



Perspectives

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Corresponding author:

Amin Heidari; Email: amin.heidari@mq.edu.au

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Tache with Trash: an image of integrating art with upcycling in the city of the future

Amin Heidari

Department of Media, Communications, Creative Arts, Language, and Literature (MCCALL), Macquarie University, Sydney, Australia

Summary

Art is rarely imagined as a strategic approach in the design of the future city. The purpose here is to offer a perspective on future cities that resides at the intersection of art and the practice of upcycling. I dub this perspective ‘Tache with Trash’, offering an artistic design for busy locales based on transforming recyclable waste into a vibrant spectrum of colours. Applicable in places like shopping malls, campuses and convention centres, I envision individuals disposing of trash in a shredding machine that injects those fragments into transparent containers, such as glass ornaments and glass wall panels. Disposing of recyclable trash becomes like dabbing a *tache* (stain, spot, blob) of pigment on an artwork. Rooted in the theoretical framework of ‘envisioning the future’, this perspective is inspired by the ‘junk art’ genre and aims to integrate communal art with sustainable upcycling. The benefits of the perspective include enhancing social interaction on sustainability, serving as a tool for younger generations’ sustainability education, providing a platform for local artists and assisting crowded centres with economization.

Future cities: a gap in the approach

The term ‘future city’ can evoke different meanings and different scenarios. The faculty of imagination, however, plays a key role in characterizing the set of possibilities that the notion holds in various contexts. ‘Future cities’ is a term used to imagine ‘what cities themselves will be like, how they will operate, what systems will orchestrate them and how they will relate to their stakeholders (citizens, governments, businesses, investors, and others)’ (Moir et al. 2014, p. 7). It could be argued that one of the most mainstream imaginings that has dominated the picture of future cities is the concept of smart cities.

‘Smart cities’ have been at the forefront of urban planning discussions for several years (Etezadzadeh 2015, Chatterjee et al. 2022, Kumar 2023). The notion of cities with intelligent infrastructure was initially explored in science fiction during the twentieth century (e.g., in Clarke (1956), Dick (1955) and Gibson (1984)). With the significant advances in information technology in the twenty-first century and the integration of various levels of intelligence into urban development, the idea of cities becoming smart has rapidly transitioned from science fiction to reality. This transformation is driven by the convergence of information and communication technologies, fundamentally reshaping urban environments. The discourse of future smart cities often fixates on otherworldly engineering ingenuity or visions of information technology-based omnipotence (Etezadzadeh 2015, p. ix).

Characteristics such as ‘Smart Economy’, ‘Smart People’, ‘Smart Governance’, ‘Smart Mobility’, ‘Smart Environment’ and ‘Smart Living’ are at the centre of the conceptualization of future cities (Giffinger et al. 2007, p. 11). One primary shortcoming in this conceptualization is that ‘smart’ itself seems to entail a narrow definition in this discourse. It mainly focuses on technological prowess leading to economic competitiveness through innovation, entrepreneurship, branding, productivity and labour market adaptability, as well as integration into the domestic and international markets (Giffinger et al. 2007). Revolving around initiatives that use digital innovation to make urban service delivery more efficient (Kézai et al. 2020), the imagination of future smart cities attaches significant importance to business-led urban development (Hollands 2008), considers economic value as the sole driver (Caragliu et al. 2011) and envisions the city of the future as a data-centric environment where citizens are continuously engaged with crowd-sourced systems, responding to queries and uploading information (Batty et al. 2012).

Despite the need to engage a broad range of disciplines in designing future cities (Likitswat 2019) and the necessity of initiating new models for sustainability centred on creative citizens (Riffat et al. 2016), the prevalent perspective on future cities and the matter of sustainability often fails to consider ‘art’ or ‘artists’ as key elements in their designing approaches (Kurt 2004, Margolin 2005). The concept of ‘art’ in the mainstream imagination of future cities is most often limited to a set of techniques responsible for the creation of ‘the beautiful’ – a narrow

understanding of art rooted in a binary, '0' or '1' view that stems from a mathematical mentality. This perspective often falls short of fully appreciating the multifaceted possibilities that art can provide.

