

Navigating uncertainty

Facilitating collective learning in an urban living lab through co-design with multiple stakeholders

Zac Woolfitt, Guido Stompff, Roos Gerritsma and Mirthe van den Hee

Abstract Urban living labs create collective learning environments in which students co-design with multiple stakeholders around societal challenges, often under conditions of uncertainty. While these collaborations are widely valued by students, educators and stakeholders, they can also generate discomfort due to their open-ended and relational nature. However, it remains relatively unexplored how living labs enable students to co-design with multiple stakeholders, and to navigate the changing circumstances and open-endedness of the process. In this paper we examined how an urban living lab supports students as they engage in collective learning and co-design with multiple stakeholders. We reflect on the practice of the last 10 years of Inholland Urban Leisure & Tourism Lab in Amsterdam Noord (ULT Lab). The methodology included interviewing students, stakeholders and lab staff and re-reading students' reflections. The resulting 5E framework highlights how five structured, relational activities (Explore, Engage, Envision, Experiment and Evaluate) can help students navigate uncertainty while maintaining meaningful stakeholder relationships. These insights provide practical guidance for educators designing urban living labs that aim to support co-design and collective learning.

Keywords urban living labs, multi-stakeholder collaboration, co-design, collective learning, uncertainty in learning

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Special issue

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Problem and context

If you had visited Amsterdam Noord in early December 2025, you may have stumbled upon a delightful night-market. Activities included video projections of local artists work, a children's dance performance, a Story Telling circle, and local food stalls funded by the council. Residents and students discussed how the added colour and storytelling helped to make this urban landscape feel safer and more connected. It was not a commercial endeavour but an engaging place activation to strengthen the community ties in Amsterdam Noord. This community feels under pressure due to rapid growth and gentrification. The market was co-designed, organised and delivered by Inholland students of the Urban Leisure and Tourism Lab (ULT Lab).

The Urban Leisure and Tourism Lab Amsterdam Noord

Based in Amsterdam Noord since 2016, the ULT Lab has been developing a valuable network of local stakeholders. Its focus is on Regenerative Tourism, placemaking and “creating ‘places for life’ rather than merely developing tourism sites” (Nieuwkoop & Dias, 2026, p. 7). The ULT Lab aims to contribute to the transitioning process of Noord, as a liveable and resilient neighbourhood. This aligns directly with the Inholland vision to contribute to a sustainable living environment and a resilient society (Inholland, n.d.). Inholland positions living labs as a means (not a goal) to examine complex problems. The ULT Lab team are modest and realistic about the potential for ‘solving’ wicked problems (Koens et al., 2024). The ULT Lab is accredited by the European Network of Living Labs (European Network of Living Labs, n.d.) and since 2020 has been “physically and socially embedded at the Buikslotermeerplein-area and its direct surroundings” (Gerritsma, 2025, p. 18). In January 2026, it was incorporated into the Participation-plan of the municipality (Gemeente Amsterdam, 2026).

Regenerative practices focus on building bridges through leisure and tourism (Urban Leisure & Tourism Lab, n.d.) and includes restoring culture, community and nature to create thriving places (Gerritsma, 2025). The ULT Lab organisational structure is depicted in table 1.

The problem

Each semester, a group of new students arrive at the ULT Lab. To be able to co-design for local challenges, they must interact within the complex and sensitive eco-system of established stakeholders. The students are combined Dutch and international from different disciplines. However, when they arrive, most students have limited local knowledge or understanding of this complex and multi-layered context. Nor do they have all the necessary tools or experience to engage within this community. The problem is to ensure that a relevant learning context is provided for the students, without disrupting or over-extracting the good will of the local network. This complex interaction requires continually facilitating and managing the sensitive learning interactions, while ensuring a positive collective learning experience for all.

