AI + Geospatial Models for Engagement and Performance Measures in the Pedagogy of Sustainable Planning Studio

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Abstract
The emergence of the 15-minute city concept is linked to the climate crisis. Research on streamlining decisions in the planning practice to respond to this crisis shows that technology integration guides better decisions and strengthens citizen engagement. This paper focuses on two questions; will the use of AI tools help make public engagement truly meaningful? and how can technology platforms in urban planning curriculum enhance students' experience? I utilized an Artificial Intelligence tool to examine engagement and integrated mixed reality to develop neighbourhood scenario models in an undergraduate studio. Feedback from student assessment and peer's input yielded an effective engagement, appreciation for technology, geospatial platforms, and role play tools. Quantitative measures using campus standard surveys were utilized to measure the impact of the revised curriculum.

Key Words: AI, GIS, XR, Immersive Environment, Planning Studio

Cutting-edge Technologies & Urban Planning Practice

Research on the planning practice and automation shows that integration of cutting-edge technologies can inform decision making, enhance resource allocation, predict trends, and mobilize citizen engagement (Ghisleni, 2024). With the rapid economic growth and urbanization, cities are challenged with a myriad of problems (i.e. traffic congestion, noise, air and water pollution). City officials are rethinking their decision process through various scenario simulation and spatiotemporal analysis that examines socio-spatial inequalities and prepares for sustainable urban development (Wang et al., 2021). Both the planning education and practice have encountered an enormous transformation through integrating technology at various levels and scopes in the pedagogy and processing and implementation of projects. In recent years, researchers explored the attributes defining the ideal plans that correspond to the "15-minute city" concept by training an automated system using previous human-designed projects and factors that are predictive of positive outcomes (Ghisleni, 2024). Urban planning practice is also seeing revolutionary changes by relying on algorithms, automation, and artificial intelligence (AI) to predict scenarios and decisions (Sanchez, 2025). Curriculum revisions in planning schools now aim to integrate structured methodology for aligning academic goals, learning outcomes, and accreditation with the recent trends and technology to advance the planning profession.

In this paper, I review a case study for integrating multiple technology platforms including AI speech recognition tool and geospatial modelling for redevelopment of four neighbourhoods (Cherry Creek, Highland, Lincoln Park, and South Park Hill) in Denver Colorado. The case study is part of a core undergraduate planning studio in the University of Colorado Boulder.

AI is defined by the Council of Europe Framework Convention on AI and Human Rights, Democracy and the Rule of Law as:

"a machine-based system that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations or decisions that may influence physical or virtual environments. Different artificial intelligence systems vary in their levels of autonomy and adaptiveness after deployment." (European Center for Not-for-Profit Law, 2024)

With the rising concerns about cities growth, climate crises, and migration, a shift in urban planning is growing by adopting automation and AI in land use and transportation planning. According to a study by Zeng et al. (2023), this shift is driven by the unreliable and intuition of human capacity in optimizing multiple metrics in large datasets. For instance, to estimate the optimal distance between various services and residential areas in the 15-minute city concept, AI or geospatial tools for processing large datasets is utilized to create visuals to help in decision making. These visual and quantifiable metrics are processed by computational AI tools, which are trained based on millions of previous trials (Zeng et al., 2023). Another example is developed by a team in Tsinghua University in China, where urban planners and scientists developed an AI tool that surpassed the performance of humans. The research team utilized attributes of the 15-minute city concept. In their automation approach, the team trained the system using variables described as positive characteristics of the city in formerly human-developed projects (i.e. parks, bike lanes, and entertainment spaces). The system, which was tested in a 3x3 grid, revealed that its project outputs have the same -or more- quality of those created by planning experts, while saving an ample time in processing (Ghisleni, 2024).

In an article on the popular planning platform, Planetizen, Sanchez (2025) discussed some of the fundamentals of planning practices that benefit from AI integration in their workflow. These include:

1) As planning relies on extensive data analysis, AI tools enhance planners' ability to process large datasets and help with output interpretation.
2) AI is not a substitute for human judgment. Since planners are taking a critical role in shaping AI's impact, the power of integrating AI workflows is to identify unseen patterns, and evaluate complex scenarios, and thus support planners' decisions.
3) Transformation of planning practice started when hand-drawn maps switched to Geographic Information Systems (GIS) generated maps, or when windshield surveys transitioned to computer vision. As such, AI is a continuation evolution of the practice, which offers a toolkit for planners to extend their capabilities as well as their possibilities.
4)Skillsets to run and customize AI tool are attainable for planners without prior knowledge in coding or a degree in computer science.

