

# That could matter to us

10 examples of how Citiverse technology can lower barriers and increase participation.



European Citiverses Uniting for Inclusion is part of EU-funded initiatives exploring Citiverse technologies. Within this context, the project focuses on how these technologies can be used to lower barriers and support accessibility through universal design.

The project focuses on developing a prototype related to event environments. At the same time, the work highlights broader possibilities, showing how citiverse technologies can help reduce barriers in a wider range of everyday contexts.

To explore these possibilities further, the project brought together expertise from across the project – including city planning, digital twins, AI and business development – through a series of speculative design workshops. Using universal design as a foundation, the workshops aimed to generate new, inclusive ideas.

Our guiding question was simple: *How can citiverse technologies be used to address real, shared needs and make everyday life more accessible for more people?*

***What if you could test real life situations in your own pace in a digital world before visiting for real.***

# Content

What is a Citiverse?	5
What is Speculative design?	6
About the project	7
What is universal design?	8
Citiverse and digital twin technology	9
Method	10
10 ideas	11
Want to know more?	22
Contact	23





***What if VR simulations could help city planners and architects see and feel how built environments are experienced by neurodivergent individuals?***

# What is a Citiverse?

A Citiverse is a digital version of a city that combines real-time data, 3D models and interactive technology. You can think of it as a virtual layer on top of the physical city.

In a Citiverse, buildings, streets, traffic, services and people's movements are represented digitally. Sensors and data from the real city update the virtual one in real time. This allows people and organizations to explore, simulate, and test ideas safely – before experiencing places in real life.

A Citiverse can be used for planning, safety, energy use, and citizen engagement. It makes it easier to understand how a city works – and how it could work better for everyone.

While new technologies increasingly support people with disabilities, this emerging combination of technologies – including visualization, audio interaction and real-time urban data – is still in its early stages of exploration and use.

This raises important questions: how might these environments be designed to lower barriers and support inclusion for a wider range of people?



# What is Speculative design?

Speculative design explores possible futures through “what if?” scenarios. Instead of solving today’s problems directly, it imagines concepts, prototypes or stories that show how technology, society and human behaviour could evolve.

It does not aim to predict the future. Instead, it helps people reflect on current trends and values. It can challenge assumptions, highlight risks and inequalities and open up more inclusive alternatives. It also supports innovation and long-term thinking.

The goal is not to create finished products. The goal is to spark dialogue, broaden perspectives and inform better decisions today.

In this project, speculative design was used to explore ideas that could be developed using Citiverse technology.



# European Citiverses Uniting for Inclusiveness

**European Citiverses Uniting for Inclusiveness is a collaborative innovation project co-funded by the European Union.\* The project brings together 12 partners from across Europe, working towards cities that are smarter, more inclusive and more human-centred.**

**Project partners:** City of Gothenburg, Göteborg & Co, GATE, Kokokaka, Lindholmen Science Park, Iceberg+, Our Normal Association, RISE, The Point Labs, University of Twente, Virtuell Design and Younite.

