URBAN EUROPE

PLAY!

# Play!UC Playing with Urban Complexity

## Booklet Guidelines

## Imprint

Authors:
Mario Platzer, Hannah Stowasser, Martina Jauschneg, Oswald Devisch, Teodora Constantinescu, Jeremiah Diephuis, Georgi Kostov, Cristina Ampatzidou and Katharina Gugerell

Graphics and Layout:
Hannah Stowasser, Felix Becker



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university of groningen
faculty of spatial sciences

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FH ÖBERÖSTERREICH

GREEN CITY LAB

# Contents

# Introduction

Complex spatial questions transgress traditional planning methods, policy and institutional boundaries. Civic engagement, participation and democratization of decision making processes are core features for novel governance approaches to tackle such complexity and deal with uncertain futures. However, such communicative, engaging processes in planning and policy making are also experienced as unsatisfactory by the involved parties. Especially civic actors – citizens – are often dissatisfied with the participatory approaches, methods and set ups. At the same time, they often feel too little informed to engage in meaningful debates with other stakeholders. There have also been a number of new and increased persistent challenges in communicative approaches, such as motivating people to engage in civic matters and participate in societal decision making, sustaining actors' involvement and fostering long time commitment, integration of underrepresented actor groups or overcoming unequal resource distribution, lack of skills and networks, knowledge, to engage in a meaningful dialogue and negotiating conflicting interests (Fainstein 2000; Uitermark and Duyvendak 2008; Innes and Booher 2010).

### Serious games in urban development

Games and gameful/playful tools, as artificial systems, can serve as an engaging link to real-world scenarios. They are expected to be entertaining and motivating for people to engage in civic matters and support learning on different levels (i.e. knowledge, skills, capacities). As serious learning technologies, they are expected to support the appropriation of knowledge, and to support self-organisation, negotiation, deliberation, immediate feedback, capacity building, and collective efficacy. In short, serious games are expected to support civic learning of different actors, during which civic actions transform individual into collective learning experiences (Gordon and Baldwin-Philippi 2014) that cover the consolidation process of learning, reaching from passive single loop to more inquisitive forms of

triple loop learning (i.e. Lozano 2014, Crookal 2010). Because of these properties, serious games and game-based approaches have been recently put forward as tools for engaging a broader audience with complex urban issues.

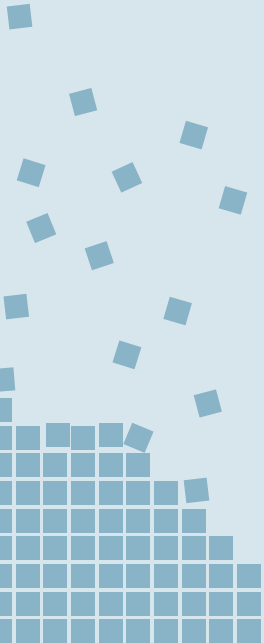
## The project

This booklet was created as part of the JPI Urban Europe project "PlayUC! – Playing with Urban Complexity". The focus of this interdisciplinary project was the development and evaluation of various analog and digital serious games for use in participatory processes in urban development. The project team consisted of international partners in the areas of urban planning, interaction design and game design and development. A series of game prototypes were developed and tested in living labs in Groningen, Vienna and Genk and adapted to different topics such as energy or mobility, as well as to regional characteristics.

## The guidelines

The guidelines are aimed primarily at persons conducting participatory processes and should provide indications both for the development and the application of serious games in participatory urban development. Depending on the level of participation, the area in which the games should be used and the target groups which are to be addressed, different game qualities can be more or less suitable. Essential aspects include, among others, the setting, the type of game (analog or digital), the content as well as the complexity and duration of games. Based on the presentation of the game prototypes created in the project, the booklet summarizes essential experiences and lessons learned that should be considered in future activities.

# 1 Game Prototypes

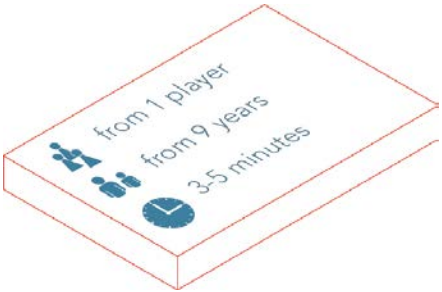


# Floating City

**Equipment:**
1 laptop + monitor/projector
1 keyboard

**Requirements:**
Game master / moderator
1 monitor (if available)
projection screen (optional)
connection for power supply

