# 严肃游戏作为大众参与城市景观规划的方法学探究

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**摘　　要：**全球当代城市化进程日益复杂，传统规划方式面临多元诉求下的公众参与困境，公众在城市空间决策中的主体地位亟待重塑。严肃游戏(serious games)作为一种融合互动机制与情境模拟的公众参与新方法，提供了公众低门槛、高参与度的城市规划体验路径。以景观城市主义为理论指导，在英国研究生设计教育的语境下探讨如何将现实城市问题(如水资源管理、生物多样性保护和社区发展冲突)有效转译为游戏机制与互动叙事，通过MDA游戏设计框架(Mechanics、Dynamics与Aesthetics)分析了严肃游戏在城市规划领域的应用逻辑与潜力。研究结果表明：1)严肃游戏能够将复杂的生态系统服务权衡与政策决策问题简化为互动模型，显著提升公众对规划议题的理解深度；2)游戏机制提供的即时反馈与角色扮演情境能促进公众主动协作并形成对城市未来发展更深入的共识；3)通过美学设计，游戏进一步加强了公众对地方文化与空间记忆的情感共鸣，推动参与者由空间消费者向积极的空间共创者角色转变。揭示了严肃游戏作为一种新兴行动设计方法论的价值与实施路径，为解决传统规划参与中公众参与不足、权力关系失衡的问题提供了创新视角与实践参考。

**关 键 词：**风景园林；严肃游戏；公众参与；城市景观规划与设计；景观城市主义；MDA框架；行动设计

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## 1 背景

当代城市化进程的加速与复杂性，使得传统规划方法面临多重挑战：专业决策的封闭性难以应对多元利益诉求，技术理性的空间想象与市民日常生活经验之间存在断裂，而形式化的公众参与机制往往陷入“象征性协商”的困境。在此背景下，探索兼具包容性与创造性的规划工具，成为重构城市治理范式的重要议题。

作为一种新兴的方法学，游戏化(gamification)策略提供了公众参与城市景观规划与设计过程的新思路。通过互动机制的设计、公众性试错与反馈机制的整合、对真实城市问题的高度抽象与情境模拟，以期降低公众参与城市规划的认知与心理门槛，激发参与者的投入感，协助公众更直观、更深入地理解城市规划涉及的复杂议题，甚至主动探索解决方案。

本研究旨在从学校设计教学层面探讨如何将城市景观规划的行动设计框架转化为严肃游戏的开发过程，同时在其中导入MDA游戏设计理论(Mechanics, Dynamics and Aesthetics)分析方法，深入探讨严肃游戏在规划领域中的设计逻辑、实施潜力及其社会意义。

## 2 公众参与的早期源起：从古希腊到英国传统

古希腊城邦(polis)尤其是雅典，被普遍视作西方民主的起点[1]。古希腊的“公民大会”(ecclesia)及由选举或抽签产生的“公民委员会”，在一定程度上让市民能够直接参与决策。而与之相对应的物理空间“广场”(agora)，不仅是市场，也是政治、社会活动的主要场所[1]。这种早期的民主萌芽与公共空间的融合，为后世城市规划和公众参与理念奠定了重要基础——城市空间为政治与公众生活提供了重要的交汇点。英国早期现代规划制度主要回应工业化导致的城市问题(拥挤、不卫生、贫富分化)[2]。这些制度更多地依赖专家决策与立法约束，如霍华德(Ebenezer Howard)的田园城市(garden city)运动，强调以全新布局来改良城市环境。然而，到20世纪中叶以后，基于民主价值观的普及与社会多元化需求的出现，一系列对“空间与社会”关系的理论反思出现，并且使公众对于城市规划开始拥有越来越多的发言权。在英国，20世纪60年代末—70年代出现的社区参与(community participation)运动促使城市更新项目更加关注基层声音与地方利益[2]。

公众在城市规划中的主体性，一开始体现在对传统规划模式背后“权力-知识”关系的质疑。米歇尔·福柯(Michel Foucault)的研究[3]指出，社会制度中的权力并非简单的“自上而下”，而是通过知识体系与话语机制被分散或再生产。专业规划师、政府机构所掌握的知识，同样可能成为对公众空间使用进行管控的工具。此时，强调公众参与，就不仅是为了收集“民意”，更意味着对专业垄断与权力格局的反思，承认公众在空间决策中的主体地位。

与福柯的权力批判相呼应，亨利·列菲弗尔(Henri Lefebvre)在《空间的生产》[4]中强调，空间是由政治经济、社会关系和文化实践共同“生产”出来。因此，当规划过程仅依赖专家的理性分析或经济利益驱动时，往往无法全面反

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映空间中的多元需求。公众参与的核心价值，在于让更广泛的社会群体成为“空间生产”的一部分，协商、讨论甚至重塑空间的功能与意义。列斐伏尔在20世纪60年代末期提出“城市权利”(the right to the city)[5]的概念，主张市民应有权决定城市空间的使用方式。

在空间是由多元主体共同生产的前提下，公众对城市的感知和理解就具有了规划基础信息的价值。凯文·林奇(Kevin Lynch)在《城市意象》[6]中采用的五元素分析框架表明城市除了以专业蓝图的形式“呈现”给市民外，还以一种“心理地图”或感知图景的方式被各自“看见”与“记忆”。公众在使用与体验城市时所形成的意象，为规划的可行性提供了不可或缺的感性与认知依据。柯林·罗(Colin Rowe)和阿尔多·罗西(Aldo Rossi)则从情感与文化层面进一步丰富了公众参与的内涵。罗(Rowe)在《拼贴城市》(1978年)中强调，城市并非统一模式的逻辑推导，更像是对历史碎片、公共空间和社会诉求的“拼贴”，因此规划需要吸纳公众对城市记忆与象征意义的多元认知。罗西(1982年)也在《城市建筑学》中提出“城市记忆”的概念，认为城市形态与意义的延续，在很大程度上取决于市民对地方的共同回忆与集体感知。公众对城市的情感投射、对历史建筑与街区的认同，以及对未来发展的想象，都是塑造城市文化景观的重要力量。

