Enhancing Citizen Experience in Kortrijk through Extended Reality - Introduction to the Tools

Workshop with Howest Focus Group, Kortrijk – 05/12/2025

A collaboration between Digital Flanders Department, Department of Environment, City of Kortrijk, Howest, imec, Cegeka, TML, Telraam and Leiedal.

Introduction & goals of the Kortrijk pilot case

In Kortrijk, a Strategic Environmental Assessment (SEA) procedure is underway in preparation for a municipal spatial implementation plan (RUP) aimed at transforming a former industrial zone into a multifunctional area for work, living, and public spaces, while preserving historical elements.

The Kortrijk city council, the intermunicipal organisation Leiedal, and the x-CITE project are developing, testing, and evaluating Citiverse solutions **to strengthen public participation** around the spatial implementation plan.

To serve the primary goal of strengthening public participation, three use cases were developed, along with four supporting tools.

Three use cases for Kortrijk

The first involves **visualising** the phased realisation of urban developments over 20 years or more, using XR and 3D models to help the public better understand and accept the spatial implementation plan.

The second use case centres on co-designing **traffic mitigation measures** with citizens, where a **Local Digital Twin** solution is tested as a decision-making tool to visualise the effects of these measures on traffic, air quality, and noise. It also explores how **XR technology** can be used to inform and consult the public about the environmental and safety impacts of such measures.

The third use case empowers citizens to take an active role in data gathering and local discussions about traffic safety policy by equipping them with smart traffic sensors and tools, enabling them to **collect and share data**, evidence, and knowledge about mobility in their neighbourhood.

Four supporting tools

Tool A is an **augmented reality (AR) app** (supporting the first use case) that enables citizens to view the special development plan in 3D. By scanning a QR code at the location, users can access an interactive AR experience that overlays the proposed new developments onto live camera images from their smartphones or tablets. Additionally, the underlying Digital Twin model will be available online via a dedicated Digital Twin viewer, enabling remote exploration and understanding of the project.

With Tool B (supporting the second use case), **simulations of a wide variety of traffic scenarios** can be implemented and modelled in a Digital Twin Environment. Effects on traffic, air quality and noise can be calculated and visualised in a 2D environment.

Tool C builds on Tool B and aims to offer **citizens an immersive 3D simulation experience**. It enhances their understanding of how the simulation affects traffic, air quality, and noise by using experimental **visualisation** techniques.

Tool D combines low-cost **traffic sensors** (counting pedestrians, two-wheelers, cars and heavy vehicles and measuring their speed) with a **2D multifunctional data analysis dashboard**. Data and the dashboard are freely available to all citizens, allowing them to conduct their own analyses.

Workshop with student focus group

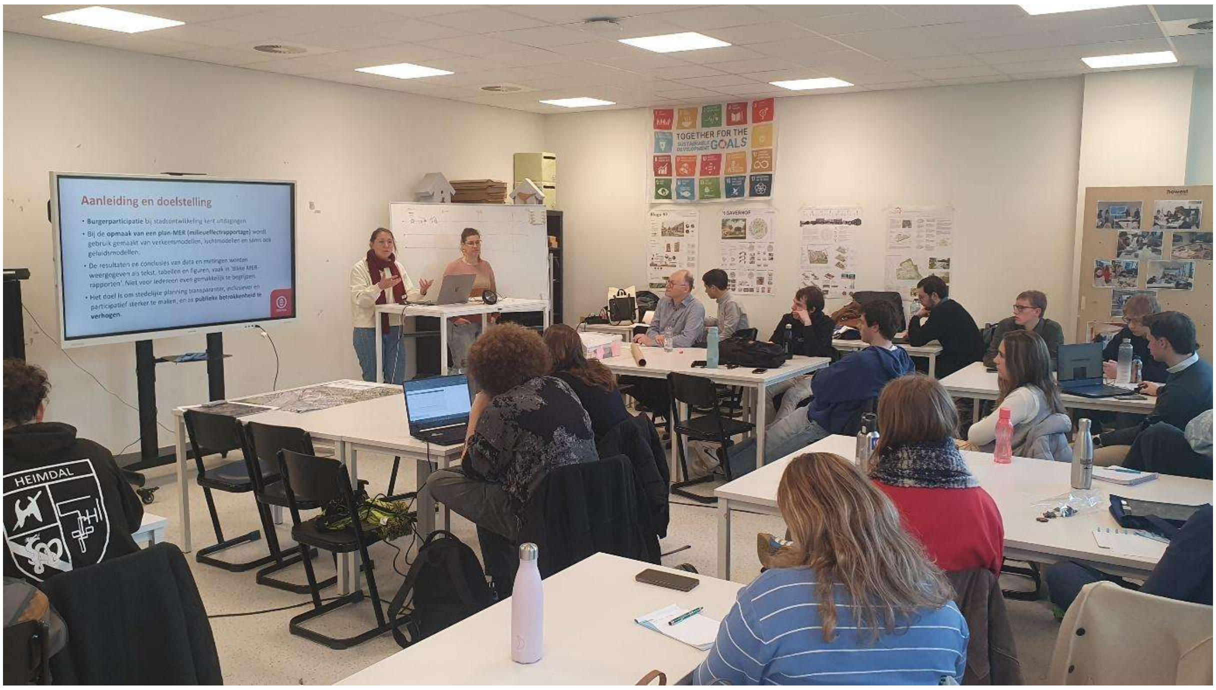
On **5 December 2025**, a guest lecture workshop was held with a focus group of urban planning students from Hogeschool Howest in Kortrijk. The workshop had three main objectives: first, to collaborate on traffic mitigation measures (anticipating changes in traffic conditions at the future site); second, to test the supporting digital tools and provide feedback to enhance their usability and functionality; and third, to test and further elaborate the concept for future participative initiatives with the citizens of Kortrijk.