With its capabilities and versatility, AI can assist local governments in responding to the impact of climate change. Using predictive modelling, risk assessment, and early warning systems enable planners to address extreme weather events through resilient planning (Ghisleni, 2024). As an example, Google's Tree Canopy tool, powered by AI and shown in Figure 1 helps to mitigate the impact of extreme heat waves. As an integrative part of Google's Environmental Insights Explorer (EIE), the tool combines AI with aerial images of cities. AI literacy is soon becoming essential knowledge for practitioners and researchers alike. Thus, developing AI knowledge as a primary component of planning curriculum is now equal to understanding budgets, zoning, land use, and citizen engagement. AI Knowledge helps planners to be key players in decisions about how AI is used and regulated. If they did not participate in regulating such use, their voices and insights could be excluded (Sanches, 2025).

Figure 1: Google's EIE AI Tree Canopy Tool applied on the City of Los Angeles, California
Source: https://insights.sustainability.google/places/ChIJE9on3F3HwoAR9AhGJW_fL-I

Climate Crisis and the Emergence of the 15-Minute City

History of City Planning

The city planning vision that Le Corbusier's approach created was centred on rationalizing and organizing urban space to improve residents' quality of life. Stimmed from a functionalist and rationalist zoning approach, his vision prioritized the efficiency and separation of land use activities, while maintaining modern aesthetics and orderly building forms (Moreno, 2024).

In the 1960th, the construction industry in the United States underwent a boast in expansion and transformation. Accompanied by considerable economic growth and cities transformation, this decade resulted in a massive scale of new buildings construction and expressways that traversed the city's urban fabric. As a result, the decades that followed 1960s suffered from damaged urban landscape and fragmentation and segregation of the neighbourhoods that were encroached by the multilane expressways. Physical barriers between communities and increasing air and noise pollution were the utmost anticipated result of such damage. Movements to urbanize and reconnect neighbourhoods arose in the following decades including new urbanism, which responded to the need to address proximity, community cohesion, and the traditional activities of city life (i.e. local markets, walkability, and urban nature), (Moreno, 2024).

City's Urbanization and Climate Crisis

As a result of the fragmentation of the city structure in the 1960s and 1970s, movements to transform the city into a city of proximity, where basic goods and services are available at short distances within 15 minutes of one's residence, evolved. The new approach envisioned the city as an urban environment that would not only eliminate reliance on traffic, but also encourages a daily happy lifestyle (Moreno, 2024). In 2015, the Paris agreement recognized this vision and supported actions to invest in the built environment of cities to reduce greenhouse gas emissions and strengthen society's resilience. Using nationally determined contributions (NDCs), the agreement tailors its action plans to reduce greenhouse gas emissions and adapt to climate change for each member city. The 15-minute city concept developed by Moreno (2024), which aligns urban growth and city plans with the anticipated response to climate crisis, emphasized promoting more frequent and meaningful social interactions through prioritizing human interactions and social networks traffic jams. Municipalities that adopted the 15-minute city concept promote cleaner, more renewable energy sources. They support the 15-minute city's holistic approach through creating more sustainable, resilient, and liveable cities for present and future generations. This is attained through electrifying the building sector and infrastructure by relying on sustainable energy systems and the use of electric or hydrogen-powered public transportation. This concept also aspires to create a more balanced infrastructure, where uses are harmoniously integrated in areas where residents can live, work, play, and connect easily. Adopting a land use system -comprising mixed-use neighbourhoods- is essential for executing this concept and to ensure adequate living spaces that support community interaction, strengthen social cohesion, and promote a better quality of life (Moreno, 2024). Inspired by the matrix developed by Professor Muhammad Yunus as well as premises of sustainable development goals (SDGs); this concept in broad and open, while focusing on an array of detailed plans to improve the quality of life in towns and cities.

