

A City Lab for Sustainable Urban Regeneration in Alexandria, Egypt

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Urban Living Lab
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Egypt
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With academic and non-academic partners from Germany, Jordan, Egypt, Iraq, Sweden.

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Alexandria University
EU Erasmus +
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Urban Challenges Tackled
Inclusive and Heritage-sensitive Urban Regeneration
Youth-Centred Civic Engagement
Applied Climate Resilience tools

A City Transformation Lab for Sustainable Urban Regeneration in Alexandria, Egypt.
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Regional Representation at the World Urban Forum about "Empowering communities for sustainable urban transformation".
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In cities like Alexandria, where large-scale infrastructure modernisation collides with fragile layers of social memory and historic identity, the risk is not only physical deletion but cultural amnesia. As tramways will convert into metro lines and industrial heritage sites fall into neglect, entire urban narratives—of labour, movement, and everyday life—stand on the edge of disappearance.

It is within this tension between development and memory that the City Transformation Lab (CT Lab) emerged in 2019 at Alexandria University: a university-led Urban Living Lab dedicated to safeguarding cultural identity while enabling sustainable urban transformation.



Advanced training for students and young professionals is strengthened through innovative, experiential curricula, inter-university mobility, and joint courses.

The CT Lab combines high-fidelity digital documentation, experiential pedagogy, and community co-production to develop human-centred interventions that protect intangible urban heritage while responding to contemporary urban pressures. The Lab operates as a transdisciplinary nexus where architects, planners, historians, technologists, and community actors collaboratively co-create context-sensitive urban solutions.

Through advanced tools such as Geographic Information Systems (GIS), Virtual Reality (VR), environmental monitoring kits, and 3D digital documentation, Alexandria's historic urban fabric is transformed into a "living classroom," enabling students to engage directly with

the city as an evolving laboratory. This pedagogical approach ensures that architectural education moves beyond abstraction, grounding learning in the urgent realities of heritage loss, environmental stress, and social transformation.

The mission of the CT Lab is twofold: to empower a new generation of professionals through immersive, hands-on learning, and to generate applied knowledge that bridges the persistent divide between academic research and real-world urban crises. The Lab facilitates experimentation across multiple domains, from green building assessment to the documentation of "at-risk" heritage assets.



The Trans-Disciplinary Dimension

The process

The working logic of the CT Lab is a participatory, bottom-up collaborative framework that prioritises knowledge valorisation—the strategic translation of academic research into tangible socio-cultural assets and public urban value. Unlike traditional academic structures that confine knowledge production to classrooms and publications, the Lab is built upon Experiential Lab-based Learning.

Students, researchers, practitioners, and local actors are positioned as equal contributors to the production of urban intelligence.

The city itself becomes a site of inquiry, where spatial, social, and historical knowledge is constructed collectively rather than transferred unidirectionally.

This approach enables students and researchers to transition from passive recipients of theory into active co-creators of Alexandria's spatial narrative. Urban interventions are thus rooted in lived experience, local memory, and community negotiation, rather than abstract planning models. In this sense, the city itself becomes both the subject and the medium of learning.

Competences and Skills

The CT Lab's capacity-building strategy is anchored

in a dual pedagogical model: Training of Trainers (ToT), Lifelong Learning workshops, and Experiential Lab-based Learning. This combination ensures both the multiplication of expertise and the immediate application of skills to real urban challenges. By adopting this model, the Lab amplifies its impact, enabling advanced digital competencies—such as high-fidelity 3D scanning, spatial data analysis, environmental monitoring, and narrative mapping—to be disseminated across a growing network of faculty members, emerging researchers, and practitioners.

By synthesising narrative maps with archival research, students develop sophisticated spatial storytelling skills, moving beyond technical documentation to capture the intangible socio-cultural memory embedded in urban space. This equips them with critical green and digital competencies, positioning them as mediators between Alexandria's historical identity and its modernised future.