**Contact:** Martina Jauschneg
office@jauschneg.at

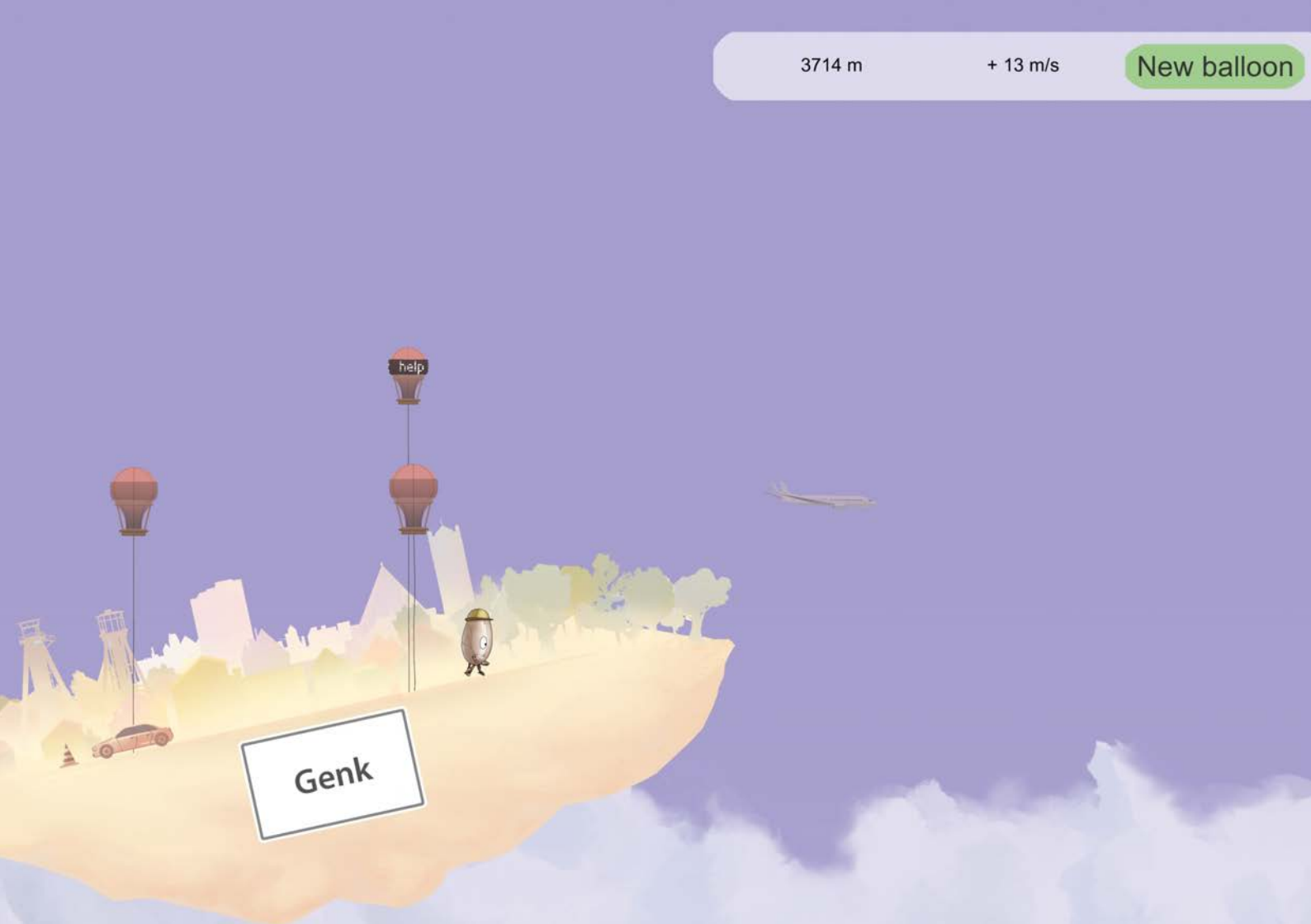



## Description

Floating City is a brainstorming game for public spaces in which players can create and publicize their ideas and suggestions for city projects. A balloon is generated for every new idea and slowly elevates the city. Existing balloons can be viewed and rated by others to increase or decrease their effects on the city. All of the generated ideas and their ratings are automatically saved and are available for evaluation after all game sessions.

## Game Rules

The game master or moderator poses a question for the audience. Players then have the possibility to generate their own answers and contributions and to like or comment on the ideas from other players. One round takes as long as the city needs to reach the top of the atmosphere. Then, either a new round starts or another question can be posed.

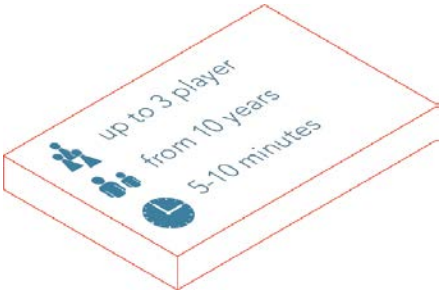

3714 m
+ 13 m/s
New balloon
help
Genk

# AR You Gonna Go My Way?

**Equipment:**
1 printed city map
3 mobile devices
1 WLAN router

**Requirements:**
Game master / moderator
1 table
connection for power supply

**Contact:** Jeremiah Diephuis
Jeremiah.Diephuis@fh-hagenberg.at




**Description**
The game "AR You Gonna Go My Way" aims at recognizing and taking advantage of potential synergies. Players navigate their vehicles via smartphone through the streets of the printed city map. Items for other players can be picked up and exchanged to shorten the distances and to reduce $CO_2$ emissions.

**Game Rules**
Players need to collect a number of typical daily items in their city and can use one of three forms of transportation: a van, a car or a moped. Each vehicle produces different amounts of CO2 and offers a different advantage, such as speed, acceleration or capacity. Overuse of certain streets leads to traffic jams and potholes, which requires players to quickly adapt to their original strategies.

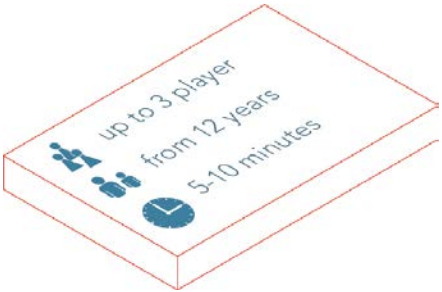

MENU
0
139
714
CO2: 853

# PoliCity

**Equipment:**
1 printed city map
3 mobile devices
1 WLAN router

**Requirements:**
Game master / moderator
1 table
connection for power supply

**Contact:** Jeremiah Diephuis
Jeremiah.Diephuis@fh-hagenberg.at




**Description**
In the game "PoliCity" every player assumes one of three roles for a series of urban planning campaigns (economy, environment or social sector). Together players can implement infrastructure and activity plans for different city quarters. The digital game is played on a printed city map using augmented reality and smart devices.

**Game Rules**
Each city features a real-time heatmap showing current activity in each city sector. Projects for the city can be proposed and placed on the city map to improve each sector. However, before being implementated, they first have to be confirmed by at least one of the other players. Resources to implement projects are collected via interactions with virtual inhabitants of the city and are used in order to unlock further potential projects activities.

