

Review

Landscape Design and Drawing as Tools for Understanding Climate Emergency and Sustainability

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Abstract: Acknowledging the importance of climate challenges to our environment, landscape and cities, this review focuses on the exploration of visual methods (e.g., design, drawing, sketches) in relation to a deeper understanding of climate emergency and sustainability on a spatial scale. It provides an overview of existing research and highlights the role design and drawing can play in landscape-led projects, as well as the impact these might have on behavioural change and decision-making. Looking at how design and drawing are perceived in landscape architecture and what their contribution is to the narrative of a project as well as the decisions made, this paper establishes a connection between pictorial forms and landscape. At the same time, this paper explores whether visualisations are used in relation to the climate and environmental challenges we face, sharing some light on the role they can play with regards to climate awareness and sustainability and how important they might be for our communities, cities and regions. This review highlights the need for further research around this topic and explains that there is a minor part of the literature looking at ways in which landscape design can be integrated into the wider climate emergency agenda and how this might influence behavioural change and the decision-making of various stakeholders.

Keywords: climate emergency; sustainability; landscape; design; drawing; decision making; behavioural change



Citation: Nikologianni, A. Landscape Design and Drawing as Tools for Understanding Climate Emergency and Sustainability. *Architecture* **2024**, *4*, 188–196. <https://doi.org/10.3390/architecture4010012>

Academic Editor: Ken Tamminga

Received: 11 January 2024

Revised: 13 February 2024

Accepted: 13 March 2024

Published: 18 March 2024



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1. Introduction

Interest in sustainable landscape design is growing rapidly. In contrast, the discussion about design, drawings and their impact on landscape architecture has been a well-known topic for quite some time. This paper review discusses how drawings, landscape design and pictorial representations contribute to the creation of sustainable and environmentally friendly landscapes and why this is important to the process of design, as well as the behavioural change in our communities and decision-makers and the impact this has on our landscape, cities, regions and environments. This study recognises design and drawing as ‘tools’ and communication methods within the landscape sector, exploring if and how visual representations can contribute to the understanding of climate emergency and the effects of climate alterations on a topographical as well as community level.

It is acknowledged that landscape design can create a vision for the region by establishing and expressing a strong concept that integrates all the sustainable and quality elements of the landscape. Van den Broeck [1] states that a ‘strategic project needs a vision framing it in a specific context, giving it a direction, a meaning, a justification and legitimacy in relation to the social-spatial context’. However, there is not enough evidence connecting drawing with spatial sustainability and how such ideas can be represented within the landscape scale, providing for resilient cities. Adopting questions such as if the landscape can support carbon consciousness [2] and how this is possible, this paper agrees with Sheppard [3], stating that a landscape can be a social mobilisation device; however, when this is seen from a climate and environmental perspective, it is largely neglected. Aragon [4] agrees that a landscape can provide a better way to communicate about climate change and

explores artistic artefacts to do so. Using the landscape as a medium, the climate effects can be better understood by professionals and the community, and therefore the chance for them to be addressed is greater. As challenging as it is to understand the scale and impact of environmental changes, the same applies to disseminating these challenges to the wider community, and for that reason, this paper suggests that landscape design and drawing are very powerful mediums to understand and disseminate environmental and spatial strategies to professionals and the wider community.

2. Methodology

This review paper explores the interaction and relevance between design/drawings, climate emergency and the landscape. The key to this is the combination of the three factors (drawing/design–climate emergency–landscape), since these topics might be separately widely researched but not in relation to themselves. This review provides a platform for further discussion, but most importantly, it wishes to highlight the significance landscape drawings and pictorial forms have in understanding and responding to spatial climate strategies and emphasise the lack of such research and its significance in landscape architecture and cities. The research question underpinning this article is as follows:

Q: What is the role of landscape design and drawing with regards to sustainability/climate emergency and the landscape? Observations on decision-making?

A literature search was conducted to allow for a wider collection of the available references in relation to landscape design/drawing and climate emergency. The initial results demonstrated that even though both ‘landscape design/drawing’ and ‘landscape and climate emergency/sustainability’ have been discussed at some point, there is minimum research around the design–landscape–climate emergency research with a scope of communication and decision-making.