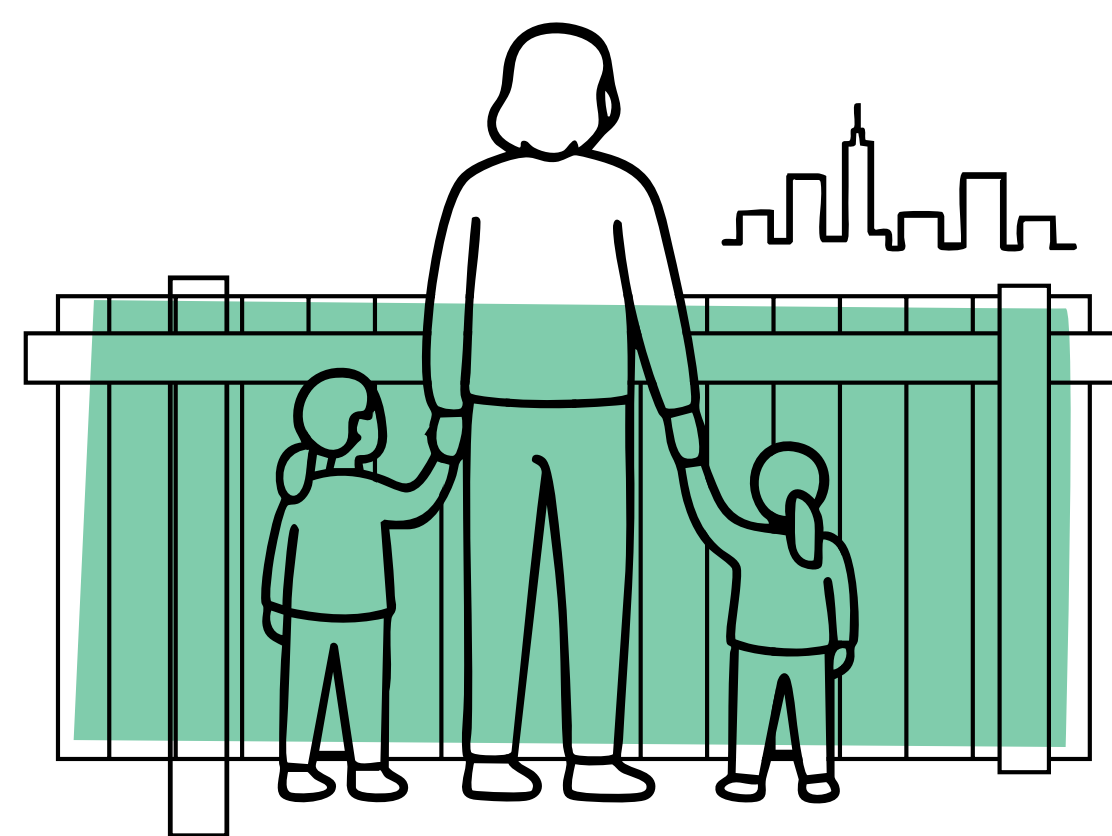
To support inclusive and universal design from the outset, the project began with a user needs analysis to ensure that the work was grounded in real lived experiences. The report “I Want to Go There Now” summarizes the key insights from this initial research phase.

While the primary goal of the project is to develop an event-focused city application, it also adopts a broader perspective to demonstrate how emerging digital twin technology can help reduce barriers and enhance inclusiveness in cities across Europe. To achieve this, the project incorporates principles of universal design throughout its development.

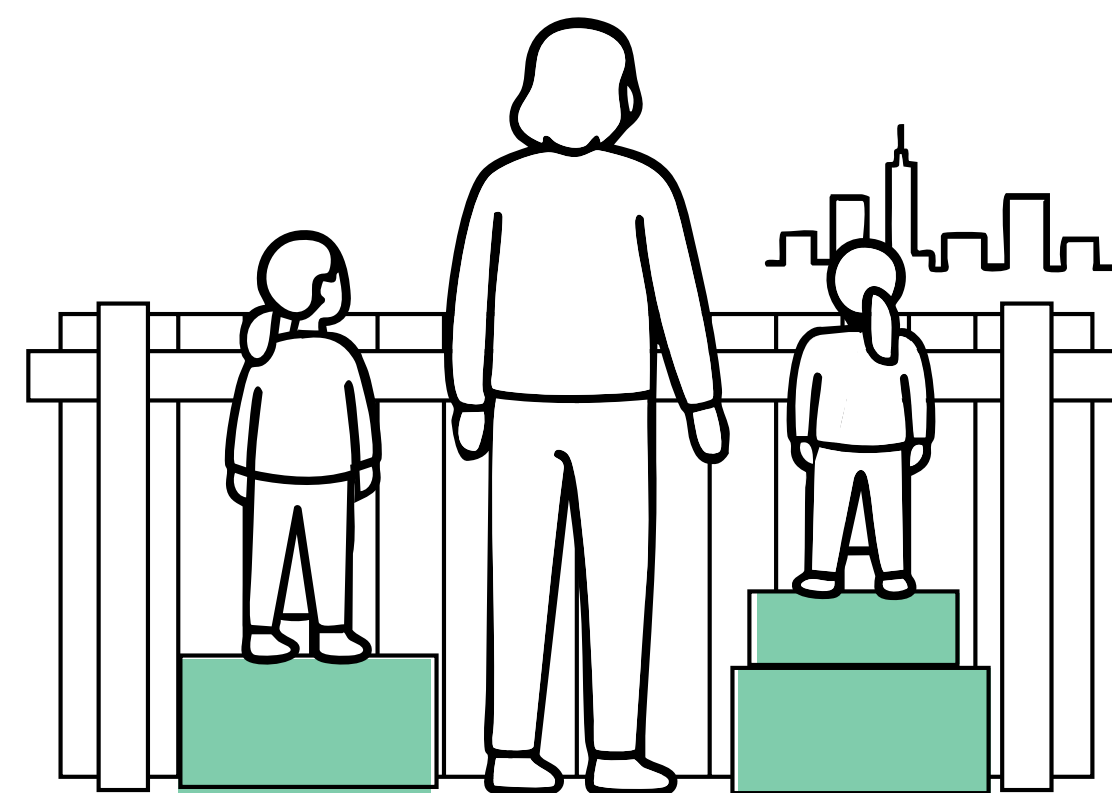
\*In Sweden the project is also co-funded by Vinnova.

