanism office in Rotterdam, Head of the Department of Urbanism at the Amsterdam University of the Arts and lecturer at Delft University of Technology, chair of regional design and metropolitan strategies.

Keynote K3

PBL and Sustainable Development Goals

Rogier van den Berg
Project manager of the Urban Planning and Design Lab, UN-Habitat (United Nations Human Settlements Programme).
rogier.vandenberg@un.org

Since 2014 UN-Habitat has developed its Urban Lab Facility which supports local authorities and Member States with sustainable urban projects and policies. Under UN-Habitat, the Lab works towards implementing the New Urban Agenda and achieving the Sustainable Development Goals by 2030. The Urban Lab's methodology aims to create stakeholder commitment through design driven processes. The methodology focuses on implementation and it utilizes the planning process to deduct transformative projects that can be politically prioritized and financially supported. Thematic Areas of Expertise of the Lab include

- Responses to rapid urbanization
- Cities, technology and innovation
- Strategic Planning and Guideline development
- Spatial dimension of climate change and resilience
- Conflict, migration and the humanitarian development nexus

Learning is an important component of the Lab's processes: Learning by doing, ideally with all stakeholders involved. The transformative project at stake is as such not only a means to an end, but often the catalyst for deeper analysis of the underlying problem at the level of policy, governance, finance or political prioritization. This dialectical relationship between the underlying problem and the actual project and its implementation is a recurring theme within the work of the Lab and will be demonstrated by work of the Lab in Latin America, Africa, the Arab States, Asia.

For further reading the UN-Habitat's Urban Labs publication on participatory plans and processes presented at the Habitat III conference in Quito can be downloaded:
https://unhabitat.org/books/urban-planning-and-design-labs-tools-for-integrated-and-participatory-urban-planning/

Postcards from participating universities

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P1 - University of Antwerp UA

Design studio 3: Smart growth in peri-urban areas
Faculty of Design Sciences
University of Antwerp, Belgium

Design studio 3 is the latter phase in a cumulative process preceded by design studio 1 and 2. The first studio focuses on the analytical skills of students whereas the second studio focuses on visioning and design with the proposal of an urban project as result. Design studio 3 is oriented to implementation, feasibility and communication techniques. The initial project (the result of design studio 1&2) is refined into a feasible project based on its financial, political, societal, legal and technical aspects. During the three design studios, students work in changing groups or individual on their own assignment. The module is fully integrated in the program whereas theoretical (ex-cathedra) courses provide insights and methods that are immediately used in the studio. Teachers from the theoretical courses collaborate jointly in the design studio.

The module is interdisciplinary in the sense that students enrolled in the master program have a different background: 50% come from design disciplines and 50% from other disciplines such as social sciences, environmental science, engineering or history. Besides, experts with specific knowledge are consulted throughout the studios to assists the students during their learning and design process. Since 2017, the module is an elective course for students from the Faculty of Political Sciences, History and Environmental Sciences. The selection of the study area and problem statement of the design studio has been set up in collaboration with local stakeholders; in this case the province of Antwerp. Moreover, the administration of the province was involved in the mid-term and final evaluation of the student work.

Final Conference - Bogotá, Colombia
19.09.18

PROGRAM(S) ***Urbanism and Spatial Planning,***

Political Sciences, History, Environmental Sciences

LEVEL ***Master*** STUDENTS ***30***

MODALITY ***Compulsory course*** ECTS ***12***

TIMING ***Sept 2017 - Jan 2018*** SDGs ***11.3, 11.a***

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Co-funded by the Erasmus+ Programme of the European Union

P3 - Universidad Politécnica de Madrid UPM

Urban Planning
Departamento de Urbanística y ordenación del Territorio
Escuela Técnica Superior de Arquitectura de Madrid (ETSAM)
Universidad Politécnica de Madrid, Spain

This module is perfectly integrated into the curriculum since the content and the subject match fully with the existing one. The methodology varies with respect to the traditional module by actively incorporating the agents.
The objective of the students is to make a comprehensive proposal of intervention in the municipality of study. To do this, they must make an approximation to the real problems of the municipalities through a participative analysis and diagnosis with the agents involved and then make a proposal for the advancement of the general plan through a team collaborative process.
Teachers accompany and advise the students throughout the process through tutorials and sharing the progress of results. In parallel, they provide specific technical tools through seminars and lessons; and they act furthermore as mediators between the local government and students .
The main agents involved and committed are the local government, which includes the services of the local administration (educational, social welfare, health care); and the university through our Department. Other important agents will be citizens and residents articulated around neighborhood associations and other formal and informal social movements (school associations of parents, sports associations, NGOs, ecologists, ...); representatives of small entrepreneurs and local trade, employers, unions and workers.

Final Conference - Bogotá, Colombia
19.09.18

CITYLAB LA - Engaging students with sustainable cities in Latin America

PROGRAM(S) ***Architecture***

LEVEL ***Undergraduate*** STUDENTS ***30***

MODALITY ***Workshop (core subject)***

TIMING ***Feb - Jun 2018***

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Co-funded by the Erasmus+ Programme of the European Union

P4 - Politecnico di Torino POLITO

Atelier Architecture heritage preservation and enhancement A
Architecture and Design Department
Politecnico di Torino, Italy

The Atelier concludes the second degree programme in Architecture for Heritage Preservation and Enhancement. It introduces students to the problems of economic - financial viability in the conservation of historical, architectural, environmental heritage assets. Through a case-study students experience the PBL approach, in which they face real problems involving stakeholders, including the local administration that plays a key role.
It is conceived as a multidisciplinary module, with the main contribution of Restoration and Project Economic Evaluation, but it is expected the direct involvement of other disciplines from Engineering. External actors will be involved: Public Administration (Municipality), Superintendence for Cultural Heritage, Piedmont Region, Private Foundations and associations, Private bodies, Investors, Citizens.

The Citylab module focuses on the potentialities of the PBL addressing real problems by identifying sustainable and effective design processes and by developing skills to analyze also non-technical aspects of problems. The students involvement methods are explicated, in order to highlight how they have been made to feel responsible, collaborative and active within a real community. The role of the stakeholders and the ways of interacting with them are detailed to demonstrate the related positive impacts on the learning process and on the development of multidisciplinary, concrete and sustainable redevelopment projects.

Final Conference - Bogotà, Colombia
19.09.18

CITYLAB LA - Engaging students with sustainable cities in Latin America

PROGRAM(S) ***Master of Science in "Architecture for Heritage Preservation and Enhancement"***

LEVEL ***Master*** STUDENTS ***40***

MODALITY ***Studio course*** ECTS ***6***

TIMING ***Oct 2018 - Jan2019*** SDGs ***11.4***

CONTACT ***rocco.curto@polito.it***

Co-funded by the Erasmus+ Programme of the European Union

P5 - University of Technologie of Compiègne UTC

Sizing infrastructure to improve freight accessibility to the port of Callao, Peru

Urban Engineering Program
University of Technology at Compiègne, France

The module was organized during two semesters. The first corresponds to the definition of the problem and the diagnosis of the current situation of the accessibility of land freight at the port of Callao in Peru. The first result was a set of proposals to improve the accessibility to the port taking into account the urban problematic and the development needs of the city of Lima as well as the needs of development of the port.

From the proposed solutions, the National Port Authority has chosen two solutions to develop. The second semester was dedicated to the sizing of the railway yard at north of the port and the choice of an optimal location and the sizing of a dry port at the east of the Lima urban area. The second result is the design of both infrastructures at the pre-project level.

They were designed to solve problems of the freight accessibility at the port and also to relieve the urban traffic of the main axes of the north and the east of the city of Lima. The designs are in concordance with the Master Plan of the Port, the Master Plan of Lima and transport infrastructure projects approved or under construction.

PROGRAM(S) ***Urban Engineering***

LEVEL ***Undergraduate*** STUDENTS ***25***

MODALITY ***Workshop*** ECTS ***6***

TIMING ***Two semesters*** SDGs ***11.2***

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CITYLAB LA - Engaging students with sustainable cities in Latin America

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P6 - Fundación Universidad de Belgrano "Dr. Avelino Porto" UB

The urban structure as generator of dynamic and transformable spaces
School of Architecture and Urban Planning
Fundación Universidad de Belgrano, Argentina

The project module stages are organized according to an urban morphology analysis sequence, a diagnosis based on geo-referenced data and project practices oriented to formulate sustainable solutions to real city conflicts. It is a 3-year-citylab experience, with expert exchange, results dissemination and the evaluation of the process itself, focused on the possibility of implementing PBL in the whole curricula.

The PBL assignment started with a morphology diagnosis based on intuition and perceptive urban 3D resource approaches, with 3rd-year students. In a second stage, the students of 4th year worked in an urban scale diagnosis with planification tools, involving the identification of urban variables. During this process, the module adopted GIS technology through the learning and practice of ArcGIS to build thematic mapping. In the 3rs stage, the students of 5th year, worked on their final degree career project through the integration of PBL methodology to an expanded area, identifying problems to be solved by architecture design with an urban approach. At this time, Public Relations area, enriched the project with communicational activities oriented to citizens and government sector.
External actors from the local government agency, were involved in the whole learning process with teachers and students.

Final Conference - Bogotá, Colombia
19.09.18

CITYLAB LA - Engaging students with sustainable cities in Latin America

PROGRAM(S) ***Morphology Communication & Digital Media, Urban and Territorial Planning, Crisis Communication***

LEVEL ***Undergraduate*** STUDENTS ***75***

MODALITY ***Workshop*** ECTS ***30***

TIMING ***2016-2018*** SDGs ***11.2-4, 11.6-7***

CONTACT ***gidcad@ub.edu.ar***

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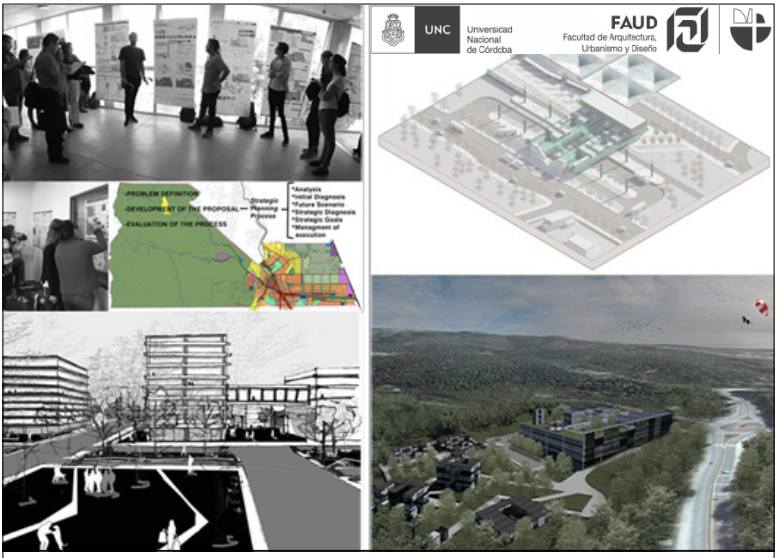
P7 - National University of Córdoba UNC



Citylab LA: Engaging students with sustainable cities in Latin America
Faculty of Architecture, Urbanism and Design
National University of Cordoba, Argentina

The project module stages are organized according to an urban morphology analysis sequence, a diagnosis based on geo-referenced data and project practices oriented to formulate sustainable solutions to real city conflicts. It is a 3-year-citylab experience, with expert exchange, results dissemination and the evaluation of the process itself, focused on the possibility of implementing PBL in the whole curricula.

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CITYLAB LA - Engaging students with sustainable cities in Latin America

PROGRAM(S) ***Career of Architecture, Four Chairs:***

Architecture VA-B and Urbanism II A-B

LEVEL ***Graduate*** STUDENTS ***700***

MODALITY ***Annual course*** ECTS ***27 & 5***

TIMING ***30 weeks*** SDGs ***11.1-4, 11.7, 11.a, 11.c***

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Co-funded by the Erasmus+ Programme of the European Union

P8 - Universidad Tecnológica de Pereira UTP

Environment and Sustainability
Faculty of Environmental sciences and Faculty of Mechanical Engineering
Universidad Tecnológica de Pereira, Colombia

In order to comply with the criteria established by the Citylab project, it was decided to include the Environmental Administration and Mechanical Engineering programs ascribed to the Universidad Tecnológica de Pereira. A subject called "Environment and Sustainability" has been performing the PBL (Problem Based Learning) methodology, an interdisciplinary co-working among proffessors, students, reasearchers and stakeholders which aims the development of a set of innovative solutions of real problems for a specific city. In this case, the municipality of Dosquebradas was selected, specifically the eastern and western sectors of the city. The neighborhoods that make up the eastern sector are called Barrios Unidos de Oriente, among which are the Mariana, Santa Teresita, Libertadores, La Capilla and Divino Niño. In the western sector, the selected neighborhoods are Rivera, Nueva Colombia, Los Guamos and Romelia.
In this way, the course was delivered during three semesters and a total of 65 students were impacted. During this time the classes were offered by several teachers with different disciplines, this was done in order to enrich the development process of the students' projects, for this reason they could consult the different teachers regarding specific questions they had during the learning process.

Final Conference - Bogotá, Colombia
19.09.18

CITYLAB LA - Engaging students with sustainable cities in Latin America

PROGRAM(S) ***Environmental Administration,***

Mechanical Engineering

LEVEL ***Undergraduate*** STUDENTS ***65***

MODALITY ***Elective course*** ECTS ***3***

TIMING ***3 semesters during 2017-2018*** SDGs ***11.4***

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Co-funded by the Erasmus+ Programme of the European Union

P9 - Universidad del Rosario URO

Challenges for Sustainable Cities
Faculty of Political Science, Government and International Relations
Universidad del Rosario, Colombia

Final Conference - Bogotá, Colombia
19.09.18

From June to July 2018, the elective "Challenges for sustainable cities" was developed in 3 groups with a total of 95 students and graduates from different disciplines. The proposal was supported by professors from different disciplines and thematic approaches that guaranteed a multidisciplinary learning environment. One of the objectives of the course was to expand capabilities and skills in the use of new tools for assisted analysis of geographic information, taking advantage of the physical and technological infrastructure of the new urban laboratory set up at the university and equipped with the computers financed by the CityLab project.

With the support of an expert professor in the subject, the students explored new tools in the use of Big Data and forms of analysis and representation with Google Engine. A guest professor from the University of Aalborg also participated in the development of the course, guiding specific exercises to identify problems or needs in Bogotá, in order to document the entire process until the formulation of sustainability alternatives for the city.

CITYLAB LA - Engaging students with sustainable cities in Latin America

PROGRAM(S) ***Urban Management and Development***

LEVEL ***Graduate*** STUDENTS ***95***

MODALITY ***Summer school*** ECTS ***2***

TIMING ***July 2018*** SDGs ***11.2, 11.6, 11.7***

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Co-funded by the Erasmus+ Programme of the European Union

P10 - Universidad Autónoma de Nuevo León UANL

Sustainable Ecological Environments
Faculty of Architecture, Faculty of Public Health and Nutrition
Universidad Autónoma de Nuevo León, Mexico

Final Conference - Bogotá, Colombia 19.09.18

Sustainable Ecological Environments is an undergraduate elective course that tackles urban problems with a multidisciplinary systemic approach. The course integrates the objectives of Sustainable Development Goal 11: inclusivity, safety, sustainability and resilience, around the problems of the Metropolitan Area of Monterrey and the big idea of healthy cities.

The whole student group scouts a delimited area within the city, where they perform an exhaustive site analysis, diagnose the main problems and explore their interconnectedness. Working in teams of 4-5 students, they pose driving questions and define the problem. Chosen urban problems are complex and might not have a clearly defined "solution", yet students identify the knowledge and actions that would be needed to solve them. Additionally, students design and execute projects that strive to build awareness and mitigate the problem.
All of the course assignments are designed to support their research and reach their project goals successfully.

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PROGRAM(S) ***Architecture, Industrial Design, Nutrition, Public Health***

LEVEL ***Undergraduate*** STUDENTS ***20***

MODALITY ***Elective course*** ECTS ***4***

TIMING ***Each semester*** SDGs ***11.2-4, 11.6-7***

CONTACT ***melissa.casillas@gmail.com***

Co-funded by the Erasmus+ Programme of the European Union

P11 - University of Guanajuato UG

Sustainable Urban Projects
Department of Architecture
University of Guanajuato, Mexico

Final Conference - Bogotá, Colombia
19.09.18

The importance of this unit of study lies on having students apply the Problem Based Learning strategy for the detection and understanding of (real) urban needs and their sustainable solutions, applying their knowledge, skills, attitudes, and the development of their values towards good professional development and social responsibility aligned with global trends and challenges.

Urban projects is open for 6th and 7th semester architecture, environmental engineering, and civilian engineering students. It is done interdisciplinarily (both faculty and students), approaching the inhabitants of the chosen site, as well as the institutions related to each project.

CITYLAB LA - Engaging students with sustainable cities in Latin America

PROGRAM(S) ***Environmental Engineering, Civil Engineering, Architecture***

LEVEL ***Undergraduate*** STUDENTS ***20***

MODALITY ***Elective course*** ECTS ***3***

TIMING ***Each semester*** SDGs ***11.6***

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Co-funded by the Erasmus+ Programme of the European Union

P12 - Universidad Simón Bolívar USB

Design Studio: Caracas: Planned & Spontaneous
Urban Planning and Arts/Architecture Departments
Universidad Simón Bolívar, Venezuela

This course aims to develop students' skills to approach and solve urban conflicts, with the application of strategies of sustainability, both in planned areas and spontaneous settlements of Caracas, considering two fundamental goals:
• the concept of Habitat by studying architectural problems at various scales and the programs that allow their insertion in complex urban contexts.
• the formulation, analysis, and development of urban plans, which include proposals for the urban intervention and renewal in a sector of the city.

From the selection of the case study between professors and local actors; and the identification of the problems to be solved by the students; the PBL model allowed to strengthen the previous experience of the USB careers of urban planning and architecture as a multidisciplinary experience and team work, intensifying the educational process with participation of urban planners and architects, teachers of others carreers/departments; public officials guests; and inhabitants of the case study areas. Such experience promoted the debate, facilitated understanding of local stakeholders needs and guided formulation of both specific and overall intervention proposals. In this way, students responded to the collective criteria as well as recognized their individual contribution, after identifying their strengths and weaknesses. It was also a consequence of their previous learning experience from other courses and they were empowered by the process of building their own knowledge.

CITYLAB LA - Engaging students with sustainable cities in Latin America

PROGRAM(S) ***Urbanism, Architecture***

LEVEL ***Undergraduate*** STUDENTS ***76***

MODALITY ***Regular workshop*** ECTS ***4***

TIMING ***Jan-Mar, Sept-Dec '17*** SDGs ***11.1, 11.3, 11.7, 11.a***

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amena@usb.ve , bdorbessan@usb.ve

Co-funded by the Erasmus+ Programme of the European Union

P13 - Universidad Metropolitana UNIMET

Towards the sustainability of informal communities

Faculty of Engineering and Faculty of Arts and Sciences
Universidad Metropolitana, Venezuela

Final Conference - Bogotá, Colombia
19.09.18

Today's society demands coherent and sensitized professionals to the main problems presented by cities. In this sense, universities must link the educational process of the student with their environment through an active, integrated and constructive learning process, for which it is necessary to break the paradigms of traditional teaching. The Metropolitan University, through the execution of the Community Service projects, has empowered the students to learn by doing, using the methodology of Problem Based Learning or ABP. Although the module has no credits, it is a grade requirement.

The objective of this study is to design proposals to improve the quality of life in favor of the creation of sustainable cities, detecting the main problems in certain communities and generating different technical and economically feasible solution alternatives. This is how the students, in multidisciplinary teams, replicated their knowledge and carried out projects with proposals for social and technical improvements that were delivered to the communities and the corresponding authorities (City Halls and municipalities) for their execution. All this in hand, not only the teacher guides, who facilitated the use of the student-centered learning method; but of urban actors who accompanied the process, thus strengthening, structurally, the relationship between university and city.

CITYLAB LA - Engaging students with sustainable cities in Latin America

PROGRAM(S) ***Community service***

LEVEL ***Undergraduate*** STUDENTS ***30***

MODALITY ***Workshops, seminars, field trips***

TIMING ***9 months*** SDGs ***11.1, 11.3, 11.4, 11.7***

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Co-funded by the Erasmus+ Programme of the European Union

P14 - University of Lima UL

Urban Planning Seminar 1022
Faculty of Engineering and Architecture
Universidad de Lima, Peru

In a participatory class, students expressed their concerns about the urban problems of Lima. Three themes emerged: Physical and Virtual Barriers in Urban Borders, Social Segmentation and Residual Public Spaces.
The "Vias under Line One of the Lima Metro" was a place whose complexity of problems covered the 3 proposed topics, it was concluded that during the study process
We analyze the disciplines related to the problem: the Identity of the place, the sociology of the people who use this place, the urbanism that shelters the users of the environment and generates unfavorable situations, the economic actors that develop in the place, the agents of municipal management of the Victoria and Metropolitan Lima, the architecture and design that would plan the solution through space.
The urban actors contacted were the municipality of La Victoria (they indicated as interested the merchants of the emporium of Gamarra), the members of the parishes and schools that could articulate their contribution to generate strategies.
The design concludes in design strategies that respond to the problems and characteristics of the intervention area. Thus, along 800 lineal meters, unique and interdisciplinary strategies were proposed that jointly seek to activate public space, order and that this regenerated area benefits the immediate environment in an interdisciplinary manner.

Final Conference - Bogotà, Colombia
19.09.18

PROGRAM(S) ***Architecture***

LEVEL ***Undergraduate*** STUDENTS ***14***

MODALITY ***Elective course*** ECTS ***4***

TIMING ***1 semester*** SDGs ***11.2, 11.7***

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CITYLAB LA - Engaging students with sustainable cities in Latin America

Co-funded by the Erasmus+ Programme of the European Union

P14 - University of Lima UL

Urban Planning Seminar 1021
Faculty of Engineering and Architecture
Universidad de Lima, Peru

Lima's "huacas" are an architectural vestige of the pre-Inca cultures that inhabited the valleys of Lima. Currently, they are forgotten and enclosed between barriers by a series of economic and social factors that have dragged the citizen of Lima for decades. These are distributed throughout the city, reaching hundreds of temples.
However, each huaca is surrounded by a reality very different from any other. As Lima is a city so unequal and disintegrated, there are problems by sectors or neighborhoods that can not be addressed in the same way to initiate a positive change in the urban context. These ancient treasures, which have been denied by the city; they are currently being considered as possible tools for the regeneration of conflict zones.

Work was presented with local and real stakeholders; that have created an ideal workplace where many projects can be carried out. All the analysis and proposals have been under the parameters of the Sustainable Development Goals for 2030, which makes it more friendly for locals in the future, and giving these guidelines the importance they deserve. We hope to shed light on Peruvian urbanism, give feedback to our Latin American neighbors and also receive criticism and comments on how to improve.

Final Conference - Bogotá, Colombia
19.09.18

PROGRAM(S) ***Architecture***

LEVEL ***Undergraduate*** STUDENTS ***13***

MODALITY ***Elective course*** ECTS ***4***

TIMING ***1 semester*** SDGs ***11.3, 11.4, 11.7***

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CITYLAB LA - Engaging students with sustainable cities in Latin America

Co-funded by the Erasmus+ Programme of the European Union

P15 - Universidad del Pacífico UP

Sustainable Cities Management
Faculty of Economics and Finance
Universidad del Pacífico, Peru

Final Conference - Bogotá, Colombia
19.09.18

In this module, the student will be able to assess an innovative solution for an environmental urban problem located in a specific district in Lima Metropolitana (Lima-Peru). For this purpose, they work in an interdisciplinary team sharing the knowledge and skills developed in their respective programs such as Economics, Business, Engineering and Law. They need to get familiar with the place and understand the problem; contact and talk with local stakeholders; promote interdisciplinary discussions to explain the problem and provide an innovative solution.