An electronic search of the relevant academic literature was conducted using the keywords “landscape”, “drawings”, “design”, “landscape architecture”, “climate emergency”, “climate change” and/or “sustainability”. This search was conducted using both the ScienceDirect and Google Scholar search engines. For Google Scholar, the search was set for all the identified words to be in the title of a paper, while the ScienceDirect database allows for the search to include the title, abstract and keywords of a journal [5].

The use of the ScienceDirect database is rationalised by its vast inclusion of peer-reviewed journals and conference proceedings across various areas within the landscape architecture field. The search has been expanded to include more keywords in order to avoid missing any significant references, although it is recognised that many of the results using these words do not address the topic in question.

The ScienceDirect queries used to conduct the search are as follows:

TITLE-ABS-KEY (drawing) AND TITLE-ABS-KEY (landscape) AND TITLE-ABS-KEY (climate emergency) = 0 results;
 TITLE-ABS-KEY (drawing) AND TITLE-ABS-KEY (landscape) AND TITLE-ABS-KEY (sustainability) = 119 results;
 TITLE-ABS-KEY (drawing) AND TITLE-ABS-KEY (landscape) AND TITLE-ABS-KEY (climate change) = 50 results;
 TITLE-ABS-KEY (design) AND TITLE-ABS-KEY (landscape) AND TITLE-ABS-KEY (climate emergency) = 3 results;
 TITLE-ABS-KEY (design) AND TITLE-ABS-KEY (landscape) AND TITLE-ABS-KEY (sustainability) = 1153 results;
 TITLE-ABS-KEY (design) AND TITLE-ABS-KEY (landscape) AND TITLE-ABS-KEY (climate change) = 454 results;
 TITLE-ABS-KEY (drawing) AND TITLE-ABS-KEY (landscape architecture) AND TITLE-ABS-KEY (climate emergency) = 0 results;
 TITLE-ABS-KEY (drawing) AND TITLE-ABS-KEY (landscape architecture) AND TITLE-ABS-KEY (sustainability) = 6 results;

TITLE-ABS-KEY (drawing) AND TITLE-ABS-KEY (landscape architecture) AND TITLE-ABS-KEY (climate change) = 0 results;
 TITLE-ABS-KEY (design) AND TITLE-ABS-KEY (landscape architecture) AND TITLE-ABS-KEY (climate emergency) = 0 results;
 TITLE-ABS-KEY (design) AND TITLE-ABS-KEY (landscape architecture) AND TITLE-ABS-KEY (sustainability) = 79 results;
 TITLE-ABS-KEY (design) AND TITLE-ABS-KEY (landscape architecture) AND TITLE-ABS-KEY (climate change) = 29 results.

The Google Scholar terms used to conduct the search are as follows:

ALLINTITLE: (drawing) AND ALLINTITLE (landscape) AND ALLINTITLE (climate emergency) showing 0 results;
 ALLINTITLE: (drawing) AND ALLINTITLE (landscape) AND ALLINTITLE (sustainability) showing 0 results;
 ALLINTITLE: (drawing) AND ALLINTITLE (landscape) AND ALLINTITLE (climate change) showing 1 result;
 ALLINTITLE: (design) AND ALLINTITLE (landscape) AND ALLINTITLE (climate emergency) showing 0 results;
 ALLINTITLE: (design) AND ALLINTITLE (landscape) AND ALLINTITLE (sustainability) showing 100 results;
 ALLINTITLE: (design) AND ALLINTITLE (landscape) AND ALLINTITLE (climate change) showing 47 results;
 ALLINTITLE: (drawing) AND ALLINTITLE (landscape architecture) AND ALLINTITLE (climate emergency) showing 0 results;
 ALLINTITLE: (drawing) AND ALLINTITLE (landscape architecture) AND ALLINTITLE (sustainability) showing 0 results;
 ALLINTITLE: (drawing) AND ALLINTITLE (landscape architecture) AND ALLINTITLE (climate change) showing 0 results;
 ALLINTITLE: (drawing) AND ALLINTITLE (landscape architecture) AND ALLINTITLE (climate emergency) showing 0 results;
 ALLINTITLE: (design) AND ALLINTITLE (landscape architecture) AND ALLINTITLE (sustainability) showing 11 results;
 ALLINTITLE: (design) AND ALLINTITLE (landscape architecture) AND ALLINTITLE (climate emergency) showing 23 results.