亨利·列斐伏尔(Henri Lefebvre)在其《空间的生产》(*The Production of Space*)一书中提出了著名的“空间三元论”：感知空间(perceived space)、概念空间(conceived space)和生活空间(lived space)。这3种空间维度，既是社会与个体互动的场域，也共同决定了城市发展的走向。传统的城市规划往往过度依赖“概念空间”——即由规划师和政府部门在蓝图、图纸与技术模型上构想出的未来场景；然而，如果忽视了公众对城市的“感知空间”和“生活空间”层面，就会导致规划缺乏社会认同和文化根基，进而难以在实践中真正惠及市民。

在列斐伏尔看来，“感知空间”指人们对城市环境的直观体验，包括日常通勤、邻里关系、街道氛围等；“生活空间”则指人们在城市中所经历的情感、记忆和文化象征。这2类空间皆极具个体性与多样性，往往难以被精密的规划模型或官方数据完全捕捉。但也正因为其丰富与多层面，城市规划若要取得成功，就必须给更多市民提供表达与对话的平台，让公众能够围绕自身对城市的切身感受、文化认同与期望进行协商。

在公众主体性日益兴起的背景下，公众不再被视作被动的“接受者”，而成为主动的“空间生产者”，日渐成为塑造城市形态、社会关系及文化认同的必要环节。据此，城市空间规划[7]的主视角也逐渐从概念化空间向生活空间转移。在过去的实践中，公众参与多以意见征集或咨询会议的形式展开，但这些形式往往局限于信息的单向传递，难以激发公众的深度参与和协作[8]。

## 3 向游戏化迈进：公众参与城市规划的新方向

在此背景下，对特定城市规划过程进行游戏化(gamification)具备从两方面改善公众参与的潜力。一方面，透过将复杂的社会问题转化为可操作的任务、情境和互动模型，使公众能够在虚拟或现实的游戏环境中，以较低的认知门槛体验和理解城市议题。另一方面，游戏作为一种行动设计工具，不仅能创造沉浸式的学习和协作环境，还能通过即时反馈和模拟试验帮助公众在“玩中学”。这种机制尤其适合处理城市规划中涉及多方利益、资源分配与政策决策的复杂性，通过游戏的机制设计与互动体验，公众能够更直观地参与到城市空间的生产过程中。

### 3.1 严肃游戏作为社会参与工具

游戏作为一种高度互动、参与性强的媒介，具有独特的潜力，通过其设计元素、互动机制和反馈系统，激发个人和群体对公共事务、政治决策、教育、健康等领域的积极参与。严肃游戏(serious games)是一种旨在超越纯粹娱乐功能的游戏，广泛应用于教育、训练、社会宣传和解决现实问题的领域[9]。尽管严肃游戏仍然保持游戏的互动性和娱乐性，但它的设计核心聚焦于特定的教育或实践目标。严肃游戏虽常结合了虚拟现实、模拟和互动技术，但并不限于电子游戏或物理性游戏，它的内涵更包括了所有“似游戏”或游戏化(game-like or gamified)机制的应用。

近年来在城市规划领域，严肃游戏的应用作为促进公众参与、模拟复杂决策及提高规划师和市民之间互动的方法论逐渐获得关注。城市规划中的问题往往涉及复杂的社会、经济、环境因素，严肃游戏通过虚拟化和互动设计，使得这些复杂问题能够以更具可视化和参与性的方式呈现，并为公众、规划者、政府决策者提供新的解决方案。

因此，游戏化不仅是一种辅助公众参与的媒介，更是行动设计理念的延续和深化。它能够在数字技术的支持下，将行动设计的协作、试验与反馈特性具体化，使得公众在游戏中扮演多元角色、探索规划方案、经历虚拟决策的后果。这种方式有效弥合了公众对技术规划的理解壁垒，促进了市民在城市空间生产中的主体性。接下来，游戏化在城市规划中的具体应用，将从其逻辑框架和操作潜能展开探讨。

游戏作为社会参与工具的兴起，主要聚焦其激励机制、社会学习与教育功能、行为改变的推动力及数字游戏在公共参与中的作用，研究发现通过自我决定理论，游戏可提供自主性、能力感和关联感，从而增强社会参与动力[10]，并能利用任务、奖励与即时反馈提升用户的理解深度与持续热情[11]；同时，游戏化和严肃游戏具备教育价值，通过互动和沙盒模拟为玩家呈现复杂社会情境，帮助他们深度学习公共决策的难度和权衡，诸如《和平制造者》与角色扮演类游戏都能培养玩家对社会、政治议题的认知[12-13]。此外，游戏中的反馈回路和奖励机制能激励人们改进生活方式[14-15]，并且驱动交流[16-17]。

### 3.2 行动设计思维与城市语境的游戏化

行动设计(action design)并非只是对城市空间进行“物理性”改造，而是融合了社会实验、社区营造、艺术介入等多元方式。其核心在于将市民从被动的规划对象转变为主动的“参与者”“共创者”与“合作伙伴”[2]。这一过程要求设计师、规划师、政策制定者与居民一同构建解决方案，甚至将方案的实施与成效评估都交由公众共同完成。公众的多样化意见与创意为城市增添活力，也让社会资本(social capital)在规划中得到积累和激发。城市规划的固有挑战包括多方利益冲突、资源分配不均、信息不对称等在公众参与的场景中寻求强化民众作为利益主体的角色在竞争、合作、博弈、妥协等过程中扮演关键角色。