This study aims to contribute to broader scientific and practical understanding of facilitating and deepening ‘student learning’ in the real-world context of living labs. Focusing on co-design, the research question is: *How does the ULT Lab facilitate students’ collective learning through co-design with stakeholders in uncertain contexts?*

ULT Lab pedagogy

The ULT Lab pedagogy uses ‘guided discovery’ where coaches support the process of self-discovery (Mayer, 2004). Students navigate the uncertain context while learning “to know what to do when they don’t know what to do” (Hattie & Donoghue, 2016, p. 3). In addition, ‘direct guidance’ (Kirschner et al., 2006) is provided by experts on specific subjects such as urban tourism or design thinking including co-design. This scaffolding during uncer-

Table 1 ULT Lab organisational structure

Students	Interdisciplinary, international and Dutch
Lab lead	Develops the research agenda (co-creating project challenges with key stakeholders)
Community builder	Develops and maintains local network (volunteers, local businesses, real estate, activist groups, SMEs, local council and tourism organizations)
Learning director	Structures learning processes
Learning coaches	Know local context, guide students in their interactions, group projects and learning journeys

Note. For this article, this group are referred to as ‘the Lab team’.

tainty allows plenty of room for self-regulated exploration in the real-world. Biesta’s three functions of learning – ‘subjectification’, ‘socialisation’, ‘qualification’ (Biesta, 2009) – are embedded into the learning objectives and holistic assessment process. Learning activities are constructively aligned and supported through formative feedback from peers and coaches. Pedagogical experts from Inholland recently updated the assessment protocol in 2025. As part of an interdisciplinary team, students are actively required to develop and share their ‘domain specific’ skills within the ULT Lab. Guest lectures and introductions from local partners provide insights to the local community. Students receive a list of volunteer opportunities and contribute to, and engage directly with, the community.

Experienced coaches who know the context of Amsterdam Noord are skilled at adjusting the education ‘on the go’, based on real-world circumstances. The Lab team iteratively refines this educational approach based on structured reflections each semester with students and partners. The textbook ‘Learning in a Living Lab’ (co-written with lab experts from Inholland and Artevelde), summarises the educational approach (van den Hee et al., 2024). The collaborative methods of co-design (Smeenk, 2023) and developing frameboards (Stompff, 2018) are central to the approach. Tailor-made tools have been developed, including the Place Exploration & Sense Making Tool (Gerritsma et al., 2024) and the Labs Loops for Life Model (Gerritsma, 2025).

Theoretical framework

This study explores how students at the ULT Lab learn collectively in an uncertain context through co-design with multiple stakeholders. Four interrelated bodies of literature are examined: (1) Navigating uncertainty, (2) Collective learning in real-world contexts, (3) Co-design as an educational practice, and (4) Shifting roles and stakeholder dynamics.

Navigating uncertainty

Higher education increasingly positions learning as preparation for complex and uncertain societal challenges rather than for predefined professional roles (den Brok, 2018). These challenges are characterised by uncertainty and ambiguity, but also by diverging stakeholder values and interests (Veltman, 2024). Learning environments that expose students to real-world complexity are argued to support the development of adaptive, reflexive, and collaborative competencies (Stompff et al., 2022), and a mindset of ‘knowing what to do when you don’t know what to do’ (Hattie & Donoghue, 2016; van den Hee et al., 2024). Learning that includes real-world connections, social encounters, or productive challenges can help students experience learning as meaningful (Blezer et al., 2024; Zeivots et al., 2024).

Drawing on Biesta’s distinction between qualification, socialisation, and subjectification, learning in real-world contexts requires explicit reflection on educational purpose (2009). In real-world contexts, the value of education lies in students learning to become familiar with ambiguity, to negotiate meaning, and to position themselves ethically and professionally. As Biesta notes ‘Our hope is that, at some point, students may turn back to us and tell us that what we tried to give them was actually quite helpful, meaningful, even if, initially, it was difficult to receive’ (Biesta, 2020, p. 104). An uncertain context can be a pedagogical condition through which meaning emerges, particularly when learning unfolds in interaction with others (Bohm, 2024).

Collective learning in real-world contexts

Learning in urban and societal contexts is increasingly understood as a collective and relational process. Collaborative learning is about working as a team toward a common goal by connecting diverse practices and perspectives and by reconciling differences and contradictions (Bakker & Akkerman, 2019). To describe how this works, Van Onselen and colleagues (2026) conceptualized ‘collective learning’ as “an ongoing process through which people learn and interrelate their actions with those of others to achieve shared and individual goals” (p. 15). Empirical studies of educational labs support this view (Holmén et al., 2021; van den Berg et al., 2019). Blezer and colleagues (2024) studied an urban living lab in Heerlen and conceptualized learning as belonging, becoming, experiencing, and doing, resulting in meaningful experiences and personal and professional growth. Learning outcomes can go beyond deliverables and assessment, and include personal identity formation, relational competence, and situated understanding.