The above methodology was used to investigate the gap tackled by this review and the level of discussion between the topics of design/drawings and climate emergency at a spatial scale. The search allowed for investigating specific terms on papers, and in most cases, there are very few results with relevant papers. Even in cases where there are many results (e.g., 1153, 454), the papers that really address the scope of this paper are very limited. When the word 'design' is used, the number of references is larger; however, the context of the papers is not much closer to what this paper examines. The ScienceDirect search allows for the search of these keywords in all titles, abstracts and keywords, giving a wider range compared to the 'all in title' option. However, initial indications demonstrate that these keywords are used separately or in relation to other concepts (e.g., general landscape design or sustainability issues) and not in relation to themselves. The papers found were further evaluated, revealing that very few were relevant enough to be used as references in this study. In most cases, the papers might have been using the words searched by this review, but they were either examining two of these ideas (e.g., drawing and landscape, sustainability and landscape) or they were examining other non-relevant items (e.g., plant diversification in agricultural landscapes, landscape design in housing, landscape characteristics in urban blue spaces and more).

Decision-making was not searched as a separate item, as this study wishes to reveal the impact landscape drawings and sustainable ideas have on decision-making in spatial matters.

3. Design and Landscape Narratives (Literature)

Design and drawings are powerful mediums to communicate narratives and landscape ideas to a wider audience, aiming for a successful outcome (e.g., masterplan, design) that will express designers' views and not just tools to 'build a narrative'. This research argues that drawings can increase imagination and make the narrative understandable. Drawings help the individual (professional designer or public) to understand space and how this can become, as well as the impact a drawing has on the decisions made for the wider area. Whether called visuals, pictorial forms, maps or drawings, these 'tools' can present something not entirely visible at the time, either because a scheme is still under development or because it is less easy to visualise it on a large scale [6]. Drawings and visuals can be memorable, illustrative, vivid, 'better than a thousand words' and therefore used from various disciplines and to fulfil all sorts of reasons. They can be used to inspire, illustrate, understand and persuade an audience. The literature suggests that drawings and pictorial forms often benefit an audience that is not familiar with a specific idea. 'When communicating with the general public, photographs have a tremendous potential for generating interest and involvement' state Dramstad and Fjellstad [7], emphasising the communicative role of visual media. Therefore, one can argue that the role of drawing in landscape-led strategies is to make the ideas tangible and visualise the spatial dimension of a scheme. But is this the only role this powerful medium has in relation to the landscape and the environment? Drawing can be a tool that helps make the narrative understandable. It is also a way to support, stimulate and develop ideas [8] to form a concrete concept aiming for the final landscape scheme.

Design and drawing can be either completely overlooked or more often introduced at the final stage of a strategic project process. The way that the management process of a large infrastructure scheme currently operates places landscape design at the fringe of the mechanism. With the early engagement and integration of design and drawing elements in the scheme, the project has a better chance to develop qualities, engage with people and have a successful outcome [6]. For professionals and experts involved with landscape design (e.g., landscape architects, designers), the development of a concept or narrative is part of the design process [9], and therefore it can be argued that 'narrative design' has a long tradition [10]. Potteiger and Purinton [10] have stated that a narrative 'is a very fundamental way people shape and make sense of experience and landscapes'. However, scale often creates several challenges with strategic schemes, and large-scale designs do not always become the living image of their conceptual drawings or narratives. Experts explain that 'Design thinking should be part of creating the vision and designing the brief for a new project' [11], but this is not always materialised when the scheme is built. Maps, drawings and visuals can play a significant role in the way in which landscape ideas are communicated and, therefore, the implementation of a landscape project [6]. Design allows for the concept to be expressed in a visual form and for ideas to be understood better by communities [12]. The significance drawing has within a landscape scheme is being discussed among research and professional sectors; however, there is very little being suggested about the link between what a design can do in relation to the climate crisis and sustainable landscapes and its impact on decision-making in urban or regional developments. Among this study's interests are the effects design interpretation and communication have on decision-makers and their understanding of land and spatial developments.