在面对城市规划中复杂的利益冲突与多元需求，如何使公众在更具沉浸感与安全感的环境中学习、协商并共同创造，成为当代行动设计的重要挑战。游戏化(gamification)便提供了一个有

潜力的解题思路：将真实世界的城市议题转化为游戏语境，通过机制、情境和体验的精心设计，让公众得以“玩中学”，从而更深入地参与城市规划与决策。

行动设计关注的是将公众从被动的咨询对象，转变为方案的主动共创者。然而在实际操作中，公众对城市规划的专业理解有限，也易受资源和信息不对称所限制[18]。游戏化则有助于打破此种壁垒。游戏能够将复杂的城市系统简化为可操作的互动模型，让参与者以较低的认知门槛“体验”城市演化。因此，游戏能为公众参与提供减负效应。游戏利用得分、关卡、协作对抗等机制，激发个体与群体的积极性[19]，有助于提升公众持续积极参与的动机与凝聚力。此外，在游戏环境下，公众可尝试不同策略并“犯错”而不必承担现实中的高昂代价。对抗与冲突变得可控，更易于让各方冷静评估方案，并在彼此互动中逐步增进互信。

表1 MDA框架对规划游戏的设计思维引导
Tab. 1 Guiding design thinking in planning games through the MDA framework

| 要素 | 意涵 | 语境化思维 |
|---|---|---|
| 机制 (mechanics) | 指游戏的规则、操作和系统，例如角色的移动方式、资源的获取方式、战斗的规则等。在城市设计与规划的严肃游戏中，机制可以对应于城市规划的规则、政策和流程 | 如何将真实世界的城市规划的核心要素(如物理空间结构、有形与无形资产、财政预算、环境政策、环境政策……)转化为游戏场景和可操作的规则 |
| | | 游戏形态(类型? 单人或多人? 电子或物理?) |
| | | 游戏过程与结果如何反馈现实政策框架 |
| 动态 (dynamics) | 指塑造互动行为和反馈循环，例如玩家的选择、策略、合作和竞争等与游戏机制互动产生的行为和结果。在城市设计与规划的严肃游戏中，动态可以对应于公众参与规划过程中的互动、协商和决策 | 不同玩家角色及其决策如何在游戏系统中互动 |
| | | 是否能在反馈回路中逐渐呈现真实城市演化的特点 |
| | | 游戏经济和激励 |
| | | 游戏张力(得与失；奖励和惩罚) |
| 美学 (aesthetics) | 指玩家在游戏过程中感受到的乐趣和情感，例如沉浸感、成就感、社会联系等。在城市设计与规划的严肃游戏中，美学可以对应于公众参与规划过程中的获得感、责任感及对城市规划的认同感，从而引导公众更好地理解规划内容并参与其中 | 玩家能否在游戏过程中感受到乐趣、挑战、合作、紧迫感等多样化情感，并在情感共鸣中加深对城市议题的理解 |
| | | 如何通过视觉、叙事、互动反馈等美学设计，使玩家在游戏中产生对城市议题的共情 |
| | | 如何通过符号(如地方建筑风格、历史元素)或场景(如真实地理环境的虚拟映射)强化玩家对城市记忆的感知 |
| | | 游戏美学是否与真实城市的物理或文化特征形成呼应、诠释或再生产？是否能在娱乐性之外，引导玩家反思现实矛盾 |

## 4 为真实城市议题而游戏：设计思考

### 4.1 上层指导原则——景观城市主义

游戏设计转化为设计方法的主要挑战之一在于脉络化(contextualisation)，也就是将真实的城市环境挑战与其背景转译成游戏设计。脉络化过程的核心挑战在于将城市生态的动态性、社会系统的嵌套性转化为可交互的规则体系。这要求设计者以景观作为“过程性基础设施”的视角，将真实城市中不可见的矛盾(如水文波动阈值、社区利益博弈)抽象为游戏机制，同时通过美学叙事保留地方文化记忆与生态关联。例如，水质管理需转译为动态决策模型，既要体现环境科学的量化逻辑，又需嵌入居民对河流的情感投射。这种双重转译需在系统简化与真实复现之间建立张力，使游戏既具备操作可行性，又能触发玩家对现实复杂性的深度共情。

### 4.2 MDA框架(Mechanics, Dynamics, and Aesthetics)

笔者的课题组借鉴了游戏设计领域中的经典的理论“MDA模型”(Mechanics, Dynamics, Aesthetics)作为方案设计的指导与分析框架(表1)。该框架将游戏设计视为3层互相关联的要素，通过解析机制、动态和美学之间的关系来指导游戏开发。这一框架能够帮助设计师从玩家的体验出发，反向分析如何通过机制和动态来实现设计目标。

在以游戏为媒介的公众参与景观规划中，“MDA模型”提供了一个结构化的设计和评估框架指导游戏设计和优化，使其在公众参与过程中实现特定的景观规划目标。这一过程通过机制(mechanics)设计规则和交互方式，动态(dynamics)塑造互动行为和反馈循环，美学(aesthetics)营造情感体验，从而引导公众更好地理解规划内容并参与其中。

MDA框架强调了游戏设计过程中的层次性：设计师从机制入手，而玩家则首先感知到的是美学层面的体验。对MDA框架的引用旨在让城市规划游戏不仅“有趣”，更要“有用”，并在一次次迭代中逐步逼近现实中多方利益主体的复杂博弈。它是连接游戏理论与城市规划实践的一座桥梁，将本就纷繁的社会议题，结构化地转译到游戏系统之中，为公众和专业人员搭建沟通与共创的平台[20]。