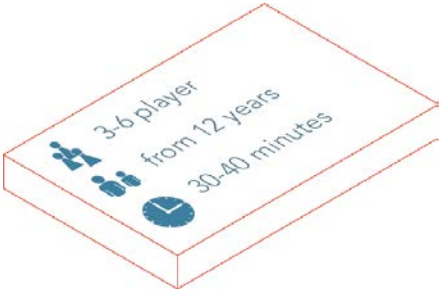

Menu
01:10
504
499
5
Complete Task
to Unlock:
Gathering
2
50 / 100
4875

# City Makers

**Equipment:**
1 (printable) game-board
1 (printable) set of cards

**Requirements:**
Game master / moderator
Observer

**Contact:** Oswald Devisch
oswald.devisch@uhasselt.be




## Description

"City Makers" is a combined board and card game that focuses on the activation of participants to improve the liveability of a their neighbourhood or city. Players can work with or against each other to earn credits by completing projects, investing in each other's projects or investing in community projects. The player who gains ten points first wins the game.

## Game Rules

Each player receives a project (in the form of a card) that he/she needs to finish to acquire points. For example, starting a business would require having a budget, idea, location and people to work with. The game consists of four sets of cards: project, resource, market and action cards. One project and four market cards are drawn from the decks and placed so everyone can see them. Everyone receives three colour tokens – one for representing them on the field and two for investments, three player cards and a project. Players are then allowed to draw an additional resource card each turn, trade with everyone and do only one of the following: finish one step of their project, invest in the common project or another player's project or play an action card.

# CITY MAKERS

## Events

1. **Procrastination**
   *All players lose one card*
2. **Social Benefits**
   *All players draw a Resource Card*
3. **New Regulations**
   *Shuffle all Market Cards and place new cards in the Market*
4. **Recycling**
   *Discard up to 5 cards and for each one, draw a card from the Resource Deck*
5. **Black Friday**
   *Get a free card from the Market*
6. **Grant**
   *Draw 3 cards*

## Player Progress

0 1 2 3 4 5 6 7 8 9

## City Project

Materials

Ideas

Time

Investors

Money

## The Market

## Landfill

## Action Cards

## Resource Cards

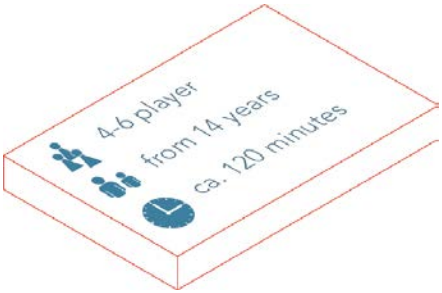
## Project Cards

# Energy Safari

**Equipment:**
Game board
Project cards
Game props

**Requirements:**
Game Master
1 Table
7 Chairs
Quiet setting

**Contact:** Cristina Ampatzidou
c.ampatzidou@rug.nl




## Description

In "Energy Safari", a game board represents an abstracted map of the province and is divided into hexagonal tiles that feature some special zones and risk zones (earthquakes, flooding) as well as urban clusters with specialised functions. Over the course of five rounds, players build up an energy network for their region. The game's domain content is based on the Agreement on Energy for Sustainable Growth, the Masterplan for Energy-Neutral Groningen and other policy documents.

## Game Rules

Players move around the board and develop projects, determined by the colour of the tile where their playing figure lands. There are three general conditions required to realise a project: creating a network of partners (among the other players), obtaining a permit (either by rolling dice or answering a quiz question) and paying the implementation costs (by rolling the dice). Each realized project provides financial revenue (coins), a renewable energy output (KWpoints), and a community output (community points) to all networked players. Joker cards enable players to overcome certain steps. At the end of each round, players need to settle annually increasing energy costs and an event card is played describing a global event which enforces externalities such as political changes, natural disasters, or new taxes.