At the same time, the literature cautions against overstating the societal problem-solving capacity of labs. Framing complex challenges as solvable problems can lead to frustration and solutionism (Stompff et al., 2024). Koens et al. (2024) argue that greater modesty is required when discussing impact, positioning labs as spaces for exploration and learning rather than instruments for resolving wicked problems. This critique is essential for understanding collective learning as a process rather than an outcome.

Co-design as an educational practice

Simon and colleagues (2025) raised critical questions regarding how, and what, students actually learn in living labs, and how labs contribute to society from an educational position. They argue that interactions between the design process, the organisation of the process and what is delivered needs to ensure that lab methodology is based on solid educational principles.

Co-design is an important tool for collective learning (Holmén et al., 2021; van der Wee et al., 2024). What remains underexplored is how students are prepared for the co-design process, when operating in real-world conditions of uncertainty, and how educational structures support both students and stakeholders in sustaining meaningful engagement over time. Co-design is increasingly positioned as a core practice in collaborative learning environments. O'Donnell and colleagues (2025) define co-design as an integrative participatory process that incorporates reflexivity, creativity, and diverse stakeholder knowledge to navigate complex adaptive systems. Co-design offers students opportunities to engage with difference, negotiate values, and iteratively shape emerging ideas.

However, co-design is neither neutral nor automatically meaningful since power imbalances, conflicting interests, and unclear expectations can complicate collaboration (Horn, 2023). Practical tools such as the Co-Design Canvas have been developed to support transparency, to reveal tensions, clarify roles, and create shared understanding in such processes (Smeenk, 2023).

Shifting roles and stakeholder dynamics

Learning in multi-stakeholder urban contexts involves fluid relationships and a shift in roles and responsibilities. Stakeholders are no longer distant clients but partners, co-designers, or users (Tercanli & Jongbloed, 2022). Students adopt more autonomous and leadership-oriented roles (van den Heuvel et al., 2021), while educators move from instructors to coaches and facilitators (van der Wee et al., 2024). Learning emerges from negotiated relationships rather than predefined hierarchies (Bhatta et al., 2025; Bohm, 2024).

These shifting roles break from traditional education, and require trust, continuity, and shared meaning-making. Gerritsma's Labs Loops for Life Model (2025) (Figure 1), developed in the context of the ULT Lab and PD-trajectory, conceptualises the iterative and regenerative processes. Relevant conditions needed for a living lab setting include infrastructure, trust-building, network growth and repeated interventions. The Loops model offers a situated theoretical way to understand how learning journeys unfold over time in the context of a living lab.

Recent literature offers strong conceptual grounding for collective learning and co-design in uncertain contexts but provides limited empirical insight into how these elements are operationalised within a single educational lab (Knickel et al., 2023; Konstantinidis et al., 2021).

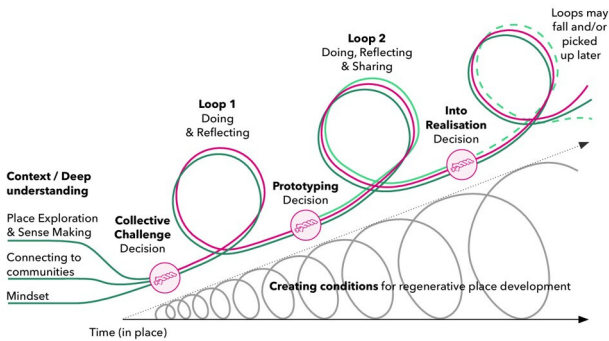


Figure 1 Lab Loops of Learning Model (Gerritsma, 2025)

Methodology

Research design: Single case study

The current study takes place under a larger research project which explores the next iteration of Inholland living labs, focused on Research through Design (RtD) (Gaver, 2012; Stompff et al., 2022; Zimmerman et al., 2010). RtD no longer considers research and design activities as separate activities, instead design output and process are fundamentally part of the research and implies ongoing improvements.

This paper explores student learning in labs, guided by the research question: How does the ULT Lab facilitate students’ collective learning through co-design with stakeholders in uncertain contexts? A single case study, with multiple units of analysis, is justified when a case serves a revelatory purpose (Yin, 2018: p. 50). The embedded units of analysis are students, staff, and external stakeholders and qualitative data was collected during two semesters in 2025 (see Table 2).

In relation to students, semi-structured interviews were held, based on insights derived from analysis of prior student reflections and evaluations. Also, data was collected from the two semesters, as all participating students completed reflective reports and gave peer feedback. Only student work that referred to ‘stakeholder interactions’ was included in the analysis. Four students volunteered for a group interview.