# What is Universal design?

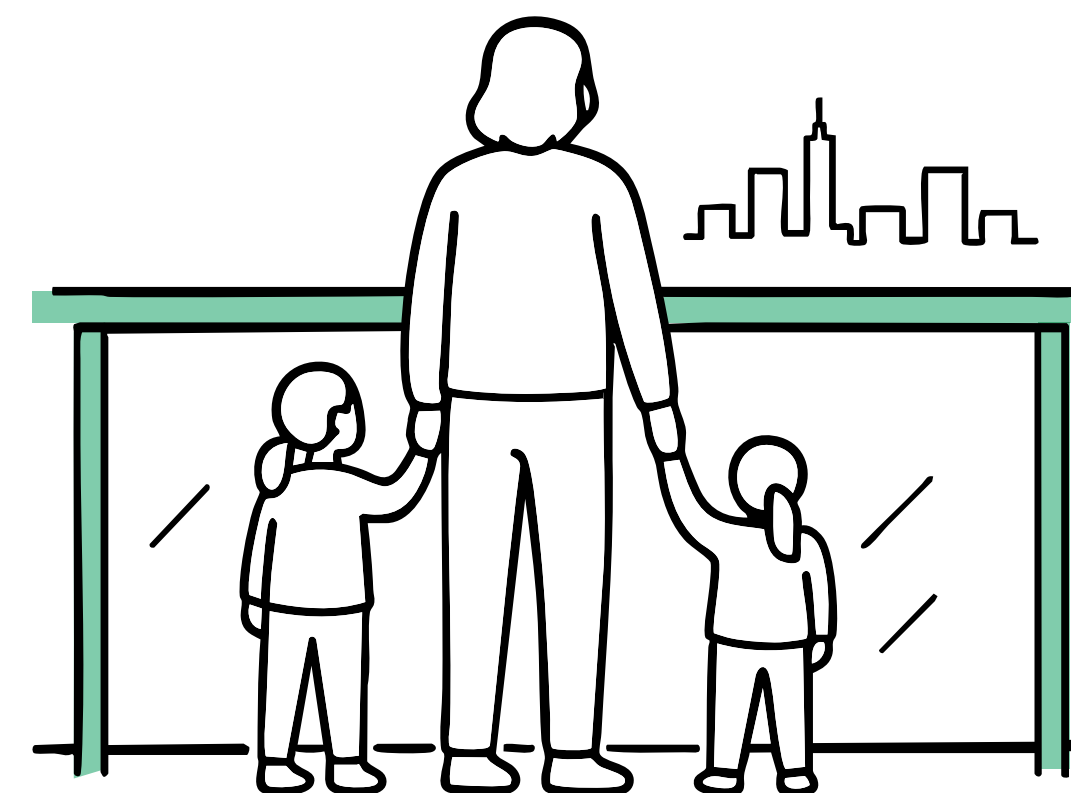
Universal design is a design approach that aims to create environments, products and services that work well for as many people as possible from the outset. It is based on the understanding that people have different needs and abilities and that these should be considered early in the design process - not as an afterthought. By removing barriers and designing for diversity from the beginning, universal design contributes to greater accessibility, usability and inclusion for all. It also leads to more sustainable and efficient solutions, benefiting both individuals and society.