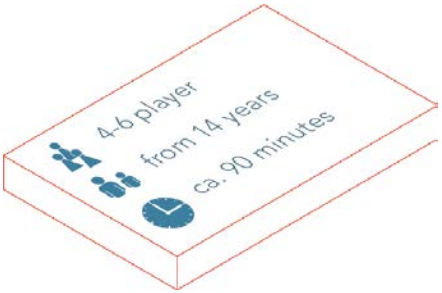

flooding zone

# Mobility Safari

**Equipment:**
Game consisting in gameboard, pawns and cards

**Requirements:**
game master
1 table
7 chairs
quiet setting

**Contact:** Martina Jauschneg
office@jauschneg.at




## Description

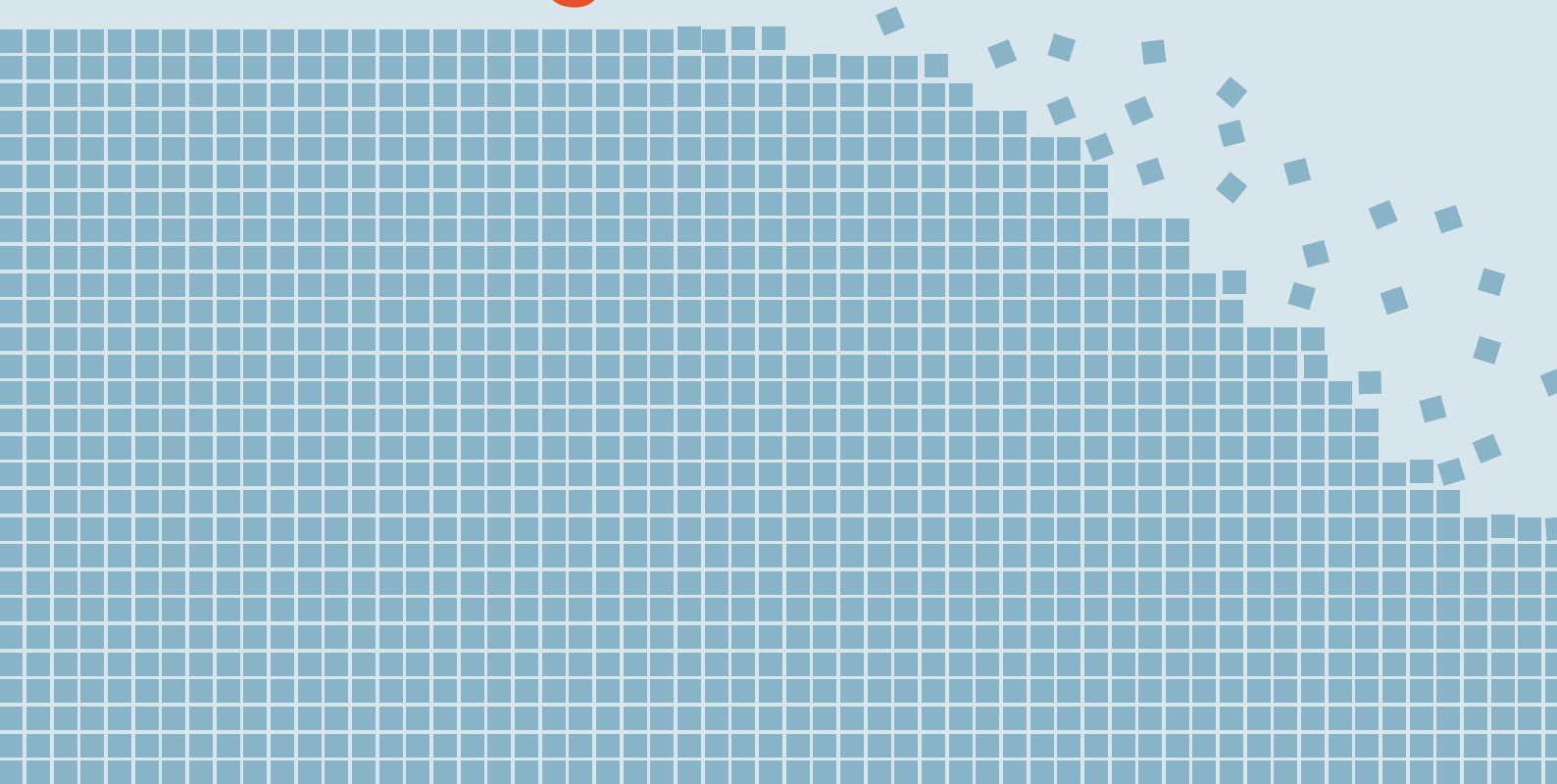
In "Mobility Safari", players try to implement as many innovative urban mobility projects as possible in the categories "innovative & educational", "fair & safe", "active & healthy" and "flexible & connected". A map of the city of Vienna serves as the game board and contains barriers like the Danube river, the underground railway network as well as some of the important urban development areas. The content of the projects derives from the Viennese Mobility Concept 2025.

## Game Rules

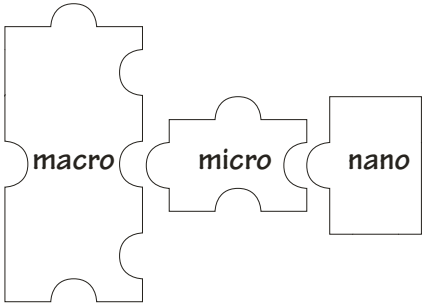
The game features a custom board for the city of Vienna and allows players to choose their own path for each of five rounds based on their roll of the dice. Each game space represents a different category of project and for every project, a network of cooperation partners, funding and a permission is required. For every successfully implemented project, players earn coins, community points and CO2 savings. There can be up to three winners at the end of each game: one for each points category.


U-Bahn
U-Bahn
U-Bahn

# 2 Visualizing Games



# Game Mechanics




The Contextual Taxonomy of Game Mechanics: Macro mechanics represent general game-world defining features. Micro mechanics are specific player actions, often directly related to the goals of a game. Nano mechanics are the smallest units representing constraints and goals and are dependent on the micro mechanics they are connected to.

Within the field of game design, there are numerous concepts that seem intangible and difficult to clearly define. At the heart of this ambiguity is certainly the idea of "game mechanics". Traditionally, game mechanics are associated with the rules of a game, which define how players can achieve a game's goals. However, the definition provided by Hunicke et al (2004) is more fitting: "Mechanics are the various actions, behaviors and control mechanisms afforded to the player within a game context." It is the interdependency between game elements that make their design and implementation particularly challenging. In their MDA framework, the interplay of multiple game mechanics leads to "dynamics" of play at run time, which the player experiences then as an "aesthetic", or emotional response. Adding, subtracting or changing a single mechanic can significantly influence the original design.

The "contextual taxonomy of game mechanics" developed for this project consists of three basic categories, each represented by a different puzzle piece. The exact shape and contours of the puzzle pieces (e.g. the number of available slots, etc.) are not fixed and can be modified to better suit the visualization of the mechanics at play in a particular game. The taxonomy aims to be a combinatorial system that allows for flexibility, but at the same time readability, making it possible to visualize

the interrelationships between individual mechanics.

The three mechanics categories in the taxonomy are referred to as macro, micro and nano (see figure 1), analogous to the levels of the units of scales used in other fields of science. The taxonomy utilizes mechanics that have already been defined in other systems. However, the taxonomy does not attempt to provide a fixed categorization of all existing mechanics according to these three categories, as their actual usage in games may differ.

### Macro mechanics

Some mechanics play a larger role in defining the entire game world, providing a broad description or theme of the general interaction paradigm; these are macro mechanics. Macro mechanics need to be further defined by micro mechanics to have any concrete meaning. Thus, the macro puzzle piece serves as a hub for the rest of the individual mechanics of the game. Macro mechanics can also be connected to each other, as they also sometimes influence each other directly.