The student has the opportunity to use the PBL methodology to solve a real specific environmental urban problem. This problem is relevant for the local authority who is willing to have concrete and feasible solutions.

Universidad del Pacifico has four Faculties (Economics and Finance, Business, Engineering and Law) and they were all fully involved in the Citylab project and the design and implementation of the course.

CITYLAB LA - Engaging students with sustainable cities in Latin America

PROGRAM(S) ***Economics, Business, Engineering, Law***

LEVEL ***Undergraduate*** STUDENTS ***25***

MODALITY ***Single course*** ECTS ***3***

TIMING ***Aug-Nov 2017 and 2018*** SDGs ***11.6, 11.7***

CONTACT ***yfrontado@unimet.edu.ve***

Co-funded by the Erasmus+ Programme of the European Union

P16 - Universidade Federal do Rio de Janeiro UFRJ

Design Strategies for Urban Expansion in Environmental Fragile Areas
Faculty of Architecture and Urbanism
Universidade Federal do Rio de Janeiro, Brazil

Final Conference - Bogotá, Colombia
19.09.18

Peri-urban landscapes present experimental possibilities for new approaches in design and planning in a multifunctional perspective, incorporating environmental values and local traditions. Focusing on Guaratiba neighborhood, which is located on Rio de Janeiro's outskirts, this module aimed to study design alternatives for urban expansion taking into account the neighborhood socio-environmental dynamics and its fragile landscape.

The module was developed at PROURB – Programa de Pós-Graduação em Urbanismo at Faculdade de Arquitetura e Urbanismo, Universidade Federal do Rio de Janeiro, involving undergraduate students + Professional Master in Landscape Architecture + Master in Urbanism students. The module methodology involved the participation of teachers from different backgrounds and faculties; field visits to Guaratiba; and the participation of stakeholders from local community and public authorities. It represented an important opportunity for our students to discuss design strategies involving contesting views from local communities and public authorities in landscape transformation of peri-urban and urban areas.

CITYLAB LA - Engaging students with sustainable cities in Latin America

PROGRAM(S) ***Programa de Pós-graduação em Urbanismo***

LEVEL ***Under- and Postgraduate*** STUDENTS ***24***

MODALITY ***Elective course*** ECTS ***30***

TIMING ***Mar-Aug 2018*** SDGs ***11.4, 11.a***

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Co-funded by the Erasmus+ Programme of the European Union

P17 - Universidade Federal de Santa Catarina UFSC

Special Topics: Sustainable Cities
Department of Architecture and Urban Design
Universidade Federal de Santa Catarina, Brazil

The four modules applied a similar assignment and they have progressively advanced from the material developed by the previous modules. The modules departed from the requirement of protection of the water streams within the campus, which are currently often occupied by parking spaces. Environmental regeneration should be the teams' goal while they reflected about the complexity of sustainable city problems and, in that direction, the future of a university campus. The students should play different roles in the teams, representing different approaches to the problem and they should preferably be from different education areas.
An important issue has been to target towards an integrative and multidisciplinary design process. During the third module, the external expert visit provided an additional support. Tom Coppens brought John Kingdon's window of opportunity and policy stream model as a base for the problem definition. Since the course is based in a once a week meeting, students should aim to present a clear and feasible approach to implement their ideas and proposals. Graphic proposals were mainly conceptual to illustrate a possible design solution. A video should be the final deliverable and each student has presented an additional paper justifying their proposal based on the literature.

Final Conference - Bogotá, Colombia
19.09.18

PROGRAM(S) ***Architecture and Urban Design***

LEVEL ***Postgraduate*** STUDENTS ***67 (in 4 modules)***

MODALITY ***Elective course*** ECTS ***5***

TIMING ***3 months ('16, '17, '18)*** SDGs ***11.5, 11.7, 11.b***

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Co-funded by the Erasmus+ Programme of the European Union

Book of Abstracts

Track I

PBL and other innovative learning methods

Moderator: Andrés Felipe Valderrama Pineda (AAU)

PBL Collaborative and cumulative dynamics towards urban sustainable environments

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The Erasmus + Citylab program, was a pilot experience in contents and practices of morphology, urban planning, and final project. The goal was to make more sustainable urban projects in collaboration with local stakeholders. The introduction of the Problem Based Learning (PBL) methodology, was introduced in an integrative, constructive and inter-disciplinary 3-year experience.
The work teams were conformed by students, who managed their own learning process to define the problem, in each stage of the process, with teacher facilitator roles, responsible to carry out the integrative and cumulative evaluation of each project.
From the didactic perspective, the implementation strategy required to contemplate:

- Survey of the real problems to detect conflict situations.
- Induction to the recognition of urban intervention tools.
- Sharing the project information of the involved actors.
- Results presentation.

In the proposed exercise, the urban transformations that were identified by students, posed the challenge, in the elaboration of new concepts to think the city, as well as to build new tools to project it. The idea was to put into perspective potential experiences with the use of devices, which allow users to interact, specifying new modes of exploration of the city.

In this context, the problems to be solved were,

- ragmatic, reflective, performative and augmented spaces of interaction
- Interaction programs designed to regulate, prolong the use of space, or mobilize.
- Actors' position: operators, strategic observers or designers.

The diagnosis was established from a comprehensive, interdisciplinary and technological innovation scenario, including the analysis of urban morphology, georeferenced records and project inclusion practices.

The application of technological tools, linked to connectivity, and the georeferencing of urban actions, allowed an innovative experience in the interventions. This transformation is seen in the renewal of traditional teaching, as well as in student self-management. The informatic tools based on GIS (Geographic Information Systems) constituted an essential element to build a model complemented by generative morphology processes. The diagnosis stage, permitted the detection of a defined degraded areas of the city, identified as critical places for urban interventions. Students determined a metropolitan sector selection, which was analyzed through different sort of variables, including urban normative and standards to understand its land use complexity, mass transport infrastructures and social impact, as common challenges to solve, in the definition of the sustainable city.

Regarding the collaborative process with local partners, interaction instances were scheduled in the initial stages, and in the final validation of the results. The final products contributed to the enrichment of the parameters taken into account for a Smart City as a Sustainable City.

Keywords: *Problem Based Learning, Urban Sustainable Experiences, Transdiscipline, Stakeholders Exchange, Scalability Processes*

An experience of PBL in the learning of urban planning. Chair of Urbanism IIA, FAUD, UNC, Argentine Republic

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In the framework of the CITYLAB LA Project "Engaging students with sustainable cities in Latin-America", ERASMUS Programme, it is intended to reflect on the workshop experience during the first semester of 2017 for the Chair of Urbanism IIA -Faculty of Architecture, Urbanism and Design, National University of Córdoba, Argentine Republic- called "Urban-Territorial Planning Plan for the Municipality of Villa Allende, Province of Córdoba. Scenario 2032", in which the Project Oriented Problem Based Learning pedagogic method was applied, framed within the topic "Metropolitan Area of the City of Córdoba, Northwest Corridor, Urban Development and Mobility". Thus, a comparative analysis is accomplished between the processes of teaching-learning with which the Chair and PBL methodology work.
The subject Urbanism II (with its two Chairs, A and B) belongs to the 5° Year of the Architecture Degree, whose 2007 Curriculum establishes that students should accomplish the competences required to self-develop in professional areas linked to strategic planning and the interdisciplinary participation in multiple ways of intervening in the city, urban management, urban design and environmental-territorial management in the making of regulations, in relation to the inhabitable space and the built environment. For this reason, the key objectives in the process of teaching-learning in the Chair UIIA are:
1. Develop the professional competences for the research and in-

tervention of the contemporary city as an integral reality, inserted within diverse territorial and contextual scenarios.
2. Understand the problems and challenges of urban realities in their cross-scale and multidimensionality and of the urban-territorial transformation processes.
3. Understand and manage the contents, processes, methods, instruments and actors of urban-territorial planning and of local management oriented to physical-spatial-environmental planning.
4. Acquire an ethical position in the face of environmental problems and on how to approach them from urban-territorial intervention.

The Chair is formed by a team of seven teachers: senior lecturer and adjunct professor, and five assistant professors. The academic year is developed in 25 days with 100 class-hours, in morning and night shifts. The total amount of students is of around 250/300, with a teacher/student ratio of 1/50-60 by shift.

Keywords: *learning; urban planning; PBL method*

Economic and cultural value, urban and built heritage, architecture education: the active role of stakeholders

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Innovation in architecture education is increasingly oriented towards the analysis of real problems considered in their multi-dimensionality and the active involvement of the stakeholders. In learning processes, it is useful to face real case studies so that students acquire disciplinary tools and technical knowledge for the definition of sustainable projects, closely linked to the territorial reality, the socio-economic context and the needs expressed by the different stakeholders involved. With an approach of students' inclusion and involvement in the process of knowledge and definition of the problem under study, they are responsible for their project, collaborate with each other and with external stakeholders and become active in the community of reference. For the students this implies competences in engaging with stakeholders establishing consistent vocabularies, and facilitating participatory research and decision making in collaboration with experts from academia, industry, government, and civil society.
Assuming these premises, the aim of this paper is to highlight how the active role of the stakeholders can improve the economic and cultural value of enhancement projects developed in Architecture and Planning Schools, focusing on the potentialities of the Problem-Based Learning (PBL) approach in addressing sustainable and effective design processes.
For this purpose, a three steps methodology based on PBL approach is presented in order to facilitate the active involvement of the stakeholders in improving the economic and cultural value of complex building

heritages at the architectural and urban scale, starting from real problems and developing sustainable and feasible projects. Each step of the proposed methodology was applied during the atelier "Heritage Preservation and Enhancement", carried out at the Politecnico di Torino and implemented as a module within the Erasmus + EU project "Citylab. Engaging students with sustainable cities in Latin-America", co-funded by the European Commission.
Specific results were achieved for each step through the interaction among stakeholders, teachers and students and the application of evaluation tools. In particular, the steps and the related findings mainly regarded the context and the main problem definition, the knowledge acquisition and management and the development of feasible and sustainable projects.
This experience highlighted the learner's role in defining problems and alternative design solutions, focusing not so much on the intended result (project) as on the path to get there and so start the transformation from a project-based approach to a PBL one.

Keywords: *Problem Based Learning; architecture education; sustainable cities; cultural heritage economic evaluation; stakeholders*

Transdisciplinary education through a solar house

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In today's world, challenges are growing more interconnected and complex than ever before. To reflect this in the academic environment, it is necessary to think about education a a transdisciplinary and collaborative process. In order to complement traditional teaching, it is fundamental to seek out new methodologies that can effectively apply the knowledge learned at the university, preparing the new professionals to deal with complex situations close to real-world problems. In this context, the worldwide recognized academic competition of houses powered only by the sun, the Solar Decathlon, introduces a relevant contribution. The event created by the United States Energy Department have been spread over the continents in 14 editions. These events consolidated a potential learning tool to increase the correlation within the academic environment between transdisciplinarity and real-world problems. The educational perspective has increasingly become a major concern of the event, for students and researchers as well as for the public. The Solar Decathlon proposal raises important issues that could influence a necessary high education revision influenced by the education in design studios and prototype constructions. The organization of the next Solar Decathlon Latin America & Caribbean 2019 has selected a team constituted by an association of Colombian and Brazilian universities, both with previous participation in Solar Decathlon. The Latin American version of the Solar Decathlon presents an additional relevant challenge to design and build a solar house with a tight budget, opening its access to a much wider public and providing sustainable ideas for low-income social housing.
The paper also suggest that the Product Development Project at the Aalto University Design Factory, is able to reproduce on a scale easier to be regularly repeated, the learning impact of the Solar Decathlon expe-

rienced by the academic competitors. The Design Factory serves as an example of how the transdisciplinary experience promoted through the development of the solar houses can be transposed and applied in the academic curriculum.

Keywords: *Solar Decathlon; transdisciplinarity; collaboration; academic competition; building design education*

Academic performance of students of urban design, applying traditional teaching Vs PBL.

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This research makes a comparative analysis of the academic performance achieved by the same group of students of the Urban Design Workshop V (Workshop V) and Urban Design Workshop VI (Workshop VI), both corresponding to the urban planning undergraduate course at the Simón Bolívar University (USB), by applying the traditional teaching method and the Problem Based Learning (PBL) method respectively, under the guidance of the same teacher during the September-December quarters of 2016 and 2017, all within the framework of the European Citylab project. Based on a qualitative analysis, direct observation is applied as a technique, both of the experience, the performance of the students and the academic documents generated, as well as the following variables: the number of students per group, the role played by the teacher, the role played by the student, the number of guest professors, the exchange opportunities with other students of urban planning or architecture, the exchange opportunities with the local actors of the urban study sector, the teaching and applied learning strategy, and the performance obtained by the students. Likewise, at the end of the workshop VI course a semi-structured questionnaire is applied to the participating students and the teacher to know their opinion about the PBL method, its impact on the capacities, the role of the participants and their replicability.From the application of these techniques and instruments, it is concluded that the PBL experience did generate a positive change, since it contributed with the strengthening of its skills for critical analysis, communication and the construction of consensus before multiple viewpoints and the own one facing the problem studied complex, which empowered them within their own learning process and generation of sustained proposals, which resulted in the improvement of their academic performance. On the other hand, the PBL represented an enrichment for the teacher in terms

of innovation in educational strategies and the extent of interdisciplinary exchange among the participants. However, he demanded more dedication both for the planning of the teaching and learning strategy, and for the coordination of the interdisciplinary meetings, considering the limited quarterly regime of the USB.
Finally, the students and the teacher recognize that a prior preparation in PBL is essential to reduce the resistance to change and align the scales of the problems to be studied to the time available.

Keywords: *academic performance, traditional and PBL learning.*

PBL, an innovative learning tool for Urban Planning teaching?: Advantages and limitations for its application in undergraduate teaching in the Spanish context.

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In Spain, teaching of urban planning techniques has traditionally been linked to Schools of Architecture, and to a lesser extent, to Civil Engineering Schools. This is a consequence of the professional competences and attributions that the legislation has established in urban planning matters that- until now- fall on architects and civil engineers as directors of increasingly multidisciplinary teams. For this reason, Urban Planning is a compulsory subject in the Degree of Architecture with the aim of providing future architects with a basic knowledge of the tools required for the regulation of urban space and territory. These teachings also aim to serve as a prelude to those students who choose to pursue postgraduate courses specialized in this subject. In the current context, traditional knowledge about urban planning techniques based on a complex approach to the urban and territorial context (physical and spatial aspects, social and economic environment, legal framework) is necessary in order to incorporate the urban sustainability framework with the objective of intervening in the city based on criteria of social and environmental responsibility.

Methodologies based on problem-based learning (PBL) seem, at first glance, a very powerful tool for urban planning teaching. This is so, because PBL is a student-centered pedagogy in which students learn about a subject through the experience of solving an open-ended problem. It allows, therefore, autonomous directed learning that encourages students to find their own answers to problems, scenarios, situations or cases that arise, hence their special applicability to practical disciplines. It is, therefore, a methodology that gives the same importance to knowledge acquisition than to skills and attitudes development. In addition, its flexibility can facilitate the transition

towards the model of the European Higher Education Area.
However, despite the extensive literature on the potential of this methodology, its implementation in Urban Planning teaching has not been as successful as in other teachings.
However, the complexity of Urban Planning teaching coupled with extensive experience has developed an efficient methodology that combines traditional teaching based on lectures (theoretical knowledge and analysis techniques) with apprenticeship workshop that shares certain characteristics with the PBL.
The objective of this article is to analyze both methodologies in order to make a comparison between them, pointing out the advantages and limitations of these approaches. PBL seems to offer undoubted advantages in the medium and long term, but with high requirements of personnel and material means. Against this, the high effectiveness of the apprenticeship workshops in limited contexts of economic resources and personnel is an indisputable advantage. In addition, technical and regulatory complexity of urban planning requires the student to acquire an important prior knowledge in a short period of time which makes it essential to accompany the workshop with a strong theoretical support.
For the comparative analysis between both methodologies, two different programs, used in Urban Planning (a subject of the last year of the Degree in Architecture of the School of Architecture of Universidad Politécnica de Madrid) are analyzed. It is a core subject of 6 CTE that takes place during a semester. One of the modules analyzed has been taught since 2010, year in which the new program of Architecture Degree was implemented. In this module, a methodology that combines theoretical sessions with a workshop has been applying. In this workshop, students make a proposal of planning, based on a diagnosis made by themselves, grouped in teams of four member each. To carry out the analysis, students visit the site and collect information from indirect and direct sources. Based on this, they frame a diagnosis and a proposal of a masterplan including a simulation exercise of a participatory process. Through a rol-playing exercise, students adopt the role of each of the selected stakeholders (citizens, business, retail trades, politicians, technicians .). The participation of stakeholders is reduced to ini-

tial phases (information gathering).
The second module analyzed is the one implemented during the 2017-2018 academic year for the same subject but applying a PBL methodology. The different stakeholders participate in the whole process, including the final evaluation. This module incorporates compulsory sessions of theoretical support. These sessions are considered essential for students to acquire analysis and proposal skills and specific knowledge on national and regional urban planning regulations.
Based on a qualitative cost-benefit analysis, both courses are evaluated with the objective of determining the limitations and potential of the implementation of the PBL methodology.
The results obtained allow us to conclude that a flexible design of PBL course has allowed adapting the module to previous important limitations: scarce academic schedule (15-16 weeks) for an adequate development of a real proposal, high student / teacher ratio, small classrooms, students' need to acquire an important package of knowledge and skills in parallel to the course development. The implementation of pure PBL would require a complete adaptation of the curriculum and the entire teaching model. However, the „hybrid modules" based on PBL offer undoubted advantages and an interesting balance between resource efficiency and quality of teaching.

Keywords: *Urban planning teaching, PBL, innovated teaching methodology, workshop based learning*

Abstract I-B7

Developing a teaching methodology: from intuition to the PBL

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The elements contended in this paper represent the development of "Seminario de Urbanismo" course between years 2014 to 2018, in relation with PBL methodology approach in the Faculty of Architecture and Project Management of the Universidad de Lima-Peru and the results of these years of experience. It is addressed for teachers who would like to start with the PBL methodology.
At the beginning of the paper, we quote Castels to explain the «information age» where all kind of data is available to everyone, and to explain that it is important for professionals to be prepared to identify and solve problems, adapting to new situations and constant changes. Next, we argue why we consider it is important to develop an educational proposal that "teaches to learn" in Peru, like the one Jerome Bruner developed in the 60's, known as «learning by discovery». After this, the PBL methodology is explained. The theory places the students as the center of the curriculum and proposes that they acquire knowledge by themselves, where teacher is a counselor suggesting sources of information and a coordinator of activities, also boosting students to interact with each other. Subsequently, the PBL methodology application is presented in five guidelines wrote in base of the experiences gained in the course, explaining some strategies teacher must apply and the spaces or furniture are needed for the course. We narrate our experience with the course in the faculty, by starting with explaining students what the course was about and exercises they had to do in class, to results we achieved at the end of the semester.To finish, our conclusions about the PBL methodology and its application in a Peruvian faculty are mentioned, giving final suggestions and thoughts.It is hoped this paper will well inform teachers and people in general who are interested in the PBL methodology and be helpful for future professionals as well.

Keywords: *Learning to learn; educational methods; methodology; application; experienced.*

Abstract I-B8

Influence of PBL strategies in the transformation of teaching and learning in Universidad del Rosario, Bogotá

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This document presents some of the advances of the University of Rosario - Bogotá, in the implementation of good practices of active learning or student-based learning, especially on the courses related to the implementation of Problem Based Learning (PBL) in practices pedagogies in a way compared to the implementation and evolution of this type of methodologies in similar institutions. Part of a rapid evolution of the strategies to implement the best didactic practice in the university that includes curricular reforms, internationalization of the curricula, collaborative work, among others. At the end, the methodology of problem-based learning (PBL) applied in the recent Citylab intersemestral courses is specifically presented. The objective is to show what progress has been made in the workshop format that has been implemented at Universidad del Rosario since 2014 in its "Learning to learn" strategy and what is the gap in the implementation of PBL compared to other universities in Colombia and the international context. With this purpose, it was tracked to date, seeking to determine how many of these courses have generated a greater application of methodologies that encourage active learning and the percentage of teachers who have begun to implement the newly incorporated methodology PBL. Similar useful experiences are compared with the practical aspects and the design of the problem, complemented by an introduction of the general concepts of active teaching and the usefulness of the programs within the framework of interdisciplinarity. The results make it possible to make visible to the entire educational community the contributions of the application of PBL methodologies through close monitoring of the courses where the strategy was applied, a short evaluation and the possibilities of integrating the methodology into new courses.

Keywords: *active learning; Problem-Based Learning; pedagogical methodologies Colombia; teaching in higher education.*

Track II A
PBL: Collaborative process with external actors
Moderator: Sandra Ornes (USB)

ABP Methodology: Linkage between the University and Urban Actors in the face of Sustainability problems

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The study that is presented about the link between the University and the different urban actors, in the face of sustainability problems had as objectives the diagnosis of the needs of improvement with a transdisciplinary approach, the identification and selection of stakeholders involved, and the proposal of project ideas as solution alternatives.
Its theoretical foundation was based on the need of the Latin American region, in the creation of cities that allow a continuous elevation of the quality of life of its citizens, without deterioration of the natural environment, and within good policies of territorial and population planning, related With social sustainability and human development.
Thus, through the Problem Based Learning methodology (ABP), the Metropolitan University linked the educational process of the student with its environment breaking the paradigms of traditional teaching, through the subject of community service. Multidisciplinary teams of students were formed to provide answers to problems diagnosed in the selected community (Las Minitas, Baruta municipality, Miranda state, Venezuela) accompanied by the tutors, who facilitated the use of the learning method, and of the social or urban actors that, like the communities impacted by the projects or as a private company or public power, that accompanied the process, provided the opportunity to structurally strengthen the relationship between the university and the city, which pointed towards the achievement of objective 11 of Sustainable Development on Sustainable Cities and Communities.
The study evidenced the development of competences in the student where he highlights his motivation to manage his own learning based

on real problems, integrating knowledge of different disciplines and solution proposals, in an integral and dynamic way in the hands of social actors, which fostered models of cooperative work, promoting coordination and shared vision of problems.

Keywords: *Universidad Metropolitana; Sustentabilidad; PBL; Stakeholders; Diagnóstico comunitario*

Abstract II-A2

An interdisciplinary PBL capstone course for Management Sciences: The challenges of its design and implementation

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Project-based learning has shown to be an effective method for developing courses. This methodology, which is student-centered, allows students to learn and apply their knowledge to solve real-life problems that at the same time motivate them in the learning process. In this kind of learning, the students are principal actors of the learning process and the lecturer is a guide of the process. This kind learning process is particularly attractive for the senior student that already have a baggage of knowledge to apply. Nevertheless, when a senior student begins to work, they would have to team with other kinds of professional distinct from his career to tackle problems.
Thus, the necessity to have a capstone multi-disciplinary PBL course.

Keywords: *education; Problem Based Learning; interdisciplinary course*

Abstract II-A3

Integrating disciplines with PBL at the Autonomous University of Nuevo Leon (UANL)

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Problem-based learning is one of the most useful resources in education with the potential to effect real world change. The evident benefits of PBL in the face of the challenges that Latin America presently encounters have led many institutions to consider the adoption of PBL curricula. However, PBL implementation has its own set of difficulties. "I liked to work in a multidisciplinary team because our skills were complemented. Sometimes, it was difficult to understand our different ways of working, because we were focused on different things", said one of the students of our institution. This paper describes how different academic programs from the Autonomous University of Nuevo Leon (UANL) in Mexico, were integrated in a Learning Unit (LU) using the Problem Based Learning (PBL) methodology. First, we present some PBL definitions to delineate its main characteristics, like the students facing real problems. Afterwards, we describe the PBL implementation process at our university, its precedents, the administrative process, and the adaptation into an existing LU. Additionally, we describe how we adapted the PBL methodology to the Sustainable Ecological Environments course while also integrating the United Nations' (UN) Sustainable Development Goal (SDG) 11, dedicated to cities and sustainable communities. Finally, we mention some findings from the Sustainable Ecological Environments LU. Most notably, the students favour working in multidisciplinary teams and the amount of student investment was higher than in traditionally taught courses. Nevertheless, multidisciplinary work means a constructive challenge for teachers, because it involves a closer monitoring of the student's learning process and a different time distribution than traditional courses, with a higher time investment during planning stages.