**Inaccessible**



**Accessible**



**Equal / Universal design**

# Citiverses and digital twin technology

Several Citiverse projects are currently being developed across Europe. These initiatives explore how digital twin technologies - using real-time data, 3D visualisation, and AI - can support cities in planning, climate adaptation, traffic management, energy efficiency and citizen participation.

Some focus on technical infrastructure while others explore how digital twins can be used in everyday life - for example to simulate climate impact, understand energy flows or co-design public spaces with citizens.

Together, these projects aim to make digital city environments more accessible, useful and inclusive - not only for planners and professionals, but also for the people who live in, and move through, cities every day.

# Method

To develop ideas, we used a worksheet supported by situation cards, user journeys and ability cards to help generate new perspectives.

The worksheet helped participants define when, where and how an idea could be used, what technological solution could be applied and how it would benefit people with diverse abilities.

It also included space to describe how the idea could create value for a broader group of people, as well as which companies or organisations could potentially develop it.



## Hear

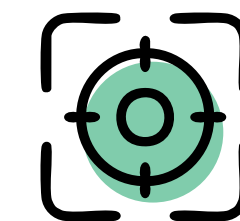
Not being able to hear.

Permanent: \_\_\_\_\_ Deaf

Temporary: \_\_\_\_\_ Ear infection

Situation: \_\_\_\_\_ Noisy environment

**OUR NORMAL**  
Developed by Our Normal Design Lab



## Focus

Difficulty maintaining focus on tasks.

Permanent: \_\_\_\_\_ ADHD

Temporary: \_\_\_\_\_ Anxiety

Situation: \_\_\_\_\_ Open-plan office

**OUR NORMAL**  
Developed by Our Normal Design Lab

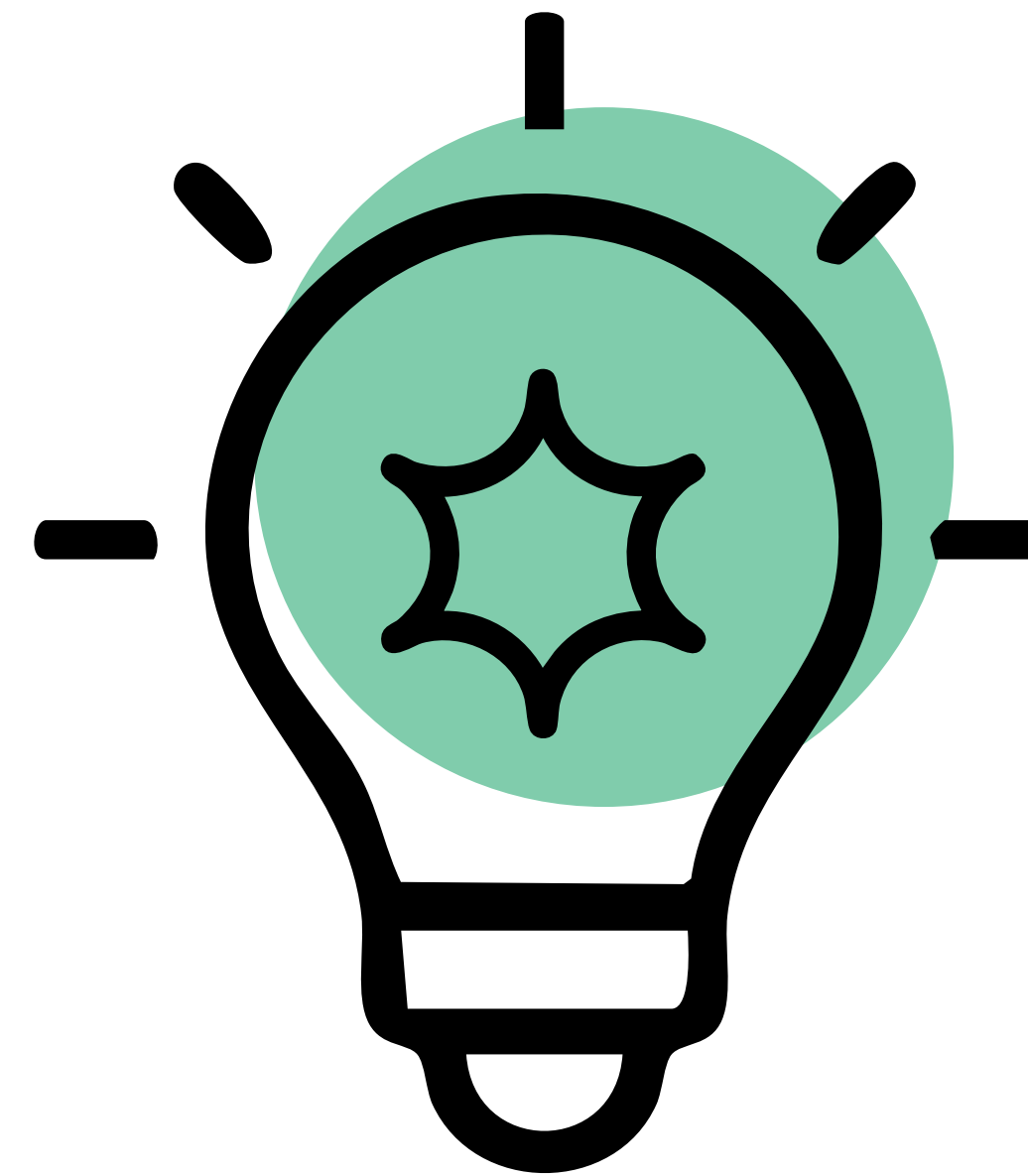
The ability cards used in this workshop are one example of tools that can support inclusive and perspective-shifting design processes. To explore more tools and methods for working with universal design in workshops, visit the Our Normal Design Lab at [www.ournormal.org](http://www.ournormal.org)