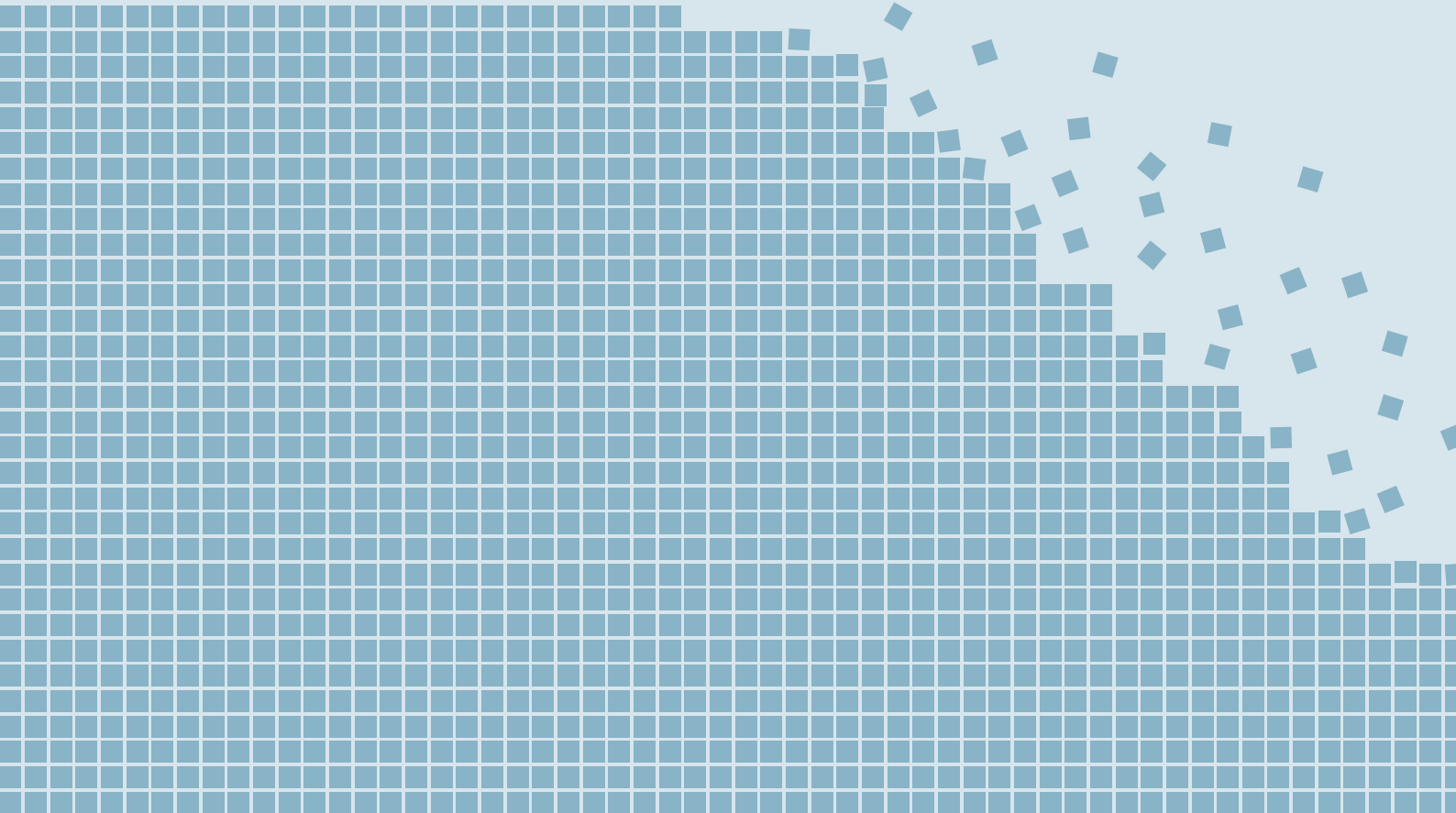
### Micro mechanics

Mechanics that actually define the actions players can take to achieve the goals of the game are considered micro mechanics; typically, these can be the "core mechanics" that the player most frequently utilizes, but this category can also include lesser utilized mechanics as well. Micro mechanics can be easily combined with other mechanics on the macro, micro and nano level (even multiple ones) to visualize unique game dynamics.

### Nano mechanics

Some mechanics serve a role as a game constraint (for example time limits) or goal (high score), but do not really define player action or behavior. These are referred to as nano mechanics; they may be related to more than one micro mechanic (e.g. high score is influenced by a multitude of factors), but they cannot be combined with macro or other nano mechanics.

# 3 Operational Guidelines



# Learning

Experimenting, gaming and learning have received increased attention for being central elements for planning and governance approaches. Then Planning integrates 'making plans' with the perspective of learning, based on dialogue and transactions between individuals. Serious games are becoming platforms for learning and experimentation. Complex spatial matters can be mirrored in serious games and make them accessible, disputable and negotiable for actors and citizens. By playing and experimenting, knowledge creation, reflection and learning processes are triggered on different levels. Learning is the general process of acquiring knowledge and skills through different processes, such as exploring, schooling or problem solving.

## Games can trigger different forms of learning

Individual and group:
Acquiring knowledge and skills via personal reflection and individual processes is referred to as individual learning. Group learning takes place when individuals act, play and experiment collaboratively. The group exceeds individual talents and collectively develops skills and knowledge for further action.

Learning in loops and cycles:
Consolidated learning integrates single, double and triple loop learning actions. Figure 1 illustrates the increasing complexity of learning processes and which learning modes can be implemented in serious games. Learning and the consolidation of learning happens in loops: hence it is crucial that iterations and loops and cycles are also implemented in the game.