Keywords: *multidisciplinary approaches; public health; industrial design; architecture; sustainability*

It Takes Two to Tango. Modalities and benefits of the collaboration between universities and local governments

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This paper stresses the main results of a study on the modalities and benefits of collaboration between universities and local governments. It has been prepared in the context of the Erasmus + CityLab project: Engaging Students with Sustainable Cities in Latin America which aims to stimulate the development of active pedagogies in undergraduate and postgraduate courses promoting collaborative work of students with representatives of local governments, based on a problem-based teaching methodologies. But, the object of this study goes beyond the pedagogical task of the universities. It aims to understand the conditions in which this collaboration is developed and its impact. A questionnaire was applied to 80 institutions in Latin America (most of them) and Europe. The most interesting responses were selected to develop 20 in-depth interviews with university representatives. Then, a comparative analysis was carried out to better understand the main dimensions of the collaboration. The small size of the sample does not allow it to be representative. However, it allows to stress some aspects that foster successful collaborations, since there is a common pattern in several of the analyzed cases. At the same time, the heterogeneity of cases and their contexts help to understand the factors of success and the obstacles of collaboration. It is not intended, in any way, to offer a model, but to present some hypotheses and points of reflection that might help city and university leaders to improve their current collaboration. This reflection is based mainly on the perception of the universities and the perspectives from the academy, derived from the surveys and interviews developed with a group of them and will serve as the basis for a later work with local governments.

Keywords: *University contribution to SDG's and Urban renewal; U's Key competences; levers and barriers; lessons from successful experiences*

Abstract II-A5

Human and nature dynamics through collaborative data and integrative process

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The Federal University of Santa Catarina main campus had its origins 60 years ago. From the beginning, the campus evolution was given with little emphasis on the landscape quality of its open areas, resulting in an overlap of layers, natural and built, that exposes an absence of environmental understanding and even lack of planning. Though continually neglected, campus hydrography is still responsible for the beauty of few green corridors that permeate the campus. In another layer, the campus road system prioritizes motorized vehicles, as opposed to infrastructure to provide adequate mobility to the nearly 50.000 people that circulate daily through its open spaces. Another significant layer represents the knowledge and permeates the natural and urban dialectic that inhabits the campus territory. The organizational structure of the university, in turn, also developed in a segmented way between its final activity - teaching and research - and the activities that are necessary for the good management of the university. However, the extensive background information and the built knowledge are under-utilized as tools for the university spatial management. The lack of connectivity between the various teaching and administrative departments creates a barrier that not only demarcates physical space but also bounds the real meaning of campus universality: the constant exchange of knowledge. Departing from this dialectic, Information and Communication Technologies (ICTs) is explored in the analysis of spaces, with emphasis on its potential to foster collaboration and knowledge networks through the campus mobility planning. This study has analyzed information collected from different digital methods in order to correlate the relations between human and environmental dynamics. The scope of the study and all digital data was obtained through a collaborative process of a variety of stakeholders within the university, demonstrating the potential that integrated management can promote in the construction of the quality of life within the urban and academic space.

Keywords: *mobility; collaborative process; resilience; pedestrian; bicycle; mobility policies*

Track II B

Implementation of PBL to different scales of intervention

Moderator: Josè-Miguel Fernandez Güell (UPM)

Abstract II-B6

Comprehensive Evaluative Perspective of PBL on the Learning-Teaching Process of Architecture in the Universidad Simón Bolívar

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The learning process in architecture at Universidad Simon Bolivar is based on confronting students with practical or theoretical situations to be solved in order to acquire knowledge about the discipline. The core of this process is on design studio courses and since early stages of the program they have to discover by themselves but with faculty support, the role of architecture in the creation of spaces for people at different levels. Alongside with this design methodology, students are exposed to theoretical, historical and technical knowledge that aims to complement and complete their skills for their professional future. Problems gain complexity for advance students, requiring a deeper level of interpretation with other subjects of his professional education, and therefore success of this methodology could be more evident and efficiently assessed on senior students. The purpose of this research is to evaluate the general efficiency of the learning process based on solving problems through the application of a problem based situation in a sustainable urban environment for the Architectural professional. This includes the comparison of the advantages and disadvantages of the methodology in accordance with the curricular design of the career, the particular characteristics of the institution and the syllabus to the different subjects included.
In order to evaluate, in a comprehensive way, the integration of the different knowledge required for the design process in a complex and global situation and to achieve a sustainable approach of measures, the topic of this module was the issue of informal city, understood as an urban process in which spontaneous settlements were develop in large metropolitan areas of Latin American cities like Caracas. Students were given basic information about

the growth process and the transformation of these areas (known as barrios in Venezuela) into regular city districts with particularities related to the geographical condition, urban fabric, density and community organization. The issue of inequality, characterized by lack of open public spaces, proper infrastructure, services, and environmental risk conditions that require a planning process in which students have to be trained for possible interventions of architecture and urban design. This experience was implemented throughout a participative design process between undergraduate students and communities from the popular sector of Petare Sur in Caracas, Venezuela, which were organized into 14 sectors, with the support of the Municipality of Sucre and leaders that were chosen and recognized by inhabitants of those settlements, representing a different approach to collaborative design.

Keywords: *Learning Process Efficiency; PBL; architecture; sustainable cities*

Abstract II-B7

Plan4CuRe : cultural resilience as a base for engaging students in bottom-up development, the case of Mariënburg

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Plan4CuRe (Platform for Activating Networks for Cultural Resilience) originates from a two-year funded research project aiming at the development of a bottom-up methodology for implementing actor-based design-driven processes of urban and rural development. This paper reports about the findings and educational experiences of student research in Marienburg – a former plantation in Commewijne, Suriname.
The research was based upon fieldwork and urban living lab methodology. The fieldwork uncovered that the actual spatial articulation of the settlement is a reflection of traditional culture and social values of Javanese kampong culture. Yet, such emanations of cultural resilience tend to be overseen and even cut off by prevailing housing policy. Moreover, the urban living lab revealed potentials of local knowledge, economies, culture and tradition, that have not been taken into account by prevailing spatial development strategies so far.
From an educational perspective, the project calls for caution regarding a too immediate and principled adoption of a PBL approach. The research demonstrated that a thorough understanding of the actual situation and conditions of how people live and inhabit their environment is a prerequisite for being able to conceive and generate appropriate solutions for development. This requires an hermeneutic and empathic stance. The process and practices to reach such understanding and stance are distinct from the process and practices of identifying and formulating a clear and univocal problem statement. A too immediate adoption of a PBL approach might force students to formulate a problem statement and to conceive problem-solving

strategies that rely upon a referential framework that already exist in their mind at the moment of exposure to the situation, rather than upon a thorough understanding of it.
We therefore advocate the notion of inquiry-based learning (IBL) - a pragmatist pedagogy that aims at making insights emerge out of an inductive process of observation, confrontation, questioning and reflection. It is a common quest of students, teachers, and involved actors that eventually not only leads to revelation and conception of potentials that are anchored in what exists, but could not be thought of before (= design), but also to a transformation of the way of thinking of all those involved (= transformative learning).

Keywords: *cultural resilience; urban living lab; Suriname; problem-based learning; inquiry-based learning*

Abstract II-B8

PBL for sustainable Cities, an experience in the initial level of architecture teaching

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Centered on problem based learning, we present an experience at the initial level of the Architecture career in the Chair of Architecture IB of the Faculty of Architecture at National University of Córdoba. The teaching of architecture always considers the simulation of situations of reality, which need to be understood for the proposal of a building project. In the initial level (first year) buildings of low complexity are designed, oriented to the project of a neighborhood institution (such as health centers, exhibition centers, educational centers, neighborhood library, among other possible topics.) The chair belongs to a faculty of a public university and is characterized by a massive student population. In 2017, it began its activities with 440 students distributed in 8 workshops. The great diversity in the profile of the students is a challenge when applying the teaching methodology.

The objectives of the paper are: to present didactic innovations in the experiences developed in the workshop that allowed us to articulate the PBL learning methodology and to formulate considerations on its implementation and necessary adjustments to program the module with this orientation.

We hypothesize that it is possible to consolidate this pedagogical experience in the initial contexts of high education, even in the particular case of the massive context of our faculty. We question ourselves:

1. To what extent does the student at the initial level have the autonomy to develop an active, integrated and constructive learning method that stresses learning to learn and learning by doing?
2. What results were achieved with the PB learning approach, in this specific context of application?

During the course we could observed that the student developed autonomy to conceptualize and solve the design problem proposed and this condition it is favored by the PBL. In the initial level the possibilities of incorporating the

interdisciplinary approach are limited, however it is possible to advance in a constructivist approach to the knowledge in an architectural-urban design problem in a massive context of teaching.

Keywords: *PBL; architecture teaching; initial level of education; pedagogical strategies*

Abstract II-B9

Interdisciplinarity and PBL in the UTP-Colombia experience

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A group of professors from the Faculties of Environmental Sciences and Mechanical Engineering in the Technological University of Pereira (UTP), designed and implemented the module Citylab "Territory, water and sustainability". It is based on the methodology Problem Based Learning (PBL) using an interdisciplinary approach. The course is composed of two courses in the undergraduate programs of Environmental Management and Mechanical Engineering. Also, a solidarity extension course was designed to involve the local actors.

With the implementation of the module, the Campus Team UTP wanted to know the lessons learned during the interdisciplinary training using the PBL method to analyze territorial problems associated with water for human consumption.

The implemented methodology allowed to accomplish the objective by the systematization of the process. In this process were involved 18 professors and 145 students from the UTP and 20 local actors from Dosquebradas-Risaralda-Colombia.

The qualitative analysis was performed using statistical data and testimonial records. The coding and systematization of the information was conducted through the qualitative atlas-ti database. The data were collected between February 2016 and September 2017.

As a case study was selected the municipality of Dosquebradas due to its complex urban problem associated with water for human consumption.

The Citylab experience is relevant because it agrees with the claim of some academics (Enrique Leff cited by Eschenhagen, 2009: 17). They have expressed the need of moving forward in the conceptual foundation that guides strategies for the transformation of knowledge and its incorporation into universities.

An interdisciplinary object of study leads us to reflect on how to articulate what we know from different disciplines to a common third (Miralles, 2012). This is because the real challenge of interdisciplinarity consists of '... getting used to undertaking the path to learning together' (Cubillos, 2000). Below we present the most significant learnings that students, professors and local actors of Dosquebradas have expressed to acquire in the Citylab-UTP experience.

The PBL rather than a method is an epistemological commitment to learning (Savery, 2006) and Savin-Baden (2000), that requires convergent changes from the classroom of the classroom to the University and the society, among other instruments through the institutional educational project. Therefore, "the scenario that opens Citylab, from the PBL methodology, can be an opportunity to discuss an integrated and interdisciplinary proposal for teaching in the UTP."

The implementation of pedagogical experiences like PBL demands the existence of minimal material and attitudinal conditions of those who make up the University. Among others, "a review of the assignment model of professor class schedules, because the methodology requires accompaniment and advice to small groups of work, with diverse and specific problems." "Information must be available", "Knowledge must be nurtured through the dialogue with local actors", "It is necessary to understand how the discipline in which the students are being trained, conceive the training topics.

The PBL has a more prospective than retrospective orientation, according to Flórez (2002). Therefore, "the pedagogical and interdisciplinary task must rely on what is to be heard and on what should be learned, and not so much on the pre-established ...". "Learning comes directly from the problem and each student reaches the goal in different ways ... Therefore, the professor must go to the field as well." Students in the PBL strengthen attitudes to be "more creative, inclusive, generators of comprehensive ideas, to transform the world and generate sustainable strategies."

The Citylab project offers students the opportunity to "explore new areas of interaction for the development of their profession in a more holistic manner ...". Therefore, the interdisciplinary dialogue between students is a permanent challenge, although there is fear for the unknown and for the diversity of the

oral communication.
Among professors, interdisciplinary communication requires adaptability to different rhythms and logics, because "this must be an exercise of proactivity", some say. "Fear and comfort are impediments, leaving the comfort zone requires an extra effort", "It is necessary to build agreements on common codes ... perhaps opening a terminological section that allows us to understand and communicate each other...", "it is necessary to speak less and listen more" and "to introduce the self-assessment of both students and professors ...".
The Citylab project made visible the real problems of the population in the society. Some actors consider that "this exercise strengthens and promotes ... the knowledge of our difficulties ...", "before they did not recognize us in the municipality ... Until now they recognize, that we have a different solution from the ones stablished by the standards for the water supply...", "The visits of students and professors from the University provide us with information that are useful to defend us from those who have abandoned us".
The characteristics of flexibility, autonomy and opportunities of interdisciplinary work by means of the PBL, allow the opening of new pedagogical ways in the UTP. The principal result of the Citylab experience is the consolidation of a scene for the dialog among local actors, students and Teachers around a real urban problematic in a Colombian municipality.

Keywords: *interdisciplinarity, learning, territory, water, environment.*

Abstract II-B10

The PEAMA Sumapaz. A pedagogical contribution for an ecological and sustanaible relationship in rural Bogotà

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This paper presents the discourse analysis on a workshop achieved with 22 students who participated for two years in thePEAMA Sumapaz, a program of Special Admission and Academic Mobility of Universidad Nacional de Colombia. This program developed a higher education in rural contex using Project Based Learning. In the workshop we asked to the students the concepts of ecology, sustainability and ABP. In addition, we also asked about work proposals for point future development of the program. Among the results we found an strong appropriation of the concept of ecology and ABP. For ecology was interesnting their approched to this as a relational science, and, for ABP, a generalized vision where the project was understood as an intermediary to reach an end. In contrast, the concept of sustainability showed very superficial approaches. Productivist interests are also materialized in the definitions and project proposals made. The students presented a strong interest on streamline the community participation in the first stages of learning project formulation.

Keywords: *aprendizaje basado en proyectos; ruralidad; ecología; Sumapaz.*

Track III
PBL international expert experiences
Moderator: Rosario Gomez (UP)

World Café as a participatory approach to facilitate the implementation process of PBL

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Shifting from a traditional teaching approach (lecture based) to a student centred approach, such as Problem Based Learning (PBL), demands significant changes in Higher Educational Institutions (HEIs) on different levels. It requires changes for teachers, students, institutional management and even the physical learning environment. Once a university is not designed from the outset to insert this type of pedagogy, it is very difficult to promote a change of this nature in a university with a more traditional pedagogical approach. Introducing PBL as an important innovation thus faces problems of conservatism, institutional inertia, path dependency, lack of knowhow and knowledge among teachers, poor institutional support and poor connection with societal and economic actors.

This papers argues that the process of implementing PBL may better be supported by using participative approaches that support people to get together, to share and discuss experiences, values, and assumptions with a collaborative learning mind-set. Among these participatory approaches, the World Café (WC), created by Brown and Isaacs (2005), is well known. The technique fosters conversation, dialogue and discussion on relevant issues for a certain group. The tool shares several aspects with other participatory approaches for collaborative learning and knowledge creation.

Our research positions the World Café technique in the context of organizational change and identifies the different values of the technique as described in multiple international researches. Furthermore, the identified values are confronted with the empiric data retrieved from the CITYLAB World café, organized during the CITYLAB project with 40 participants with different job positions and areas of expertise from 17 different European and Latin Ameri-

can HEIs. Moreover, this paper identifies three aspects of the implementation process of PBL in HEIs that can be facilitated through the world café technique: (1) understanding the principles of PBL through engaging in a constructive dialogue (2) fostering critical reflections about teaching and learning practice (3) changing the organizational culture by promoting sense making and the construction of meaning.

Keywords: *World Café; situated learning; PBL; participatory approach; collaborative learning*

International collaboration in PBL experience analysis and methodological contribution. A study of accessibility and mobility for the UFRJ's Campus on the island of "Fundão" in Brazil.

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The modul PBL was develop as part of the project to renew the campus of the University of Rio de Janeiro (UFRJ). The UFRJ and UTC have been engaged by the Mayor of the UFRJ campus to develop a study about accessibility and internal mobility in order to facilitate access to the island, reducing internal congestion, providing an efficient internal public transport, motivating the use of the bike and to design a new parking organization. The study resulted in proposals from transport services and transport infrastructure for scenarios in the short, middle and long term.
The methodology presented is empirical and based on the practice of both higher education and professional management of architectural, urban and civil engineering projects. It has been applied and refined on the practice since the creation of the Department of Urban Engineering at UTC in 2003. The mixed academic and professional profile of the teachers of the Department of Urban Engineering has strongly contributed to guarantee the transmission of knowlege as well as the quality deliverables and their usefulness to project sponsors.
This methodology is a guide for the assembly, the organization of work, the organization of the exchanges with the external partners, the establishment of the objectives to wait and for the notation of the students. Nevertheless, it is not compulsory and the colleagues of Urban Engineering (UTC) are free to apply it or work the PBL modules according to their own pedagogical criteria.

Keywords: *International PBL collaboration; PBL methodology; accessibility; mobility; urban planning*

Abstract III-A3

The Crowdmapping Mirafiori Sud experience (Torino, Italy): an educational methodology through a collaborative and inclusive process

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The pilot project Crowdmapping Mirafiori Sud" (CMMS), carried out by the Politecnico di Torino (Italy), has involved the academia and the local community in a participative and inclusive process. The genesis of the project lies in the emerging themes of Social Innovation and Collaborative Processes. Given the above, the project was born as an educational experience and supported by funds for students' activities. The work was conducted by a team of students and professors together with the Mirafiori District, the Fondazione di Mirafiori Onlus, the local population and the CBOs, with particular attention to the most vulnerable categories in terms of accessibility and usability of urban spaces. The District is a vastly area in Torino characterized by a very high average age of its residents and a high percentage of foreigners and a peculiarity is the attitude of its residents towards taking an active part in the district life, thanks to the presence of a rich network of associations. The aim of the project is to identify and report, through the use of ICTs, the obstacles that prevent residents from making use of the public space in their district. The information gathered, processed and classified, is made available through an online platform. Citizens, especially the vulnerable ones (i.e. the elderly) are active subjects: they are asked to report problems and proposals, thus feeding a participation process. Originally, it was not developed starting from the explicit application of the PBL approach: in fact, it been born as an educational experience that started from the students' projects and the exchange of their skills. It evolved as a problem solving according to the PBL approach: the focus are related to the application of the project and to the connections with the participatory process. In particular, the moment of mapping the stakeholders and identifying the connections between the networks of actors proved to be strategic for the

implementation phases of the project. Crowdmapping Miarfiori Sud was developed in two different phases. The first one (2013) has set up a pilot methodology to know the context and test the method. It has involved students and citizens with different age and technological skills in a participatory mapping about the neighbourhood. In the second phase (2015), after being awarded with the SIforAGE prize, a more structured approach in term of IT system has been developed in order to involve public officers in the reporting process.

Keywords: *crowdmapping; collaborative process; digital divide; smart communities; Mirafiori Sud*

Abstract III-A4

Education strategies for a positive environmental impact

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The growing field of regenerative design, which emerged from the view that we should not limit to reduce our impact, but to redefine what the environment encompasses and what is its role. The belief is that the only way to promote more effective results, is to consider that the impact and intention should be positive, which means being and feeling connected to the natural world, coevolving with environmental systems. To this end, it is understood that professionals should move towards a regenerative model based on the relationships between natural and cultural systems and a deep understanding of regional characteristics, recognizing the interdependence between humans and nature.

One way to look for more positive environmental impacts is to understand that universities play a key role in this process and have social responsibility in the society development, particularly in educating future professionals and in spreading public awareness about environmental issues. Several universities have sought to promote sustainability in their elementary systems, such as teaching, research, community outreach, self-assessment, reporting, as well as campus operations, which pertain to activities involving energy and water consumption, greenhouse gas emissions, solid waste generation, food purchase, transportation, among others. But they are punctual solutions, and the reality perceived in the areas of universities points in the opposite direction.

Since 2016, four learning modules departed from the requirement of protection of the water streams within the campus. Environmental regeneration should be the students' goal while they reflected about the complexity of

sustainable city problems and, in that direction, the future of a university campus. The students should play different roles in the teams, representing different approaches to the problem and they should preferably be from different education areas. An important issue has been to target towards an integrative and multidisciplinary design process. During the third module, the external expert visit provided an additional support.
Tom Coppens brought John Kingdon's window of opportunity and policy stream model as a base for the problem definition. This guidance guiding. The transdisciplinary learning process that uses a real-life problem applied this guidance to promote a collaborative approach that can impact the physical spaces of the universities positively.

Keywords: *University Campus, Regenerative Design*

Abstract III-B5

3D models as a multidisciplinary researching and learning tool

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This article aims to investigate an undergraduate learning and research proposal, focusing on student autonomy and collaboration with external stakeholders. Wi-fi data and digital representation methods, especially three-dimensional models and videos, are explored as collaboration and communication platforms to engage the various spheres responsible for sustainable initiatives. The campus of the Federal University of Santa Catarina (UFSC), located in the city of Florianopolis, southern Brazil, is the object of this study.

Several streams create a hydrographic network within the university campus and are part of the Itacorubi river micro basin. This valley bottom region has suffered considerable environmental impacts due to irregular interventions, especially from parking lots located in environmentally protected areas, at the borders of the streams that pass through UFSC. The presence of these parking lots, in addition to their ecological implications, causes a separation between users and water streams, generating a lack of interest and, consequently, disregarding the need of preserve such streams as an integral part of the urban and natural systems where they should play an important role.

The production of a three-dimensional digital model represents an objective tool for synthesis and continuous approaches between understanding and formulating problems, its construction, and the graphic representation of potential solutions. The method is constant, precisely for allowing the formulation of several alternatives and not just an ideal project solution. The digital model is not limited to a representation tool, it also possesses a relevant aspect for the incorporation of learning and researching strategies. Besides the visualization of existent situations or alternative design, through

this model we can see understand people dislocate through the campus. The model becomes a facilitator of the discussions between the different stakeholders involved in the process.
Through the inquiry of new methods of approaching and comprehending the physical ambient and the patterns of human use on campus, Wi-Fi data are used to trace how students from different centers of teaching in the university are dislocating in campus during the day. Using those data, we can infer what the best places to promote encounters between students, to locate project interventions and to obtain information that can be used to bargain and to substantiate an intervention.

Keywords: *3D models; multidisciplinarity; videos; sustainability.*

Abstract III-B6

Is the Design Studio always Problem Base Learning? Comparative view among DSL and PBL at Simon Bolivar University

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There are similarities among Problem Based Learning (PBL) and the Design Studio Learning (DSL). While some authors affirm that the last is indeed a type of the former (Cennamo, 2011), for others it is wrong to assume that DSL is PBL (Green-Bonollo, 2013). This paper explores the similarities and differences of both methods, as they were applied in the Architectural Design Studio at Simon Bolivar University in two consecutive courses, between September 2016 and March 2017. The first of these experiences followed the traditional methodology used at the University. The second was a hybrid proposal based in the Aalborg PBL model. Data about objectives, methodology, level of student participation and results were compared using the syllabus.

Even though the workshop space and dynamics and activities show similarities among both methods, the comparison of title, competences and objectives shows that these aspects should be addressed differently if using PBL, and they should be defined with a non-mandatory approach, leaving space for the students to experiment and to look to both, problems and solutions, by themselves.