There has been a gradual increase in studies revisiting the link between art and future cities (e.g., Coleman & Byrne 2015, Garland 2015, Mostafa Hatem 2023). However, art is still mostly considered an ornament for future cities that, at times, can communicate a message in a more appealing form. While that could be one of the benefits of incorporating the arts in our thinking about sustainability, as Vola (2022) observes, the medium in its totality is still 'overlooked in discussions on the "smart" future of our urban environment.' Therefore, I attempt to address the question of how the medium of art could become fundamentally integrated into the strategies of sustainability in future cities. I endeavour to address this question by drawing on the design of 'Tache with Trash' (TwT) and envisioning a picture of future cities where 'art' is not a mere embellishment 'apart from human experience', but 'is what the product does with and in experience' (Dewey 1980, p. 4).

The effects of art are especially prominent in the pedagogical sphere. Drawing from the insights of various educational practitioners and researchers such as Littlely et al. (2009), Rickinson (2001) and Stevenson (2007), I contend that sustainability education does not solely reside in the 'content' taught but rather in the overall strategies of making sustainable practices a facet of lived experience. The emphasis should not merely be on imparting information about impact and effect; it should involve acknowledging how certain practices can cultivate the agency and awareness essential for becoming more attuned to the role of humans in a complex and challenging environment. As Hunter et al. (2018, p. 15) suggest regarding the link between 'art', 'education' and 'sustainability', the arts must not be used superficially to spice up other subjects but rather to acknowledge their deep educational value, especially in connecting with sustainability education to redefine meaningful education for all life.

Consequently, rather than pigeonholing art into a rigid dichotomy solely responsible for creating the 'beautiful', it is vital to acknowledge art's potential for enriching urban life, fostering creativity, promoting cultural diversity and contributing to a more holistic and vibrant vision of future cities. Artistic thinking can assist urban planning in practising sustainability, promoting the culture of social communication and engaging the community in a shared goal and meaning. I try to demonstrate an image of the future city where 'art', 'sustainability' and 'social engagement' are infused to create an upcycling strategy within the urban environment. I will first establish 'envisioning the future' as its methodology. I will then look at sustainability as a critical issue in urban governance and the role of 'upcycling' as a sustainable solution in urban planning. Subsequently, by looking at the genre of 'junk art', the intersection of art and upcycling will be demonstrated.

The title that I have chosen for this perspectival design is 'Tache with Trash'. The French word *tache* comes from *tachisme*, which was a form of abstract painting characterized by spontaneous brushstrokes, gestural abstraction and the emphasis on the act of painting itself rather than predetermined forms or subjects. As a noun, *tache* means 'spot' or 'stain'. According to the Merriam-Webster Dictionary, 'tache' is also a transitive verb from Middle English *tassen*, *tatchen* and Middle French *tacher*, meaning 'to stain, blemish, or tarnish'. TwT refers to the use of every single piece of recyclable trash as a spontaneous spot of colour in a

transparent panel in busy locales. TwT is an attempt to apply the genre of junk art to the everyday practice of disposing of recyclable trash, counting everyday trash as an opportunity for engagement in communal art in public places and as a platform for sustainability education and practice in everyday life. The United Nations Educational, Scientific and Cultural Organization's (UNESCO) education for sustainable development sector stresses that cultural identity is shaped by the memories of childhood art projects that felt larger than life (Southwick 2023). TwT endeavours to envision a picture of future cities where those projects and the resultant cultural identity extend beyond schools.

Envisioning the future

According to Meadows et al. (2006), envisioning is the process of visualizing genuine desires, starting broadly and then becoming increasingly specific. Envisioning the future involves letting go of limitations like feasibility, doubt and past disappointments and allowing the mind to explore its most cherished dreams. However, envisioning does not dismiss the practical aspects of achieving these dreams; it transcends the barriers in thinking about the future. As Meadows et al. (2006, p. 272) propose, it is essential to clarify that although vision alone does not drive change, it plays a crucial role in guiding and motivating action, and, when widely embraced, it can lead to the creation of new systems.