Drawings and Decision-Making

Decision-making directly or indirectly impacts the outcome of designs, proposals, developments and built projects, as well as the man-made characteristics of an area. Governments often lack strong communication between their administrations and citizens [13], resulting in isolation or non-communication towards the communities of which they serve. This could be a result of a lack of strategy or neglecting the need to communicate spatial proposals. Drawings can communicate ideas; especially in landscape-led initiatives, maps,

sketches and drawings often impact decisions made in relation to strategic schemes. Meijsmans et al. [14] suggest that it can be possible for drawings to facilitate plan development and policy formulation; however, they question the way in which this can happen on a strategic scale. Both Sullivan [15] and Moore [16] discuss the power of drawing from a landscape perspective and its ability to better understand the land, revealing its spatial dimension. Sullivan ([15], p. 7) also explains that ‘drawing a landscape allows you to visualize it in a new way. As opposed to taking a photograph, drawing a landscape enables you to really understand it’ and makes it an integral part of the active process, making it a tool for thinking and analysis. Moore ([17], p. 40), examining drawing within the landscape and spatial dimensions, explains that ‘drawing is thought to improve the power of observation and may enhance the ability to externalize what is in the mind more quickly and effectively’. In a similar direction, Sullivan [15] suggests that drawing is an act of thinking and seeing clearly when it comes to landscape developments. Baker [18] contributes to this discussion by stating that factual information can be represented by different graphic techniques, but without explaining their significance in the spatial dimension. Stephenson [19], though, argues that there is a difference between tangible data and spatial (place, time, subjective) ones, making the intangible qualities, such as those discussed here, more often overlooked or given less attention. Freehand sketches and concept diagrams also play a significant role in design problem solving, and as Do and Gross explain, ‘design reasoning’ is often encouraged by drawings ([20], p. 2). Therefore, this study understands that drawing and sketches are not always confined as ‘the thinking’, but also ‘the justification’ medium of a wider design, allowing for the designer as well as the decision-maker to understand the current situation and the proposals being made in a spatial context. Drawings often ‘reveal’ hidden information that is not easily understood by non-experts, giving the opportunity to civil servants and decision-makers to further evaluate the real circumstances of their area.

Enhancing the communication argument, Meijsmans et al. [14] suggest that drawings can play a key role in disseminating new forms of regional planning, and they emphasise that ‘the design tool is explicitly addressed for its capability as a vehicle for identifying stakeholders and organising the process of negotiation and coproduction’ ([14], p. 6). In addition, Corner [21] admits that while drawings have certain limits in representing the landscape experience, they remain an ‘extraordinary powerful medium in relation to the production of landscapes’ ([21], p. 159). But even if all these points are being made about the role and significance of drawings in spatial designs and landscape plans, their role in decision-making in relation to current environmental and social challenges is not taken into account. This study wishes to highlight the potential of design and drawing in relation to sustainability and decision-making; however, there is minimum research that allows for this to be extensively discussed. More recent research suggests that visualisations improve viewers’ understanding of landscape change [13] and that graphic and pictorial forms can act as the link between complex scientific information and the spatial environment. Krätzig suggests that “decision-makers must communicate sustainable development concepts to the public and stakeholders in a clear and understandable manner” [13] if they are to introduce climate challenges and environmental objectives into their urban or regional spatial strategies.