The level of participation of actors also differs, both in general and in how the participation evolves during the term. To assign to the students the task of defining the problem is one of the most important differences, as the traditional DSL tends to make students to understand the project not as an their own investigation but as an external commission.

In PBL, the inclusion of self-evaluation, the assessment of external actors and valuation of the process as well as the product allows to measure the students' skills in a more integrated manner, encouraging weaker students to improve.

Preliminary results, even with a small amount of data, show that under PBL the students seem to improve their performance.

Keywords: *Universidad Simon Bolivar; architecture; syllabus; design studio; PBL*

Abstract III-B7

Innovating education for sustainable urban development through Problem Based Learning in Latin America: lessons from the CITYLAB experience

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This article discusses the challenges and opportunities aroused during the implementation of the Citylab project in Latin America during the period of 2015-2018. The project was funded by the Erasmus+ Key action 2 programme of the European Union and aimed to innovate teaching for sustainability in higher education institutions through Problem Based Learning (PBL). Opposed to traditional teaching methods, the pedagogical approach of PBL is a learner-centred approach starting from a complex problem instead of existing knowledge. Since application of such learning methods is rather limited in Latin America, the Citylab project tried to introduce PBL in the existing curricula of 12 Latin American universities through the implementation and development of Citylab modules focusing on sustainable urban development.

First, the role of PBL in education for sustainability is discussed in a broader theoretical context. Thereafter the goals, implementation strategies and results of the Citylab project are being illustrated. This is followed by some critical issues and success factors experienced during the project. The findings of this paper are based on (1) self-reported questionnaires from the partners at the end of 2017, (2) on-site visits by the authors and expert visits, (3) meetings, interviews and conversations with project leaders of the participating institutions during the project.

Depending on the institution, the project results were varying in terms of innovation and upscaling potential. Critical factors which appeared to be of

influence were related to the role of the project leader in the organization, the flexibility of the implementation or cultural differences. Internal regulations created both incentives and disincentives for participation. Competitive elements in the project and available resources for equipment can act as stimulators in this case. The challenge lies moreover in detecting windows of opportunities for change in order to accomplish curriculum reform and by doing so, pursue continuation of the PBL approach after the project's horizon.

Keywords: *Problem Based Learning; sustainable development; educational innovation; niche management*

Track IV
PBL and Sustanaible Development Goals
Moderator: Fernando Santomauro (UCLG)

A Mix Strategy for Assessing an Interdisciplinary PBL course

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A PBL interdisciplinary course introduces a deeper challenge than a regular PBL course for setting an evaluation system that allows to assess student academic achievements in different areas such as cognitive and soft skills. The objective of the paper is to discuss a guided assessment protocol that is useful for students evaluation in an interdisciplinary PBL course as well as to evaluate the course. The article suggests complementary evaluations from facilitators, experts, and students. Therefore, the innovative response to an interdisciplinary PBL course assessment is to apply a mix-strategy, based on two types of evaluation such as (i) Hetero evaluation and (ii) Self assessment, each one includes different strategies (i.e. world cafe, logbook), and instruments (i.e. professors and experts student evaluation, entry and exit quizzes).
The article is based on the design and implementation of an interdisciplinary PBL course called Sustainable Cities Management given at the undergraduate level in Universidad del Pacífico (Lima-Perú). The course goal is to propose an innovative solution to an environmental-urban problem in a specific district in Lima Metropolitan Area.

Keywords: *evaluation; education; Problem Based Learning; interdisciplinary assessment*

Abstract IV-A2

Evaluation of PBL implementation in undergraduate courses at Simon Bolivar University. A scalable experience

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Innovation, creativity and educational strategies adapted to flexible environments, is one of the challenges of university education for the 21st century, for the purpose of ensuring global competitiveness levels in the knowledge society. Corcerning to this, problem based learning (PBL), from its student-centered, constructivist perspective, seems to facilitate an active, interdisciplinary, self-directed learning aligned with working competencies and the search for solutions to real problems, therefore, it is interesting to assess its application in different knowledge areas and educational levels.
Thus, this research proposes to assess the PBL implementation in six courses (theoretical and workshops) at the Simon Bolivar University (SBU) (Caracas, Venezuela) during 2017, within the framework of European project Citylab, which include the careers of urban planning, architecture and engineering, being the City, the study problem. To do so, the CIPP model was used, based on four stages according to the educational decision type: context, input, process and product, but working with integrated courses to regular SBU curricula, the evaluation focuses on the last three: its variables, dimensions, indicators, sources and procedures, based on information derived from direct/participant observation, literature review and participating teachers and students opinions.
From this experience some strengths emerged such as students could easily identify needs (60-61, 8%) and the complex problems (55.5%-66, 6%), this led their learning process (36, 6-100%), they strengthened their research, teamwork, critical analysis capabilities in (29, 9-75%) and extended their points of views of problems and solutions (20-73, 6%), despite of the fact that PBL demanded more time and dedication.
In terms of weaknesses, these are focused on the differences in PBL tea-

chers training (formal and empirical), some resistance to implement new educational strategies, limited time availability of local actors for meetings with students, and SBU's quarter modality study system. However, PBL is considered by students and teachers as a useful method but complex, replicable to other courses at the SBU.

Keywords: *PBL methodology, CIPP Evaluation, learning method, USB*

Abstract IV-A3

Designing equipment for sustainable cities. Work for specific requirements of the community of Mendiolaza

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This work shows the experience of students from Equipamiento A, a subject of the School of Architecture at the National University of Córdoba (UNC), inspirated in the 2017 ERASMUS Program, City Lab. With the purpose of launching a contest of ideas to design a Market of Cultures, an agreement was signed between Daniel Salibbi, Mayor of Mendiolaza, and Ian Dutari, Dean and Architect, and also official from FAUD (School of Architecture and Design).
Since students had to follow the schedule and start immediately with the Market, professors from the Chair participated in devising a master plan required for the Community Center which includes the City Hall, Mendiolaza's government building, the Local Library and a Center for the retired. By doing so, the Civic Center plan was conceived as well as its relationship with the city, and with other institutions nearby. Pedestrian and vehicles entrances were also devised. As Kelly Henao (2017) claims, the world has problems, colleges have schools with their creative ideas and technology.
This curricular work, which belongs to the degree program professional stage, is aimed at primarily training students in the field of interior design, and it considers sustainability, comfort and inclusion concepts. It carries out practices, developed with local technology, on the social typology of service to the community of Mendiolaza.
Local regulations were the basis to work throughout the master plan and the contest of ideas in order to make this intervention a suitable project to

be built. Accordingly, we worked with the City Hall to be provided with accurate and required information. The collaborative work of professors from the Chair with City Hall's officers took place during the launching stage of the contest's topic as well as the assessment of results and award stages. We carried out mapping practices, neighbors' surveys, etc. on site. Learning based on real and specific problems bring us closer to training students both in content but also in know-how, by accomplishing practices and incorporating attitudes and rules for a responsible professional performance. The selected social typology was based on considering the possibility of encouraging and contributing to the City Hall cultural development through programs and measures that strengthen social networks, its community identities, and increase and deepen the distribution of cultural goods and services which are addressed to the citizens and the cultural artistic community of Mendiolaza.

Keywords: *culture market; City Council of Mendiolaza; university*

Abstract IV-A4

Implementation of 'Sustainable Urban Projects' a spearhead course to Problem-Based Learning at the University of Guanajuato, Mexico

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Universities worldwide are immersed in an internationalization process, particularly in Latin America. In such a context, the implementation of novel pedagogy approaches is imperative for encouraging students to become responsible of their own learning. The student must take an active role in the learning process, and the teacher should become a facilitator rather than a lecturer. To promote innovation in Latin American universities, the European Union through Antwerpen University in Belgium and Rosario University in Colombia enter an agreement named Erasmus + Citylab with the objective of implementing Aalborg's Problem Based Learning (PBL) model to sustainable urban project courses across Latin American universities. This paper describes the experience of the University of Guanajuato on the initial implementation of a PBL-based curricular multidisciplinary course in 2017. The course, sustainable urban projects, was implemented as a PBL-based Citylab module open to students of architecture, civil engineering, and environmental engineering, In the course participated professors from those three disciplines. The students of this first cohort performed well in a co-

llaborative and interdisciplinary working environment. The main challenges remaining are to strengthen the student's ability for self-learning and for involving external stakeholders. After two consecutive semesters offering this course, results suggest the module has pedagogical and academic elements to continue, although improvements are still required. Finally, a significant challenge is for PBL to become a pedagogical approach used throughout the University, and not only on an isolated course. The spreading of PBL within the university would increase the beneficial societal impact of the University of Guanajuato.

Keywords: *learning methodology; educational innovation; multidisciplinarity; Citylab*

Abstract IV-A5

Problem-based learning in higher education: Methodologies for the technical, social and political evaluation of urban plans under an urban sustainability approach

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The research evaluated the application of the Problem Based Learning (PBL) strategy to the Workshop X, taught in the 5th year of the Urban Planning programme at Universidad Simón Bolívar (Caracas, Venezuela). It is justified by making evident the existence of different learning strategies for the approach to urban realities and stakeholder groups. PBL was applied in the framework of the Erasmus+ Citylab international project as well as the Sustainable Development Goals (SDG).

The main objective of this investigation is showing that PBL can be developed for the resolution of urban problems. Students learned how to apply different methods to evaluate the technical, social and political feasibility of urban plans as well as the elaboration of proposals and solutions to enhance such feasibility under an urban sustainability approach and collaborative learning. The workshop-type subject has a workload of eight hours/week with a total of 12 weeks (academic quarter).

Qualitative methods were used combining different strategies and techniques for the learning process as well as the collection, analysis and dissemination of information and knowledge. PBL was applied to seven students in groups of three and four in two consecutive quarters (September-December 2017 and January-April 2018) which case studies were the Metropolitan Special Plan (PEM) of Plaza Brión Chacaíto and the Local Urban Development Plan (PDUL) of Chacao Municipality.

The general hypothesis of the investigation was that the application of PBL to the original academic syllabus of Workshop X generated an innovative

educational strategy which generates a positive impact to the learning process and the knowledge management with students. This strategy seeks to improve learning and promote its independence making the student take protagonism and responsibility with a more active participation in its process of knowledge acquisition.
Obtained results confirm the valuable input of the PBL to the urbanism learning process, deepening of the acquired knowledge, role of different stakeholders in the iterative process, the importance of the contact with local realities and systematization of learning. Several recommendations were made to improve the Workshop with those results, including the long-term revision of other experiences to evaluate the implications and impact of PBL teaching in those courses.

Keywords: *Problem-based learning (PBL); superior education; sustainable cities; educational innovation; evaluation methodologies of urban plans.*

Students' Contributions

Presented at the PBL for Sustainable cities Conference

International students competiton

Jury Composition

PBL for Sustainable Cities Conference 2018

President of the Jury

Terry Maguire
Director of the National Forum of the Enhancement of Teaching and Learning (Ireland)

Jury Members

Daniel Samoilovich
A Columbus Association member

Fernando Santomauro
A member of United Cities and Local Governments (UCLG)

Andrés Felipe Valderrama Pineda
A PBL expert (Aalborg University)

Rogier Van Den Berg
A member of UN Habitat

P1 - University of Antwerp UA

Contribution to the Citylab Student Competition during the "PBL for Sustainable Cities" conference

19-20-21 September 2018

CITYLAB MODULE

University of Antwerp

PBL for Sustainable Cities
Design Studio 3

Supervisors: Tom Coppens
Hardwin De Wever
Sigrid Pauwels

Mandatory course
September 2017 – January 2018

Learning experience

In the second year of the master Urban Planning (University of Antwerp) we developed a fictive cooperation for a small town in Belgium for the third part of the design studio. This design studio consisted of three parts: The first part of the design studio consisted of a spatial and social analyse to result in a design solution for the second part of the studio. The feasibility of this design was explored in the last part of the design studio (the third), by looking at the social-, financial-, juridical and design aspects of the proposal.

It is a cumulative process in which all studios provide information to come to an end product after each phase, but especially at the end of studio three. The practical implementation involved a weekly discussion with the supervising professors, which varied per part with regard to specific expertise, as well as cooperation with the defined groups.

Interdisciplinarity

In practical terms, all lectures around the design studio support that specific part in the studio. As an example: part three (the feasibility study) of the design study is in the third semester of the master, the other courses of this third semester are process management, legal implementation instruments and so on. This gives information that can be used in the design studio via these lectures. Teachers giving these lectures where often also the ones present in the weekly discussions with addition of experts.

But besides this information given in the lectures inside the university, is not sufficient to complete the studio. For our cooperation we invoked international best practices, contacted inspiring organisations in the Benelux, consulted experts from the Antwerp Management School, Technical University Delft and law firm Janson-Baugniet. And of course, the existing different background profiles of the students in our working group was used.

Involvement of local stakeholders

First of all, we want to give a brief description of our project: the problems described by the province of Antwerp and the analysis from design studio 1 is an ever-increasing aging and urban sprawl. In order to provide an answer, we have set up a fictional housing cooperative called 'Woonstroom'. It will operate by and for the citizens of the village of Bevel (population: 2128). The design provides a hub and spoke model, which means that (outdated) houses from the village can also be included in the cooperative, but new apartments will also be provided in the village.

Urban sprawl is a characteristic Belgian problem, due to a specific planning history. Because of the small scale of the country, urban sprawl is a problem because it occupies all open space (like agricultural land and forests).

The local stakeholders involved are the participated inhabitants of Bevel, the municipality of Nijlen (where Bevel is a part of) and the Province of Antwerp. The municipality of Nijlen and the province of Antwerp where the initiators of the project proposal and also the jury of every end product of each part of the design studio.

The stakeholders collaborated upward of studio 1 (analysis phase) by providing a problem statement. Studio 1 was also characterized by a specific way (organized walks) to contact residents of Bevel and to inquire what their position is in relation to the problem posed by the province of Antwerp and the municipality of Nijlen. The feedback moments with the jury (Nijlen & Antwerp) happened once interim and at the end of each part of the design studio, so a total of six times. After the final jury moment, from studio 3, the municipality of Nijlen has contacted our housing cooperation to present the project to a housing development body of the region.

SDG goal(s)

The concept of a housing cooperation started from the Sustainable Design Goals 11 (number 1, 4 and 7 in particular): 'Make cities and human settlements inclusive, safe, resilient and sustainable'.

11.1 Ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums (or inadequate housing) (by 2030).

This goal in incorporated in the project wherefore the goal provides in the following aims: everybody can participate in the cooperation, the final living cost will be lower than offered in regular villages, the project provides flexibility in house-sizes and opportunities for a larger range of people will therefore expand.

11.4 Strengthen efforts to protect and safeguard the world's cultural and natural heritage

The project contains a large church in the centre of the village. This cultural heritage is incorporated because of its special historical place in the community, the low occupancy rate, and the extraordinary possibility to use this church for a different function.

11.7 Provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities

Woonstroom not only provide innovating housing, but also access to newly renovated public spaces and local services for example nursing, car- and bike sharing etc. The design of the cooperation involves private gardens that connect directly to public squares or/and green spaces.

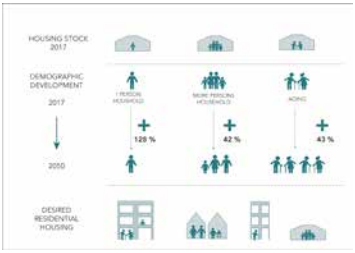
P1 - University of Antwerp UA

Contribution to the Citylab Student Competition during the "PBL for Sustainable Cities" conference

19-20-21 September 2018

Citylab Project: Woonstroom

Cooperative housing provides an innovative and suitable way of dealing with the complex population in a city, but in this case with the incomplex population in a village. The village of Bevel is dealing with a few trends: large houses build in the 1960 which are decaning, are taking in too much space, the people inhabiting them are getting older and in the need of nursing. Besides this aging population, younger people who are starting a family or want to stay in Bevel but not in the elderyhome have difficulties finding an affordable house. Alongsides this social issue the strong urban sprawl in Flanders caused a highly fragmented landscape were main services are not always around. Bevel is also expanding in the open landscape, while there is still enough open space in the center of the village.
Therefore Woonstroom is providing an integral answer to the increasing pressure on our open space, affordable housing, aging people and the diverse population. Affordable housing is a basic right, but not always evident.



Research

Woonstroom is a residential cooperative aiming to create a long-term living space for the local villagers. The project initiation was based on the following data: the increasing aging population (especially in this area), the lack of basic services for this population group, a unilateral supply of goods, a growing vacancy of large and expensive properties and the associated space intake. The current housing supply is based on this kind of allotment and therefore very unilateral. For starters it's difficult to buy or rent those large villas. Besides this, the patrimonial have a large spatial impact. Woonstroom offers a solution for those problems by setting up a housing cooperation. This instrument is already used in other countries such as Switzerland and Germany. Belgium set up the first cooperation last year (2017) in Ghent.

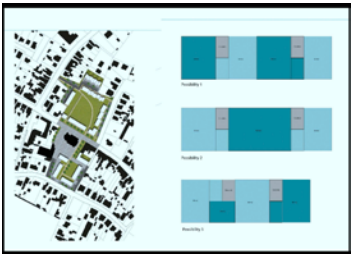
Methodology Woonstroom

For us the most extraordinary fraction of a cooperative is that it can be set up by the residents of Bevel self, therefore there is not interference of any municipality or developer in the price of the housing. The structure of the cooperation offers a position that the residents rent the house from themselves. There is no rental and buying market but a local hybrid market. One invests in the cooperative and receives shares, on which one receives an intended 5% dividend. As a result, no month's rent is owed to a landlord and one is not confronted with difficulties to sell his property. This is a perfect combination of capital investment and affordable living. An important characteristic of the cooperative is that everyone is welcome to join this residential project. The main goal is to live intergenerational with flexible moving options inside the cooperation. The residential phases are realized in modular units, so the apartments can easily be adapted to the specific living requirements of the residents. Therefore, the opportunities stay for people to continue living in the cooperative although their living situation is changing, there can be found the type of housing matching the current requirement. To enter the cooperation, you need to buy one share, what makes it easily accessible and affordable. The system of shares makes it flexible to enter or to quit the cooperation. When people want to invest than one share there is a possibility to buy more, and can therefore use the cooperation as an investment with a 5% interest rate.

Masterplan – Hub & Spoke model

The masterplan is developed by the hub and spoke model, what in this project means that Woonstroom of divided in an A-phase and a B-phase. Each A-phase contains a new development around the church (center of village) aimed at the sustainable densification of the village. These buildings consist of a modular system, which makes it possible to transform a two-room apartment into a three- room apartment. This results in a large diversity of housing typologies. In each B-phase the cooperation will renovate existing houses in the village, which can be split in two houses or can be used by large families. The targeted audience for the project is especially people around 60/70 years old, who own a large house in/around Bevel and want to invest their house or capital in the cooperation. But also, young families who cannot afford the large houses in Bevel.

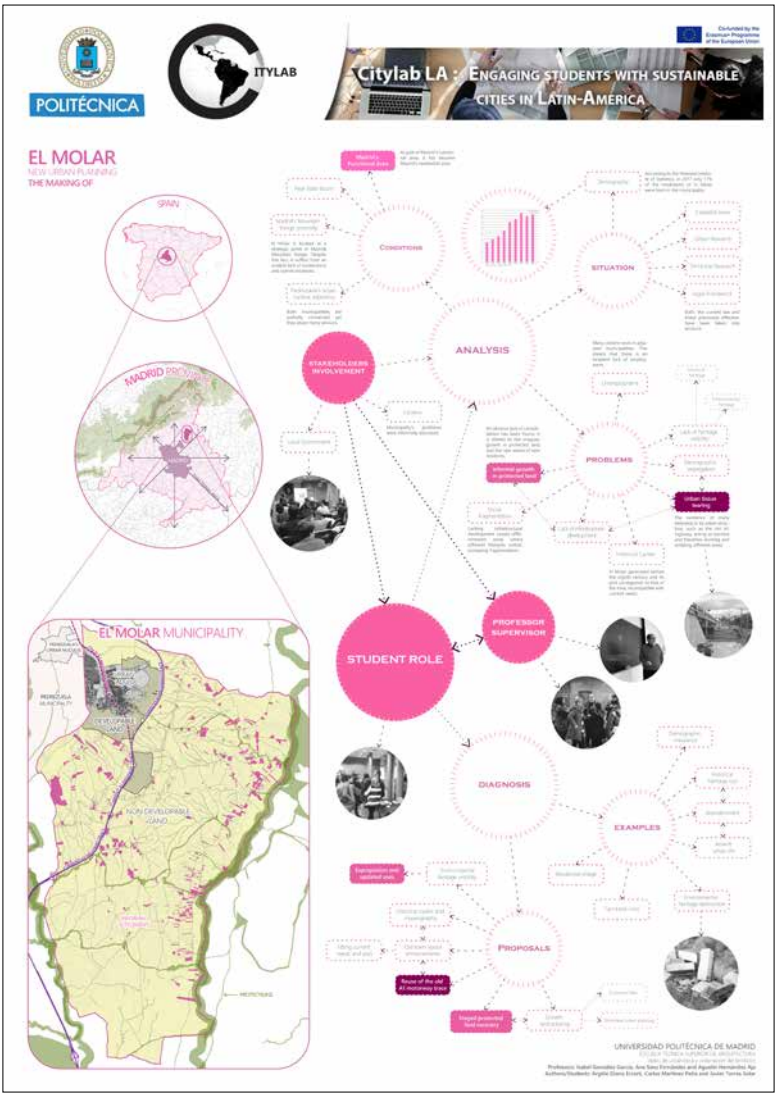
The masterplan corresponds with a previously made research, published in the Nijlen Structuurplan. According to this research, residents of Bevel attach importance to the rural character of the village, which is characterized by the open plot in the center. The first (A)phase of the plan starts at the southern area next to the church. This area will be reinforced by an apartment block (STORIES HIGH) including a square and a small supermarket (which is currently not present in Bevel). The second (B) phase consist of existing houses which are invested in the cooperation as capital. These homes are included in the cooperative and renovated, wherefore they can be split up in diverse typologies.
We believe that the cooperative is able to combine all the current issues: sustainable development goals, urban sprawl, aging-problems, lack of services, diverse/complex population, and justice housing. And because the cooperative will be owned by the local villagers, and are therefore the shareholders, their necessities and preferences will be the base output.