Morning session

The day began with an **introductory plenary session** in which representatives from the Digital Flanders Department and the Department of Environment introduced the x-CITE project. They outlined the project's objectives, structure, and key challenges, and they explained its connection to the Citiverse—a human-centred digital twin of cities that uses Extended Reality (XR) and Artificial Intelligence (AI) to actively engage citizens in urban transformation.

Afterwards, a more detailed explanation was given about the Kortrijk pilot; which aims to redevelop the historic Van Marcke site into a new urban district, preserving heritage while introducing flexible, future-proof public spaces. The RUP (Spatial Implementation Plan) procedure and the plan-MER (Strategic Environmental Assessment) procedure were explained, emphasising the importance of public participation and the evaluation of environmental effects and mitigation measures throughout the planning process.

The city of Kortrijk initiated the Workshop by presenting the overall picture of the urban planning aspect of the x-CITE project and how to make urban planning more transparent, inclusive, and participatory by leveraging digital tools to enhance public involvement in the planning process. The session began with an explanation of the concept of mitigation measures, supported by data and maps, and included examples to clarify the concept. During the workshop, the students were divided into three groups to brainstorm practical mitigation measures - actions designed to limit or reduce the negative environmental impacts of urban development plans. Students gathered around the map of the RUP, and they discussed, drew on transparent drawing paper and discussed various potential measures that could be implemented to minimise local environmental effects, ensuring a more sustainable development.



The workshop encouraged questions and collaborative thinking, fostering a deeper understanding of how targeted interventions can make urban projects more environmentally sustainable and socially acceptable. After this creative moment, a half-hour wrap-up was held, with a representative from each group sharing lessons learned.