4. Design/Drawing as a Communication Tool for Climate Emergency and Sustainability

Pickerill [22] argues that ‘our future urban spaces need to be better designed to reduce our collective environmental impact, but they also need to be accessible to a diverse population’ and this can be a start for a low carbon vision. Previous research examined low carbon as a gas emission indicator or new technological approaches related to climate change, arguing that there is no ‘internationally agreed’ or ‘universally applicable’ definition of low carbon [23,24]. Aiming to make a connection between landscape and sustainability, Gossop [25] stated that ‘Good design is the key [to] creating successful places that are sustainable in the broadest sense. There is a growing recognition of what constitutes good design and there are numerous examples from around the world of successful places, that

both, function well and are attractive in architectural and landscape terms. But the new dimension is the need for those places to be low carbon as well'. Even though a point was being made at the time about the importance of environmentally friendly or low carbon space, there was no strong indication as to the role design/drawing could play in this. The literature has followed a similar pathway, suggesting that if we are to address environmental challenges, then we need to work at the local and regional level, supporting human and environmental interrelations while accommodating for social change [13]. As excellent as such notions are, they do not give any information on the ways in which landscapes can support more resilient cities. Sheppard [3] makes the point that landscape architects are very well equipped to intervene at the physical scale, dealing with areas where people live, commute and recreate. He suggests that landscape architects are those who bring their designs to life using visual tools, and that such methods can apply at the community or local level [3]. There are various designs that can be discussed and presented, but this study does not aim to promote one design over the other; instead, it makes the argument that several forms of drawing/design are required and that some can work better than others depending on the occasion and area, but very few are currently being developed embedding such concepts. On the ideas related to climate emergency and sustainability as well as decision-making, strategic-scale designs can offer a greater opportunity to evaluate, understand and make decisions in a wider area. Landscape approaches such as the West Midlands National Park (WMNP), High Line, Rewild My Street's Vision and London National Park City all offer different views.

More recently, the topic of landscape visualisation and climate emergency has started to arise, with sources exploring the impact a visual medium has on communities and their approach to climate emergency. Aragon [4] states that public engagement can be enhanced if artists and designers use landscape as a 'setting' to visualise climate change features, while Köpsel [26] discusses that cultural values are threatened by environmental changes when these are connected to physical locations. The impact on understanding what climate emergency means for the landscape, our communities and how it all relates to our livelihoods has started to be explored, with Aragon indicating that site-specific installations have been useful in the general public's understanding of the situation since they tend to present the problems on a local scale [4]. Krätzig and Warren-Kretzschmar [13] also examine how landscape visualisation in environmental planning can support sustainable decisions and how using the medium of visualisation in a spatial context can change the decision-making process. The recent literature also points out that the local scale is important when it comes to a deeper understanding of climate challenges [3] and that design professions such as landscape architects, planners and artists can truly establish a communication bridge on environmental topics, creating further interest at a community level [3,27]. In addition, a lack of such understanding and engagement by the public can result in minimum support or interest in matters related to climate planning [28,29]. I have examined the current literature in relation to visualisation and the landscape. This paper understands that as visualisation tools, there are usually considered 2D and 3D visual formations, and not always the wider range of pictorial forms, drawings, maps and sketches produced during a landscape-led design. All these different forms of graphical and visual communication can impact the deep understanding of climate emergency. All pictorial forms and visuals can be beneficial when it comes to both the conceptualisation and implementation of climate-related ideas, despite the current focus on 2D/3D visuals.

Climate Emergency Awareness and Society

Why is it so important for the wider community to fully understand the impact of climate emergency in their area? Climate awareness is known as the ability to "enhance stakeholders' understanding of climate change" [30] and therefore to increase the perception of the risks resulting from environmental changes. Overall, even though climate emergency and environmental elements have been constantly discussed in recent years, it seems that there is still a lack of climate awareness among the public and politicians, despite the