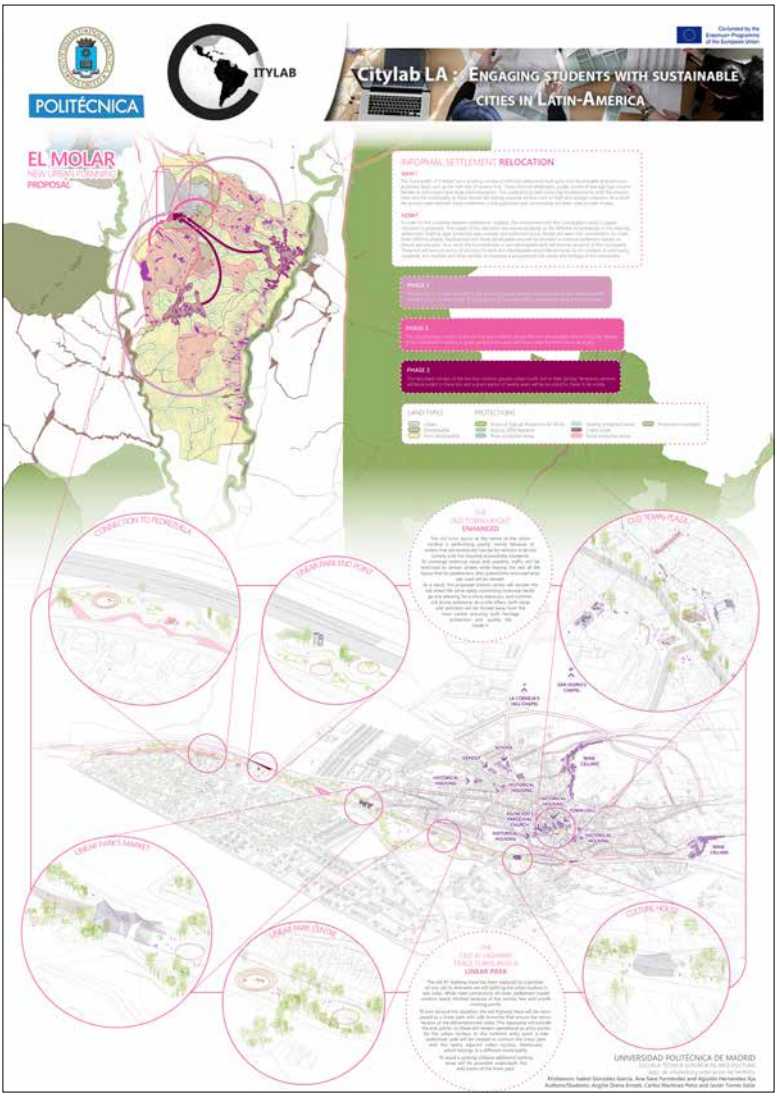
Jolien Kramer, Aurélie Ligon, Yaro Meeusen, Tom van Vilsteren

University of Antwerp

P3 - Universidad Politécnica de Madrid UPM



P3 - Universidad Politécnica de Madrid UPM



P5 - University of Technologie of Compiègne

Sizing infrastructure to improve freight accessibility in the port of Callao, Pérou

Learning Process Of The Project

ACCESSIBILITY URBAN DIAGNOSTIC

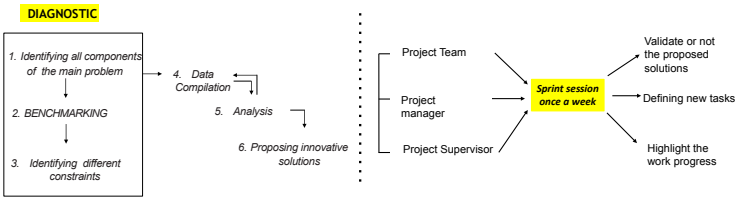
Based on reports from local authorities, it turns out that Callao's general mobility is largely congested due to Callao port activity. Despite a relatively low car ownership rate, traffic jams remain.

HARBOR LOGISTIC DIAGNOSTIC

The increase of goods traffics through Callao's port make necessary the creation of new inland's accessibility alternatives in order to satisfy the current traffics as well as to satisfy the huge growth of containers traffic. Another problem to solve is that internal logistic is at its capacity limits of storage and containers handling.

Based on a global diagnostic and also on the information given by the autority of Callao Harbor, we have defined different type of solutions, which have led to 3 complementary solutions.

METHODOLOGY



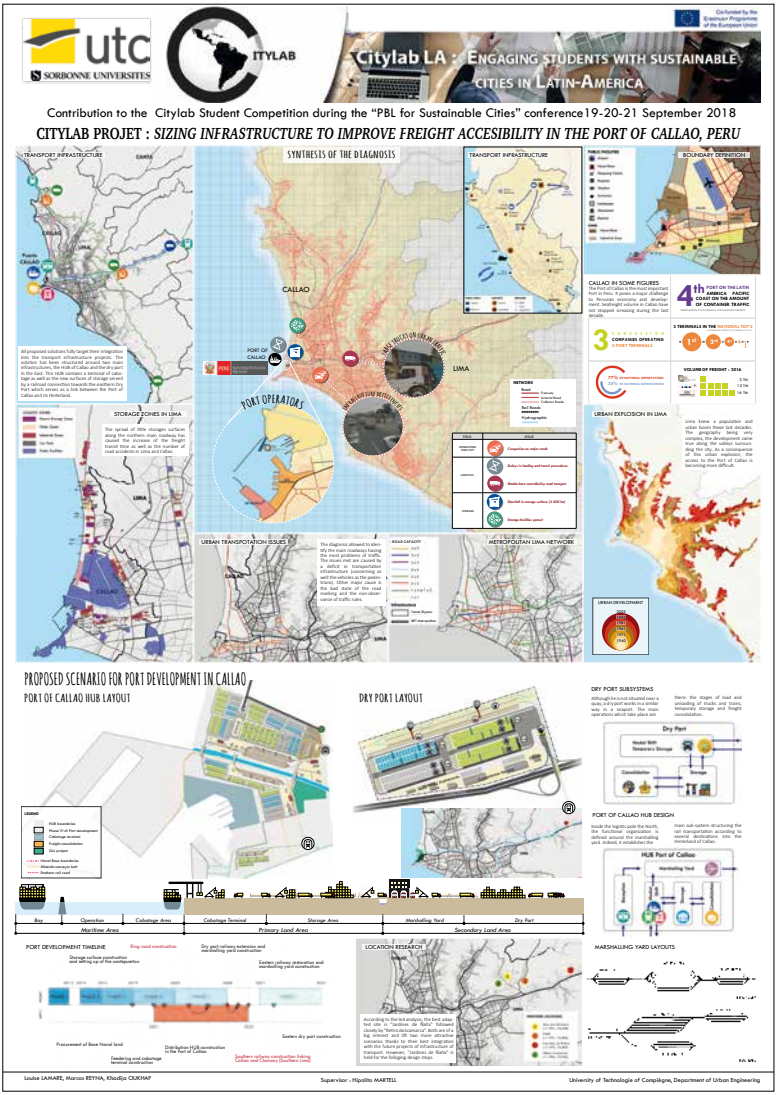
A BOTTOM-UP APPROACH

Once a week, restitution sessions supervised by the supervisor were organized. The project group was split into two small groups. Each group has its own tasks. These sessions allowed us to exchange and also to highlight the work done each week.

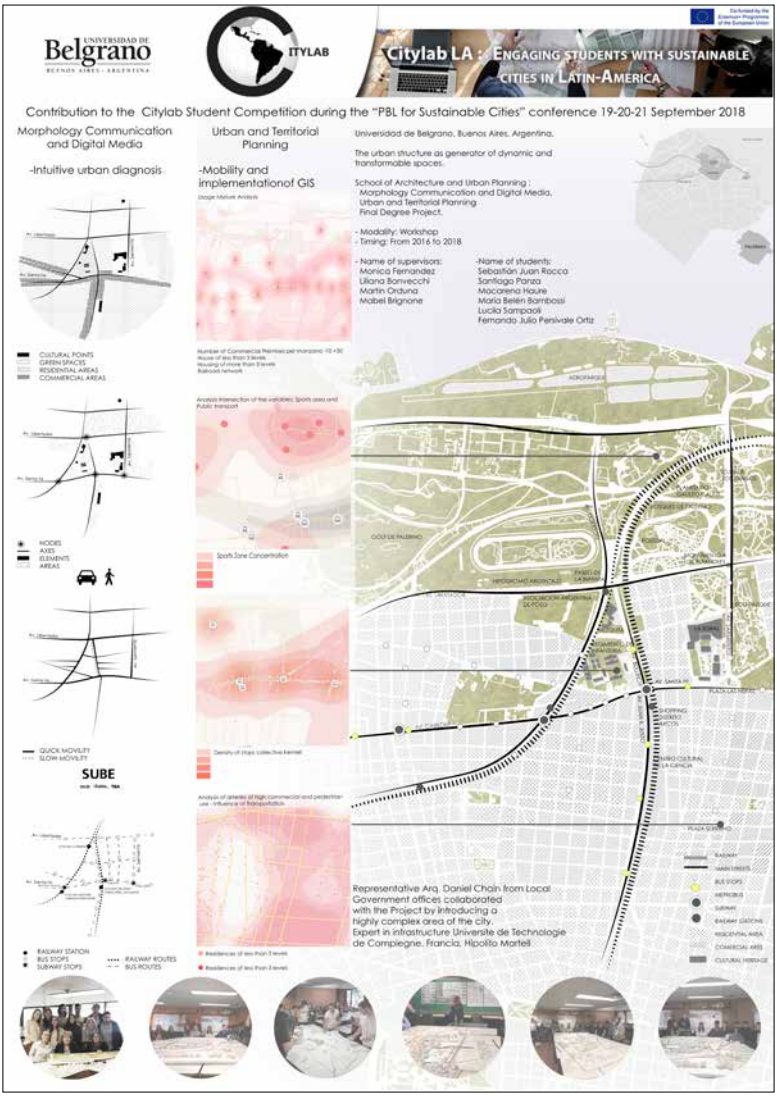
The National Port Authority of Peru tracked the project by mobilizing its engineers for videoconferences organized once every two months. These exchanges helped to drive a BOTTOM-UP approach to the project and to have feedback on our work.

Louise LAMARE- Khadija OUKHAF- Marcos REYNA- Daniel FERNANDEZ- Patricia TATSINKOU
Supervisor: Hipolito MARTELL FLORES
University Of Technology Of Compiègne

P5 - University of Technologie of Compiègne UTC



P6 - Fundación Universidad de Belgrano “Dr. Avelino Porto” UB



P6 - Fundación Universidad de Belgrano “Dr. Avelino Porto” UB

P7 - National University of Córdoba UNC

Contribution to the Citylab Student Competition during the "PBL for Sustainable Cities" conference 19-20-21 September 2018

CITYLAB MODULE

Name of the institution
Faculty of Architecture, Urbanism and Design.
Name of the Citylab module
CityLab LA: Engaging Students with sustainable cities in Latin-America
PBL Module: "Platform of infrastructure, equipment and services. Hospital Regional Río Ceballos " ASA 2017
Program(s) in which the module is implemented
Mixed.
Name of supervisors
Arq. Bertolino Mónica (Associate Professor)
Arq. Villarino Marcela Inés (teacher manager)
Name of students
Toledo, Germán Andrés
Komornicki, Mikael
Repice, Franco
Modality (summer school, workshop, course,...)
Annual course
Timing
Nine (9) hours per week
Two hundred and seventy (270) annual hours

Toledo, Germán A. | Komornicki, Mikael | Repice, Franco

Learning experience

Learning experience Architecture 5 is the proyectual subject of the fifth year of Architecture carreer. It is in the highest level of the academic cicle of the vocational training, which contents derive from the urban proyect of the architecture developement program. Its structure is composed of six teachers (one main professor and one associate professor and four manager guides). The unit is organized and articulated in three different phases: problem definition, developement of the proposal of intervention and evaluation of the process. It require the participation of the local actors in the different stages of the process, of students with the ability of self-manage and guide teachers. The students' experience has been guided by the Architect Villarino, who is the teacher of PBL web course ERASMUS, university of Amberes UA_FAC_OW_CITYLAB_OT: Citilab PBL 2.0.
The PBL unit faced students into a new pedagogic modality, in wich learners are given a real and concrete problem to solve: "the poblational sustained increased in Sierras Chicas Corridor affects the territory, generating envirormental, social and economic problems." Problematic that we as future professionals had to give solution, using previous knowledge and adquiring new too. The inter-disciplinary job contributed to inlarge the knowledge and quality of the proposal, bringing this closer to the actual one. The PBL metodoogy woke up an special interest on the intellect to each member and to the job group itself, interest that is reflected on the final work, the thesis, in wich we are researching about new and real problematics of the health-service área of the San Roque Hospital, patrimony located on a degraded área of the city.

Interdisciplinarity

The accademic stage is constituted by a base program, a sequence of events and colaborations (trips, students exchanges, workshops and conferences dictated by architects and professors) on an enlarge academic of "Red Sur" (UNC, UNL, UNER, UTALCA, UDELAR, UNIRITTER, Escola da Cidade, PUCP, Università Kassel,Università degli Studi 'Mediterranea' di Reggio Calabria Y Universidad de Tesalia).
***Cordoba government**: graphic informative support "publishment of the "preliminary diagnosis of Sierras Chicas corridor by IPLAM" and interviews with officials of the different municipalities of Sierras Chicas **Academic professionals:** professors, architects, engineers colaborated in workshops and conferences during the working process. **Local citizens**: collaborate with interviews and polls. The roles of the group members to the different stages was: Toledo Germán (urban architecture proposal), Komornicki Mikael (health área research) Repice Franco (technologic resolutions) Villarino teacher (speciallist on health and urbanistic architecture, group guide).*

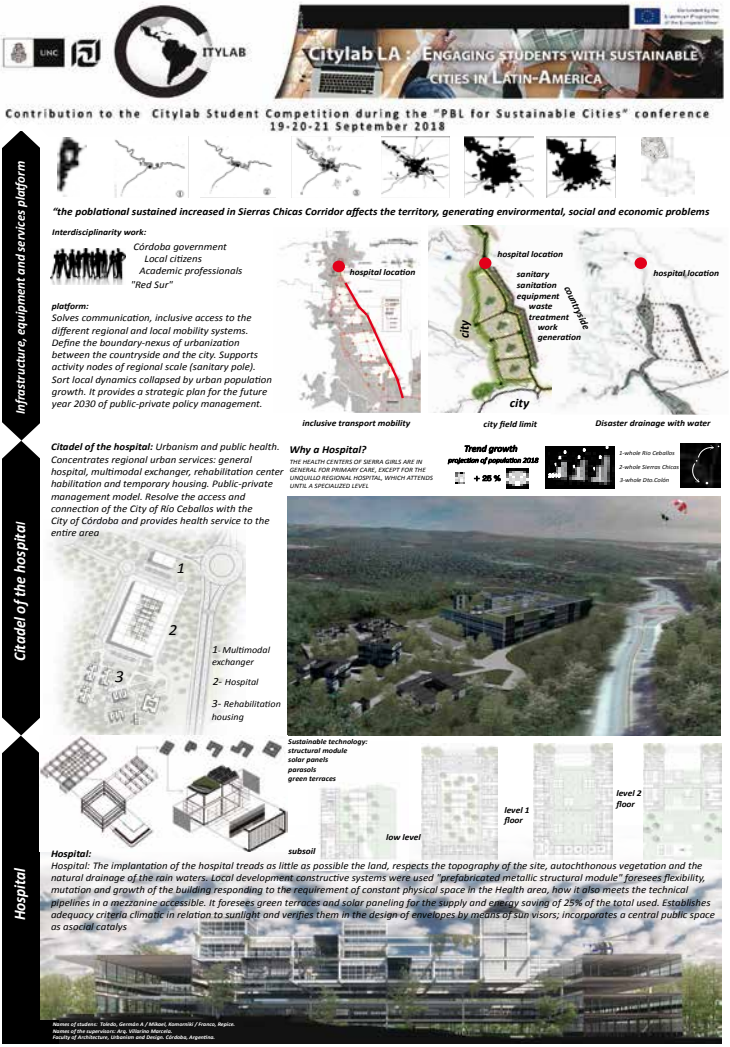
Involvement of local stakeholders

The project in its three scales solves the needs of the community, the local dynamics and the different interests of the local actors from the following sub-topics:
***Infrastructure, equipment and services platform:** Solves communication, inclusive access to the different regional and local mobility systems.Define the boundary-nexus of urbanization between the countryside and the city. Supports activity nodes of regional scale (sanitary pole). Sort local dynamics collapsed by urban population growth. It provides a strategic plan for the future year 2030 of public-private policy management.*
***Citadel of the hospital:** Urbanism and public health. Concentrates regional urban services: general hospital, multimodal exchanger, rehabilitation center habilitation and temporary housing. Public-private management model. Resolve the access and connection of the City of Río Ceballos with the City of Córdoba and provides health service to the entire area.*
***Hospital:** Medical-architectural program, resolves the universal inclusion and demand of patients that are derived to the capital city.*
Who? When? How?
Córdoba city government, IPLAM área (institute of metropolitan planning) Colaborates with seminars of preliminary guidelines of Sierras Chicas corridor and publishment (graphic, mapping support) of the preliminary diagnosis of the Sierras Chicas corridor, IPLAM, on the beginning of the module. Professors, architects, engineers, dictating workshops, talks, and conferences on each module stage. Local cityzens collaborate with interviews and polls at the beginning of the module. Involvement of local stakeholders

SDG goal(s)

The project in its three (3) scales shows the issue of environmental, social and economic sustainability with technical quality.
***Infrastructure, equipment and services platform:** It brings together the general infrastructure lines for the supply and sanitation of the Sierras Chicas Corridor. Acts on the environmental problem related to water disasters by its location, draining it and reusing it for the production. It foresees equipment for the sustenance of the demographic growth of the area (economic problems).*
***Hospital Citadel:** Concentrates regional urban services: general hospital, multimodal exchanger. Public-private management model. Preservation of the existing vegetation, recovery of the native forest and design of the therapeutic landscape.*
***Hospital:** The implantation of the hospital treads as little as possible the land, respects the topography of the site, autochthonous vegetation and the natural drainage of the rain waters. Local development constructive systems were used "prefabricated metallic structural module" foresees flexibility, mutation and growth of the building responding to the requirement of constant physical space in the Health area, how it also meets the technical pipelines in a mezzanine accessible. It foresees green terraces and solar paneling for the supply and energy saving of 25% of the total used. Establishes adequacy criteria climatic in relation to sunlight and verifies them in the design of envelopes by means of sun visors; incorporates a central public space as asocial catalyst.*

P7 - National University of Córdoba UNC



P7 - National University of Córdoba UNC

FAUD Facultad de Arquitectura, Urbanismo y Diseño
UNC
Reforma
ITYLAB
Co-funded by the Erasmus + programme of the European Union

Citylab LA : Engaging students with sustainable cities in Latin-America

Contribution to the Citylab Student Competition during the "PBL for Sustainable Cities" conference 19-20-21 September 2018

CITYLAB MODULE

- NAME OF THE INSTITUTION / NAME OF THE CITYLAB MODULE/ FACULTY OR DEPARTMENT OFFERING THE MODULE.
Universidad Nacional Córdoba
Facultad de Arquitectura, Urbanismo y Diseño
Career of Architecture (Department of Architecture and Design)

- PROGRAM(S) IN WHICH THE MODULE WILL BE IMPLEMENTED.
Subject: Architecture 5A, Architecture 5B, Urbanism 2A and Urbanism 2B

- LEVEL (UNDERGRADUATE/POSTGRADUATE).
Undergraduated. 5th year of the career.

- TOTAL NUMBER OF STUDENTS (APPROXIMATELY).
360 students (in Urbanism 2B)

- MODALITY (SUMMERSCHOOL, WORKSHOP).
Workshop, seminaries,conferences, theoretical course, survey in territory

- TIMING (WHEN WILL THE MODULE RUN).
First and second four-month period of 2017.

- NUMBER OF STUDENTS PER GROUP.
5 students per group.

- NOMBRE DEL SUPERVISOR
Mariana Debat

- NOMBRE DE LOS ESTUDIANTES.
Moran Javier / Perdomo Julian / Soler Gabriela / Vallejos Brenda

LEARNING EXPERIENCIE

GENERAL DESCRIPTION OF THE MODULE

It was agreed to work with one sector of the Metropolitan Area of Córdoba city, in different scales and sections, making emphasise on the subject of mobility and transport.

DESCRIBE THE ROLE OF THE STUDENTS

The organization of the subjects in design workshops, offers to the student a central role as engine of its own process of learning, with the accompaniment of teachers. Specifically in Urbanism 2B, the process consist in what we call "operative trilogy" :
a) Reading (reconnaissance of the physical and spatial reality of the territory, relation between different scales involved);
b) Interpretation (main conflicts, weakness and strength, responding to future possible scenario)
c) Proposal (guidelines and schedule of projects with the concept of "preparing the territory to confront its future challenges").
These phases are replicated in the different scales of territory approach: metropolitan scale, territorial scale (subregion); sectorial scale (intermunicipal peripher); and urban scale. In a) students goes all over the territory and survey it, reconstructing it through mapping that shows its physical and spatial characteristics (none-abstract), as well as they analyse and draw the construction of the territory throughout time, in order to comprehend the underlying logics that were giving it shape.
In b) the students formulates hypothesis of possible future scenarios that could impact into the territory.
In c) they produce a group of proposals that, depending on the approach scale, constitute general guidelines (in metropolitan scale and subregion scale - 1:250.000/1:125.000), schedule of projects (sectorial scale, Plan of the Area – 1:12.500) or strategic projects (urban scale, urban projects with territorial impact – 1:5.000/2.500).

INTERDICIPLINARITY

The territorial issues demand to cross over disciplines, so the students worked with local professionals and experts in urban planning, ecosystem, environment and environmental risk, mobility and transports, among others.

This was carried out throughout conferences with specialist and the supplies for study, investigation and bibliography material that includes different aspects involved in the development of the territory. Urbanism 2B respond to a perspective of territory project, in wich spatial dimention express and synthesise the multidisciplinary character of urbanism.

INVOLVEMENT OF LOCAL STAKEHOLDERS

WHO? WHICH LOCAL STAKEHOLDERS ARE INVOLVED?

Fundamentally two: a) the Goverment of Cordoba province, throughout the Institute of Metropolitan Planning (IPLAM); and b) the Municipality of Cordoba, throughout technicians of the Direction of Urban Planning.

WHEN? WHEN WILL THESE STAKEHOLDERS BE CONSULTED /INVOLVED IN THE MODULE?

In three moments:
1) in the preparations before the launch of the module, and with the colaboration and technical assist of IPLAM was determined the area and main guidelines of work, besides collecting the necessary supplies to start the module (publications, technical studies and investigations). Also, the accompaniment on the first visit and survey in territory.

2) in a series of exhibitions and conferences where the technical levels of the State (Province and Municipality) addressed the problems of the territory under study.
3) the participation in collective criticism of exposed works of students.

HOW? HOW WILL THESE STAKEHOLDERS COLLABORATE IN THE MODULE?

Through exhibitions, criticism of works and seminars.

WHAT ARE THE BARRIERS AND SUCCESS FACTORS IN THE COLLABORATION OF THE LOCAL STAKEHOLDERS?

The involvement of the local interested party gives the work an approximation to local realities and the concerns of government bodies on territorial issues. In addition to the feedback between State and University to detect conflicts and visualize solutions. The barriers are focused on the lack of basic study in certain aspects of the territory, beyond the good intentions of articulation between the interested parties.

SDG GOAL(S)

The project reflects the objectives of sustainable development in the following way:

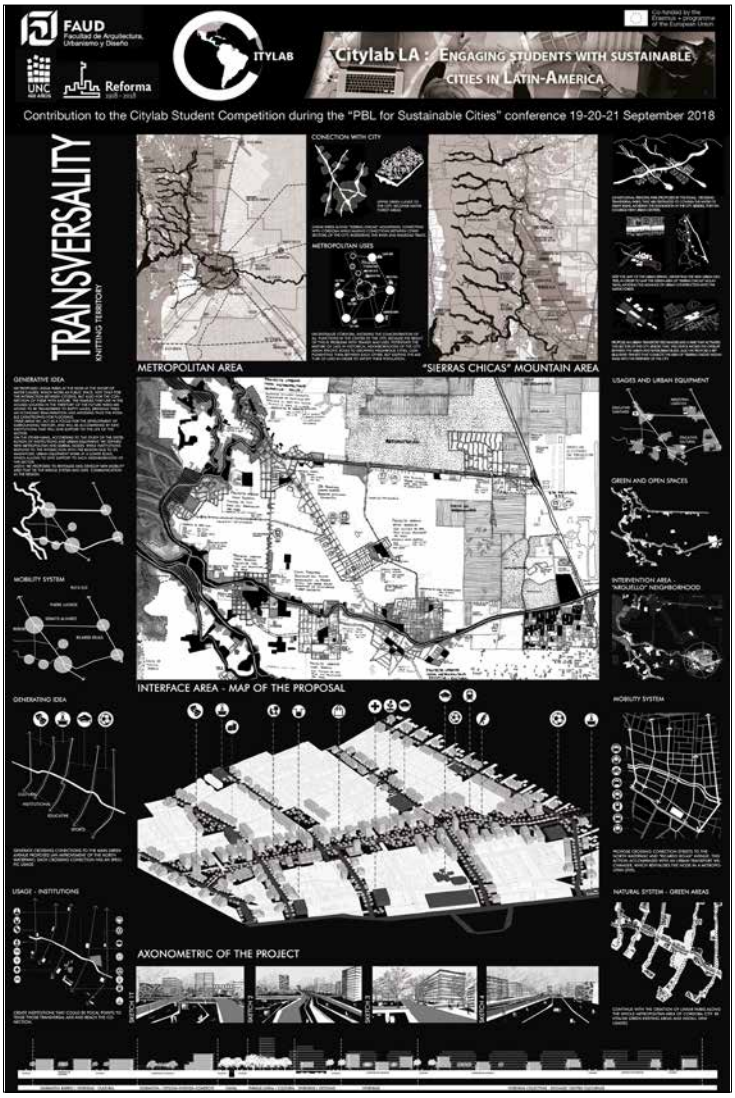
- Sanitation: it provides infrastructure and urbanity to areas of the metropolis where pollution of water and soil channels predominates, as well as informal settlements.