While addressing proximity, liveable spaces, and community cohesion, the 15-minute city, shown in Figure 2, is also centred on climate action. It supports the creation of a naturally linked system of ecological, economic, and social dimensions. The transition to this concept requires thoughtful changes and a commitment to transform one's lifestyle and the urban landscape of the cities and towns into a system of neighbourhoods that create living spaces that are attractive, welcoming, and conducive to interaction. This means designing neighbourhoods where the use of public spaces for cultural, economic, and social activities, as well as the relocation of local shops and services are intermingled. Moreno (2024) also re-envisioned a 30-minute territory concept for medium and sparsely populated areas (Moreno, 2024).

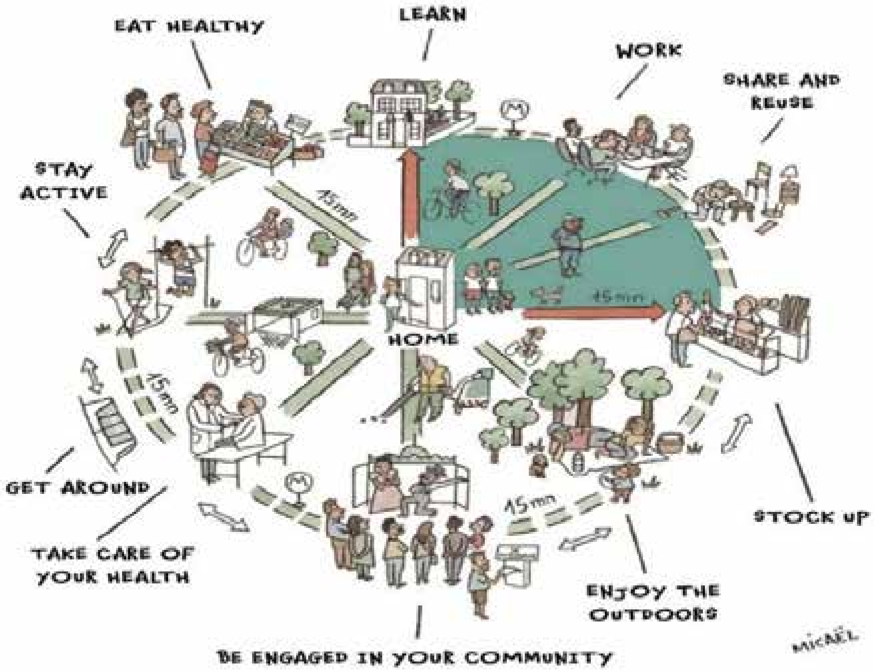

Figure 2: The 15-minute city Paris
Source: Moreno (2024)

Rethinking The Sustainable Planning Curriculum

Transformation of urban planning training for undergraduate students using advanced technology for planning scenarios and placemaking helps prepare students for the job market and be ready for the shift in planning practice discusses in Sanchez's (2025) article. A revised design for the planning curriculum helps to equip students with a mix of skills including technological know-how to tackle complex and technically challenging problems that require processing large datasets (i.e. climate adaptation, resilient planning, zoning reform). Continuous improvement of our pedagogical approaches in the 21st century is a necessity not a luxury. I see a value in dynamic instruction tools that regularly change and adapt to align with the needs of decisions and support changes in the planning practice. Designing innovative pedagogies helps to tailor technology platforms to student capability and align digital applications with the project and course needs. Instructional methods also need to be enhanced through integrating methods that best reach students of diverse backgrounds and ability, so we can prepare our students for the future. At the University of Colorado Boulder, Arts and Sciences Support of Education Through Technology (ASSETT) program provides support for integrating technology with pedagogy to promote impactful learning for all faculty. Through a two-semester workshops and reflection meetings, the program helps faculty to engage in a discourse with fellow faculty members from other disciplines and coaches to address the best practices and lessons learned from technology integration into instructional methods. It helps to emphasize the importance of continuous improvement of studio instructions, enhance active learning, and infuse technology where it could best align with the scope of work and the learning outcomes.

After completing this program, a proposal for instructional revision is proposed and tested in course instruction or a program of study.