In the process of envisioning the integration of art into sustainable practices, and more particularly in the upcycling strategy in future cities that is undertaken here, several elements play a vital role. Firstly, the genre of 'junk art' is perceived not solely as an individual medium but as a possible collective practice in upcycling waste. Secondly, local artists are imagined as contributors to the local designs of the transparent platforms that host the colours of everyday waste in public places. Thirdly, TwT is about valuing the creation of a shared meaning amongst the community. Although human contribution can be as simple as disposing of waste, the result of their action is adding a *tache* – a colour spot – to an artistic project. Accordingly, TwT is a perspective on the future city that appreciates the 'process' and human engagement in everyday sustainability practice.

In its current form, TwT is at the level of imagination. Although imagination might be associated with unreality and thereby quickly dismissed, in it lies the potential for change. 'Imagination is necessary . . . for the application of thoughts or concepts to things, and without such application no human discourse and no goal-directed activity would be possible' (Warnock 1976, p. 202). It is through imagination that the world can be rendered more familiar, aligning with high hopes and aspirations. Educational philosopher Maxine Greene (2000, p. 35) suggests that reinvigorating imagination could alleviate societal stagnation by emphasizing ethical values and the importance of heightened awareness in shaping community and personal significance.

Sustainability, upcycling and junk art

Within the realm of sustainable development, an imperative challenge lies in waste management. This encompasses the techniques involved in gathering, transporting, processing and disposing of various waste products, all whilst maintaining control and monitoring standards. Sustainability in waste management is crucial to ensuring effective handling of all types of waste. The goal of sustainable waste management is to minimize waste generation, reduce consumption of natural resources and maximize the reuse

of resources. Well-managed waste can be a catalyst for the development of the 'green economy' (Saita & Franceschelli 2017, Nandy et al. 2022, Misztal & Dziekański 2023) by reclaiming resources, creating business opportunities, reducing greenhouse gas emissions and generating energy. As a result, new strategies in the framework of waste management need to be developed (Zorpas 2020, Anuardo et al. 2022).

Given the overwhelming volume of waste generated by modern societies, recycling has become a paramount strategy for environmental protection. Recycling is part of the paradigm of the 'circular economy', which involves closing the loop on material resources through reuse, thereby eliminating waste. Broadly, there are two methods included in recycling: downcycling and upcycling. In the former, the cycle of destruction halts, yet the products undergo a loss in quality. Conversely, the latter adds value to the waste through creative intervention. Upcycling presents a sustainable alternative, fusing 'upgrading' and 'recycling'. It involves taking discarded items and transforming them into something of increased value. Within the expansive realm of upcycling, artistic creation becomes a dynamic avenue teeming with possibilities. What sets this approach apart is its inherent versatility in transcending traditional artistic disciplines. The underlying ethos extends beyond the canvas or sculpture, seeping into a broader cultural consciousness that emphasizes responsible resource utilization.

In this rich tapestry of creativity, the practice of 'junk art' finds its fitting place. By reimagining discarded items, 'junk art' challenges conventional notions of beauty and value, inviting viewers to reconsider the potential inherent in the overlooked and discarded. The term 'junk art' describes a tradition of reapplying waste to create something new. One of the primary theoreticians of junk art is the British art critic Lawrence Alloway (2006), who suggested that 'junk culture is city art. Its source is obsolescence, the throw-away material of cities' (p. 78). By incorporating ready-made objects of various conditions into artworks, the distinctiveness of the medium of art is blurred, amplifying its ties to the environment, particularly when drawing from urban waste to create juxtapositions that reflect city life: 'Assemblages of such material come at the spectator as bits of life, bits of the environment' (Alloway 2006, p. 79). Overall, junk art focuses on creating works of art from trash or other remnants of consumer society to give discarded items a new aesthetic and practical meaning.