-Energy clean and climate action: the project proposes an increase in the absorbent surface and vegetation, which helps to combat the problem of floods by advances of the urban area on the riverbeds, and increase the purification of air and decrease in heat island effect.

Economic growth: the project proposes new metropolitan nodes in which there are institutions and equipments that promote tertiary and quaternary activities, which do not predominate in this area in which they are intervening. On the other hand, through the recovery of the landscape qualities of the place, the tourism industry is reactivated, which has historically been predominant in this sector.

-Industry, innovation and infrastructure: Different areas are proposed, which have different activities that characterize them, and in turn, secondary activities are proposed that accompany the primary, thus promoting the mixture of uses, which will help to revitalize the city. This is accompanied by public institutions and services, which allow having a dignified, accessible and inclusive city for all citizens.

P7 - National University of Córdoba UNC



P7 - National University of Córdoba UNC

Contribution to the Citylab Student Competition during the "PBL for Sustainable Cities" conference

19-20-21 September 2018

CITYLAB MODULE

Name of the Institution: Universidad Nacional de Córdoba

CityLab LA: Engaging Students with sustainable cities in Latin America

Career of Architecture - Subjects: Architecture V B

Name of supervisor: Arch. Marcelo Fiorito

Name of students: Costa Corrado, Maria Fernanda – Crespi, Christopher Gabriel – Garombo Garelis, Agustin

Modality: Course

Timing: Annual - 30 weeks

Learning experience

Issue problem: mass public transport. Learning based on problems is common in the project subjects (Department of Architecture); varies the complexity of the issues addressed, which, in general, at Level 5 is linked to the incorporation of territorial scales, either as a project object (Urbanism 2) or as a context (Architecture). The academic program of our Mediterranean Workshop corresponding to the 5th year of the Architecture career includes urban and metropolitan complexity as the center of project reflections. The city is pproached in two main dimensions: as a didactic object, to learn from it, and as an object of intervention, to act in it. Likewise, we understand as the main objective of the level to be able to address the contemporary city and its processes of metropolization. This supposes an interdisciplinary and transdisciplinary view of the actions on the urban construct. Motion systems are one of the main keys to address these processes. These are interventions by complex and multi-programmatic architectural pieces, as parts of a larger urban system, which must be understood and which must be improved on the basis of these specific actions. The crisis of traditional centrality, the growth of city periphery, urban decentralization and the creation of areas of new centrality, are all issues closely related to urban mobility, as well as the issues of collective dwelling, and policies to mitigate socio - spatial segregation and urban poverty. In this case, it is about approaching sustainable mobility, which links the consideration of new multimodal systems as alternatives to the hegemony of individual transport. Likewise, the study of these multimodal systems and their institutional headquarters is intimately related to the approach of Sustainable Urban Projects where typological innovations can be tested, mixtures of uses proposed with public spaces. Organizing these programs in space is the main meaning of these project actions, together with the necessary coherence of technical and material viability.

Interdisciplinarity

The problem of transport demands a disciplinary crossing, for which we worked with professionals and local experts in disciplines such as: urban planning and mobility and transport, among others. This was addressed through lectures to specialists and the input of studies, research and bibliographic material that included the different aspects involved in the development of the theme / problem. The interdisciplinary work was materialized with external actors and with subjects of the same level that complement and offer their specialties and contribute to the synthesis of the project; this is the case of the subjects Urban Planning 2B and Structures IV, which made two contributions, the first at the urban scales, and the second the design and verification of the proposal of large lights with metal structure

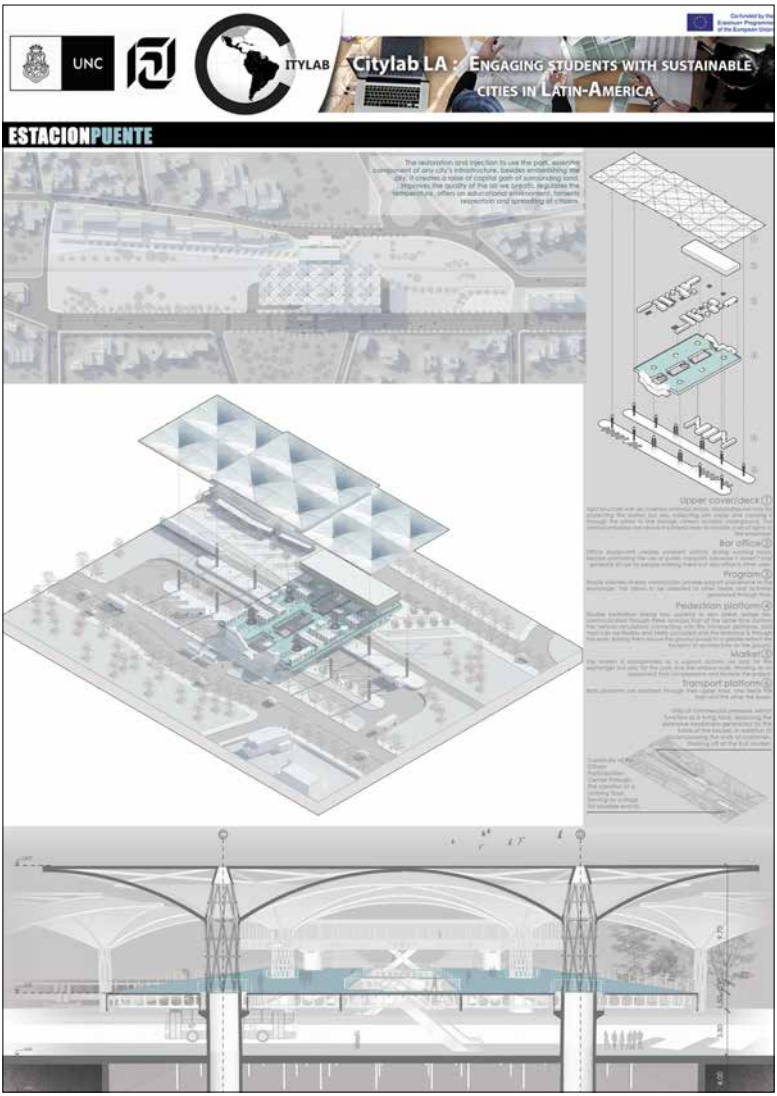
Involvement of local stakeholders

The Government of the Province of Córdoba participated, through the IPLAM (Planning Institute of the Metropolitan Area) and it's Master Plan for Sierras Chicas. On the direct advice of these specialists (in theory classes, consultations and technical trip to the localities to see the sites), three possible locations in disused railway grills were evaluated in the localities of Córdoba, Villa Allende and Unquillo. Based on the Master Plan of Sierras Chicas, it was defined for the Arguello site, the optimization and incorporation of the following means of transport: train of the sierras, interurban buses, urban collectives, "Solo Bus", taxis and private vehicles; for the latter, a car park for 150 vehicles was incorporated. During a technical visit to the property, an interview was held with the Director of Private Works of the Municipality, who expressed the need to motivate the private sector for investments in the project. This contributed to the definition of complementary programs (parking and offices). The students on their own made another technical visit to the site where, in addition to performing an ocular survey of the property, they conducted interviews with neighbors and park users; this helped to define program needs, where the need for collective meeting, entertainment and exchange spaces was defined, which configured the incorporation of a complementary program of Market and Offices

SDG goal(s)

The challenge was posed in terms of preserving the park, minimizing the impact of the building. In this sense, we sought to solve both the complexity of mobility and its insertion in a park, so that both programs (exchanger and park) reciprocally nourish each other. That the presence of the park is permanent in the building, and that the park is nourished by the flow dynamics that the exchanger produces. The proposal seeks to reduce the impact of the footprint of the building on the park, placing the building perpendicular to the direction of the park and stacking programs (parking, transport systems, pedestrian hall, and complementary programs). A deep recognition of the support was made, incorporating to the preexisting proposal such as railroad tracks, large vegetation and recent buildings. The roof of the building, inspired by the famous umbraria by Amancio Williams, seeks to unify the readability of the proposal and provide it with strong image in the sector. The columns define impluvium for the collection of rainwater, which is collected in the parking plant for reuse for water irrigation of the park.

P7 - National University of Córdoba UNC



P7 - National University of Córdoba UNC

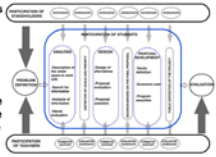
Contribution to the Citylab Student Competition during the "PBL for Sustainable Cities" conference 19-20-21 September 2018

CITYLAB MODULE

Name of the Institution:	Universidad Nacional de Córdoba
Name of the Citylab module:	Citylab LA "Engaging students with sustainable cities in Latin-America"
Program:	Career of Architecture, Urbanism II.
Name of supervisors:	Repiso, Luciana Sanchez, Mónica
Name of students:	Agüero Meineri, Andrea Buri, Maria Carolina Nanini, Luciano
Modality:	Annual course

Learning experience

The PBL experience of the chair URBANISM IIA (5th level Architecture career at FAUD - UNC) is presented here, in which the PBL modality of the University of Aalborg (AAU, Denmark) was used: problem-based projects were solved with specific solutions. It was based on the hypothesis that the municipal government of Villa Allende requested the formulation of a Territorial Urban Plan. This assignment becomes the issue on which the learning process is based on.
The development was carried out through the stages of the planning process: Strategic Analysis and Diagnosis, Design of Proposals and Scenarios, and Management of Execution. The evaluation of the process and final result was the closing moment in which the contributions of the agents involved (local agents, students, teachers) were considered. As students, we believe that the PBL made us improve the way we work in teams and with other disciplines that we weren't used to working with prior to this process.



Interdisciplinary Work

The interdisciplinary approach was developed through different strategies: theoretical and methodological contributions of various disciplines: economic, demographic, urban management, e cologic; as well as lectures with specialists and professionals, interviews with specialists and local stakeholders, and use of information sources of different disciplines.
For example, Demography gave us population number and conformation, quantity of woman and men of every age, growth rating, etc. Economic helped us identify the main activities in corridor and region, complementary or competition relation between cities, etc. Urban managment guide us on understand compatibility between the different land physical functions the city have. And Ecology taught us aboutr isk zones, tress and animals in danger of extintion, air and water contamination rating, pasive ways of living.

Involvement of local stakeholders

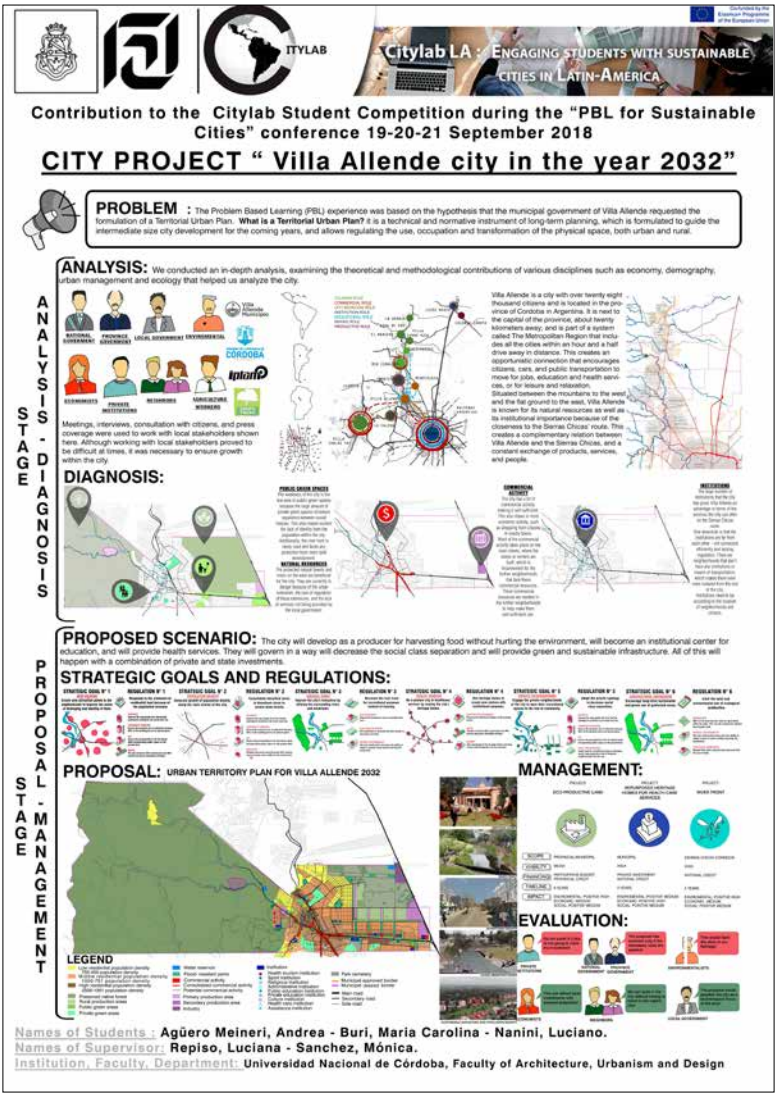
Different techniques were used to work with local stakeholders: meetings and interviews with key officials and citizens, open/unstructured consultation to citizens, press coverage (printed newspapers, digital articles, etc.)The main actors were: Municipality of Villa Allende (Secretariat of Public Works), neighbors of Villa Allende, IPLAM - Institute of Planning of the Metropolitan Area of Córdoba. Other direct and indirect stakeholders were also identified with the problem (public, private, community and academic.) An instance where these different perspectives were shown was the "role play", based on the sociopolitical context and the proposed scenario was particularized in the actors' vision of the desired scenario. This was done in the workshop, requiring students to assume the role of a key management actor, involving solid arguments to manifest their positioning before the different proposals of the class.

'Working in teams and with other disciplines encourages collaborative learning. Discussions and debates during the process of solving the problem help knoledge sharing and developing knowledge between eachother' *Heilyn Camacho, PBL Philosophy.*

SDG goal(s)

Regarding the Sustainable Development Goals of the UN, the work focuses on Objective 17: Sustainable Cities and Communities, incorporating the paradigm of sustainability into the desired city model, guiding the actions "to make Villa Allende a more inclusive, safe, resilient and sustainable city ". The guide lines and projects proposed are linked to the objectives: clean water and sanitation, affordable and non-polluting energy, health and well-being, decent jobs and economic growth, climate action, life of terrestrial ecosystems and responsible production and consumption.
The proposal also works with two of the eleven CityLab goals; on is by 2030 enhance inclusive and sustainable URBANIZATION and capacities for participatory, integrated and sustainable human settlement PLANNING and management in all countries and the other is strengthen efforts to protect and safeguard the world's CULTURAL AND NATURAL HERITAGE.

P7 - National University of Córdoba UNC



P8 - Universidad Tecnológica de Pereira UTP

Contribution to the Citylab Student Competition during the "PBL for Sustainable Cities" conference

19-20-21 September 2018

CITYLAB MODULE

Universidad Tecnológica de Pereira
Environment and Sustainability
Environmental Administration and Mechanical Engineering
M.Sc., Ph.D. Juan Esteban Tibaquirá Giraldo
Jenny Lorena Ladino Méndez, Leonel Chaverria Garzón, Sebastián Martinez, Natalia Villegas Figueroa, María Alejandra Vargas Ladino.
Elective subject
One year and six months (2017-2018)

Learning experience

The CityLab project was originally included within the programs of environmental management and mechanical engineering, as subjects focused on the module "territory, water and sustainability", however since the second semester of 2017 it has been offered to all University programs such as elective subject called "Environment and sustainability" looking for a wider interdisciplinarity. The students faced the first phase alone and this was recognized as a lack of search skills for accurate and truthful scientific information; After this phase and taking into account the advice of the teachers, progress was made in the search for better solutions to the problems posed.

Interdisciplinarity

The Citylab LA initiative was developed in the faculties of Environmental Management and the Faculty of Mechanical Engineering, integrating teachers of both faculties in guiding students through the PBL methodology to address local issues concerning the environment. The teachers involved in this project are mechanical engineers and environmental administrators at master and doctorate levels. Finally, the application of the project in a real problem of the community brought together a working group consisting of a student of Environmental Administration in charge of the issue of water quality and environmental regulations, four students of Mechanical Engineering of which two are responsible for supporting the process of investigation and identification of the problem and the other two students in charge of the development of an engineering solution for this problem.

Involvement of local stakeholders

How the needs of the community and interests of local actors are met. In view of the population increase in the region and the imminent need for energy sources, the project was directed towards an alternative form of energy generation based on the natural riches existing in the region, as well as to propose a friendly solution with the environment that sensitizes the local leaders and main companies in the region. The project meets the needs of the population of Barrios Unidos de Oriente by making use of the resources available there for an adequate drinking water treatment and a guarantee of the existence and good quality of the water over time for the supply of the aforementioned population Who? Local interests This project focused on the application of a solution to a problem in the municipality of Dosquebradas in the department of Risaralda, hence the stakeholders in the project are the inhabitants of the neighborhoods La Mariana, Santa Teresita, Libertadores and Puerto Nuevo, the government of Risaralda, directives of the university, the students of masters of the Faculty of Mechanical Engineering and the Faculty of Environmental Sciences. The main stakeholders involved were the administrators of the community aqueduct neighborhood of the United East that had an active and forceful participation from the beginning of the project since they provided the necessary information for the identification and solution of said problem. How? Stakeholder collaboration The interested local parties will collaborate with the delivery of technical data of the water resources of the area, the management of the spaces for the implementation of the solution, as well as the intellectual support of masters students who contribute their experience with the learning methodology Based on problems (PBL) to apply improvements to the Project. When? Interests of local actors The directives will be consulted and involved when there is a complete cost analysis that evaluates the economic viability of the project.

SDG goal(s)

The main objective of the project is to ensure water quality in the future, reflecting the goal of sustainable development number 6, Guarantee the availability and sustainable management of water and sanitation for all (Goal 6: Ensure availability and sustainable management of water and sanitation for all.), in addition to goal number 7, Ensure access to affordable, reliable, sustainable and modern energy for all, which is related to the proposed engineering solution of the project through the implementation of clean and friendly energy generation with environment. In addition, the application of the project is related to a specific point of goal number 11, 11.4 strengthen efforts to protect and safeguard the WORLD'S CULTURAL AND NATURAL HERITAGE (11.4 strengthen efforts to protect and safeguard the world's CULTURAL AND NATURAL HERITAGE), based on the tributary where the project is applied (Quebrada roca verde, Dosquebradas, Risaralda).

P8 - Universidad Tecnológica de Pereira UTP

Universidad Tecnológica de Pereira

Contribution to the Citylab Student Competition during the "PBL for Sustainable Cities" conference

19-20-21 September 2018

PROPOSAL TO ENSURE A GOOD QUALITY OF WATER IN THE COMMUNITY AQUEDUCT BARRIOS UNIDOS DE ORIENTE, MUNICIPALITY OF DOSQUEBRADAS

INTRODUCTION

The Barrios Unidos de Oriente community Aqueduct has a system of artisanal filtration, which causes low water quality leading to a cut off of the water supply for the population in times of rain. This adds to the conflicts of land use and shortcomings in the conservation at higher part of the supply basin. Faced with this problem, the institutional responses have not led to a successful solution as evidenced by the current technology that does not operate due to the lack of technical studies.

Characterization

Technical Proposal

Plan of Activities

OBJECTIVES

THEORETICAL FRAMEWORK

Water quality	Community aqueduct	Ecological flow
• Organoleptic characteristics • Physicists • Microbiological	• Basin • Intake • Desander • Adduction • Water treatment • Storage • Distribution	• It is understood as the quantity and quality of the water resources necessary to maintain the habitat of the river and its surroundings in optimal conditions.

RESULTS

Identification of the current water quality

The physicochemical analyzes of the last six months were reviewed, conducted by the Ministry of Health, which were analyzed taking into account the Sole Regulatory Decree 1076 of 2015. In addition to this, two water samples were taken without treatment and with treatment, with support from an external entity. The results were acceptable in both cases.

Execution of a technical proposal for the start-up of the treatment plant

Once identified the main difficulty for the proper functioning of the Filtration Plant, it was concluded that the most effective and viable solution is the installation of a Centrifugal Pump in the inlet pipe to the Plant, which allows its correct operation. A hydroelectric plant will be installed beside water for the required energy generation.

Design of a plan of activities to raise awareness of the surrounding community.

A plan of activities for community awareness is structured, which will be based on three thematic axes according to the Citylab project (Territory, Water and Sustainability), with 6 sessions for 3 months and a duration of two and a half hours per session.

Names of the students Jenny Ladino, Natalia Figueroba, Sebastián Martínez, Leonel Chaverria, Alejandra Vargas.

Names of the supervisors Juan Esteban Tibaquirá, Tatiana Loaiza, Álvaro Ignacio Ramírez, Juan Carlos García

Institution, Faculty, Department Universidad Tecnológica de Pereira, Ingeniería Industrial.

P9 - Universidad del Rosario URO

Contribution to the Citylab Student Competition during the "PBL for Sustainable Cities" conference

19-20-21 September 2018

CITYLAB MODULE

University of Rosario

"Retos para ciudades sostenibles"

International Relations

Willian H Alfonso

Paola Avendaño, Camilo Florez, Luisa Martinez, Lina Olave, Natalia Puerto and Luz Marina Vargas

Course

Learning experience

During the course we got in contact with some theories about urbanism and ecology we did not know before. Also we think that the PBL methodology is a fantastic mode to understand problems like we have in Bogotá. For careers like International Relations the topics about the composition of city doesn`t exit so this course, tried to incorporate how the environmental problems affect the cities and the development of these.

Interdisciplinarity

In our case, our group is integrated for professionals in International Relations, Political Science and Urban management an development. This, gave us a bigger and more complete vision of the current problems of Bogota, and what could be the possible solutions.

Involvement of local stakeholders

One of the most critical problems in Bogota is the mobility and the relation of these with the air pollution. So, the use of sustainable transport is a great option to solve these problems. In this context, we take into account:

- Transmilenio Operators: applicants for competitive bidding with clean energy certification.
-Transmilenio: contributor and administrator of the resources and the applications of the impact bonds.
- Clean energy and compensation companies : suppliers that offer clean energy services, training courses and activities that complement the operators in the development of this sustainable model.
- CHEC: Hydroelectric Company that has a pilot system of public transport.
-Shareholders: companies that become part of the Project as investors interested on advertising.
- BID, International funds and organizations: International cooperation.
- Citizen: they are also involved in particular with the ecobots and the tickets.

SDG goal(s)

Then we realized that one of the most polluters sources is the public transport in Bogotá, in particular, transmilenio system. This company has an active fleet of 160 articulated buses, being one of the most used means of mass transportation in Bogotá, Colombia. But the main problem is that theses buses are run on diesel so that they produce a high volume of pollution that can be calculated based on ecological footprint theoretical framework. For this reason, we think that this project help to the SDG 11.