Data collection with staff and external stakeholders of the ULT Lab was less extensive and concerned semi-structured interviews, based on their availability. All interviews were audio recorded or documented through notes, transcribed verbatim and all data were anonymized.

Table 2 Overview of the participants (role and number) and the qualitative data sources

Unit of analysis	Qualitative data sources	Number of participants
Students	Semi structured interview (SSI)	4
	Reflective reports	30
	Peer feedback reports	17
	Reflections on volunteer work	15
External partners & stakeholders	Semi structured interview (SSI)	10
Inholland lab staff and team leads	Semi structured interview (SSI)	11

Data analysis

The data of the student reflections and semi-structured interviews were coded through two rounds of inductive, thematic analysis (Braun & Clarke, 2006). Intersubjective themes were established in three steps. First, the data was analysed by the four authors separately from each other and resulted in individual insights. Second, several (online) sessions were held to share, compare and discuss the individual insights. Third, these insights were then combined, clustered and labelled into seven preliminary textual themes: Discover (support students to learn about context and stakeholders); Engage (support students to engage with stakeholders), Ideate (help students to create novel ideas); Imagine (invite students to express ideas), Prototype (encourage students to make functional prototypes), Test (facilitate students to test prototypes) and Reflect (help students to reflect on outcomes and process).

Once preliminary themes were established, we strived for a visual framework that relates individual themes into a meaningful and comprehensive whole for others, but how? Two sessions were held to discuss possible frameworks (see Figure 2), alongside both known and new frameworks, until we found an optimal one:

- (1) *Climbs*: Students progress in climbs and in the climbs specific themes are addressed. For example, ‘Explore’ mostly concerns Climb 1. Yet it quickly became clear that at least four themes are relevant for every climb: climbs hardly help to clarify the findings.
- (2) *Coaching Squiggle*: A well-known model in design thinking is the Design Squiggle (Newman, n.d.). It depicts the messy process to reach certainty when at first everything is unclear. Lab Coaches need to offer clear guidance at first and challenge students’ certainty at the end, leading to our ‘Coaching Squiggle’. Yet despite its idiosyncratic character, it was dismissed as it does not offer a framework to include all the themes.
- (3) *Lab Loops of Learning Model*: This model of ULT Lab (see also Figure 1) concerns not just student-learning but also of researchers, staff and partners. Although it