There are a number of characteristics that link junk art to the practice of upcycling within the more general scope of sustainability. Firstly, the essence of junk art can be seen as finding its unique niche in urban environments, making it inherently local and intimately tied to the urban fabric (Whiteley 2012, p. 171). Secondly, a pivotal aspect of junk art lies in the histories embedded within its objects, with each item serving as a tangible testament to a moment of everyday life. Thirdly, junk art departs from the conventional dynamics of distance and contemplation in confronting art and replaces them with proximity and participation. Finally, junk art operates within a non-hierarchical cultural framework that inherently connects all objects and images. By doing so, it serves as a powerful tool to bridge the gap created by elitist views on art, bringing citizens closer to the concept of artistic creation and engagement. It serves as a vivid reminder that innovation and artistic expression can be as simple and accessible as reimagining and repurposing everyday discarded items.

An image of the future city: Tache with Trash

The suitability of the school of *tachisme* and the act of *tache* for the perspective of TwT provided here is that each disposed-of item has a colour, and each spot of colour, when added to the bigger picture, appears as a brushstroke of a painter. Several transparent containers can be imagined, from wall-sized glass panels to shapes made of silicon positioned in public places, as hosting platforms for the colours of everyday life. These shapes could be recognizable figures related to special occasions or characters (such as Father Christmas) or more abstract structures that local artists have designed and installed. When disposing of recyclable items like tissues, cups, paper bags and cans, people commonly sort them into designated sections of a bin – a practice that is already widely established. Next, the trash is broken down into the smallest possible particles. These remains come to look like coarse pigments. These powder-like outputs can flow into different transparent frames via a suction device. In this way, each piece of everyday upcyclable waste transforms into a paint *tache*, which is added to an artwork by any passerby.

TwT creates a canvas on which the fleeting instances of everyday life integrate into the fabric of a community artwork. It is a process akin to transforming the ordinary into a canvas for creativity. Taking fragments of everyday occurrences, TwT aims at crafting something entirely new out of materials that have lost their original value – a practice that aligns with the ethos of upcycling. What emerges from this artistic alchemy is not just a collection of pieces but a tangible recollection of those seemingly mundane happenings of everyday life. These artworks become the lasting imprints, the visual echoes of moments that might have otherwise slipped away unnoticed in the rush of daily life. TwT provides a setting for a deliberate challenge to the conventional understanding of art, turning the commonplace into extraordinary expressions that linger in the viewer's mind long after the initial happening has dissipated.

Advantages

The genuine value of the proposed design of TwT can only be fully gauged post-implementation. However, there are several positive consequences theoretically attributable to TwT. Before delving into them, it is crucial to acknowledge the critiques of the 'circular economy' (Korhonen et al. 2018, Corvellec et al. 2022). While dealing with those critiques is beyond the scope of this paper, it is worth noting that TwT is not an encouragement of consumption or endless production. If anything, TwT generates artworks capable of delivering a visual warning against limitless production and consumption. When one sees the amalgamation of everyday waste compiled in TwT platforms, one might fully understand the mass of everyday waste in a single location.

Apart from that, the fact remains that modern societies produce waste every day. People need to appreciate this fact and initiate creative ways of dealing with the problem more sustainably. TwT and its upcycling method represent an enterprise envisioned to deal with this issue in an artistic manner. There are at least four main values that can be associated with the perspective of TwT: pedagogical benefits regarding the concept of sustainability, especially for younger generations; enriching local artists' contributions to the creation of shared meaning; fostering community engagement in sustainable practices; and economization in decoration and renovation processes. In essence, TwT can

create a platform for community art – a collaborative artistic endeavour open to all – elevating the practice and education of sustainability across diverse localities.

Pedagogical benefits

In pedagogical terms, the most valuable aspect of TwT's artistic projects may be directed towards younger generations. Children develop media fluency through creative activities, as the language of art seamlessly transforms into the language of learning, enriching children's lives through artistic actions. TwT can encourage a platform for 'emancipatory learning' (Kopnina 2020), where the framing of everyday waste as mere pieces of trash ready for disposal is challenged. These seemingly unworthy objects can accumulate and turn into something creative and precious whilst simultaneously highlighting social and moral values. Engaging in artistic creations such as TwT could represent a foolproof method in societal attempts to cultivate lifelong learners: individuals who naturally ask questions, embrace challenges, find joy in the learning process, consider diverse perspectives and value the feedback and contributions of others (Pelo 2016, p. 165).