Considerations and Risks of AI Adoption

Although AI tools might steer a fast pace of data processing and lead to radical efficiencies and deeper connections with the public, one must be aware that these tools need to be responsibly adopted. Concerns arose among practitioners on the use of AI and thus, the leading international corporation, Deloitte (2025), addressed the following considerations and risks, shown in Figure 3, related to the best practices in the adoption of AI-assisted outreach and engagement:

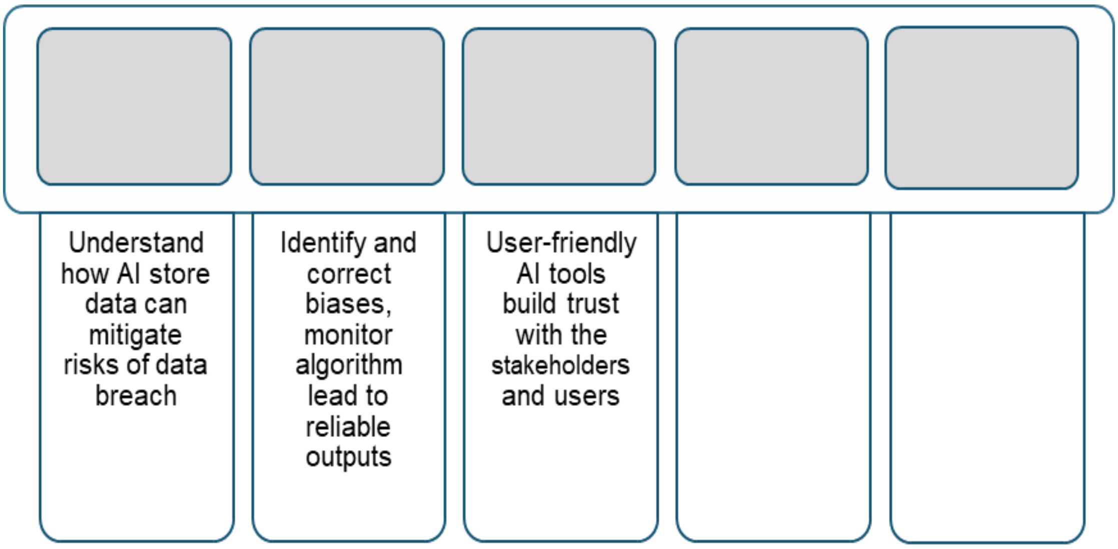

Figure 3: Deloitte's key considerations and risks for AI adoption in outreach and engagement.

Technology Integration in Sustainable Planning Studio
In the academic year 2024/2025, the program helped to support the revised course instructions for an undergraduate planning studio that I led at the Program in Environmental Design. Carefully revised modules, shown in Table 1 and Figure 4, in partnership with two campus institutions, helped to advance course and project content, enhance student engagement, and equip students with technical and communications skills through hands-on learning and experimenting.

The optimal goal was to equip students with technical skills included focusing on geospatial tools and mapping and using different Geographic Information Systems apps and online tools for 2D, 3D mapping and data visualization apps for interactive data visualization (Esri, 2024). In this paper, I discuss the pedagogical innovations that included collaboration with the Immersive Media Lab, where students utilized VR/AR devices and the Sketchup Software (Trimble, 2024) to develop intervention models of the pre-post retrofit scenarios of Denver neighbourhoods. I also analyse the results of quantifiable use of an AI tool to measure a week-long Role-Play workshop series, led by students to emulate the roles of stakeholders and their -often- conflicting interests. This Co-Design CoBI AI tool was a collaboration with the campus Institute of Cognitive Science, which has tested the tool in different secondary education classrooms.

Table 1: Revised planning studio curriculum using advanced technology and AI tools.