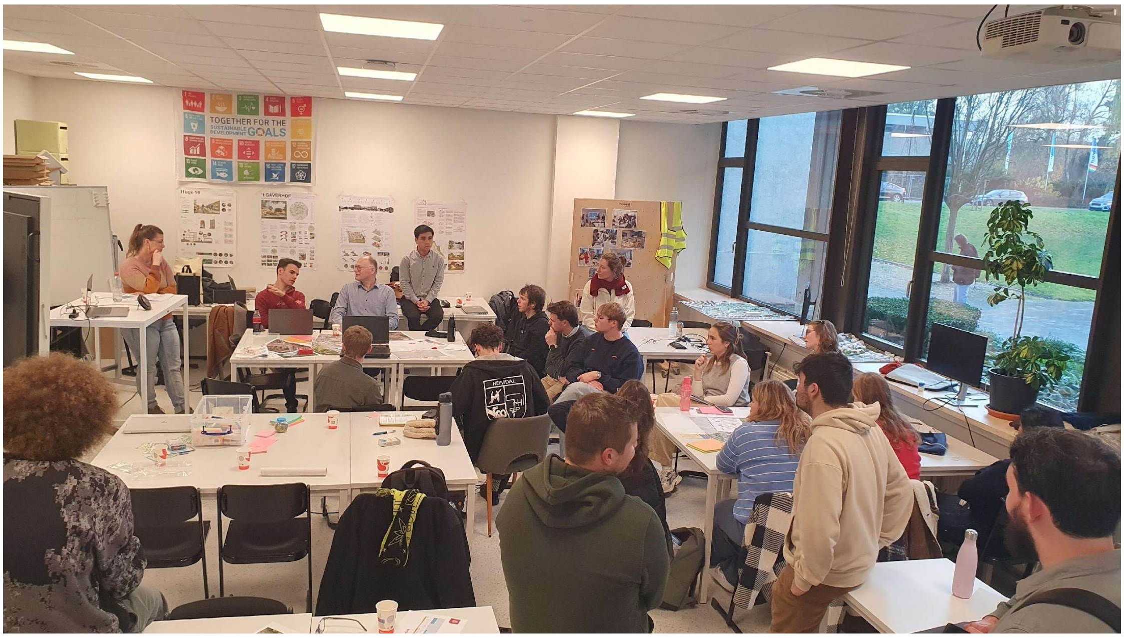
Afternoon session

The afternoon session focused on the x-CITE tools to enhance public involvement in the planning process. A general introduction was given by Digital Flanders. It was explained that traditional plan-MER reports, which are based on traffic, air, and noise models, are often complex and difficult for a broad audience to understand. x-CITE addresses this issue by introducing interactive solutions, such as XR-based visualisations and digital twins, that allow citizens, businesses, and schools to explore the future development of the *Van Marcke site* in Kortrijk. These tools enable users to visualise gradual urban changes, assess the impact of mitigation measures on traffic and safety, and objectively monitor current and future traffic intensities using smart sensors in combination with a public analysis dashboard, ensuring transparency. All four tools and their functionalities were showcased live to the students by their owners and developers: the technical partners Howest, TML, Cegeka, imec and Telraam.

Students were then split into two groups.

- One group tested the augmented reality app (tool A) on the *Van Marcke* site. They learned from a technical developer at Howest how to scan a QR code on-site, calibrate the AR functionality, and explore the new buildings planned for the site in their full 3D glory. It was interesting to see them explore the tool's UI/UX on a tablet and identify potential improvements.

● The second group further developed the traffic mitigation measure designs they developed in the morning brainstorming session, by translating their scenarios step-by-step into real model simulations (mobility and air quality) within a Digital Twin environment (tool B), supported technically by Cegeka (Mobilize Digital Twin integrations) and TML (Traffic Scout traffic model). Tool B enables users to add new roads, change traffic directions and speed, and assess how these changes impact traffic movement. The tool works at the meso level, meaning that it models traffic intensities but not individual vehicle behaviour.
The second group also discovered how developers at Howest created and fine-tuned Tool C to present traffic density in a way that makes the results of Tool B's scenarios as clear and understandable as possible for citizens. Together, these tools gave participants valuable insights into the potential outcomes of each scenario.



Learnings/Findings concerning Tools

After the parallel workshops, both groups came together for a plenary wrap-up and to share the lessons learned and recommendations.

- **Tool A** would benefit from starting with a clear information screen and a step-by-step guide, including colour codes for easy reference. Interactive AR information buttons should provide basic details about each building, and the introduction should set user expectations and explain calibration to avoid display issues. On-site, prominent information boards with simple maps, clear zoning, and QR codes are recommended, along with amenities like benches for accessibility. Marking the boundaries of the planning aera according to the SEA-report and ensuring consistency in zoning colours is important. Finally, a built-in feedback option should allow citizens to share their experiences and suggestions.
- **Tool B** allows for easy addition of new connecting roads, such as cycle paths, but has limitations with complex traffic features like mandatory turns or roundabouts. Data interpretation can be challenging for non-experts, so guidance is valuable. The interface is intuitive and works well with the existing street network, but accuracy depends on the underlying road data. It is mainly designed for experts, but when used with Tool C, it supports broader scenario analysis. Key features include navigation and air quality modelling; future improvements could add additional traffic functions and noise modelling.
- Allowing more than three viewpoints and improving the representation of heavy vehicles would enhance the **Tool C**'s usefulness. Differentiating between cars and buses is especially relevant in areas with unique traffic patterns, such as near depots. Tool C strengthens public support for projects by making traffic scenarios more understandable, and adding features like snapshot or replay functions would help users review and analyse traffic build-up more effectively.

Feedback on the participation process

The students gave a positive overall assessment of the day, finding both the introduction and the digital tools interesting and relevant to their studies. During the evaluation, the guest lecture and the tools were discussed in terms of their strengths, areas for improvement, missing functionalities, and user-friendliness. The analysis also considered how feedback from focus groups with stakeholders could be used moving forward.

For the public participation process, several recommendations emerged. It's essential to explain the concept of mitigation measures, give citizens time to identify issues themselves, and encourage local ideas to develop. Citizens should have sufficient time to propose and collaboratively develop mitigation scenarios, with clear communication of the benefits to the neighbourhood. Maps should include clear legends and explanations, and the scale or level of detail should always be indicated to avoid confusion.

Evaluation and conclusions

Today's workshop was very productive, with valuable feedback and suggestions received across three levels.

- The Urban planners of the city of Kortrijk received alternative mitigation solutions and deeper versions of existing plans, enabling collaborative development of new approaches.
- Technical feedback from the students will be used by the x-CITE developers to improve, customise, and debug their tools.
- Additionally, the script and planning of this focus group workshop, enriched with the feedback of the students, serves as a basis guideline in preparation for broader public information and consultation sessions.