# Ten ideas

**On the following pages, we present ten examples of how Citiverse technology can be used to lower barriers and increase participation.**

These examples represent a selection of ideas developed during a series of workshops with participants in the project. Together, they illustrate different ways in which Citiverse technologies could support more inclusive experiences in everyday life.

The examples include: Virtual Life Lab, All Senses Seating, Real Time Access Info, SeatSense, Direct Dialog, Accessible Event City, SenseSpace, Sensory Map Sign, Access Path and Wayfinder.



# Virtual Life Lab

A place to safely practice on real-life situations



**Example of a situation:** A young adult with an intellectual disability is exploring greater independence in everyday life. With the right support, clear information, and opportunities to prepare in advance, they can navigate new situations with confidence and participate in society on their own terms.

**Idea:** Different virtual tours of real-life situations that you could try out at your own pace before visiting for real. For instance practice how to vote, apply for a passport, a virtual tour of your new school guided in the virtual world by your future teacher, going through a security check, going to the local swimming hall or borrow a book from the library. It could also be guidance in a healthcare situation - like preparing for surgery.

Stay and explore what you want. Practice as many times as you need.

**Tech:** digital twin technology. VR for immersive exploration and simulation. Mobile, tablet and desktop screens for easy, everyday access.

This could also be useful for people that are new in the country and don't understand how common procedures work, small children and elderly people with dementia or trouble remembering.

**Could be developed / offered by:** The city, region or the state.

# All Senses Seating

A new kind of restaurant booking service



**Example of a situation:** A neurodivergent child is going to a taco restaurant with their grandmother. Since they have not been there before, the grandmother does not know what it will be like on site. There is concern about possible overstimulation and attempts to run away.

**Idea:** The possibility to view the restaurant's layout on a map, with layers that allow you to see which tables are the calmest, quietest or meet other preferences.

Could be done by the restaurant owner (the restaurant owner scans their venue, creating a 3D visualization for visitors to explore) or by an independent service provider of booking services.

**Tech:** 3D scanning, sensory map data and immersive visualisation.

This idea could also be good for people with hearing impairments, elderly individuals and people with social anxiety. Also useful for everyone.

The service could be used in other places like the cinema, theatres, in concerts and similar venues.