Module	Tool	Weeks	Modality
Research on Denver neighbourhoods and planning reports	Policy analysis	Three	Individuals
Case study research	Reports review	One	Individuals
City & neighbourhood resilience	Environmental and sociodemographic analysis	One	Individuals
Experiential learning through role play	CoBI AI	One	Randomly assigned groups

Retrofit planning proposal	GIS Pro + StoryMap	Three	Self-assigned groups
Immersive environment for scenario modelling	XR devices Trimble Connect	Four	
Final development proposal	All tools	Two	

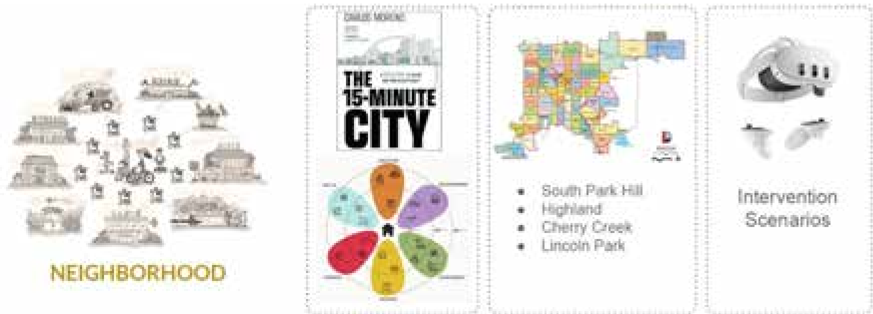

Figure 4: Revised planning studio; research and immersive environment integration

Denver as an Open Lab

Wang et al. (2021) examines research trends and the usefulness of urban scenario modelling. Their approach focused on global planning practices, urban planners, and politicians who should draw up suitable frameworks to implement sustainable urban development policies. Based on their systematic and quantitative review of 126 articles, they concluded that utilizing scenario modelling to help achieve sustainable development goals (SDGs).

In this undergraduate studio, the City of Denver, Colorado, US, was the open urban lab, where students were tasked with exploring, analysing, and redesigning four neighbourhoods (Cherry Creek, Highland, Lincoln Park, and South Park Hill) using the 15-minute city principles and local zoning and sustainability plans. In addition to site visits and visual analysis using site images for critical areas, students reviewed the existing zoning codes, newly adopted ordinances for minimizing parking requirement, and resiliency and climate action initiatives. In this studio 19 undergraduate students were introduced to sustainability and resilience measures, and contemporary urban design to examine urban growth as well as the development regulations on four prototype neighbourhoods. The neighbourhood characteristics entail different building typologies and density in order to propose a retrofit plan for each within the framework of the 15-minute neighbourhood concept. As an undergraduate studio, pedagogy challenges them to think through a multi-faceted and complex lens that intertwines environmental and equity measures.

After individual analysis of the City of Denver zoning, environmental and resiliency metrics, students were organized in four -randomly assigned- groups to undertake AI engagement workshops. The goal of the engagement module, shown in Table 1, was to engage students in a series of research activities, and to let them acquire research knowledge through engaging in small-group discussion and analysis. Students worked in groups of four to five students each to analyse each neighbourhood and its context.

AI for Community Engagement

The challenges of community engagement that the government sector faces are largely due to the need to establish trust with the populations they serve (Deloitte, 2025). Cities and public sector organizations don't have to re-invent the wheel – they can advance their existing outreach and engagement practices using AI platforms. According to Deloitte (2025) guidelines, AI offers new opportunities for public sector communicators at each step of the marketing and outreach process. AI-powered analytics can uncover behaviour patterns and preferences with precision in real-time, Generative AI (GenAI) tools can produce hundreds of tailored content options, and Machine Learning (ML) technologies can now make real-time data-driven decisions to maximize every dollar (Deloitte, 2025).

Hurley's (2024) article questions the ability of urban planners to use AI to support their public engagement work. Centred on AI for public engagement, the article discussed ways that planners have proposed or adopted AI for public engagement. These ideas include the utilization of tools such as Chat GPT, Claude, or Microsoft Bing, and include the following possibilities:

Writing Support Uses

• Edit text to convert planner terminologies to everyday language at a 6th grade reading level: as Hurley explained, planners and related professionals such as engineers, architects, and landscape architects have higher levels of education than the population at large. The jargons of each of these professions could be very challenging to be understood by the general public. This shorthand makes it easier and more accurate to talk amongst peers, but it can be a barrier when communicating with the public. It is also a challenge to write for a reading level lower than one's own. Hurley assures that AI is great at adjusting a short piece of text to a particular reading level.