游戏化要真正融入城市规划，关键在于如何把现实的社会、空间和政策问题转译成游戏规则与情境，同时保持对真实决策的有效启示。以下是几个核心设计思考。

1)议题选择与抽象层级。

城市更新、交通治理或土地使用等议题，常常涉及复杂的专业知识与政策细则。设计者需将其中最核心的变量或冲突点提炼出来(如道路容量、居民人口、资源分布)，以形成游戏可操作的“机制”(mechanics)，让玩家在该框架下做出选择与博弈[20]。

2)角色扮演与利益多元。

城市规划并非单一主体的行为，而是多个利益相关者的协商过程。通过引入角色扮演(role-playing)，让参与者在游戏中扮演不同社会群体(政府官员、社区居民、开发商、环保团体等)，体验彼此的立场与约束。此举不仅可以拉近各方距离，也更能让公众体会现实中利益冲突的由来。

3)即时反馈与学习循环。

游戏设计理论强调“即时反馈”对于维持玩家投入与学习的重要性[19]。在城市规划游戏中，可以通过模拟指标或可视化图表，让玩家立即看到其决策带来的环境、交通、经济后果。这样的“动态”(dynamics)不仅令玩家产生更深的代入感，也在潜移默化中帮助他们理解城市系统的复杂联动性。

4)公共讨论与集体决策。

为了突出规划的公共性，游戏常鼓励玩家在决策后进行讨论或投票。此时，游戏的“美学体验”(aesthetics)也不只是画面或界面设计，而是玩家在游戏中产生的情感共鸣、协作成就与价值冲突[20]。这能在现实公共议程中形成对话基础，为后续正式谈判或规划制定预先热身。

游戏最终的目标，不只是一场临时活动，而是能将共识与创意带回真实的决策流程。为此，需要将游戏产出的数据、玩家讨论要点或策略评估结果，与城市管理部门、专业规划团队及社会


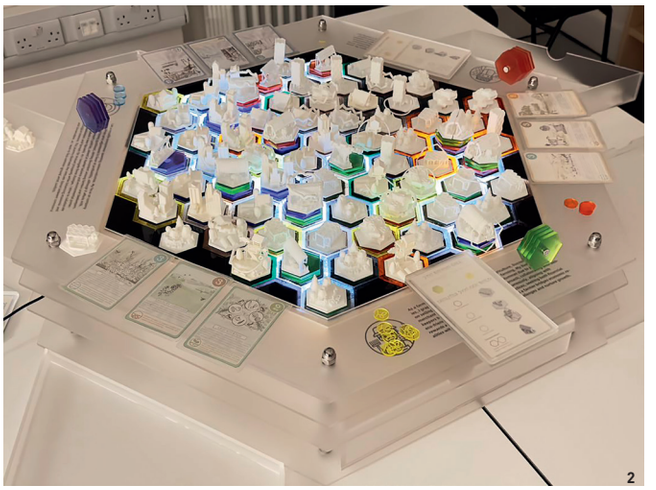


图1 在“奇切斯特研究周”活动中开放当地民众体验《Water Neutral City》游戏(Eduardo Rico Carranza摄)
Fig.1 The game Water Neutral City takes centre stage during the “Chichester Research Week” event, where it was made accessible to the public for hands-on engagement
图2 由英国伯明翰南部的实际地理状态转化的交互式棋盘(徐汉喆摄)
Fig.2 The interactive game board transformed from the actual geographical condition of southern Birmingham, UK
图3 在研究团队成员指导下进行的《Dummy City》游戏(Eduardo Rico Carranza摄)
Fig.3 Dummy City game conducted under the guidance of research team members

组织建立有效对接机制。只有当游戏结果能够影响实际规划方案或公共政策时，公众的积极性与信任才能得到巩固。

## 5 案例分析

### 5.1 案例一《Water Neutral City》(单人游戏，竞赛时间模式)

机制：本游戏为单人游戏，玩家扮演英国某个城市(以奇切斯特Chichester为背景)的政策制定者或城市管理者，目标是展示地方政策、技术选择和水资源管理之间复杂的互动关系。游戏具体设定在奇切斯特市，由于水资源紧张和营养物质浓度增加，该地区保护区的状况受到威胁。玩家需在投资、税收和环境目标之间持续保持平衡。

动态：随着时间推进，对水资源系统的需求和污染压力不断增加，玩家需要平衡投资、税收及可能导致民意不满的决策，同时维持水质。如果水质低于标准，游戏失败；但若民意支持度跌破某个阈值，随之而来的选举压力将进一步阻碍决策，加速环境恶化。游戏通过一个代表奇切斯特市的棋盘进行，棋盘分为5个区域，每个区域都有特定的水文与环境特征。标记物显示可用预算、水资源数量、区域水质和政府的民意支持度。每个回合玩家抽取并分配代表政策、技术或事件(如干旱、污染)的卡牌。玩家需做出决策(通常提高税收会增加资金但降低人气，或限制污染)或投资基础设施(花费资金改善水质)，在保持水质和维持人气之间做出权衡。随着时间的推移，随机事件将给水质和民意带来挑战，玩家需仔细选择在何时何地使用政策或基础设施投资，以免任一区域的水质或民意指标降为零，导致游戏结束。本游戏已通过多次测试，验证了其良好的可玩性(图1)。

美学：游戏采用绘画与卡通风格的视觉元素与地图，画面清晰、图像精致。游戏强调决策者面临艰难抉择时的脆弱性和复杂性。简单而清晰的视觉设计体现了政策制定者需权衡不同利益的决策本质。