One learning model (Brown and Lambert) suggests that for truly collective learning, groups need to pass four different stages

1) What should be? (establishing shared interests, ideas)
2) What is? (exploring the existing joint or competing points of view)
3) What could be? (bringing together different creative ideas)
4) What can be? (combining different contributions)

### What are the learning goals?

The starting point for the game design or development process is the establishment of the design goals of what the players should experience and learn. Hence, the first step is to settle the learning goals: i.e. should the players be informed about a certain policy topic (single loop learning), should they question existing models and concepts (double loop learning) or is the goal that they are engaging in problem solving and developing ideas and processes (triple loop learning) – or should it be a combination of all three?
The more complex the learning goals are, the more time needs to be invested to integrate those different learning steps into the game structure and the game narrative. During different stages of game development and playtesting of the prototypes, it needs to be evaluated if the game prototype delivers the experiences and the learning action that were established in the beginning.

### Learning in full-fledged games vs mini-games?

There are different options for facilitating learning in games: (1) full-fledged games (with several

fig. Quiz questions as a part of the learning process. ▷

rounds, levels, or progressive difficulty) or (2) Mini Games. Developing full-fledged games is fun, challenging and offers a rich and diverse playing experience, exploration and learning. The games can then pose progressing challenges for the players and instigate learning at different moments in the game. However, full-fledged games require a significant amount of time to play. Mini-games are short and rather simple games, that focus on one or two specific learning goals. Hence, they are often less complex, quicker to play and have comparatively easy game rules. In mini-games, the set of design goals and learning goals are not packed into one game, but are divided over a series of playful experiences. Mini-games work in two ways: either as a standalone or in a string of several mini-games that are linked into a bigger planning and/or learning process.

### Important: It is the game mechanics that make the serious game fun, not the topic

Contrary to their name, serious games should not be too serious; they need to be fun and entertaining. Some serious games put too much focus on "learning" specific content and drilling players until the get the correct answers. Game-based learning is fun because it provides players with choices and allows them to experiment, to play. Thus, it is crucial, that learning is deeply embedded in the game structure and not treated like an add-on. Game mechanics are the rules and elements that define what players can (or cannot) do in the game and how the players can interact with the game and with each other. They are the crucial part to make a game rich in experience, exploration and leaning opportunities.

### Debriefings are crucial to deepen the learning experience

Learning takes place at least at two different moments: the players explore, experience, learn and build up capacities during gameplay, packaged in the game world. Hence, the learning remains often tacit or subconcious. To transfer the gaming experience into deeper and more enhanced levels of learning, a debriefing as the final

stage of the gaming activity is essential. In the debriefing, the game master can guide the players through three different levels of reflection:

### WHAT?

The "WHAT" layer asks the players to describe what happened in the game, their own experiences and different decisions they took in the game, individually or in the group. The game master can also add observations he or she made during the game.

### SO WHAT?

The "SO WHAT" layer addresses the interpretation and contextualisation of the gaming experience. Players are invited to explore the actual meaning of their decisions and actions in the game and link them to their real-world experiences and actual social practises. In this phase of the debriefing, the players are actively connecting the content, processes and experiences with their actual situation and are evaluating those based on their values, norms and interests.

### NOW WHAT?

NOW WHAT is important for translating the SO WHAT into future perspectives and actionable knowledge. If games are considered to contribute or raise awareness for behavioural change, the transformation of experience into actionable knowledge (what can I do, what can I change, what is reasonable in my daily life) is crucial. Asking "now what" raises awareness of the players and activates them to turn the contextualisation and interpretation into actionable measures that they consider important and reasonable.

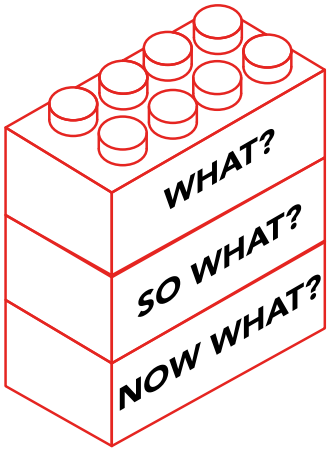



fig. The three W's: "What?", "So what?" and "Now what?" ▷

# Content

Co-located Serious Games are intended to inform about certain topics in a playful and entertaining way, trigger social processes and discussions between different players and create the possibility of participation. For urban participatory processes, they are suitable for identifying municipal urban planning core issues, planned initiatives and opportunities for participation. In the course of the playful and intensive discussion of complex urban development issues, such as a sustainable urban mobility or energy transition, sensitization, learning and participation processes are primarily initiated. However, care should be taken to ensure that the content of the game follows an exciting narration and that the rules of the game are not too complex in order to be able to explain the game to interested participants quickly and easily.

In order to ensure the complexity of the content and the practical orientation of the game, an iterative co-creation process should be planned from the first game idea to the design phase through to the evaluation of the prototypical game. Here, both professional and administrative planners as well as interested citizens and citizens' initiatives have the opportunity to express their ideas, needs and concerns. In addition, the orientation of the game idea and goals to current and future issues and initiatives of urban development have proven to be beneficial. In such cases, urban guidelines (e.g. mobility concepts, urban development guidelines, smart city strategies) can form the content. The underlying objectives and planned measures form the basis for the development of the game idea, game mechanics and narration. However, it is important to translate the partially subject-specific topic into an understandable, playable and motivating context.