• Expand the options to consider: Planners are often asked to give an overview of policy options for a particular problem or analyse a possible solution for pros and cons. Due to the broad scope of planning expertise; not all planners are qualified to provide information in an area where they are not an expert. Even if the planner is familiar with the topic, it may require further research to ensure an accurate response. In situations like this, AI can help furnish some options for planners or provide a few examples to support their policy (Hurley, 2024).

• Convert one form of writing into another: Plans often have text to describe the graphic and analysis content to the public. In many occasions, AI could help create the first draft of the goals based on the vision or to support the intended goals (Hurley. 2024).

Meeting Support Uses

• Convert handwritten notes to text: It is very common for planning practitioners to use markers and flip charts for meeting notes. Visibility of the notes helps keep people focused, the messiness of the handwriting reinforces the idea that this is a work in progress and change is possible. I tis -however- time consuming to transcribe all those handwritten notes into a word document or presentation slides. AI could help with the transcribing task.

• Develop slides from text: despite lack of complete accuracy when putting together the text for a presentation and importing into an AI tool, this could be a first draft and save planners time to create the full presentation. With minor editing, the presentation could be enhanced in accuracy and visual content.

• Provide ideas for meeting activities or a draft agenda to meet meeting goals: AI tools could help planners and facilitators develop scenario of activities that could take place during the meeting to help achieve the goals for that meeting.

The Power of Role Play & AI

The terms "role play" and "simulation" are sometimes used interchangeably. yet, the two have some differences. While simulations can incorporate role play, leading to the term "role-playing simulation", they often involve instances where each participant may not have a prominent role. By contrast, in a role play exercise, the focus is more on the interaction between participants (or the characters students emulate), hence each participant role is a primary (UNSW, 2025). Role play is a form of experiential learning (Russell & Shepherd, 2010). In a role play scenario, students take on assigned roles and act out those roles through a scripted play. The role play can be carried out one-to-one (individual role play) or as a group role play with each member in the group taking on a role/character. In the script provided by instructors, roles and rules for the role play exercise are clearly defined to help students prepare for effective engagement and enhance the quality of the output. Role plays can provide very powerful learning experiences for students by immersing them in simulated real-world situations, where they act out a particular role/character in a safe -and often fun- environment.

As today's global education policies address the benefits of problem-based, and active learning models, which further reflects curricula contents for achieving twenty-first century skills (Darling-Hammond, 2006; Vincent-Lancrin et al., 2014). Role play and simulation are becoming critical in enhancing student engagement and immersing them in an environment for real problem-solving scenarios. Role plays and simulations function as learning tools for groups or individuals in an online or in-person environment. They shift the power and autonomy in teaching and learning processes between students and educators, as students learn through their explorations and the viewpoints of the character or personality they are emulating in the environment (Aura et al., 2023). As a powerful student-centred space, role plays can enable learner-oriented assessment, where the design of the task is created for active student learning. Students are actively involved in both self- and peer-assessment, where they both give and receive feedback, and thus feel they contributed to the teaching pedagogy. In role-play exercise, students adopt different characters and work through a given scenario together, interacting in their assumed roles. Role-play is particularly effective for learning about complex social/human systems (Russell & Shepherd, 2010).

In this studio and in collaboration with the leadership team in the Institute of Cognitive Science at the University of Colorado Boulder, I was able to examine the NSF-funded tool Community Building [CoBI] tool that utilizes Artificial Intelligence [AI] Automated Speech Recognition [ASR]. The tool is designed to help researchers measure effective engagement through capturing and analysing the conversation during the engagement workshops. I conducted a role play in a well-structured one-week module that focused on enhancing student collaboration through emulating public participation in planning and design process. The activities encompassed in this week enabled students to fully represent a unique stakeholder's persona, where they can address the stakeholder's interests and concerns through addressing the SWOT analysis for each neighbourhood and the neighbourhoods' re-envisioning ideas. The activities throughout the week included workshops that took place during studio meeting time on Monday and Wednesday. The output of which were reconfigured and presented -using a visual and analytical collage of manually rendered maps and infographics and presented in class on Friday.