### 5.2 案例二《To Bee Free》(合作游戏，3名玩家)

机制：玩家分别扮演农业产业链中不同利益相关者的角色，包括养蜂人、农场主和零售商，游戏重点关注通过负责任的农业实践促进昆虫生物多样性。玩家需要相互合作，发展各自业务，同时学习负责任的农业机制、现有政策补贴和英国农民所面临的威胁，尤其强调保护自然授粉昆虫与农业生产、养蜂之间的相容性。

动态：游戏在合作与个人发展战略之间取得平衡。每个回合玩家拥有预算和技能卡牌，可以选择迅速扩大业务占领更多区域，或较缓慢地建立与其他玩家的联盟，形成更具韧性的农业景观。当随机事件卡牌(干旱、虫害等)出现时，更具韧性的农业格局能减少事件带来的损失，惩罚那些快速扩张但忽略长期可持续性的玩家。

美学：游戏棋盘设计精致细腻，基于英国伯明翰南部的真实区域，并配有3D打印棋子，当特定棋子放置于棋盘格上时，该格子会亮起灯光(图2)。此外还有一个与棋盘联动的3D虚拟展示屏幕，将游戏抽象化的决策与真实场景连接，增强游戏体验感，实现基于政策教育的沉浸式学习。

### 5.3 案例三《Dummy City》(对抗游戏，2名玩家)

机制：本游戏聚焦于城市发展与英国现有规划规则，帮助社区运用这些规则实现自身利益。2个玩家分别代表开发团队(反派)和当地社区(正派)，争夺棋盘控制权。玩家通过游戏了解英国现有的规划规则，如社区规划、地方开发税或临时空间利用规则等。

动态：游戏具有竞争性，目标是占领整个棋盘。开发团队初始资金较多，通过投资占领棋盘格；而当地社区则利用规划政策限制开发并逐渐收复失地。虽然开发团队资金充裕，但社区方随着游戏推进会获得政策优势卡牌。游戏的核心策略在于平衡扩张速度：过快扩张将面临政策风险，过于保守则易被对方夺取土地。每局游戏时间30~40 min。

美学：游戏视觉风格极为繁复且充满巴洛克式细节，采用3D打印棋子和激光切割的多层棋盘。卡牌以深色巴洛克风格设计，强调开发团队(怪兽形象)与社区方(天使形象)之间的鲜明对比。游戏房间通过昏暗灯光与迷幻色彩投影营造

一种超现实的氛围，吸引玩家探索卡牌与政策背后的故事。复杂的规则使研究团队成员需积极指导玩家进行游戏，以确保游戏顺利进行(图3)。

## 6 讨论

### 6.1 严肃游戏设计实践典型路径

严肃游戏融入城市规划的实践路径并非简单的线性流程，而是一个动态迭代的社会技术系统。在AA建筑学院景观城市学工作室的实验中，这一过程始终强调“现实锚定-游戏转译-共识反哺”的结构原则，其核心在于通过游戏化工具重塑规划权力关系，而非仅追求技术层面的形式创新。

1)与地方规划机构合作：与市政规划部门建立合作伙伴关系，确保游戏符合地方具体情境和政策。

2)主题探索、定义与结构化：识别核心城市议题，确定关键目标，并将其细化为适用于游戏设计的具体环节。

3)目标受众确定：确定游戏的参与群体，例如居民、政策制定者或学生。

4)游戏形式选择：选择适合目标和受众的游戏类型，包括数字或实体游戏，单人或多人游戏。

5)游戏目标定义：制定清晰的游戏目标，例如促进公众理解、模拟决策过程或为政策制定收集反馈。

6)MDA游戏设计、测试与优化：运用机制、动态和美学框架指导游戏开发，进行测试，并根据反馈不断优化。

7)游戏发布：正式向公众推出游戏。

8)用户反馈收集：收集参与者反馈，评估游戏效果。

9)数据分析：分析游戏过程数据，以指导城市规划决策或策略。

### 6.2 规划游戏的双重教育性

对于公众用户，严肃游戏通过沉浸式的城市规划场景，教育参与者理解现实议题的复杂性。例如，参与者能更好地了解资源分配、环境可持续性或政策社会经济影响之间的权衡。

对于游戏设计与开发者(执行项目的学生)，游戏的创作过程本身即为一种教育体验。学生在游戏设计中深入理解并反思城市规划面临的挑战、政策及技术工具，从而培养对城市规划理论与实际应用之间关系的深层理解。这一过程能激发创造性思维，建立理论知识与实践应用之间的认知联结。

### 6.3 严肃游戏驱动的城市空间生产

严肃游戏的导入为公众决定城市空间的愿景提供了额外的动能。Water Neutral City的数字部分表明它不仅能借助数字技术或模拟沙盘，把“概念空间”可视化为具体的场景或任务，也能像其《To Bee Free》和《Dummy City》一样通过游戏机制激发公众积极参与，让不同群体在“扮演”城市角色或面临虚拟挑战的过程中，表达并交换对城市的体验、情感与需求。换言之，严肃游戏为“感知空间”与“生活空间”注入了新的发声渠道，使得公众在更具沉浸感和互动性的环境中分享彼此的体验和愿景。与此同时，规划者也能够从游戏反馈中更加直接地捕捉到市民在日常生活与文化脉络中的真实需求，从而在规划理念与城市现实之间建立更紧密的联结。

## 7 结论

本研究初步揭示了城市景观规划中公众主体性从被动接受到主动共创的范式转型。严肃游戏作为方法论创新，不仅回应了“空间生产”理论中市民作为空间共同生产者的诉求，更通过机制转译与情境模拟，重构了公众参与的权力格局。在《Water Neutral City》与《To Bee Free》等案例中，游戏化设计将水资源管理、农业生物多样性等复杂议题转化为可操作的互动叙事，使公众得以在虚拟决策中直观理解生态系统服务权衡、政策连锁效应及多方利益博弈的本质。其寓教于乐的参与模式，既降低了专业知识的认知门槛，又通过即时反馈与协作机制激活了市民对城市未来的想象力与社会凝聚力。