P9 - Universidad del Rosario URO

Logo Institution

Contribution to the Citylab Student Competition during the "PBL for Sustainable Cities" conference

19-20-21 September 2018

CITYLAB PROJECT

Problem Definition

The mass public transportation "Transmilenio" has an active fleet of 160 articulated buses, but since it was implemented it has been generating a carbon footprint approximately equivalent to 10,26% of the total carbon footprint of Bogotá per year. That means that the system requires to find a way to decrease its greenhouse gas emissions. Another factor that contributes to the pollution generated are the high particulate matter concentrations found at the bus stations. One of the main reasons that explain that is that these buses are run on diesel and most of them are old fashioned so that explain the energy inefficiency of the system. Additionally, this system does not have such an strategy for the environmental sustainability and they are planning to expand to new roads as "Carrera Séptima", there are many reasons to oppose to that project, mainly because that road is not wide enough and there is a growing concern about the contamination it may generate. However, if this is an imminent decision, we propose an alternative so that this project can be planned to be sustainable and serve as an example for the rest of the system.

Alternative

Transmilenio Green compensation system (Environmental impact bonds): Implementation of clean energies on the system.

Pay for success:
- Entire float of buses running on electric energy. (Alliance with the private sector- publicity)
- Solar panels to improve the energy efficiency into bus stations.
- Fundraising -Transmilenio tickets through ecobots with publicity

Solution Indicators

Main Indicators
- % variation particulate matter concentrations
- % variation Carbon footprint per year at the city.
- %variation GHG Emissions
- % variation Energy inefficiency
- Index Human Appropriation of Net Primary Productivity

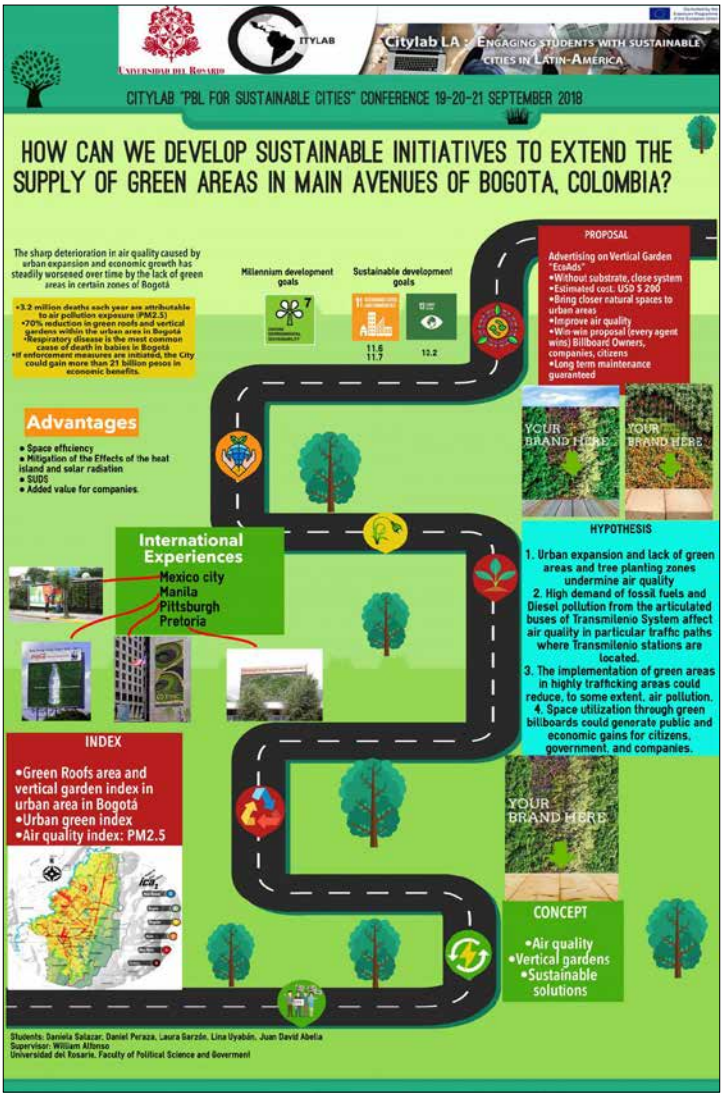
Complementary Indicators- Monthly savings on operational costs and maintenance – Benefits generated for shareholders (resources and advertising) - Impact on the citizens and involvement on recycling campaigns.

Paola Avendaño, Camilo Florez, Luisa Martinez, Lina Olave, Natalia Puerto and Luz Marina Vargas

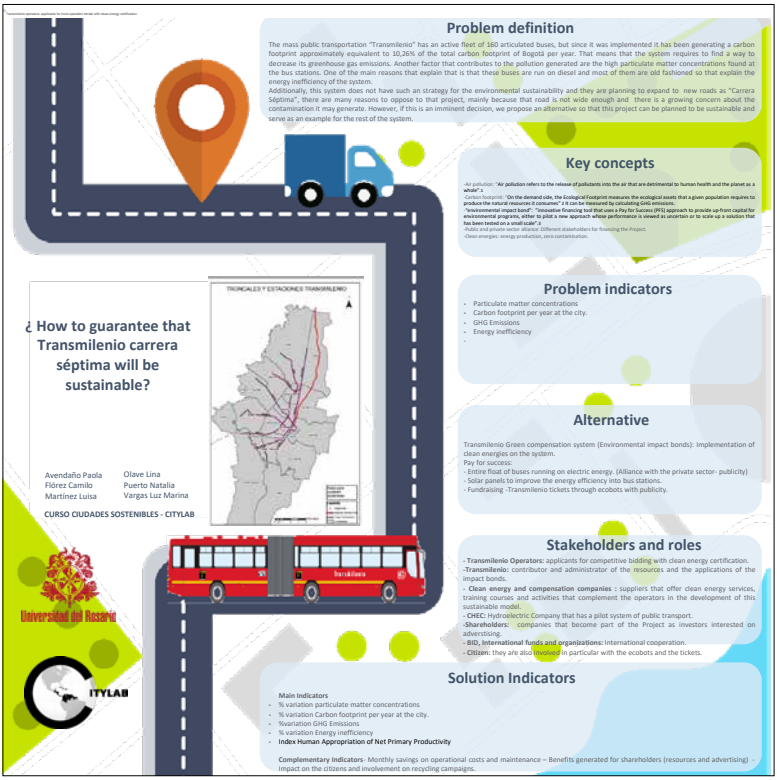
Willian H Alfonso

Universidad of Rosario, Faculty of Political Science, Goverment and International Relations .

P9 - Universidad del Rosario URO



P9 - Universidad del Rosario URO



P10 - Universidad Autónoma de Nuevo León UANL

Contribution to the Citylab Student Competition during the "PBL for Sustainable Cities" conference

19-20-21 September 2018

CITYLAB MODULE

Name of the institution: **Universidad Autónoma de Nuevo León**

Name of the Citylab module: **Sustainable Ecological Environments**
Program(s) in which the module is implemented: **Bachelor in Architecture, Bachelor in Industrial Design, Bachelor in Nutrition.**

Name of supervisors: **Carlos E. Aparicio M.; Karen Hinojosa Hinojosa; Amanda Melissa Casillas Zapata; Laura Elena Castro Sánchez; Ana Victoria Casillas Zapata; Elfide Mariela Rivas Gómez.**
Name of students: **Ana Lucía Besnier Navarro; Betsy Loroama Valdez Valdez; Dirce Jovanna Gómez Gómez; Eliud Reynaldo Jaramillo Gaona; Mayela Edith Mascorro Herrera.**

Modality: **Elective course**
Timing: **16 weeks**

Learning experience

In the recent years, our University has been putting efforts into sustainability. It adopted an institutional policy to reduce greenhouse gas emissions, generating the conservation and sustainable use of the natural capital under its protection, correcting inefficiencies in the use of energy. According to the global education, the *UANL* is focused on giving the students the best tools for our future.
This module definitely integrates the diverse points of view from students from different disciplines, such as architecture, nutrition and industrial design. It helped us see problems through our classmates' eyes, and finding out how a problem can be solved in many different ways. In my experience (Dirce Gómez), this methodology helped me to realize the way I solved problems, specially when I started working with my teammates.

Interdisciplinarity

One of the most important parts of working in Citylab was the interdisciplinarity, where we shared our classroom with people from different disciplines, such as Architecture, Nutrition and Industrial Design. It merged each person's abilities to make a strong group of multidisciplinary people, aiming to attack the problem from different flanks.
As we worked with a certain problem near one of the University Campus and also with the Sustainable Development Goals, we got to choose three of those different goals, in order to involve the different areas each member is used to work with. We decided the role each student had, in order to what each one was good at. It was easy to split the work and then have group feedbacks in order to put the work together. Our teachers were always willing to help us and dive their opinion and guidance for our work.

Involvement of local stakeholders

Expand the knowledge of the university environment through agents of the same. The sustainability secretary committed to help develop recreational activities that promote ecology in students of new generations who enter the university, as well as facilitate participation in a TV program and in congresses, university federations like UNIVERDE were the nexus with the secretary of sustainability, in the same way we consulted experts in the subject to ensure the viability of the project as they are SIMEPRODE.
Finally, as we try to raise awareness about the current environmental problems, develop a rational capacity on the environment that surrounds us and understand that the main agents of change are university students.
A pilot test was carried out with the containers in the course of new entry to the bachelor's degree in nutrition, in addition a contest was held by social networks which consisted in taking a photograph with a sustainable proposal to invite them to participate and how worried they were find on this subject, in addition to taking into account to discuss it with the authorities.

SDG goal(s)

Our project focuses on providing safe and clean public spaces to improve the health and quality of life of the inhabitants (**SDG 11**). Some of the benefits are: The improvement of our physical and psychological health, the strengthening of our communities and the transformation of the streets and cities, making them more attractive places to live and work. It is also correlated with the noncommunicable diseases of **SDG 3** (guarantee a healthy life) by providing safe spaces. Supports **SDG 12**, since it covers environmental effects, such as waste management (goal 12.5), and the release of pollutants, especially chemicals (goal 12.4) by the exposure of garbage to air, water and land , and also highlights in the project, reduce the production of garbage taking due importance to the information given to the consumer and environmental education for sustainable development and lifestyles (goal 12.8). In addition, it contributes to **SDG 13**, since it encourages the adoption of measures to change habits to reduce the impact of climate change.

P10 - Universidad Autónoma de Nuevo León UANL

Contribution to the Citylab Student Competition during the "PBL for Sustainable Cities" conference

19-20-21 September 2018

Background

According to the Report on the environmental situation in *Mexico in 2015*, **the generation of urban solid waste reached 53.1 million tons per year** and currently the figures continue to increase. According to INEGI data, 2,770.2 tons of solid waste are collected in the Monterrey metropolitan area (MMA), equivalent to 90% of the total collection documented for Nuevo León. (INEGI, 2013).

The lack of environmental culture in the population of the MMA continues to be shown by the large volumes of solid waste that are dumped in the roads, which later becomes one of the main agents for observing sites with floods, since they cause the sewer system is covered with garbage. **One tonne per day is collected in these rainwater drainage systems**, and when it rains, this amount is often doubled as a result of water drag (Cantú-Martínez, P. C., 2015).
Solid waste has impacts on the population and ecosystems. Some of them are (Semarnat, 2006):

- The generation of pollutants and greenhouse gases
- Thinning of the ozone layer
- Floods
- Pollution of soils and bodies of water
- Proliferation of harmful fauna and transmission of diseases

Theoretical framework

Environmental education
"*Education work in environmental issues is essential, aimed at both young generations and adults and that pays due attention to the less privileged population sector, to broaden the foundations of a well-informed public opinion and conduct of the individuals, companies and collectives, inspired by the sense of their responsibility in terms of the protection and improvement of the environment in all its human dimension* "
(United Nations Conference on the Human Environment (Stockholm, June 5, l972. Principle 19).

Ludification and education for citizenship
The gamification refers to the application of game strategies in spaces or areas whose nature is not playful (Deterding et al., 2011: 10). The main purpose of the gamification is to motivate the change of behavior towards a specific objective. (Romero-Rodríguez, L. M., Torres-Toukoumidis, Á., & Aguaded, I., 2017)
Through the game is achieved to increase empathy with other personal circumstances. The values of cooperation, solidarity, tolerance and respect are fostered. (Green Classroom, Journal of Environmental Education, 2006)

CITYLAB PROJECT

Description of the Proposal

Pilot test

This project was implemented in the School of Public Health and Nutrition in July 2018. Two containers with recyclable material were designed and made, one of aluminum cans and one of pet bottles. The containers were located in the School of Public Health and Nutrition. It was observed during 1 month that the students did properly separate and deposit the cans and cans in the containers. The dynamics of environmental education and the search for solutions activity was carried out with more than 300 new students of the Nutrition Degree from the Autonomous University of Nuevo León.

The proposal **seeks to reduce** some of the impacts of solid waste on the population and ecosystems such as: the generation of pollutants and greenhouse gases, thinning of the ozone layer, floods, soil contamination, and proliferation of noxious fauna and transmission of diseases (Cantú, 2015).

Educate and raise awareness about the importance of reducing, reusing and recycling.

Separation and Collection

Disposal containers to collect aluminum cans and pet bottles, with a design that allows the disposition process to be more attractive. These containers are made with the material that is intended to be collected, in order to facilitate the identification of the containers and promote reuse.

SDG 3: Target 3.9
SDG 12: Target 12.4

Reuse and reduce

Base on the Zero Waste philosophy, where it is considered that the flow of materials must be circular to use it at its maximum level. Winners of the activities are given "ecological kits" to motivate them to use reusable products and reduce the amount of waste they generate. The kits contain a reusable bag, botte, cutlery, and food container. It also includes a triptych with information about current issues, change actions examples. (Song, Q., et al., 2014); (South Australia's Draft Waste Strategy 2010-2015, Consultation Draft); (Lehmann, S., 2011).

SDG 12: Target12.8

Enhance reach

Facebook is used to extend the scope of the project. Here students can upload their solutions proposals, allowing other people to see them. In addition, through the Ecological Claw ("Garra Ecológica") Facebook account, information of sustainability issues, and environmental awareness is posted.

SDG 12: Goal 12.8

Finding solutions

Activity to trigger student's critical reflection of reality and find solutions to the environmental needs of the area (Alonso, 2004). Students published their ideas on Facebook, increasing the scope.

SDG 13: Target 13.3
SDG 12: Target 12.8

Environmental Education

Program that lay on environmental awareness, implements the disposal containers and adopts gamification; an innovative teaching model based on the resolution of games with a high playful component (Scolari, 2013). This allows to influence the behavior of students through game experiences and achieve greater environmental education and awareness (Ramírez, 2014). SDG 13: Target13.3

Future plans

- Exhibition of Student Federations related to sustainability: August 17, 2018, at 1:00 p.m. The work carried out will be exposed so that the other students federations can get interested in the project and adapt it according to their needs. // TV Program: Interview and participation in the programming of the sixth edition of "Sustainable World", date still to be confirmed. // Re-application of "Sustainable Claw" dynamics: The Secretariat of Sustainable Development committed to carry out more fun activities around education and awareness among students, together with student federations, to be actors of change in the community.

Names of the students: Ana Lucía Besnier Navarro; Betsy Loroama Valdez Valdez; Dirce Jovanna Gómez Gómez; Eliud Reynaldo Jaramillo Gaona; Mayela Edith Mascorro Herrera.

Names of the supervisors: Carlos E. Aparicio M.; Karen Hinojosa Hinojosa; Amanda Melissa Casillas Zapata; Laura Elena Castro Sánchez; Ana Victoria Casillas Zapata; Elfide Mariela Rivas Gómez.

Autonomous University of Nuevo Leon, Faculty of Architecture and School of Public Health and Nutrition. City Lab Module: Sustainable Ecological Environments

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P11 - University of Guanajuato UG

1 PROCESS OF THE PROJECT

1. PROBLEM DEFINITION

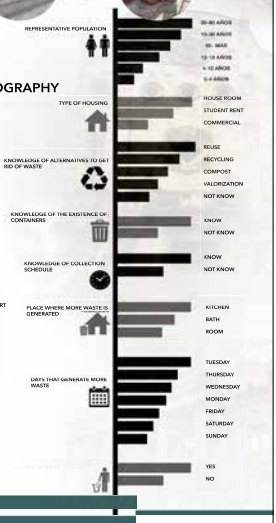
THE STATE OF GUANAJUATO IS KNOWN POPULARLY FOR ITS TOURIST ATTRACTION REFLECTED IN THE ARCHITECTURE OF ITS FLAMES, THANKS TO THE NEOCLASSIC STYLE THAT IT CONSERVES.
BUT IN VIEW THAT IT WAS BUILT FROM THE MOUNTAINOUS TOPOGRAPHY, WE FACED THE CHALLENGE OF ADAPTING TO REDUCED SPACES.
BEFORE THE FACT THAT THE LIFESTYLE CONTRASTS WITH THE GUANAJUATO RELIEF THERE ARE TOO MUCH BLACK HUITS AT THE TIME

2. SITE DELIMITATION AND BACKROUND

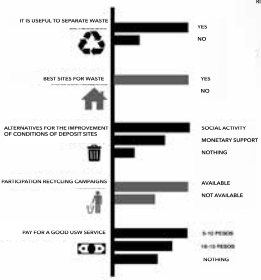
- VISIT TO THE CLEANING DEPARTAMENT
- DOCUMENTARY RESEARCH
- FIELD TRIP

3. DIAGNOSIS

- SOCIETY: ENVIRONMENTAL EDUCATION
- SITE: URBAN FURNITURE, INFRASTRUCTURE AND TOPOGRAPHY
- INTEGRAL WASTE SYSTEM- QUALITY OF SERVICE
- GOVERNMENT DEPENDENCIES- QUALITY SERVICE



4. EVALUATION OF INDICATORS



5. PROPOSAL/SOLUTION

K´ANGI "WASTE´S SOLUTION"

URBAN SOLID WASTE

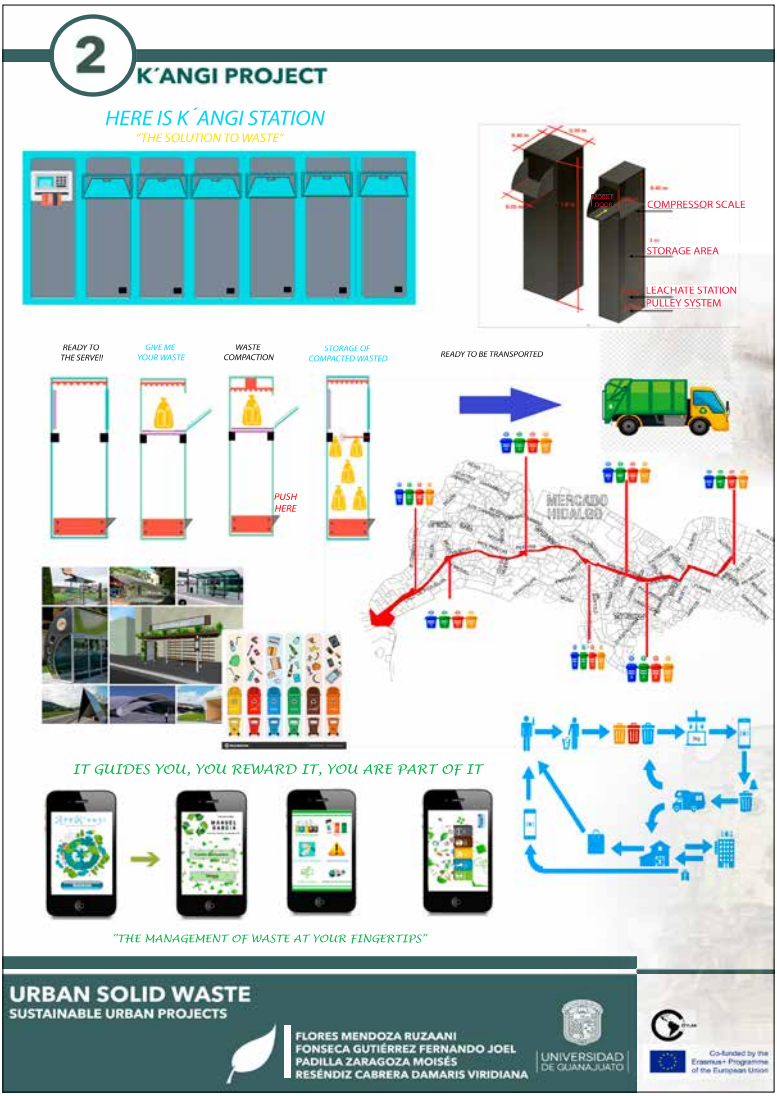
SUSTAINABLE URBAN PROJECTS

FLORES MENDOZA RUZAANI
FONSECA GUTIÉRREZ FERNANDO JOEL
PADILLA ZARAGOZA MOISÉS
RESÉNDIZ CABRERA DAMARIS VIRIDIANA

UNIVERSIDAD DE GUANAJUATO

Co-funded by the Erasmus+ Programme of the European Union

P11 - University of Guanajuato UG



P13 - Universidad Metropolitana UNIMET

UNIVERSIDAD METROPOLITANA
Campus Sustentable

ITYLAB

Citylab LA : ENGAGING STUDENTS WITH SUSTAINABLE CITIES IN LATIN-AMERICA

Contribution to the Citylab Student Competition during the "PBL for Sustainable Cities" conference
19-20-21 September 2018

CITYLAB MODULE

Universidad Metropolitana, Caracas - Venezuela

- **Citylab module:** Towards the sustainability of informal communities.
- **Faculty or department offering the module:** Faculty of Engineering and Faculty of Arts and Sciences.
- **Program(s) in which the module will be implemented:** Community service.
- **Level (undergraduate/postgraduate):** Undergraduate.
- **Modality (summer school, workshop,...):** Workshops, seminars and field visits.
- **Timing (when will the module run):** 9 months.
- **Total number of students (approximately):** 30 students
- **Number of students per group:** 5 students per group
- **SDG goal(s):** Ensure the improvement of public services in the informal community. Promote joint participation for improvement the urban environment through the joint venture with a vision of sustainability. Foster care and Protection of Cultural Heritage. Promote access to public spaces and green areas of the Community.

new methodology for better learning **PBL**

Learning experience

The approach to the PBL methodology represented a challenge for students and teachers, incorporating it as a learning strategy in the Chair of Community Service, being this a condition of degree required by Law. The process allowed us to acquire and strengthen competences such as critical thinking, work collaborative, autonomy in learning and project management, but at the same time, added value through strengthening the community in terms of diagnosis of needs, training in water quality issues and the collaborative approach to problem solving, what facilitated community empowerment. The process evidenced that this double intention, allowed to respond to typical problems of urban sustainability of our country.

Interdisciplinarity

The project was designed and executed by students of the different careers of the Universidad Metropolitana, which favored training through a holistic and global vision with the capacity to solve complex current problems. This methodological contribution of meaningful learning for life was based on the importance of diagnosis, communication and socialization during the process, from an integral approach.

Involvement of local stakeholders

The project responds to a problem of national sustainability, seen from the local, where all the actors involved in the management of water resources search collaboratively for viable alternatives seen from their different roles and assuming that they are all part of the problem as well as of the solution.

WHO? : Fundación Vivienda Popular, Asociación de Viviendas Civiles ASOVIV Las Minitas, Mayor of Baruta, and the Universidad Metropolitana.
HOW? : La Fundación Vivienda Popular, actively participated in all phases of the project, facilitating the exchange with the organized community and the training of the students. For its part, the Asociación Civil de Vivienda ASOVIV Las Minitas, collaborated with the students in the diagnosis and identification of problems and solutions. The Mayor's Office of Baruta, participated in the initial phase for the recognition of the problem and the authorizations of law and later in the evaluation. Finally, the Universidad Metropolitana, was responsible for the links of collaborative work with external actors.
WHEN?: The actors supported the development of the module during the 9 months of execution. Some did it permanently, but in the case of the public power actor, participation was for specific moments within their functions as a municipality.