Utilizing an active learning jigsaw approach, students from each neighbourhood group I randomly assigned a different role, and students from all groups with similar roles formed a new group to represent matching stakeholders' interest. The Jigsaw active learning technique ensured that a person from each neighbourhood will be participating with three new students to envision the neighbourhood plan from a specific interest perspective that represents the stakeholder they were assigned:

• Environmental specialists (advocacy)
• Residents (Social + Cultural)
• Real estate (developers)
• City planners/public officials (Zoning/Land use)

The workshops were organized to engage the newly formed groups of stakeholder's mutual interests in a sequence of short exercises to conduct a Strengths, Weaknesses, Opportunities, and Threats [SWOT] Analysis and develop a visioning plan for the four assigned neighbourhoods. The short exercises were designed to empower students to take actions and address the -often-conflicting- stakeholder's interests. SWOT analysis workshops for each of the four neighbourhoods assigned to student groups. Figure 5 shows the workshop and its outputs including an engagement tree that measures effective use of languages associated with each attribute during the workshop, a comparison radar that uses pie-wedges to compare the three attributes of the engagement session (being committed to community, moving thinking forward, and being respectful) and measures and examples of thinking critically using specific algorithm-based wording from students speeches and the level of confidence in this analysis.

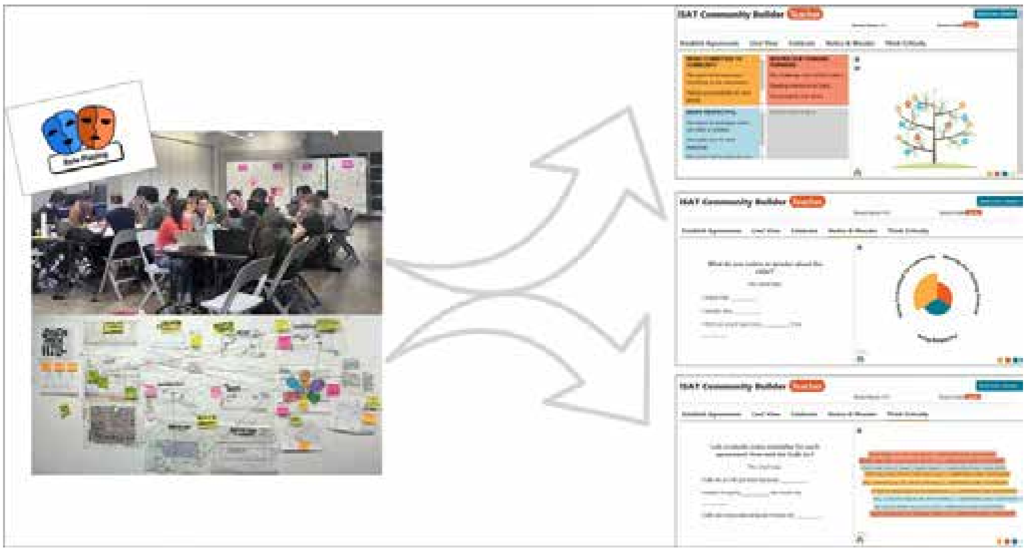

Figure 5: Role play workshops using CoBI AI tool and output [1. engagement tree (top), 2. a comparation radar (middle), and 3. examples of statistical confidence (bottom)].

Following the one-week workshops, students developed a preliminary and a final plan for sustainable neighbourhood's and analysed proximity of basic services using geospatial GIS models and the 15-minute city concept. Part of their analysis was proceeded with lab tutorial, where they attained hands-on instructions on using GIS for proximity analysis and data clipping and reporting (see Figure 6 for an example of students work). A final neighbourhood model was developed using Trimble Sketchup and a revised model was cast on Trimble Connect and navigated through an immersive environment using mixed-reality (XR) device.

Figure 6 shows the outputs of the geospatial scenario models created in GIS by Cherry Creek student team, which was later then integrated into Trimble Connect and visualized by the XR headset.