严肃游戏的深层意义在于推动行动设计的范式转型——市民从空间消费者转变为具有决策能力的共创者。当游戏机制将抽象规划规则转译为具象化任务时，参与者得以在安全环境中探索冲突、试验策略，其产出的数据与共识可反向赋能真实决策流程。这种“游戏-现实”的双向反馈机制，不仅强化了规划过程的社会合法性，更通过情感共鸣与文化认同(如《Dummy City》中的地方符号植入)重塑了公众与城市的精神联结。未来研究需将游戏进一步与城市的物质现实整合，如融合物联网监测与游戏动态数据，构建“感知-模拟-优化(或调整)”框架，并且避免技术主导的形式化陷阱。严肃游戏是否能建构一种实现“城市权利”愿景的参与性核心媒介，在其中市民能否是城市空间演化的见证者，更是其未来愿景的共同探索者？需要进一步探索。

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# An Exploratory Study of Serious Games as a Methodology for Public Participation in Urban Landscape Planning

HUANG Shengyang, (Spain) Eduardo Rico CARRANZA

## 1 Introduction

The accelerating and increasingly complex process of contemporary urbanisation has posed significant challenges to traditional urban planning methods. The closed nature of expert-driven decision-making struggles to address diverse interests, technical rationality in spatial imaginaries remains disconnected from the everyday experiences of urban residents, and formalised public participation mechanisms frequently lapse into symbolic negotiations. In this context, exploring planning tools that are both inclusive and creative has become crucial for reconstructing urban governance paradigms.

As an emerging methodology, gamification offers new possibilities for public participation in urban landscape planning and design processes. By designing interactive mechanisms, integrating public trial-and-error and feedback loops, and highly abstracting and simulating real urban problems, gamification seeks to lower cognitive and psychological barriers to public involvement. This approach enhances participants' sense of engagement, helps the public intuitively and deeply comprehend complex planning issues, and even encourages proactive exploration of solutions.

This research aims to examine, from a design-educational perspective, how action design frameworks in urban landscape planning can be translated into serious game development processes, integrating the Mechanics, Dynamics, and Aesthetics (MDA) game design framework. It further investigates the design logic, implementation potential, and social significance of serious games in planning.

## 2 Historical Origins of Public Participation: From Ancient Greece to British Traditions

The ancient Greek city-state (polis), especially Athens, is widely recognised as the starting point of Western democracy. Institutions like the Ecclesia (citizens' assembly) and citizen committees, either elected or chosen by lot, allowed citizens to participate directly in decision-making. Correspondingly, physical spaces such as the Agora (marketplace) served as vital centres for political and social activities. The early integration of democracy and public space provided a foundational principle for urban planning and public participation-urban spaces became essential intersections for political and civic life.

The early modern British planning system mainly responded to urban issues stemming from industrialisation, including overcrowding, poor sanitation, and socioeconomic disparities. These systems relied heavily on expert-led decisions and legislative frameworks, such as Ebenezer Howard's Garden City movement, which advocated novel urban layouts for environmental improvement. From the mid-20th century onward, however, the widespread adoption of democratic values and increased societal diversity sparked critical reflections on the relationship between space and society, granting the public greater voice in urban planning processes. The community participation movement of the late 1960s and 1970s particularly highlighted grassroots voices and local interests in urban regeneration projects.

Initially, public agency in urban planning manifested through critiques of power-knowledge relations underlying traditional planning models. Michel Foucault's studies revealed that power in societal institutions is dispersed or reproduced through knowledge systems and discursive practices. Thus, expert planners and government agencies' knowledge could also control public use of spaces. Public

participation, therefore, transcends merely collecting public opinions, emphasising instead reflection on professional monopolies and power structures, acknowledging public agency in spatial decision-making.

Henri Lefebvre, in "The Production of Space", argued that spaces are co-produced by political economies, social relations, and cultural practices. Thus, relying exclusively on expert rational analyses or economic drivers often fails to capture diverse spatial needs fully. The essential value of public participation lies in enabling broader social groups to partake in "spatial production", negotiating, discussing, and reshaping spatial functions and meanings. Lefebvre's concept of the "right to the city" further asserts the public's entitlement to influence urban spatial use.

Public perceptions and understandings of cities constitute valuable planning information. Kevin Lynch's analytical framework in "The Image of the City" indicated that cities are perceived by individuals not only through professional blueprints but also through psychological or perceptual maps formed during everyday experiences. Colin Rowe's "Collage City" and Aldo Rossi's "The Architecture of the City" enriched public participation concepts emotionally and culturally, highlighting collective memories, historical fragments, and symbolic meanings as essential components shaping urban cultural landscapes.

Lefebvre's spatial triad – perceived, conceived, and lived space – highlights the multifaceted dimensions shaping urban development. Traditional planning overly emphasises conceived space – technically designed future scenarios – while neglecting perceived and lived spaces, leading to diminished social acceptance and cultural roots of urban projects. Consequently, successful planning necessitates platforms facilitating public dialogue and negotiation around personal experiences, cultural identities, and expectations.

## 3 Towards Gamification: A New Direction for Public Participation in Urban Planning

Gamification in urban planning processes offers twofold potential improvements. First, it transforms complex societal issues into manageable tasks, scenarios, and interactive models, allowing participants to experience and comprehend urban issues at lower cognitive thresholds. Second, gamification serves as an action design tool, creating immersive learning and collaborative environments, and assisting the public in exploring solutions through immediate feedback and simulated trials. This mechanism effectively addresses the complexity inherent in multi-stakeholder interests, resource allocation, and policy-making.