high levels of awareness and acceptance among climate experts, urban designers and planners [31]. From all these discussed above, one would agree that it is rather important for society to understand the significance of climate emergency; however, it is stated that despite the regular and increasing rate of several scientific results coming out, science is not enough to stimulate behavioural change and the necessary actions [32]. Bulkeley et al. agree that we need an engaged society to be able to swiftly transition into a low carbon future [33], as this global challenge requires a common effort from politicians and professionals, as well as the public. It is for these reasons that this review suggests that design and drawings are very significant tools in supporting and enhancing the understanding of climate emergency, as well as their adaptation and mitigation measures. With a better understanding of the changing climate, people are being educated and inspired to change their lifestyle, and the various visualisation methodologies are means to better communicate and disseminate the message about sustainability to communities, decision-makers and politicians [13]. There are many visuals, drawings and maps that integrate environmentally friendly ideas and solutions, but such concepts have not—until now—been deliberately presented in a master plan. Sustainability is an element that can certainly be interpreted by a strong concept or a skilled designer. Krätzig and Warren-Kretzschmar suggest that aerial photographs, visualisations and panorama photographs are able to help viewers recognise the characteristics of their landscape [13]; however, this study takes it a step further, stating that design and drawings have this potential as well, when used in the right context. Sheppard agrees that visual communication can advance people's awareness of climate change, affect behavioural change and 'accelerate social learning' [34]. But again, there is less clarity about what visual representations are able to enable (e.g., behaviours) and, most importantly, what, if any, are better ways to impact decision-makers. The literature from the same sources moves on to suggest that social learning is being benefited by visual communications [35] and that such mediums can play a vital role in climate awareness [34], but the most significant finding is that landscape-led visualisations can also demonstrate the consequences of a changing climate in such ways that are being truly acknowledged and understood by communities [35]. There is also an argument being made by Sheppard [35] between the informative role of visualisations on climate change and a persuasive role affecting decision-making and policy, stating that emerging techniques of landscape-based visualisations will potentially support climate awareness; however, ethical procedures will need to be in place to ensure that such powerful mediums will not be used in a bad manner.

The influence such tools might have on the ways people perceive their land and neighbourhoods could create the opposite effect from what this study's scope is, and therefore it is important to mention that, as with landscape design, drawings can create powerful impressions, and it is the role of the landscape architect and the designer to ensure these impressions are realistic and accurate. Landscape architects have the power to act on different scales, from local to regional, and therefore they can engage stakeholders in planning, decision-making and design processes, giving them the opportunity to have a more active role in society [3] and lead by example. Even though the discussion around climate emergency is quite popular, findings suggest that there is limited understanding in relation to the impact and solutions at a spatial scale and the benefits to the community.

5. Conclusions

Key findings of this paper indicate that the role of design and drawing within a landscape-led approach does not often relate to the way in which sustainability and climate emergency are being perceived in a spatial context. Drawing, design, maps, visualisations and pictorial forms are common techniques amongst professionals, landscape architects, designers and planners, either to understand or communicate their designs to a wider audience. However, such methods have not been explored widely when it comes to environmental challenges. Landscape designs and drawings can provide a communication pathway for decision-making and the public, but they could also demonstrate the impact

climate emergency has on our cities and regions as well as visualise possible solutions. One of the points made by this study, based on the examined literature, is that there is no coherent research linking the spatial scale with the tools of design and drawings and the ideas of climate emergency and sustainability.

This paper reveals that the topics of drawing and landscape architecture are being discussed, but there is a very small part of the literature examining how landscape architecture and visuals can be embedded in the wider climate emergency discussion. In most cases, visuals are only considered as the 3D versions of areas and in relation to the effects of climate change. The impact a design can have on the decision-making process and the communication or understanding of the land are not considered widely in current research. This study suggests that landscape design and drawing with a focus on climate emergency have great potential for aiding decision-making, as they can play a significant role in supporting spatial planning decisions either by demonstrating the existing situation or by proposing possible solutions. There is also a lack of information in relation to drawings focused on climate emergency and behavioural change, as well as how such examples could potentially impact the lifestyles of our communities and the decisions being made at a local as well as a governmental level. This paper concludes that design, drawing and pictorial representations can play a significant role with regards to sustainable development and climate emergency in our cities and regions, but for this to happen, we need to allow for powerful designs to be embedded in the decision-making process.

Recommendations are being made for future research to examine how drawings can support the understanding of landscapes in relation to environmental and climate challenges and the ways in which such methodologies influence decision-makers and politicians. It is then necessary to examine how landscape design and drawings can not only be a 'thinking' technique but also a communication tool that improves understanding of spatial scale and its challenges.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The author declares no conflicts of interest.