**Could be developed / offered by:** Restaurant owners, existing booking apps, the city or destination organisations.

# Real Time Access Info

Freedom to participate



**Example of a situation:** A grown daughter and her family are going on an outing with her father, who has multiple disabilities due to a stroke. Having accessible toilets at the location is crucial for the

outing to take place. According to the information online, such facilities are available, but when they arrive they discover that the toilet is out of order and they have to return home.

**Idea:** An IoT solution that provides real-time signals about whether a toilet is actually open and available could offer reassurance, predictability, and above all, the freedom to participate.

The solution could be modular, making it easy to implement in more places.

**Tech:** A combination of real-time data and interactive map functions.

Knowing in real time that accessible toilets are open also makes things easier for others with mobility challenges, those who have a broken leg or use a walker, those with a stroller or similar and pregnant people.

**Could be developed / offered by:** The city or the state.

# SeatSense

Smart, real-time seat availability



**Example of a situation:** A father with chronic back pain wants to go to a concert with his family. He cannot stand for long periods and therefore needs a seat. The venue has some seating available but it's on a first-come, first-served basis.

**Idea:** A sign outside the concert venue shows how many seats are taken, so people know whether they can get a seat or not and when they should line up to avoid standing for too long.

Could be developed as a festival area map showing lines to the entrance, toilets, restaurants so that you could choose a route that works for you. Also it could be linked to a special badge that could grant visitors to pass queues if needed.

**Tech:** Real-time data and visualisation.

This would also be good for neurodivergent people, families with children who don't want the kids running around during a concert, elderly people and others who need to sit.

**Could be developed / offered by:** Music venues, event organisations, the city or the state.

# Direct Dialog

Inclusive real-time feedback



**Example of a situation:** A group of people with diverse abilities are visiting the Gothenburg Culture Festival. During their visit, they reflect on aspects of the experience that could be improved to better meet their needs and preferences. However, they perceive the process of sharing this feedback, for example through a form on the website, as a barrier.

**Idea:** By creating an interactive environment with approachable AI question bots, statements to respond to, virtual spaces to point and interact in and the option to record spoken ideas – all guided by a human facilitator – the organisers can gather feedback from groups that are rarely represented. This creates a continuous feedback loop rather than an after-the-event report.

Various types of feedback could be captured on the go that would otherwise never reach the event planners.

**Tech:** Digital twin technologies and AI chatbots.

The tool could also be used to help interpret the often somewhat difficult language in democratic processes in a more easily understandable way. It could be good for people with dyslexia and those who don't speak the language.

**Could be developed / offered by:** The city, region or state, destination organisations or event organisers.

# Accessible Event City

Helps you navigate during city events and urban redevelopment



**Example of a situation:** During large city events or urban developments, the city changes dramatically. Streets are closed, routes are redirected, signage is temporary. For people with early-stage Alzheimer's, this unpredictability can be overwhelming. Where can I pass the street?

**Idea:** An AI powered agent connected to the city's real-time digital twin can guide city visitors based on temporary changes in the city traffic environment. The user gets information about busy areas, quiet zones, alternative routes, waiting times, weather shelters, accessible paths and additional activities like live performances. The agent then generates a simple, personalized checklist summarizing what to expect and what to consider.

During the visit, live data on signage and mobile devices shows real-time route changes and calm navigation options.

**Tech:** Real-time data connected to digital twin.

This solution could also benefit people with visual impairment, anxiety or sensory sensitivities, neurodivergent visitors, tourists, cyclists, families with children, people that are in a hurry and event planners and city planners using crowd data insights.

**Could be developed / offered by:** The city or the state.

# SenseSpace

Helps staff gain deeper insight into how to create more inclusive spaces



**Example of a situation:** Urban planners and architects may have limited insight into how people with diverse abilities experience the built environment. Education often emphasizes wheelchair accessibility, while other access needs receive less attention.

**Idea:** A simulation that helps city planners and architects better understand how different environments can be experienced by neurodivergent individuals. For example, experiencing busy and crowded places, or environments with intense sensory stimuli in various forms.

**Tech:** 3D scanning, sensory mapping and immersive visualisation.

This could also be valuable for politicians, social workers, teachers, and event staff – as well as others who want to better understand different perspectives. It can support builders and project managers in understanding and prioritising accessibility when developing new hospitals and care facilities.