1) Serious games as tools for social participation Serious games transcend pure entertainment, extensively used in education, training, advocacy, and real-world problem-solving. By employing interactive and visualisation techniques, these games present complex social, economic, and environmental issues interactively, providing planners and citizens with novel solutions. Consequently, gamification is not merely a participation tool but a deepening of action design, actualising collaboration, experimentation, and feedback mechanisms through digital technologies. This promotes the public's active involvement in urban space production, overcoming technical understanding barriers and enhancing public agency.

2) Action design thinking and gamification in urban contexts Action design integrates social experimentation, community building, and artistic intervention, shifting citizens from passive recipients to active co-creators. Gamification addresses challenges such as complex stakeholder conflicts and unequal resource distribution by creating engaging and safe environments for learning, negotiation, and co-creation. It simplifies intricate urban systems into interactive models, enhances motivation and cohesion through gameplay dynamics, and provides opportunities to experiment without real-world risks.

## 4 Gaming for Real Urban Issues: Design Considerations

### 4.1 Guiding principles – Landscape Urbanism

One major challenge in translating game design into a design methodology is contextualisation, i.e., translating actual urban environmental challenges and their backgrounds into game designs. The core challenge of this contextualisation process lies in transforming urban ecological dynamics and the embeddedness of social systems into interactive rule systems. This requires designers to adopt a landscape perspective as a form of "process infrastructure", abstracting invisible real-world tensions (such as hydrological fluctuation thresholds and community interest conflicts) into game mechanics, while maintaining local cultural memories and ecological relationships through aesthetic narratives. For example, water quality management needs to be translated into dynamic decision-making models that reflect environmental science's quantitative logic and integrate residents' emotional associations with rivers. This dual translation must establish a tension between system simplification and realistic reproduction, ensuring the game remains operable while also evoking players' deep empathy for real-world complexity.

### 4.2 The MDA framework (Mechanics, Dynamics, and Aesthetics)

This study draws upon the classic game design theory known as the MDA framework (Mechanics, Dynamics, Aesthetics) as the guiding and analytical framework for our design proposals. The framework views game design as three interrelated layers, guiding development through the analysis of relationships between mechanics, dynamics, and aesthetics. It helps designers start from the player's experience and work backward to understand how mechanisms and dynamics achieve design goals.

In serious games aimed at public participation in landscape planning, the MDA framework offers a structured design and evaluation approach to guide and optimise games, ensuring they fulfil specific landscape planning objectives. This process involves mechanics to set rules and interactive modes, dynamics to shape interactive behaviours and feedback loops, and aesthetics to create emotional experiences, thereby guiding the public toward better understanding and involvement in planning processes.

Mechanics represent game rules, operations, and systems, such as movement methods, resource acquisition, and combat rules. In serious urban design and planning games, mechanics correspond to urban planning rules, policies, and procedures.

Designers must consider how to transform core urban planning elements (physical spatial structures, tangible and intangible assets, financial budgets, and environmental policies) into operable rules within game scenarios.

Dynamics shape interactive behaviours and feedback loops, including player decisions, strategies, cooperation, and competition generated by interactions with game mechanics. In serious urban design and planning games, dynamics reflect interactions, negotiations, and decisions in public participation processes. Designers should explore how different player roles and decisions interact within the game system, gradually reflecting characteristics of real urban evolution through feedback loops, game economics, incentives, tensions, rewards, and punishments.

Aesthetics refers to the fun and emotions players experience, including immersion, achievement, and social connection. In serious urban design and planning games, aesthetics align with the public's sense of achievement, responsibility, and identification with urban planning, enhancing understanding and engagement. Designers should consider if the game provides diverse emotional experiences – fun, challenges, cooperation, urgency – and promotes emotional resonance with urban issues through visual, narrative, and interactive feedback. Symbolic elements (local architectural styles, historical components) and scenarios (virtual mappings of real geographic environments) reinforce players' perceptions of urban memory, creating emotional empathy and promoting reflections on real-world contradictions.

The MDA framework underscores the hierarchical nature of game design, beginning with mechanics from the designer's perspective, while players first perceive the aesthetic experience. The application of the MDA framework ensures that urban planning games are both enjoyable and practically meaningful, incrementally aligning game interactions with real-world complex stakeholder negotiations. It bridges game theory and urban planning practice, translating intricate societal issues structurally into game systems, and providing a platform for communication and co-creation between the public and professionals.

Integrating gamification into urban planning hinges on translating real-world social, spatial, and policy issues into game rules and scenarios while preserving their relevance to real decision-making. The ultimate goal of gamification is not temporary entertainment but integrating generated consensus and creativity into actual decision-making processes. Effective interfaces between game outcomes, urban management authorities, professional planners, and social organisations are essential to enhance public enthusiasm and trust, ensuring game outcomes meaningfully impact real-world planning and policies.

## 5 Case Analyses

### 5.1 Case 1: Water Neutral City (single-player game, timed competition mode)

Mechanics: This single-player game positions participants as policy-makers or city managers in a British city (based on Chichester), aiming to illustrate complex interactions between local policy, technological choices, and water management. Set specifically in Chichester, participants balance investment, taxation, and environmental targets amidst growing pressures from limited water resources and nutrient concentration threats to protected areas.