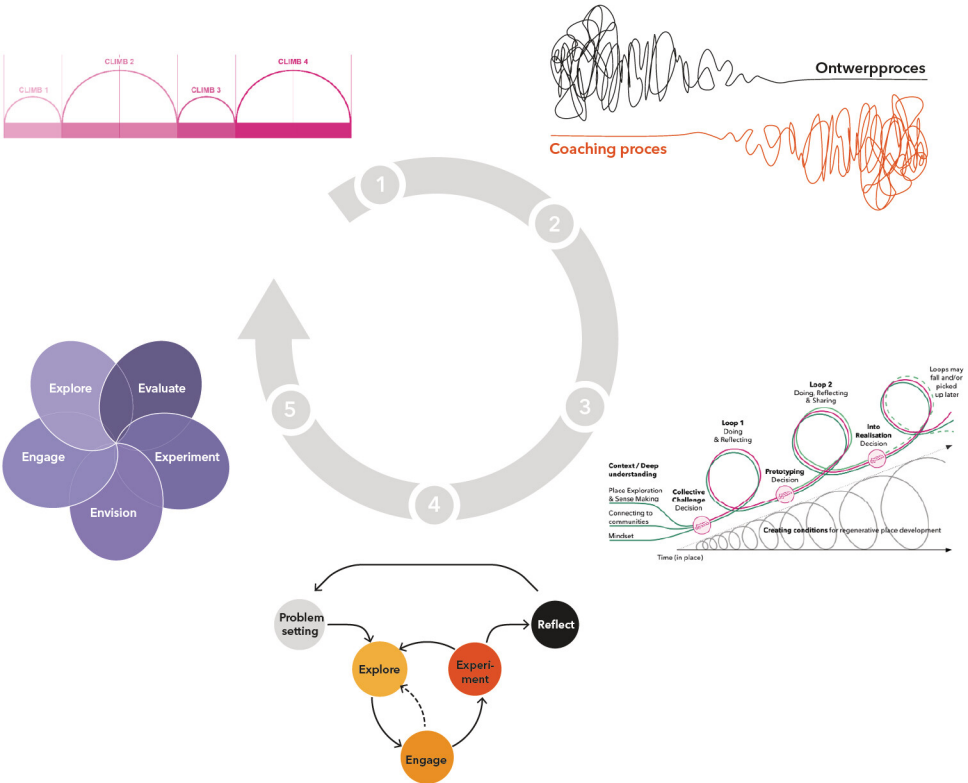


Figure 2 Intermediary steps to develop the framework

- could accommodate all themes, it just becomes more complex and needs extensive explanation.
- (4) *Activity Loops*: Focusing on activities, we realized that in all climbs students must Engage, Explore, Prototype and Test. To organise themes, an activity-based framework was developed whereby we combined Prototype and Test, as these activities cannot be separated. (Engage, Explore and Experiment). Even while being cyclic, it suggests a specific order we do not intend to communicate.
 - (5) *5E-model*: Nevertheless, the three E's stuck. We reviewed the themes again, combined two other closely related themes (Ideate + Imagine = Envision) and settled on five E-themes. The last question to be answered was: is there a natural order? We settled on the order discussed below.

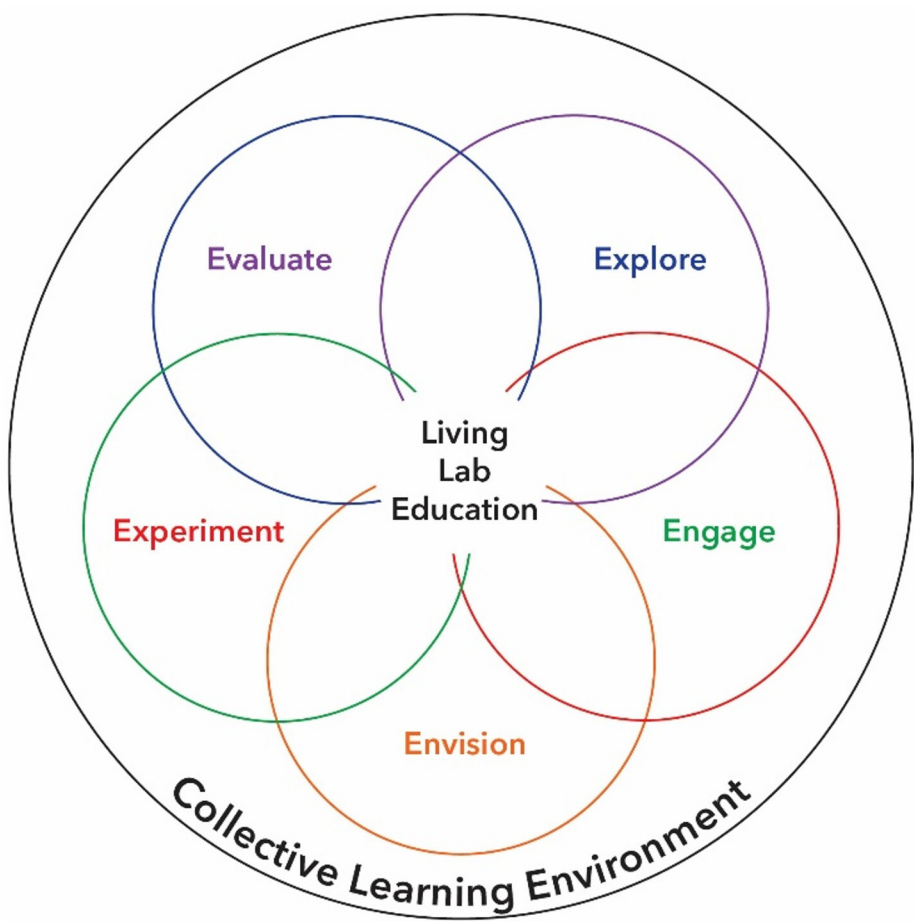


Figure 3 Five E-model of urban living lab education

Results

The research question was: How does the ULT Lab Amsterdam Noord facilitate students’ collective learning while co-designing with stakeholders in uncertain contexts?

We identified five relational activities that fall within collective learning. They reflect the learning experience and process of students in the ULT Lab, which needs structural pedagogical support: Explore, Engage, Envision, Experiment and Evaluate. This order starts with Explore and continues with iterative loops through Engage, Envision, Experiment and Evaluate. The research results are presented under these categories.