In order for the content to be perceived more realistically, geographic and familiar urban features have to be integrated into the game. The game board, event cards, tasks, and other aspects can be adapted according to spatial and local conditions such as city or district boundaries, rivers, POIs or different land uses. By means of

themed game characters, players also have the opportunity to express their preferred attitudes and their everyday behavior. For example, in the developed game Mobility Safari, characters are used which symbolize a cyclist, a pedestrian, a wheelchair-user and so on. Thus the player can slip into this role and express his/her preferred means of transportation.
In addition to taking into account social aspects of play (for example collecting community points, promoting team building processes), it seems important to be able to slip into different roles (e.g. city administration, politics, mobility researchers). Role-compliant play brings out the diverse and different interests and complex decision-making processes, without, however, having to fear negative real consequences. In this way, many simplified and incorrect ideas of complex topics can be overcome and viewed in a broader and more realistic light. Ideas, preferences and concerns of city dwellers can be identified as early as possible in the course of an open negotiation process and taken into account in the further planning process.
Depending on the level of participation pursued (for example, inform - consult - advice, co - produce, self - management), different game mechanics should be used. Players can for example be very well informed about specific content by means of quiz questions, which should be available in different levels of difficulty. Co-creation activities can also be employed to produce dditional game content, such as in the case of quiz questions, allowing players at the end of a play session to generate their own quiz question ideas. Above all, the conversations initiated by the game promote a deeper and multi-layered gain in knowledge. Social and reflexive learning as well as the independent solving of problems is promoted above all by an open game-setting, in which rules are often flexibly interpretable, and thus, negotiation processes are required. In addition, concluding rounds of reflection are suitable for comparing gaming experiences with everyday experiences and discussing thematic issues in greater detail.

◁ fig. game characters of Mobility Safari represent different forms of urban mobility.

# Analog or Digital

Whether analog or digital games are better suited to the knowledge transfer and participation of citizens depends to a large extent on the planned target group of the players. While children and adolescents as so-called "digital natives" are perhaps more familiar with electronic games and are well-versed in their handling, older participants are typically less inclined to play them.

Analog games, in the form of board or card games, can be played almost anywhere without any real restrictions. They require no electricity or network access and can easily be played outdoors. In contrast, digital co-located games often require complex setups and fine-tuning between the equipment used (e.g. screens, interfaces, sensors, etc.). However, the ubiquity of sensors in typical devices such as smartphones and integration of social media applications offer a multitude of possibilities that allow the use of real-time, location-based data. These technologies allow for novel experiences that can more easily scale to variable audience sizes, not being limited to the typical 4-6 players in a traditional analog board game. In addition, data from a play session can easily be collected and saved for further use or evaluation.

For deeper personal interactions, analog games tend to be more suitable, but require the simultaneous presence of all players on site. This requirement is not a must in digital games, as the saved data component also permits asynchronous interaction. Also, analog games tend to require more time to play. Thus, if a meeting with a fixed number of participants is the primary focus of an activity, and there is enough time provided, then analog games can be more effective as they typicall allow for more social interaction.
Mixed forms are also an effective option to combine the advantages of analog and digital. For example, analog games can be expanded to include smartphones, tablets and sensors with the goal of dynamically retrieving new game content, or enriching the real world with virtual information (e.g. augmented reality).


◁ fig. Analog and digital games address different target groups.

# Indoor or Outdoor

At busy public places, such as parks or pedestrian areas, the use of outdoor games is particularly promising to appeal to a variety of different urbanites. Interested passers-by should be informed by trained staff specifically about the purpose and course of the game and be encouraged to participate. However, it is important that the games are easy to understand and have a short playing time, especially since passers-by often have little free time as part of their daily errands. The entry barriers should be as low as possible and the rules and mechanics of the game should support a continuous exchange of players.

In principle, the underlying game theme in outdoor games can be presented to a wider audience. These games are especially suitable for informative and awareness-raising purposes as well as for obtaining feedback. In addition, outdoor games are particularly effective for connecting with social fringe groups, which are often difficult to access through standard recruitment. Of particular note, however, is that there are not too big distractions as a result of noise or other events. Furthermore, the weather plays a decisive role in the use of outdoor games. This can lead to problems especially for digital games with expensive technological game equipment. In outdoor games, particular focus should be placed on adapting the playing field or the game elements for a suitable size. As a publicity measure and to promote the interaction of the players with each other, it has been shown that players themselves can act as game characters or playing pieces.
Within buildings, the spontaneous participation of different passers-by often is not possible. The undisturbed game situation, however, allows for more complex games with longer playing time. Above all, digital games, which require more expensive and sensitive equipment, are predestined for indoor use.
For indoor games, a prior contact and invitation is often required so that players receive essential information, i.e. about the purpose or the game date. For the particular topics, relevant target groups (for example,

residents of a specific district, associations, citizens' initiatives, city planning managers) can be addressed here.
The more specific and complex the game or the underlying game theme is, the more suitable indoor games are on a small scale. Furthermore, in undisturbed premises, the game situation (e.g., moves, pursued strategies), can be better observed and recorded by trained observation staff.
By preventingl disturbances (e.g. external noise) players perceive more clearly the actions of others, and they can also directly communicate (verbally, through gestures, facial expressions, etc.) with players and non-players about their intentions or judgments regarding current or past gameplay.
Due to the generally lower time pressure of the players and the better planning of the gameplay, indoor games are also suitable for a reflexive debriefing process at the end of the game.
Regardless of the location, a pleasant and relaxed game environment should be created (for example, through drinks, snacks, comfortable seating, a casual game atmosphere) so that the players have fun and do not leave the game prematurely.
Regardless of the spatial reference, it is crucial for co-located games that, everyone in the room or public space, including spectators and otherwise uninvolved bystanders, can potentially benefit from discussion generated in a co-located setting. The co-located setting fosters interaction and collaboration and therefore provides the possibility to not only take part in participatory settings, but also to enhance understanding and raise awareness for complex urban development topics such as mobility and energy transition.