Dynamics: As the game progresses, increasing demands on water resources and pollution pressures require players to maintain the balance between investments, tax rates, and potentially unpopular decisions, all while preserving water quality. Failure occurs if water quality drops below acceptable levels or public support falls beneath critical thresholds, creating electoral pressures that exacerbate environmental degradation. The game utilises a Chichester city map divided into five hydrologically distinct areas, displaying budget availability, water resources, water quality, and public approval ratings. Players manage policy, technology, or event cards (e.g., droughts or pollution events), strategically deciding taxation levels and infrastructure investments to maintain the balance between public popularity and water quality. Random events challenge players over time, demanding strategic foresight to avoid critical failures. The game's repeated testing has confirmed its strong playability.

Aesthetics: Visually, the game employs clear, cartoon-style illustrations and maps, emphasising the complexity and vulnerability faced by decision-makers. Simple, elegant visuals underline the inherent trade-offs between different policy interests.

### 5.2 Case 2: To Bee Free (collaborative game, three players)

Mechanics: Players assume roles within the agricultural value chain, specifically beekeepers, farmers, and retailers. The game emphasises responsible agricultural practices that enhance insect biodiversity. Players collaborate while developing their respective businesses, learning about responsible agricultural mechanisms, existing policy incentives, and threats faced by British farmers, especially highlighting the compatibility between natural pollinator conservation, farming, and beekeeping.

Dynamics: The game balances individual expansion strategies with cooperative alliances. Each round, players manage budgets and skill cards, choosing rapid business expansion or slower, more resilient alliance formation strategies. Random events (droughts, pest outbreaks) disproportionately affect rapid expansion strategies that neglect long-term sustainability.

Aesthetics: The game board features a detailed design inspired by the actual geography of southern Birmingham, complemented by 3D-printed playing pieces. Certain game board sections illuminate when relevant pieces are placed, enhancing interactivity. An integrated 3D virtual display connects abstract decisions with real-world scenarios, enhancing immersive policy-oriented learning.

### 5.3 Case 3: Dummy City (competitive game, two players)

Mechanics: Focused on urban development and British planning regulations, this game assists communities in leveraging existing planning rules to their advantage. Players represent developers (antagonists) and local communities (protagonists), competing for board control while learning about British planning rules such as community planning, local development taxes, and temporary land use regulations.

Dynamics: The competitive nature involves controlling the entire game board.

Developers begin with substantial resources to acquire board spaces quickly, whereas communities utilise planning policies to restrict development and reclaim territory gradually. Although developers have financial advantages, communities gain policy advantage cards as the game progresses. Strategic decisions around expansion pace – too fast or too conservative – affect success. Typical gameplay lasts 30-40 minutes.

Aesthetics: Rich, Baroque-inspired visuals dominate, with detailed 3D-printed pieces and multi-layered, laser-cut game boards. Cards feature stark contrasts between developers (depicted as monsters) and communities (depicted as angels). The game environment employs dim lighting and psychedelic projections to create a surreal, engaging atmosphere, enhancing the exploration of card narratives and policy backgrounds. The complexity of the rules necessitates active guidance from research team members during gameplay.

## 6 Discussions

### 6.1 Typical practical pathways in serious game design

Integrating serious games into urban planning practice is not linear but involves iterative social-technical processes. Experiments conducted in the AA Landscape Urbanism studio emphasise a structure comprising "reality anchoring – game translation – consensus feedback". This framework highlights restructuring power dynamics through gamified tools rather than purely pursuing technical innovation.

Steps involve collaborating with local planning authorities to ensure contextual alignment, identifying and defining critical urban issues, determining target audiences, selecting appropriate game formats (digital or physical, single-player or multiplayer), establishing clear objectives, employing the MDA framework for design, conducting iterative testing and refinement, public release, collecting user feedback, and analysing game-generated data for informing urban planning strategies.

### 6.2 Dual educational value of planning games

Serious games educate public participants through immersive scenarios, enabling a better understanding of resource distribution, environmental sustainability, and socioeconomic policy implications. For game designers and developers (particularly students executing projects), the creation process itself constitutes an educational experience, promoting the deep reflection and understanding of urban planning challenges, policies, and technological tools. This process fosters creativity, reinforcing theoretical and practical connections.

### 6.3 Serious game-driven production of urban spaces

Serious games provide additional momentum for public participation in shaping urban space visions. Digital components, such as those in "Water Neutral City", visualise conceptual spaces as tangible scenarios or tasks, while games like "To Bee Free" and "Dummy City" encourage active participation, enabling diverse groups to articulate and exchange experiences, emotions, and urban aspirations. In essence, serious games amplify perceived and lived spaces' voices, fostering deeper connections between planning visions and citizens' daily realities and cultural contexts.

## 7 Conclusion

This study demonstrates the transformative potential of serious games, shifting public roles in urban landscape planning from passive recipients to active co-creators. Innovative methodologies like gamification respond effectively to Lefebvre's theory of spatial production, reshaping power dynamics through mechanism translation and scenario simulation. Games like "Water Neutral City" and "To Bee Free" translate complex issues like water management and biodiversity into accessible interactive narratives, enhancing public comprehension of ecosystem service trade-offs and policy consequences. The educational yet enjoyable nature of serious games lowers cognitive barriers and activates public imagination and social cohesion regarding urban futures.

Serious games embody a paradigm shift in action design, transforming citizens from passive space consumers to empowered decision-making co-creators. By translating abstract planning rules into tangible tasks, these games facilitate experimentation and conflict exploration within safe environments, generating actionable data and consensus that enrich real-world planning processes. Future research should integrate serious games further into urban realities, potentially harnessing technologies like the Internet of Things (IoT) to create "perceive–simulate–optimise" frameworks, carefully avoiding technologically driven formalisations. Ultimately, serious games could emerge as critical participatory media actualising the "right to the city", enabling citizens not only to witness but actively shape urban spatial evolution.

(Editor / JIN Hua)

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