TwT might be well situated within the frame of 'eco-pedagogy', which recommends making changes in economic, social and cultural structures to foster 'planetary citizenship' (Antunes & Gadotti 2005). Kowasch (2022) suggests that field trips are great opportunities for students to learn by seeing, touching and experiencing things firsthand. They also help students realize that they can make a difference in the world. TwT has the potential to transform every visit to a busy locale into a field trip about art, upcycling and everyday waste. During these trips, younger individuals can practise thinking critically by asking questions regarding how things are made and used.

Benefits to local artists

The decision to engage in community art through TwT offers artists numerous benefits, impacting them on personal and professional levels. The greatest advantage lies in the opportunity to have a positive impact on the local community. Community artists can creatively and meaningfully fulfil their desire to contribute to others, using community art as a powerful tool for individual and collective social change. Numerous local artists have noted that participating in community art also has significant professional advantages (Krensky & Steffen 2009, p. 42). Community art often brings tangible benefits. While obtaining financial support from councils and public centres is possible, the true value of this approach lies in the opportunity for artists to reach a vast audience. In addition, artists' efforts can prompt the inhabitants of a city to rethink and interact with their local communities in unconventional ways (Marchese 2015). This might spark innovative approaches amongst citizens to sustain and improve their living conditions. By engaging in the collaborative creative process of TwT, community artists can find and bring about inspiration in terms of new ways of thinking and acting.

Collective project, shared meaning

When a community collaboratively creates a piece of art, a profound tapestry of shared experiences, diverse perspectives and collective identity emerges. The act of communal art-making transcends individual contributions, fostering a sense of unity and connection amongst participants. It becomes a visual and symbolic representation of the community's values – notably, its care for

sustainability and upcycling. Additionally, it can function as a medium for representing the story of some particular moments of everyday life because each person has contributed a *tache* of colour to the public manifestation involved. This collaborative process not only enhances social cohesion but also encourages creativity, communication and mutual understanding. The final artwork serves as a testament to the collective spirit of the community, capturing the essence of its shared journey and leaving a lasting imprint on both the physical and cultural landscape. The engagement and participation involved in contemporary art projects around ecological urbanism can broaden their influence, drawing on collective insights to shape their actions and, consequently, inform the public (Michails 2015). Furthermore, these collaborative endeavours often spark imaginative innovation, envisioning a positive trajectory for the future.

Economization

Annually, substantial resources are allocated to the renovation and decoration of public spaces, spanning from bustling shopping malls to expansive convention centres and various communal areas. This consistent investment reflects a commitment to enhancing the overall experience and aesthetic appeal of these shared environments. Renovations are not merely cosmetic upgrades but strategic initiatives aimed at creating welcoming and functional spaces that cater to the evolving needs and preferences of the public. While there is no accurate global estimate of the cost of all of the colours applied in public space renovations annually, it is safe to say that it constitutes a significant portion of the overall expenditure involved.

Colour plays a crucial role in the aesthetic transformation of public spaces. TwT represents a way to reduce the cost of the colours used in this process. Not only can such a design bring new perspectives to our thinking about decoration, but it can also replace a significant amount of the colour that is applied annually in these internal and external designs. TwT introduces a sustainable approach that transcends conventional colour consumption and can be seamlessly integrated with a community's communal and collective identity. Rather than relying on predetermined colour schemes to imbue meaning into a space, TwT establishes a setting in which the everyday lives of people, including their waste, collaboratively generate an aesthetic sense.

Conclusion

TwT represents a convergence of community-engaged art with the upcycling of waste materials, injecting an artistic dimension into the upcycling practices of waste management in public places. Informed by the theoretical framework of 'envisioning the future' and drawing inspiration from the 'junk art' genre, TwT envisions communal art being seamlessly intertwined with sustainable upcycling in crowded locales. TwT can act as an educational framework on sustainability for the younger generation whilst offering a platform for local community artists to actively contribute to local sustainability efforts. Targeting high-traffic areas like shopping malls, campuses and convention centres, TwT proposes a method whereby individuals deposit recyclable trash into a shredding machine, incorporating the resulting fragments into transparent containers such as glass forms and panels, in a process akin to infusing pigments into a collaborative artwork. Such innovative design can: create educational settings in which people can learn about sustainability, waste management and

upcycling; benefit local artists by providing them with a platform for expression and visibility; create an artistic forum manifesting community engagement and shared experience; and reduce the use of colours in public centre decorations, mitigating expenses through an artistic means of waste management.