Explore

The Explore relational activity refers to place-based learning and developing an understanding of the local, social, cultural, and spatial context before intervention. This concerns students' first engagement with Amsterdam Noord and can be described as knowing the Story of Place with a regenerative mindset (Gerritsma, 2025). Results showed a tension between students' ambition and their limited contextual knowledge. One student commented that you need to be "confident to meet different people, you need to be open and brave enough to interact" (Student9). Students were motivated to work on meaningful projects but their initial lack of (local) knowledge could slow down the collaboration and create friction with local partners. Stakeholders and the lab team explained how exploration requires time, presence, sensitivity, and structure to access local knowledge and networks. Respondents consistently described the ULT Lab as embedded in society rather than a detached experimental space. This required what is described as 'deep hanging out', understood as sustained presence that allows for trust-building and contextual understanding. "The living lab as a place in society, the importance of place-based work" (LabStaff1). Stakeholders noted that insufficient preparation led to repeated questions and frustration: "I noticed, you are having these fine projects. But I asked a few students, what do you know about Noord ... You need to prepare for an interview, research the area. Learn about it" (Stakeholder2). Without exploring, students risked designing for a place they barely knew. Exploration does not occur automatically and requires guidance and encouragement. One learning coach stated, "we also need to guide students a bit more, because we lose time when they simply do not know the environment" (LabStaff3). When such support is lacking, each cohort starts from scratch, placing strain on community relationships. Exploring functions as an individual learning process is a structural responsibility of the living lab.

Engage

The Engage relational activity refers to the development of relationships through increasing interaction with community members. Engagement unfolds in cycles, ranging from initial contact to sustained involvement, and emphasises consistency, trust, and reciprocity. A local stakeholder highlighted this need: "The people in Noord are very sceptical ... Consistency here is very important" (Stakeholder2). The findings showed that engagement goes beyond one-off encounters. Students engaged through structured and repeated presence, often via volunteering or contributing to local initiatives such as working at the local café, dance school, or vintage fashion boutique. While these activities may begin as course requirements, they often led to deeper connections, with some students continuing as volunteers or researchers after the course. As one coach explained, "'deep hanging out' is simply that you are there and stay there" (LabStaff1). Engagement must be actively facilitated, as students can be hesitant and community members sceptical due to previous short-term projects. The ULT Lab's existing network and reputation play a key role in lowering barriers to interaction. Deep engagement is

associated with visibility and regular participation, such as hosting evenings, helping with community meals, or collaborating with local artists. At the same time, stakeholders warned of engagement fatigue when continuity is lacking. Students reported that sustained engagement increased confidence and cultural understanding, making collective learning more embodied and meaningful. One student reflected: “While helping and sharing meals together, I got to know new people and quickly formed genuine connections. The atmosphere was warm, open, and welcoming, and I immediately felt part of the community” (Student₁₁). Overall, Engage highlights how meaningful community-based learning depends on reliability and time. Without continuity, this engagement risks being perceived as extractive and may damage fragile local relationships.

Envision

The Envision relational practice refers to the process of concept development and co-design, where students articulate future-oriented ideas aligned with community needs. It involves clarifying value propositions, making strategic choices, and communicating intentions to multiple stakeholders. The results showed that students often struggled to move from vague intentions to clearly articulated concepts, particularly in complex real-world contexts with sometimes conflicting stakeholder views. Envisioning is described as both an internal and external process. Internally, students hesitated to share ideas they perceive as unfinished. “Our group says: ‘We do not have our concept ready.’ Then I think we hold ourselves back as a group” (Student₇). Externally, stakeholders stressed the importance of confidence and clarity. Ideas must be locally rooted and beneficial. One stakeholder advised: “Your appearance, that is your project. If you go to meet them, be confident about your project ... Show them you will bring something for them” (Stakeholder₂). Students noted that early conversations with stakeholders often strengthened their projects. “The ULT Lab is all about co-creation ... One of the most important things I learned was what co-creation really means” (Student₁₃). Tools such as the co-design canvas and frameboards can be helpful but are secondary to dialogue. Envisioning is therefore iterative and relational rather than about producing a single outcome. “Stay in touch with the neighbourhood and what they want to see projected” (Stakeholder₇). Overall, Envision demonstrates that credibility, intention, and openness are more important than polished results. Clear communication of emerging ideas supports trust and collaborative learning.