Could be developed and offered by: city planners, architects, municipalities, or public authorities.

**Could be developed / offered by:** City planners, architects, the city or the state.

# Sensory map sign

Interactive signs showing real-time sensory maps



**Example of a situation:** A school class is visiting an urban public space for an outdoor lesson followed by a picnic. Finding a quiet, less crowded area is important, as a busy environment may cause stress and make it harder for the group to focus on the planned activities.

**Idea:** Before entering a public space such as a park or a festival area there is a sign to look at. An interactive sign shows sensory information, including crowd density, sound levels, smells and other environmental factors.

This supports the teacher to plan the visit according to various needs that the students have.

**Tech:** Sensory mapping with historical, predictive and real-time data and map visualisations.

This could also be good for people experiencing burnout or brain fog or people just preferring a peaceful and quiet visit in general.

This could also be used in other places, like hospitals, central stations, shopping malls.

**Could be developed / offered by:** Municipalities, city planning departments or park and public space managers.

# AccessPath

Independent accessibility



**Example of a situation:** A person with reduced stamina wants to enjoy a walk in a city park but is unsure about terrain, slopes, and where to rest. Another person using a wheelchair wants to attend a hockey match independently for the first time. The venue is under renovation, signage may be outdated, and they prefer not to rely on staff for directions.

**Idea:** A personalised, AI-powered navigation companion that supports independent movement across indoor and outdoor environments. Through a conversational interface, users describe their needs and preferences, and the assistant generates tailored, accessible routes. Before the visit, users can explore routes through simple 3D views or simulations. During the visit, the assistant provides step-by-step guidance via map, audio, and optional AR overlays, adapting to changes such as renovations, weather, or crowd levels.

**Tech:** LLM-based AI assistant for conversational guidance. digital twin data and positioning for real-time navigation, multimodal access via mobile devices (text, voice, visual overlays).

Privacy is a key design challenge: the system should minimise data collection, avoid storing sensitive personal information, and enable use without persistent profiles. Value: Supports people with mobility needs, neurodivergent individuals, people with anxiety, and anyone who benefits from clearer, more predictable navigation.

**Could be developed / offered by:** Municipalities, transport and venue operators, in collaboration with AI, mapping, and digital twin technology providers.

# Urban Reach

Designing cities for independent living in the 15-minute city



**Example of a situation:** A city planner designing a new neighborhood must consider a wide range of needs and scenarios in their planning process.

**Idea:** Use digital information from digital twin technology to support urban planning tools and guidance throughout the planning process. This data can help planners address needs related to green spaces, quiet areas, accessible routes, safe pathways and conditions such as shade and heat.

It can also help ensure that essential services – such as healthcare, kindergartens, schools and shops – are within easy reach. By integrating this information, planners can design more inclusive, healthy and accessible environments that better support everyday life in the city for everyone.

**Tech:** A digital twin can provide highly granular information on accessibility and walkability for a wide range of user groups and scenarios.

An interesting research project on this topic is led by the GATE Institute in Sofia, as part of the CU project.

This approach allows cities to be planned with multiple needs in mind from the very early stages, prioritizing well-being for everyone.