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References

Alloway L (2006) *Imagining the Present: Context, Content, and the Role of the Critic*. Edited by R Kalina. New York, NY, USA: Routledge.

Antunes A, Gadotti M (2005) Eco-pedagogy as the appropriate pedagogy to the Earth Charter process. In PB Corcoran, M Vilela, A Roerink (eds), *The Earth Charter in Action* (pp. 135–137). Amsterdam, The Netherlands: Royal Tropical Institute.

Anuário RG, Espuny M, Costa ACF, Oliveira OJ (2022) Toward a cleaner and more sustainable world: a framework to develop and improve waste management through organizations, governments and academia. *Heliyon* 8: e09225.

Batty M, Axhausen KW, Giannotti F, Pozdnoukhov A, Bazzani A, Wachowicz M, et al. (2012) Smart cities of the future. *European Physical Journal Special Topics* 214: 481–518.

Caragliu A, Del Bo C, Nijkamp P (2011) Smart cities in Europe. *Journal of Urban Technology* 18: 65–82.

Chatterjee U, Biswas A, Mukherjee J, Majumdar S (2022) *Advances in Urbanism, Smart Cities, and Sustainability*. Boca Raton, FL, USA: CRC Press.

Clarke AC (1956) *The City and the Stars*. San Diego, CA, USA: Harcourt.

Coleman G, Byrne D (2015) Experiential ecologies: a transdisciplinary framework for embodiment and simulacra. In FT Marchese (ed.), *Media Art and the Urban Environment* (pp. 63–84). Cham, Switzerland: Springer International Publishing.

Corvellec H, Stowell AF, Johansson N (2022) Critiques of the circular economy. *Journal of Industrial Ecology* 26: 421–432.

Dewey J (1980) *Art as an Experience*. New York, NY, USA: Perigee Books.

Dick PK (1955) Autofac. *Galaxy Science Fiction* 11: 70–95.

Etezdazadeh C (2015) *Smart City – Future City?: Smart City 2.0 as a Livable City and Future Market*. Wiesbaden, Germany: Springer Vieweg.

Garland VW (2015) Our place on that wall: community online art projects. In FT Marchese (ed.), *Media Art and the Urban Environment: Engendering Public Engagement with Urban Ecology* (pp. 247–266) Cham, Switzerland: Springer International Publishing.

Gibson W (1984) *Neuromancer*. New York, NY, USA: Ace Books.

Giffinger R, Fertner C, Kramar H, Kalasek R, Milanović N, Meijers E (2007) *Smart Cities – Ranking of European Medium-Sized Cities*. Vienna, Austria: Vienna University of Technology.

Greene M (2000) *Releasing the Imagination: Essays on Education, the Arts, and Social Change*. Hoboken, NJ, USA: John Wiley & Sons.

Hollands RG (2008) Will the real smart city please stand up? *City* 12: 303–320.

Hunter MA, Aprill A, Hill A, Emery S (2018) *Education, Arts and Sustainability: Emerging Practice for a Changing World*. New York, NY, USA: Springer.

Kézai PK, Fischer S, Lados M (2020) Smart economy and startup enterprises in the Visegrád countries – a comparative analysis based on the Crunchbase database. *Smart Cities* 3: 1477–1494.

Kopnina H (2020) Education for the future? Critical evaluation of education for Sustainable Development Goals. *Journal of Environmental Education* 51: 280–291.

Korhonen J, Honkasalo A, Seppälä J (2018) Circular economy: the concept and its limitations. *Ecological Economics* 143: 37–46.