◁ fig. Outdoor game with large playing pieces and “walkable” game board

# Open or Closed

Under open or closed setting, we understand to what extent the rules of the game are flexibly interpretable ("open") or strictly binding ("closed"). Especially in the case of unclear topics or for explorative purposes, more flexibly interpretable rules should be applied. By contrast, fixed rules of the game are self-evident when clearly defined questions and objectives dominate the game orientation.
A creative and situational rulebook requires interactions between those who can go beyond the actual story of the game, providing new insights for both the research team and the players. However, an exact analysis and a comparison of the moves and strategies of different player groups are not expedient due to the variable gameplay.
For more complex games with open rule interpretations, it is helpful to have an independent, non-playing moderator who can respond to open questions, encourage stimulating topic-specific conversations and only intervene in the game if necessary.
The most open setting possible and the minor influence of the game director has proven to be promising if more complex learning processes are to be initiated and a transferability of the gaming experience to the everyday situation is to be established.
For example, participants talked about transport policy initiatives, possible alternative solutions, and necessary processes (such as network building, required resources, and framework conditions).
In particular, an open and flexible game setting and post-game reflection processes (such as a short debriefing) can significantly contribute to a deeper understanding of the challenges and a related play experience with the broader "real world" context. However, in order to be able to achieve these positive effects, various planning-relevant actors must be involved in the conception and design phases by means of a co-creation approach. Only in this way can a game of learning and co-design be initiated which reflects the diverse perspectives of those involved in planning and promotes mutual understanding and learning.

◁ fig. The game rules of Energy Safari are discussed and adapted by the players.

# Abstract or Specific

In his seminal book *Homo Ludens*, Huizinga introduced the concept of the 'magic circle' also known as the 'circle of play'. Entering the circle, the players comes into a fictional, but safe world directed by clear rules and a consistent narrative. The more abstract the game, the further this magic circle is removed from reality, and thus from existing power relations and financial and legal constraints. The more realistic the game, the closer the magic circle is to a real situation, and the more engaging it may be for non-gamers.

In his analysis of Huizinga's magic circle, Juul (2008) addresses one of its major criticisms: although the experience of play appears to be separated from the world surrounding the play space (e.g. there is a different meaning for actions, acceptance of rules, etc.), there really is not a clear delineation as Huizinga seems to suggest. Moreover, play and games are not entirely removed from their surrounding environment. Juul suggests replacing the concept of the magic circle with the metaphor of a puzzle piece, representing the idea that play is embedded into the social and spatial context that it is surrounded by.

The choice between utilizing an abstract or a specific context greatly depends on the objective of using a mini-game. Effectively, this objective serves as the contextual setting, or the surrounding puzzle pieces. If the goal is to collectively explore an institutional context, or to collaboratively collect (spatial) data, then it would be more obvious to design (or select) a specific mini-game. But if the goal is to make the players discuss what they find more or less valuable in relation to societal issues such as energy or mobility, then an abstract mini-game may be more effective.

Playtesting a number of mini-games demonstrated that one can also tune abstract games to a specific situation, simply by referring to real places or characters (and as such making the magic circle a little less magical). Another valuable lesson was to schedule enough time for a substantial debriefing after the

game. Although the games were primarily designed to impart content and foster awareness about urban planning issues, they effectively serve as stimulus material for discussion between the participants.  A final lesson is that it can be useful to begin the game with a short explanation on the purpose of the game, without too much steering their playing behaviour. This expectation management may result in a more productive debriefing (as the players will not question the game itself and focus on their game experience).


fig. Discussing gameplay ▷ directly after a session is an essential activity.

# Complex or Simple

As addressed in the Contextual Taxonomy of Game Mechanics, the actual inner workings of a game can be broken down into individual mechanics that, together, combine to create a specific aesthetic experience of gameplay. Each of these mechanics is, in turn, based on a fairly simple interaction, such as collecting an item. As such, every complex system is composed of a number of simple systems.

However, although the idea of having complex systems built on simple processes definitely can mirror the complexity within urban planning, the design of serious games presents a few additional challenges. First, players typically enjoy learning the rules of a game and the game world by directly experimenting with them. Although for a board game, it may be common to read through the rules at the beginning, most of the actual strategy is learned by playing the game, making mistakes and redeveloping a strategy. If a simple system is negatively influenced through this experimentation, it has the potential to be detrimental to the gameplay of other players. As such, these simply systems need to be loosely coupled, so that players are not inhibited in their choices.

Conversely, simple systems tend to oversimplify real-world processes and tend to be easy to second-guess. One of the main sources for excitment in a game is not fully being able to understand or predict what may happen in a particular situation. Utilizing elements chance or chaos can mitigate this problem to a certain extent, but in the larger workings of the game, one or more complex systems may be necessary. In a common digital game, for example, the physics of the world often represent this complexity. Although basic jumping mechanics may be simple to understand (e.g. there is a single and a double jump), the physical properties of opponents or different world elements may function entirely differently.

To achieve this structure of both simple and complex elements, the use of macro, micro and nano mechanics from the taxonomy can be very helpful.

◁ fig. Different project rewards from the game Mobility Safari in the form of coins, $CO_2$ savings and community points.

# Closing

Co-located serious games can serve as a very effective method to facilitate productive, collaborative activities in participatory processes for urban planning. The games themselves can provide both informative content and an artificial conflict to promote interaction and discussion between participants. Nevertheless, the activities surrounding such games need to be structured so that a reflection of the gameplay is utilized, both in terms of individual learning and group dynamics.

Within the scope of the Play!UC project, a series of games with different approaches, including board and card games, digital public space and augmented reality games, were developed and tested in the context of one of three (or more) living labs.

Although these games were all tailored to the needs of a specific urban context, each of them could be easily adapted to another setting utilising the same combination of game mechanics. The collection, production and adaptation of such content is a time-consuming process, but its use tends to positively affect the acceptance of new participants and give the game its own clear identity. Detailed information about each of these games, including the ruleset and a video of gameplay, is available on the project website:

http://play-uc.net

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