SDG goal(s)

Contribute to the development of sustainable cities and communities, means the integral management of the resources that the urban ecosystem has, and one of them is precisely water, which according to the concept of water security, must be of quality and at the same time sufficient to satisfy the needs of citizens. A sustainable city is one where its citizens are partners in solutions to sustainability problems, so promoting training in water security, among all the actors of the resource, is vital to contribute to the quality of life and promote development. . This project, not only reflects the work towards the achievement of Goal 11 of sustainable development, but also affects the achievement of Goal 6 of clean water and sanitation, given that we can not see the SDGs, as isolated objectives, in terms of Sustainability issues refer.

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P13 - Universidad Metropolitana UNIMET

P14 - University of Lima UL

Contribution to the Citylab Student Competition during the "PBL for Sustainable Cities" conference
19-20-21 September 2018

CITYLAB LEARNING PROCESS

Revisión de trabajos previos a modo de referentes con el fin de proponer un tema propio de interés urbano. **1**

Dinámicas en equipo para analizar problemáticas que se analicen y luego resuelven. **2**

Conversatorio y dinámicas con el colectivo "SEMBRA" que comparte sus experiencias en activaciones urbanas. **3**

Levantamiento de información. Visitas de campo y comunicación con los vecinos del entorno. **4**

Estudiantes: Hillary Aliaga, Gianmarco Aramayo, Melissa Campos, Gabriela Champin, Meylai Choy, Mohammed Forero, Mayra Palacios, Hugo Palomino, Mayra Quiñones, Shaaron Rodriguez, Christian Salas, Jimena Torres, Rodrigo Vargas, Karla Yarleque.

Profesora: Marina Vella.

Universidad de Lima - 2018

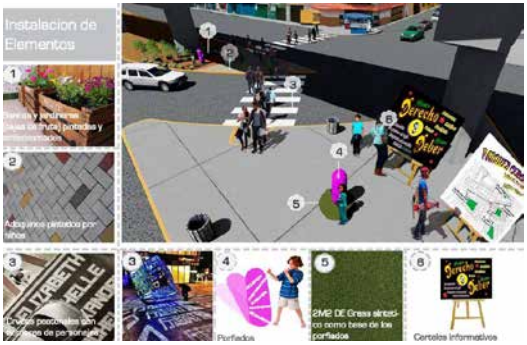
Identificación de Stakeholders. Estudio del lugar. Propuesta y reflexiones. **5**

P14 - University of Lima UL

Contribution to the Citylab Student Competition during the "PBL for Sustainable Cities" conference

19-20-21 September 2018

CITYLAB PROJECT

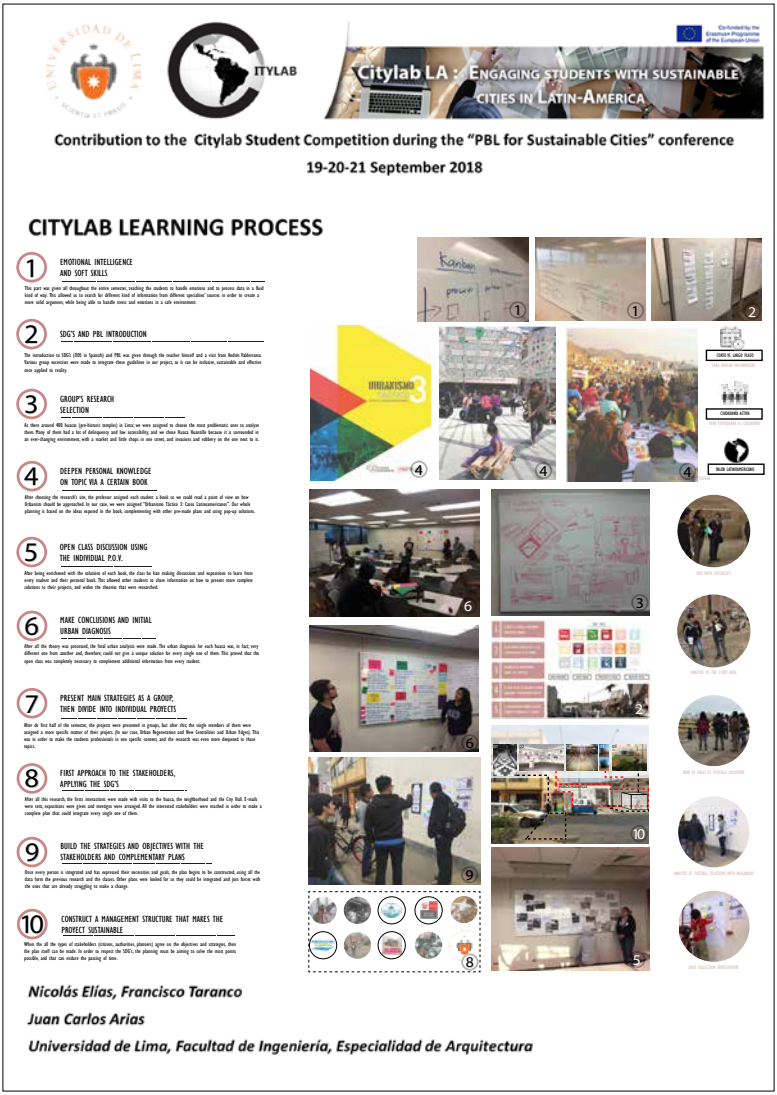


Estudiantes: Hillary Aliaga, Gianmarco Aramayo, Melissa Campos, Gabriela Champin, Meylai Choy, Mohammed Forero, Mayra Palacios, Hugo Palomino, Mayra Quiñones, Shaaron Rodriguez, Christian Salas, Jimena Torres, Rodrigo Vargas, Karla Yarleque.

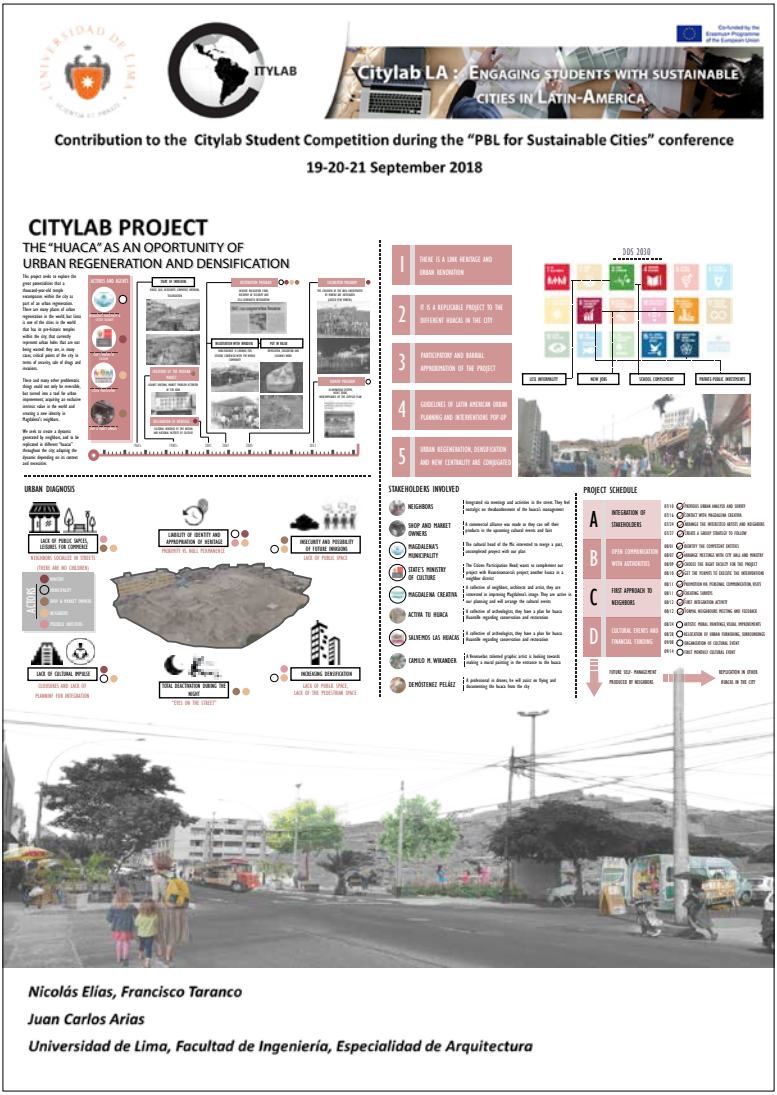
Profesora: Marina Vella.

Universidad de Lima - 2018

P14 - University of Lima UL



P14 - University of Lima UL



P15 - Universidad del Pacífico UP

Contribution to the Citylab Student Competition during the "PBL for Sustainable Cities" conference 19-20-21 September 2018

Sustainable Cities Management

Institution: Universidad del Pacífico
Course: Sustainable Cities Management
Program in which the module is implemented: Economics
Supervisors: Daniel De La Torre, Ronnie Farfán, Rosario Gómez, Vanessa Heller, Miguel Nuñez del Prado, María Angela Prialé, Juan Weston.
Students Name: Luis Cano, Hidemi Kiyan, Patricia García, Teresa Chuchón, Alejandra Marisú
Modality: course
Timing: 1 academic semester (2017-II)

PBL learning experience

The PBL methodology is really useful when students try to learn new topics. This is because most of the students compete in an academic way and by doing collaborative projects they are able to make their best effort while trying to accomplish the best possible result. This way, the student is motivated to follow an independent learning process in order to solve the problem and propose an innovative solution. Therefore, it has been a great experience to have the opportunity to understand and use an alternative methodology, such as PBL, to enhance the learning process. Now, the course is part of the curriculum for the four Faculties at the University.

Interdisciplinarity

This project is interdisciplinary because the four faculties of the University (Business, Economics and Finance, Engineering and Law) and the academic department's joint efforts to design and implement a new course fostering and challenging the student's capacities to apply their best knowledge and skills to solve a concrete environmental-urban problem. For example, the interdisciplinary student team for the project regarding Sustainable Irrigation System for Green Areas, collaborate in such a way that their capacities were capitalized in different aspects, for instance, the engineering student leads the proposition and discussion regarding the model and the programming of the system. The business student contributes with the cost assessment. The economic student leads the cost-benefit analysis as well as the socio-economic impact of the project. Finally, the law student advises regarding the normative framework required to implement the project. All the students gained new perspectives and integrated knowledge to solve a specific problem.

Involvement of local stakeholders

Stakeholders involved in the project were the Municipality of San Isidro and the inhabitants. The Municipality provided information and guidance for the elaboration of the project. Now, they are committed to the allocation of financial resources for the implementation of the project. This project helps the community of San Isidro to the extent that the inhabitants will enjoy well maintained green areas using less water. This is why the inhabitants appreciate this kind of projects and are willing to collaborate by paying taxes to the Municipality on time. Likewise, the stakeholders were involved from the beginning of the course until the end of the project.

SDG goal(s)

The project contributes to two SDG: the 11th Sustainable Development Goal, that is Sustainable Cities and Communities and the 6th Sustainable Development Goal, that is Clean Water and Sanitation. The project is oriented to save water for green areas irrigation, that means it is possible to have sustainable cities with well maintained green areas based on reduction of water used and improve the well being of the inhabitants. The objective of the project was to build a tool based on data from humidity and temperature sensors to help those responsible for water resource management to make informed decisions regarding when, how much and where the irrigation must be made in green areas.

P15 - Universidad del Pacífico UP

Contribution to the Citylab Student Competition during the "PBL for Sustainable Cities" conference
19-20-21 September 2018

Sustainable Irrigation System for Green Areas: A Case Study of San Isidro, Lima - Peru

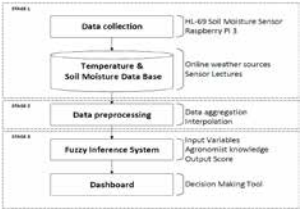
One of the main challenges for local authorities is to improve water management by taking care of green areas in Lima. This research develops a smart decision support system to optimize irrigation in green areas.

The Challenge

Most of the major cities in Peru are located near the coast. Therefore, the most developed region could have the most serious water supply problem. In this sense, a study of the main water supplier for the districts of Lima, Sedapal, pointed out that most districts in Lima far exceed the limit of litres per inhabitant per day suggested by the World Health Organization in 2005 (50 litres). More specifically, San Isidro district inhabitants are Lima's greatest water consumers, with an average daily consumption of 346 litres of water per inhabitant. San Isidro has 18.2 m2 of green area/hab that is higher than the WHO recommendation. The data used in the model correspond to those measured in the Tamayo in San Isidro. The system was built based on low-cost humidity sensors, a Raspberry Pi 3, a cell phone and a portable cell phone charger to provide the necessary energy for sampling with the sensor. The cell phone was used to remotely connect to the Raspberry Pi 3 to get the data needed for the model.

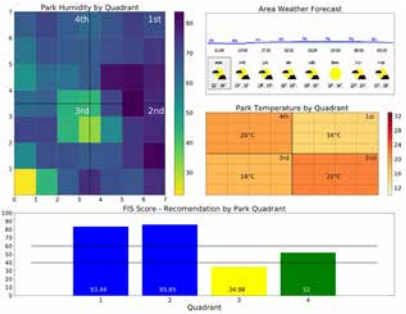
The Methodology

The project proposes a methodological framework. This includes the following stages: data collection (sensors and online sources), data storage (online database), data pre-processing (system input variables), interpolation of the land humidity and temperature values to minimize the number of sensors needed, a fuzzy inference system, and a visual decision-making tool (dashboard). The fuzzy inference system output is a score based on the selected variables that provide information regarding the water requirements.



The Results

Our results provide a solid evidence that data-driven management helps to make informed decisions regarding when, how much and where the irrigation must be made in green areas. This translates into significant water savings, improving water management. Likewise, this methodological framework has proven to be sufficiently replicable and economical to be applied to any green areas with the necessary adjustments. Also, the proposed dashboard contains relevant information about the park that is easily human interpretable. Thus, decision-makers do not need any prior knowledge of the algorithms and models used to take advantage of it.



	Current			Based on data			Savings		
	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
dm3	6,750,000	9,000,000	7,875,000	3,918,750	5,225,000	4,571,875	2,831,250	3,775,000	3,303,125
Soles	S/75,930.00	S/101,240.00	S/88,585.00	S/44,068.59	S/58,758.12	S/51,413.35	S/31,861.41	S/42,481.88	S/37,171.65

As shown in the table, the annual expenditure savings in terms of cubic decimeters is very high, with an averages savings of 3,303,125 cubic decimeters representing a reduction of 58% approximately. Although the monetary saving is not so high, this is because the state currently subsidizes the water and makes expenditure significantly less than other Latin American countries.

Students Team: *Luis Cano (Engineering), Hidemi Kiyan (Engineering), Patricia García (Law), Teresa Chuchón (Economics), Alejandra Marisú (Business)*
Professors: *Daniel De La Torre, Juan Weston, Miguel Nuñez del Prado, Maria Priale, Rosario Gomez & Vanessa Heller*
Universidad del Pacífico, Faculty of Economics and Business, Academic Department of Economics

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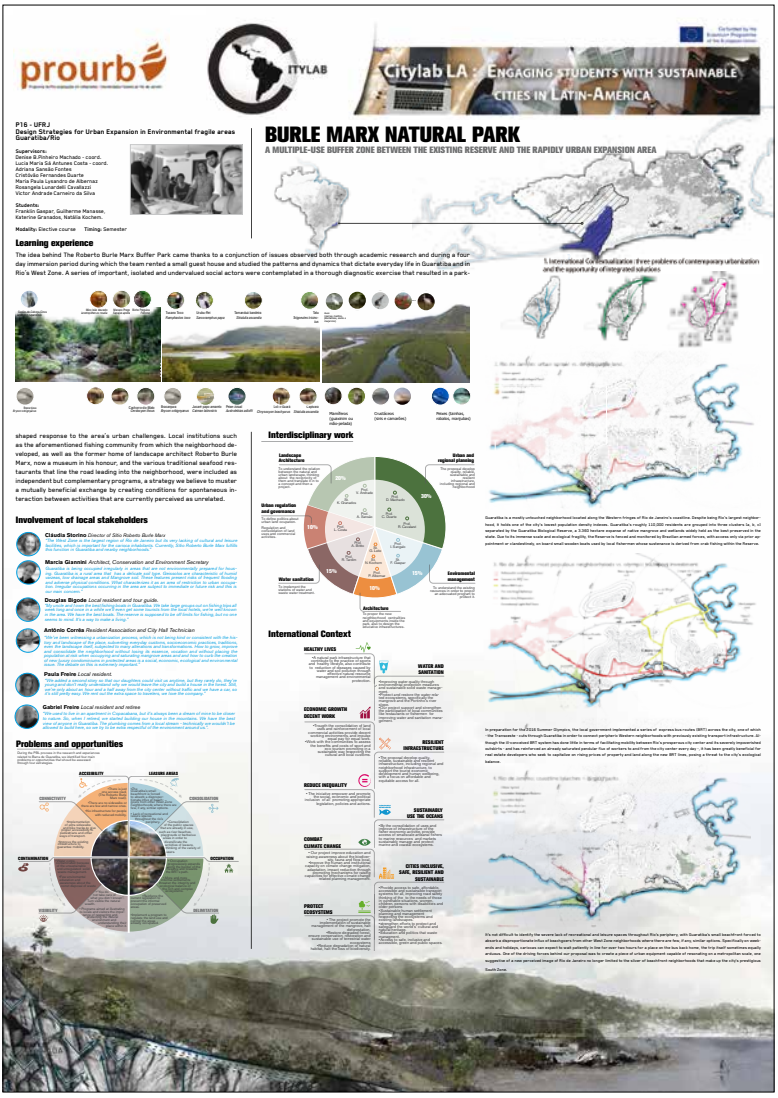

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P17 - Universidade Federal de Santa Catarina UFSC

Contribution to the Citylab Student Competition during the "PBL for Sustainable Cities" conference

19-20-21 September 2018

CITYLAB MODULE

Universidade Federal de Santa Catarina

Special Topics: sustainable cities
Post-Graduate Program of Architecture and Urban Design

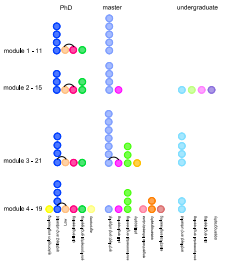
Supervisors: José Kós, Cesar Pompêo, Mauricio Petrucio
Students: Camila Poeta, Kelvin Centenaro, Lucas Zimmermann, Marcia Troncoso, Victor do Carmo

Elective course

Quarter (3 months)

Learning experience

The Post-Graduate Program of Architecture has offered since 2016 , four 3-month learning modules as elective courses. They are open to PhD and Master students from all university post-graduate programs and few undergraduate students were also able to register for them. The modules have incorporated faculty from different departments and will in the future be offered simultaneously in other post-graduate programs.
Developing communication skills have been a relevant goal and students depart from a clear definition of the problem, exploring stakeholders to plan an implementation process. In fact, group negotiation with colleagues from different areas represented the module major challenges. The contributions from the international expert, Tom Coppens, were decisive for a significant change in the modules goals and methodology. Since then, Kingdon's stream model has taken an important role to support the groups' problem definition.



Interdisciplinarity

The aim of the modules was to foster interdisciplinarity and students playing different roles in their project processes. The four modules have had different faculty and student configurations. Four faculty members from Architecture and Urban Design (two), Environmental Engineering and Ecology departments have alternated throughout the modules and students have progressively become more diverse from the first to the last module. The team was constituted by two architects, a civil engineer, an automation engineer and an agronomist. The discussion processes in quite a diverse group was instigating, presented intense and difficult discussions and, for these reasons, also originated richer results.

Involvement of local stakeholders

The project considered the academic community as key stakeholder to impact, through interviews, the university administration. Other stakeholders from the university were involved and backed up the proposal. The university Mobility Observatory collaborated with the project adapting their plans to improve public transport. The dynamics of the academic community could be understood through the location of wi-fi connections. The university ICT's management provided the raw data and the Department of Informatics and Statistics manipulated it, to prevent identification guaranteeing users' privacy. Understanding the dynamics of the problem owners was important to validate the reduction and replacement of parking space with green areas for a park to protect the rivers.

SDG goal(s)

11.7 *The park along the rivers creates inclusive and accessible green corridors to connect the university community and city neighborhoods.*
11.6 *The ecosystem regeneration of degradaded rivers within the campus includes the natural depuration of organic matter in the water.*
11.b *The park creates a green infrastructure for stormwater control of increasing floods due to climate change and urban growth.*
11.2 *The university represents a major impact in public transportation. Parking control increases the demands, supporting better services.*
11.4 *Florianopolis is an important tourist destination. Reducing the rivers' polution significantly contributes to the sea water quality.*

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CITYLAB PROJECT

Open spaces are fundamental elements for the quality of life within cities. They often play a significant role in urban projects. A river that cuts across a city or the local road system, they constitute the stage for public life, structuring and ordering the urban space and stimulating the dynamics of people's lives.
These spaces are likely to transform the landscape construction process and act as flexible components to structure the territory, either functionally or spatially. These interventions are part of the design of an integrative project that implies a continuous and moving process. They aim to restructure the campus of the Federal University of Santa Catarina creating a place of people ecosystems' interaction.

GOALS

The project aims to create a public green space generating social and health benefits to its users towards a more sustainable and resilient city. The linear park shapes a public space that is accessible, diverse and democratic. People of disabilities, children and senior are seldom a concern in Florianopolis public spaces. This project specially considers these groups to afford means to enjoy the city and its environment. It promotes ecosystem regeneration of degraded rivers and contributes to improve the quality of sea water. One should remember that the city has nearly 100 beaches, which constitute its most important tourism attraction.

STORMWATER CONTROL

Improve the outflow and quality of the waters of the Middle River which, due to the high groundwater table and the undersized structure of its canals, overflow during storm periods.

RETHINKING PARKING SPACES

Recover the degraded river borders constituted mainly by parking lots creating structures that encourage sustainable mobility within the campus, particularly walking and cycling.

PEOPLE DYNAMICS

Wi-Fi data was used to verify the best places to foster academic exchange dynamics within the campus and possibilities of meeting and interacting with the surrounding community.

METHODOLOGY

_Integrative and multidisciplinary diagnosis of the environment and the mobility within the campus;
_Analysis of the pedestrian circulation dynamics throughout the Campus collected by Wi-Fi connections data;
_Interviews with academic community;
_Exchange of information with university laboratories, for example the Department of Informatics and Statistics and Mobility Observatory.

PROJECT

Proposed along the banks of the Middle River, the Linear Park was conceived in to allow an integration between academic and the surrounding communities, through the ecosystems regeneration. In the project, ecosystems are understood as a "coherent whole", including human life, biotic factors, and urban landscape, where all benefits from each other.

Thus, we have proposed adequate infrastructure for pedestrians and cyclists mobility, where nowadays parking areas predominate and, in some stretches, we have proposed natural depuration areas to filter the water polluted by the surrounding neighborhoods.

Alternative parking spaces near the university edges guarantee 250 meters maximum distance to every building within the campus. These new structures control and reduce current parking space, stimulating public transportation use and liberating the rivers' margins.

The UFSC Linear Park aims to create a green public space providing social, psychological and physical benefits to individuals as well as accessible and democratic open spaces.

Students: Camila P Mangrich, Kelvin Centenaro, Lucas Zimmermann, Marcia Troncoso, Victor do Carmo

Supervisors: José Kós, Cesar Pompêo, Mauricio Petrucio

Universidade Federal de Santa Catarina . Post-Graduate Program of Architecture and Urban Design

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