Kowasch M (2022) Circular economy, cradle to cradle and zero waste frameworks in teacher education for sustainability. *International Journal of Sustainability in Higher Education* 23: 1404–1425.

Krensky B, Steffen SL (2009) *Engaging Classrooms and Communities Through Art: A Guide to Designing and Implementing Community-based Art Education*. Lanham, MD, USA: Rowman Altamira.

Kumar TMV (2023) *Smart Master Planning for Cities: Case Studies on Domain Innovations*. The Gateway, Singapore: Springer Nature Singapore.

Kurt H (2004) Aesthetics of sustainability. In H Strelow (ed.), *Aesthetics of Ecology: Art in Environmental Design, Theory and Practice*. Basel, Switzerland: Birkhäuser.

Likitswat F (2019) Future cities: new generation's visions of sustainability concepts and models. *Future Cities and Environment* 5: 1–8.

Littledyke M, Taylor N, Eames C (2009) *Education for Sustainability in the Primary Curriculum: A Guide For Teachers*. South Yarra, Australia: Palgrave Macmillan.

Marchese FT (2015) The art of urban engagement. In FT Marchese (ed.), *Media Art and the Urban Environment: Engendering Public Engagement with Urban Ecology* (pp. 225–246). Cham, Switzerland: Springer International Publishing.

Margolin V (2005) Reflections on art and sustainability. In S Smith (ed.), *Beyond Green: Toward a Sustainable Art* (pp. 20–29). New York, NY, USA: Independent Curators International.

Meadows D, Randers J, Meadows D (2006) *Limits to Growth: The 30-Year Update*. London, UK: Earthscan.

Michails M (2015) Toward an ecological urbanism: public engagement in contemporary art practice. In FT Marchese (ed.), *Media Art and the Urban Environment: Engendering Public Engagement with Urban Ecology* (pp. 1–46). Cham, Switzerland: Springer International Publishing.

Misztal P, Dziekański P (2023) Green economy and waste management as determinants of modeling green capital of districts in Poland in 2010–2020. *International Journal of Environmental Research and Public Health* 20: 2112.

Moir E, Moonen T, Clark G (2014) *What Are Future Cities? Origins, Meanings and Uses*. London, UK: Foresight Future of Cities Project and the Future Cities Catapult.

Mostafa Hatem FAF (2023) The role of art in smart cities research and making. *IET Smart Cities* 5: 291–302.

Nandy S, Fortunato E, Martins R (2022) Green economy and waste management: an inevitable plan for materials science. *Progress in Natural Science: Materials International* 32: 1–9.

Pelo A (2016) *The Language of Art: Inquiry-Based Studio Practices in Early Childhood Settings*. Saint Paul, MN, USA: Redleaf Press.

Rickinson M (2001) Learners and learning in environmental education: a critical review of the evidence. *Environmental Education Research* 7: 207–320.

Riffat S, Powell R, Aydin D (2016) Future cities and environmental sustainability. *Future Cities and Environment* 2: 1–23.

Saita M, Franceschelli MV (2017) The role of waste management in the green economy. In A Jean-Vasile, D Nicolò (eds), *Sustainable Entrepreneurship and Investments in the Green Economy* (pp. 169–199). Hershey, PA, USA: IGI Global.

Southwick C (2023) Advancing Sustainability Education Through Art, Expression and Culture. UNESCO [www document]. URL <https://www.unesco.org/en/articles/advancing-sustainability-education-through-art-expression-and-culture>

Stevenson R (2007) Schooling and environmental education: contradictions in purpose and practice. *Environmental Education Research* 13: 139–153.

Vola L (2022) The Need for Art in the Smart City. *AMT Lab @ CMU* [www document]. URL <https://amt-lab.org/blog/2022/10/the-nterconnection-between-arts-and-smart-cities>

Warnock M (1976) *Imagination*. Berkeley, CA, USA: University of California Press.

Whiteley N (2012) *Art and Pluralism: Lawrence Alloway's Cultural Criticism*: 6. Liverpool, UK: Liverpool University Press.

Zorpas AA (2020) Strategy development in the framework of waste management. *Science of the Total Environment* 716: 1–13.