Through this process, the role of the architect is fundamentally reconfigured—from a solitary designer of objects to a collaborative urban strategist capable of simultaneously negotiating the interests of heritage, technology, environment, and community.

The Open Science Dimension

Inclusivity

Through public exhibitions, digital platforms, and narrative mapping initiatives, the CT Lab transforms localised knowledge into shared civic resources. By making hidden histories, everyday practices, and community memories visible and accessible, the Lab expands who can participate in the interpretation of the city. This process generates social value by strengthening collective ownership over urban narratives and fostering a more inclusive public imagination.

Equity

In the context of the Egyptian architectural landscape, the Lab provides a vital platform for youth empowerment and female leadership in high-tech domains traditionally dominated by men. While the undergraduate population at Alexandria University's Faculty of Fine Arts is already 66% female, the CT Lab has successfully accelerated this trend toward professional leadership. The 2025 seasonal schools

documented an unprecedented level of female engagement in both workshops (80%) and ToT and LLL (66%). By placing female researchers at the forefront of advanced GIS mapping, VR simulations, and 3D heritage documentation, the Lab is actively challenging traditional gender roles within the Egyptian construction and planning sectors.

Sustainability

Sustainability is embedded in the Lab's methods as an operational strategy, workflows and measurable outcomes for Alexandria's built environment. This strategy applies through: 1) the promotion of resource-efficient urbanism, by prioritising adaptive reuse and community-led spatial interventions that minimise carbon footprints while maximising social utility; 2) Innovation in curricula, by embedding green and digital competencies into the official architecture curriculum; 3. Economic Resilience, by attract diverse funding and secure long-term institutional support.

The summer school exhibition "About the Tram" featured student-led interactive mapping and educational games designed to foster transdisciplinary dialogue with the public.
© Aya Abbas, CT Lab, 2025.

The Lab does not merely preserve heritage; it reactivates it as a social asset that informs contemporary identity, belonging, and urban futures.

The Knowledge Valorisation Dimension

- **Educational Value:** Innovative experiential curricula, inter-university mobility, and digital tools (GIS, VR, online platforms) strengthen applied green and digital competences through learning in real urban contexts.
- **Social Value:** Participatory processes supported by digital tools empower communities, enhance access to information, and foster inclusive dialogue and collective ownership of urban spaces.
- **Cultural and Economic Value:** Community-led interventions integrating local heritage revitalise underused spaces while supporting creative uses and local economic activity.

Outputs & Impacts

Outputs

The Lab produces an annual report of activities. It has attracted 9 research visiting scholars. Scholarly outputs include: scientific posters, research papers, reports, master's thesis.

Impacts

Operating as a primary driver for curriculum modernisation, the Lab facilitated hands-on experience for over 730 students and professionals through 11 specialised environmental and heritage documentation kits. These activities are institutionalised via 4 core courses and +10 Training of Trainers (ToT) sessions,

and more than 20 Lifelong Learning (LLL) activities. The activities of teaching and capacity building of the LAB created a strong foundation for future externally funded projects for teaching innovation like Erasmus+ and DAAD.

Practice Public exhibitions on urban heritage and community engagement have strengthened community awareness in local heritage projects. Also, the documentation methods of the lab provide a tested methodology for safeguarding urban memory during rapid infrastructure changes, offering replicable strategies for other cities facing modernisation pressures.



Alexandria's historic tramway corridor during the transition to metro infrastructure. © National Authority for Tunnels, 2024.

CT Lab integrates urban regeneration, heritage conservation, and environmental design through cross-disciplinary collaboration, embedding sustainability while promoting inclusion, community engagement, and youth-centered, gender-sensitive participation.

By developing small-scale, participatory, and scalable interventions, the Urban Lab shows how universities can pragmatically address urban challenges even in contexts of limited municipal resources, fragmented governance, and socio-economic inequality.



The city as a classroom facilitates knowledge through on-site urban engagement. © Malak Magdy - CT Lab, 2025.