Discussion

There are multiple technological platforms that can be used to provide decision support to urban planners to obtain useful information and provide effective support (Anthony et. al., 2006, and Ning-rui and Yuan, 2005). Planning Support System (PSS) was proposed by the American scholar B. Harris in 1989. The system has been developed primarily to support planning processes (Geertman, 2002), based on the assumption that an increase in access to relevant information will lead to a greater number of alternative scenarios and, thus, a betterinformed public debate (Shiffer, 1995; Gerrit and Ligtenberg, 2007). Harris's proposed idea was to combine information technology with urban planning methods to provide decision-making assistance during every step of the planning process (Mao et al., 2008). PSS not only covers the ultimate act of decision making, but also the discovery, analysis, and evaluation stages of planning; it has been applied to urban-rural planning for the past 20 years. DSS also furnishes a process for analysing problems, establishing models, and simulating decision-making alternatives and results, all of which help improve decisions. The most significant area where spatial planning can be used in planning is to integrate it into decision making on various different scales. In the Netherlands the National Environmental Policy Plan (Ministry of VROM, 2001) emphasized the responsibility local authorities have for creating a sustainable environment, stressing that spatial planning at the local level has a direct impact on both urban and rural environments. This requires an area-specific planning approach at the local level.

The benefits of incorporating interactive forms of decision-making using GIS applications have developed beyond an operational support system and into a strategic decision-making support system (Grothe, 1994, and Cornelius and Medyckyj-Scott, 1991). AI-powered tools can facilitate communication between urban planners and the community. Applications of virtual reality (VR) or augmented reality (AR) can assist residents in visualizing proposed changes and provide feedback, promoting a more participatory planning process (Ghisleni, 2024). Comparing the results of engagement effectiveness will inform future pedagogies and assignment structure for next years. The results of student assessment, integration of AI and geospatial tools and other online environmental performance platforms utilized in this studio, serve as an opportunity to discuss and reimagine planning education as a critical change agent for enhancing student experience. Curriculum enhancement and partnerships with the Institute for Cognitive Science and the Immersive Media Lab helped to align faculty interests while advancing student experience and increasing their access to campus resources without adding any financial burden on their tuition and fees. Student evaluation is discussed in the conclusions section.

Conclusion and Recommendations

Planners are crucial contributors to the conversation on AI applications in urban planning practice and education. According to Sanchez (2025), planners have a long-term perspective, a commitment to public participation, and a thorough understanding of the intersection of policy, infrastructure, and daily life. These strengths are exactly what is needed to ensure that AI supports a sustainable and equitably built environment. Through a revised studio pedagogy using the capacities and support of University of Colorado's ASSETT program, I developed a curriculum for an undergraduate sophomore planning studio to respond to two primary questions. In the curriculum modules, I employed technology tools and geospatial platforms to support the learning objectives and to align student learning with the shift in the planning practice. Collaboration with two campus institutions yielded great success and supported student access to multiple technologies at no additional cost. The responses to these questions showed a positive and effective impact on students learning experience, measured through the campus administrative survey, peer-feedback, and unstructured observations of group performance.

Question 1: Will the use of AI tools help make public engagement truly meaningful? In the case study of this undergraduate -sophomore- studio, the students reported excitement and full autonomy of the engagement process including the decision making and their views of the SWOT elements of each neighbourhood. Role play exercise helped to maintain clarity of stakeholder's interest in each part of the exercise and students were able to immerse themselves in their assigned roles. One of the students' feedbacks is shown here:

" I enjoyed the stakeholder workshop and the different formats of the class periods."

Question 2: How can technology platforms in urban planning curriculum enhance students' experience? Since the studio integrated multiple platforms including Esri and Trimble products and XR device developed by Metaverse, it was challenging to measure the effective use of each tool or platform separately. However, unstructured observations showed that students were more committed to learning Esri products (ArcGIS Pro and StoryMap) than applying what they learned in the analysis of their neighbourhood. Some students utilized ArcGIS Pro to analyse proximity of goods and services to the residential areas in their assigned neighbourhood, while others utilized Adobe Illustrator to draw proximity buffers. Further tutorial sessions are needed to ensure that students will apply all tools. The most remarkable part of student interactions with technology was when they were introduced to AR/VR and XR as they started to navigate through their developed neighbourhood models. The following quote from students' feedback is related to technology use in this studio:

"The VR thing is so cool, I really do love it. Thanks for the great studio!"

Using in-class tutorials to train students on applying geospatial technology and AI tools in their projects is essential to ensure that students graduating can conduct neighbourhood proximity and flower of opportunity analyses. Students are also prepared to tackle real world problems related to mixed use and residential neighbourhoods. Future tools for assessing studio outcomes could be developed in the form of structured and systematic survey.

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