Experiment

The Experiment relational practice refers to learning through action in real-world contexts, where ideas are tested, adapted, and sometimes fail. Students commented that they often find this phase particularly challenging since they are required to share unfinished ideas while accepting an uncertain outcome. In the ULT Lab, what appears to be a finished product may in fact function as the next prototype. Findings indicated

that learning intensifies when students moved from planning to practice. Unlike simulated assignments, experimentation involved real consequences and responsibility. One student expressed this clearly: “I get the feeling if it goes wrong ... it will be our fault” (Student7). The lab team and stakeholders described experimentation as necessary but precarious. Events and pilots increased visibility but also raised questions about ownership and communication. Misalignment caused tension, as illustrated when one stakeholder reacted during a prototyping session: “Hey, this is my area, at least you could have asked” (Stakeholder3).

Students described experimentation as emotionally demanding but highly educational. One student stated it involved “practical learning, that we actually go out, create something together with real people” (Student6). Despite fear of failure, and perceived unequal workloads amongst students, the students stated they valued producing real-world outcomes that were appreciated by the community. Another student said: “I noticed that I derived enjoyment from small social interactions, and that my self-confidence grew as I gained more experience and became more comfortable in this role” (Student10). The relational activity of Experiment shows that uncertainty can foster resilience, responsibility, and collaboration in students, while also requiring ongoing learning and adaptation from the lab team and stakeholders.

Evaluate

The Evaluate relational activity captures the iterative moments of reflection by students, staff, and stakeholders, on both intended, and unintended, outcomes. Evaluation occurs throughout the entire process and focuses on learning, visibility, and long-term value rather than simple success or failure. Stakeholders evaluated projects, such as the Night Market, positively, emphasising atmosphere, diversity, and student ownership. Continuity was seen as crucial. As one staff member noted: “From the perspective of visibility for the neighbourhood ... it is important that you don’t just pop in and out. Otherwise, it’s: ‘Oh, they’re here to take something again’” (LabStaff1). Evaluation also reveals tensions between the educational value of ‘not knowing’ and the need for reliability in partnerships. One partner reflected: “I think this is fantastic ... because this is the first time I’ve seen students not only develop something but also carry it out themselves” (Stakeholder8). Students evaluated their personal growth, including increased confidence, empathy, and cultural awareness. Evaluation becomes ongoing moments of meaning-making. One student reflected: “this experience has changed me personally: I have become more open, more social, and more curious about others” (Student5). Overall, the Evaluate relational activity shows the ULT Lab’s value lies in both tangible outcomes and sustained relationships. Reflection is shown to function as an ongoing feedback loop that supports continued learning, strengthens trust, and maintains social relevance.

Discussion and conclusions

In this paper, we examined how the educational approach of the Urban Leisure & Tourism Lab Amsterdam Noord enables students to navigate uncertainty while engaging in multi-stakeholder co-design. Urban living labs, such as the ULT Lab, have gained popularity in higher education over recent years, but it remains relatively unexplored how students are guided through the uncertainty that accompanies co-designing with multiple stakeholders (Simon et al., 2025; van den Heuvel et al., 2021). This study was guided by the following research question:

How does the ULT Lab Amsterdam Noord facilitate students' collective learning while co-designing with stakeholders in uncertain contexts?

Through a single case study with multiple units of analysis, we discovered five relational activities that reflect the teaching- and learning processes of students in the ULT Lab. This section draws conclusions from these results and discusses these conclusions in relation to educational theories and to prior research in living labs in higher education.

Explore. Participating students work on a real-life societal issue, related to the ULT Lab ('learning as experience', Blezer et al., 2024). For students to develop an understanding of the local, social, cultural and spatial context of the real-life issue, exploration is essential to be able to meaningfully collaborate with the community. Because each cohort needs to start from scratch with exploration, there is a risk of frustration and strain long-standing, important relations with stakeholders who may be asked the same questions each semester.

Engage. The importance and impact of the relations with local stakeholders is further emphasized in 'Engage'. The ULT Lab has invested years in building mutual trust and connections with many different partners in Amsterdam Noord. Engagement with the local community is facilitated by encouraging students to volunteer or participate in local initiatives through the lens of 'socialisation' ('learning as belonging'; 'learning as becoming', Blezer et al., 2024). According to Biesta (2009, p. 40), socialisation is "the many ways in which, through education, we become members of and part of particular social, cultural and political 'orders'". However, as the interviews with stakeholders show, with the short-term student projects, some partners remain sceptical of the impact. "Involving stakeholders in a living lab setting, without a clear understanding of what can and cannot be achieved, can lead to mismanaged expectations and participation fatigue" (Koens et al., 2024, p. 6). Consistency, authenticity and repeated engagement are essential.