**Could be developed / offered by:** The city or the state.

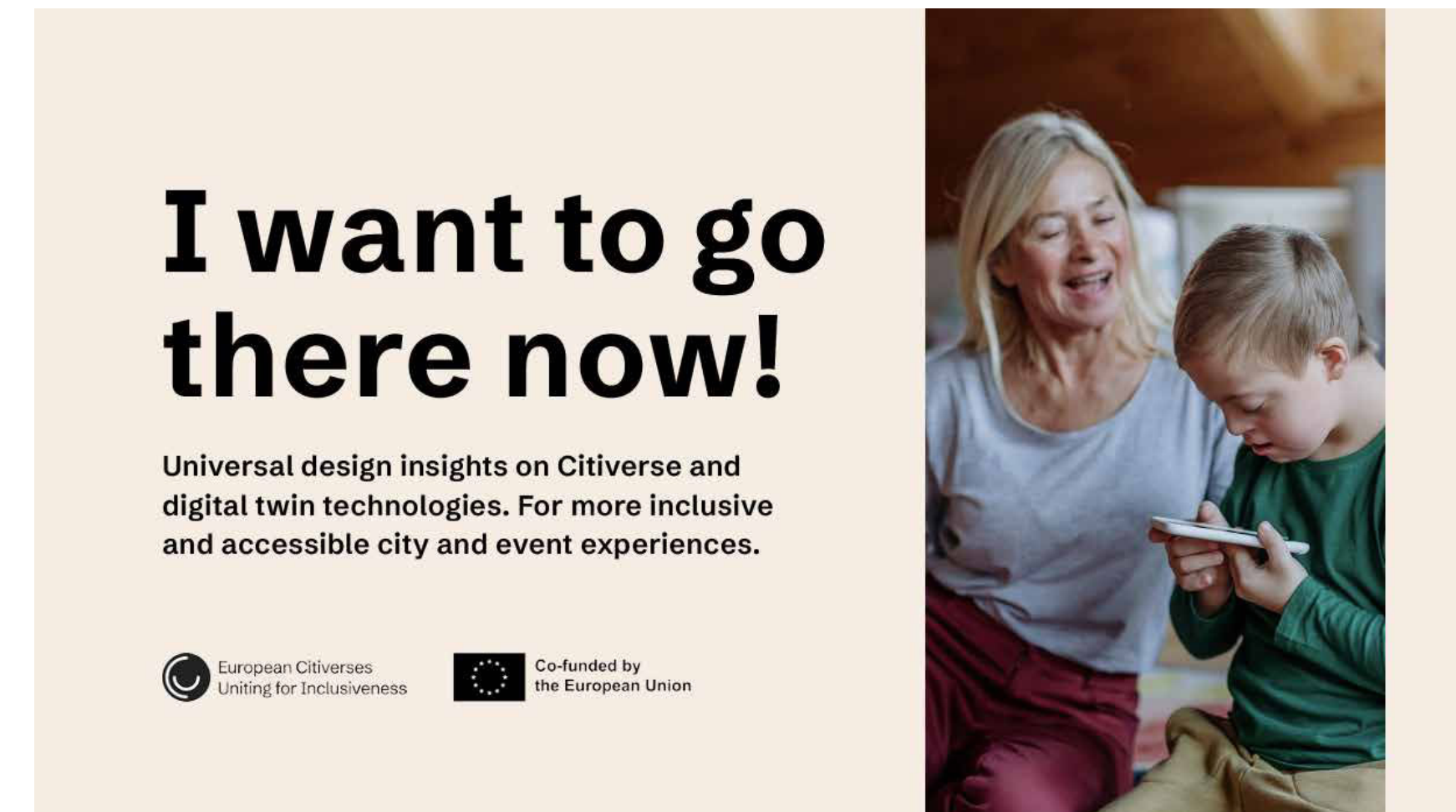
# Want to learn more?

European Citiverses Uniting for Inclusiveness is an EU-funded project running until 2027. Alongside the project's core development work, this report presents an additional, exploratory track based on a series of "what if" workshops. In parallel, the project is advancing an iterative phase of concept development and prototyping, exploring how emerging technologies can support more inclusive city and event experiences.

The project takes youth with disabilities as a starting point, using their needs and perspectives to guide development. From this foundation, solutions are explored and tested with a broader range of users, including families, adults with diverse abilities and experiences, and the wider public - with the aim of reducing barriers to participation and ensuring real user value.

Follow the project's journey and get updates by visiting our website and subscribing to the newsletter: <https://cu-project.eu>

Co-funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.



Want to read more about the project? The report "I Want to Go There Now!" summarizes the key insights from the initial research phase. Find it at: [cu-project.eu](https://cu-project.eu)

# Contact

To learn more about universal design, this insights report, or access in-depth research materials, contact [www.ournormal.org](http://www.ournormal.org).

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## Follow the project on social media:

LinkedIn: [linkedin.com/company/european-citiverses-uniting-for-inclusiveness/](https://www.linkedin.com/company/european-citiverses-uniting-for-inclusiveness/)

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