Envision. This represents an iterative process in which students can move from vague ideas to community-aligned, co-designed concepts. Close communication and interaction with stakeholders, and methods and tools are used to help students move through the iterations. Still, where stakeholders expect confidence, clarity and local relevance, students find it difficult to present unfinished concepts or navigate the uncertainty of differing stakeholder perspectives, with no one single solution being 'correct'. Prior research

in educational living labs in Dutch higher education show a similar tension focusing either on students participating in user-driven innovation or on pedagogical aspects and learning outcomes (Griffioen & van Heijningen, 2023).

Experiment. While students may not feel ready to take the next step, ‘Experiment’ focuses on ‘learning by [as] doing’ (Blezer et al., 2024). Students must test their prototypes in real-life settings, such as the Night Market. Students described fear, pressure and tensions, but also confidence-building, joy and meaningful interactions (Stompff et al., 2022). Additionally, students experiment in co-creation with involved stakeholders. Careful facilitation and taking the time to get to know each other are essential for valuable co-creation, as prior research shows (van den Berg et al., 2019).

Evaluate. Finally, activities within ‘Evaluate’ happen throughout the process and with students and stakeholders, capturing intended and unintended outcomes and focusing on long-term values and community building. Although evaluation acts as a necessary formative feedback loop, “only a small percentage of labs evaluate (the impact of) their projects systematically” (Overdiek & Genova, 2021, p. 4). For several years, the ULT Lab has structured organized student- and stakeholder-evaluations, helping the ULT Lab to maintain relevance, strengthen relationships and support collective learning.

The ULT Lab is positioned as a space for guided discovery and exploration (Koens et al., 2024; Mayer, 2004). It contributes to positive transformations in complex urban ecosystems, especially around regenerative tourism in Amsterdam Noord. Involving students in this complexity, requires guided discovery, the ability to hold space for discomfort, and attention to connections between students and local stakeholders. The 5E-model offers an elegant and comprehensive framework to guide students. The challenge for the ULT Lab remains balancing student-learning and trust-building within the collective learning process, while supporting long-term meaningful relationships with local stakeholders.

Limitations

Being a revelatory single-case story, there are limitations: every Living Lab has another practical and educational context, which implies ‘everything’ will be different. The 5E-model is a ‘made to stick’ framework for pedagogical support of students in living labs that has the quality of a colouring page: it depicts the essence but needs to be coloured in locally. We invite other practitioners to experiment with it and share experiences in order to hone it to perfection.

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Navigeren in onzekerheid: Het faciliteren van collectief leren door co-design met meerdere stakeholders in een urban living lab

Samenvatting Studenten in *urban living labs* werken aan maatschappelijke vraagstukken door middel van collectief leren en co-design met meerdere stakeholders. Dit proces is vaak complex en onzeker. Hoewel deze samenwerkingen breed worden gewaardeerd door studenten, docenten en *stakeholders*, kunnen zij ook ongemak oproepen vanwege hun open en relationele karakter. Er is relatief weinig onderzocht hoe living lab onderwijs studenten in staat stelt om met meerdere *stakeholders* als collectief te leren en om te gaan met de daaruit voortvloeiende onzekerheid. Daarom onderzoeken wij in dit artikel hoe een *urban living lab* studenten ondersteunt in dit proces. Wij reflecteren op tien jaar praktijkervaring van het Inholland Urban Leisure & Tourism Lab in Amsterdam Noord (ULT Lab). De methodologie omvatte interviews met studenten, *stakeholders* en medewerkers van het lab, evenals het herlezen van reflecties van studenten. Het resulterende 5E-raamwerk laat zien hoe vijf gestructureerde, relationele activiteiten (*Explore, Engage, Envision, Experiment en Evaluate*) studenten kunnen helpen om met onzekerheid om te gaan en tegelijkertijd waardevolle relaties met *stakeholders* te onderhouden. Deze inzichten bieden praktische handvatten voor docenten en onderwijsontwikkelaars die *urban living labs* ontwerpen met als doel co-design en collectief leren te ondersteunen.

Trefwoorden urban living labs, multi-stakeholder samenwerking, co-design, collectief leren, onzekerheid in het leerproces