References

1. Van den Broeck, J. Strategic Spatial Planning and Strategic Projects. A transformative practice. In Proceedings of the 44th ISOCARP Congress, Dalian, China, 19–23 September 2008.
2. Boardman, B.; Palmer, J.; Arvidson, A.; Buerger, V.; Green, J.; Lane, K.; Lipp, J.; Nordstrom, M.; Ritter, H.; Timpe, C.; et al. *Consumer Choice and Carbon Consciousness for Electricity (4C Electricity)*; Environmental Change Institute: Oxford, UK, 2003.
3. Sheppard, S.R.J. Making climate change visible: A critical role for landscape professionals. *Landsc. Urban Plan.* **2015**, *142*, 95–105. [[CrossRef](#)]
4. Aragón, C.; Buxton, J.; Hamin Infield, E. The role of landscape installations in climate change communication. *Landsc. Urban Plan.* **2019**, *189*, 11–14. [[CrossRef](#)]
5. ScienceDirect. Science, Health and Medical Journals, Full Text Articles and Books. 2021. Available online: <https://www.sciencedirect.com/> (accessed on 10 November 2021).
6. Nikologianni, A. The Role of Low Carbon, Spatial Quality and Drawings in Landscape-Based Regional Strategies. Ph.D. Thesis, Birmingham City University, Birmingham, UK, 2018.
7. Dramstad, W.E.; Fjellstad, W.J. Landscapes: Bridging the gaps between science, policy and people. *Landsc. Urban Plan.* **2011**, *100*, 330–332. [[CrossRef](#)]
8. Magalhães, G.M.A.S.; Providência, F. Dreamed gestures: A case of architectural design communication through drawing. In Proceedings of the Drawing Research Network 2013 Conference/Thinking Through Drawing Seminar; Teachers College, Columbia University: New York, NY, USA; The Metropolitan Museum of Art: New York, NY, USA, 2013; pp. 116–121.
9. Alon-Mozes, T. From 'Reading' the Landscape to 'Writing' a Garden: The Narrative Approach in the Design Studio. *J. Landsc. Archit.* **2006**, *1*, 30–37. [[CrossRef](#)]
10. Potteiger, M.; Purinton, J. *Landscape Narratives: Design Practices for Telling Stories*; John Wiley & Sons: New York, NY, USA, 1998.
11. DesignCouncil. *A Design-Led Approach to Infrastructure*; Design Council: London, UK, 2012.

12. Milburn, L.-A.S.; Brown, R.D. The relationship between research and design in landscape architecture. *Landsc. Urban Plan.* **2003**, *64*, 47–66. [[CrossRef](#)]
13. Krätzig, S.; Warren-Kretzschmar, B. Using Interactive Web Tools in Environmental Planning to Improve Communication about Sustainable Development. *Sustainability* **2014**, *6*, 236–250. [[CrossRef](#)]
14. Meijsmans, N. *Designing for a Region*; SUN Academia: Amsterdam, The Netherlands, 2010.
15. Sullivan, C. *Drawing the Landscape: The Art of Hand Drawing and Digital Representation*; Wiley: Hoboken, NJ, USA, 2014.
16. Moore, K. *Between the Lines: Drawing, Creativity and Design, Environments by Design*; Eccles, T., Ed.; Spring: Berlin/Heidelberg, Germany; Kingston University Press: London, UK, 2000; Volume 3, pp. 35–57; ISSN 1352-8564.
17. Moore, K. *Overlooking the Visual: Demystifying the Art of Design*; Routledge: Abingdon, UK, 2009.
18. Baker, K. Sense of place: Understanding architectural and landscape design through a layering of visual representations. *J. Learn. Des.* **2014**, *7*, 74–83. [[CrossRef](#)]
19. Stephenson, J. The Dimensional Landscape Model: Exploring Differences in Expressing and Locating Landscape Qualities. *Landsc. Res.* **2010**, *35*, 299–318. [[CrossRef](#)]
20. Do, E.Y.L.; Gross, M.D. Drawing as a means to design reasoning. In *AI and Design*; Stanford University: Stanford, CA, USA, 1996.
21. Corner, J. Representation and landscape: Drawing and making in the landscape medium. *Word Image* **1992**, *8*, 243–275. [[CrossRef](#)]
22. Pickerill, J. Building liveable cities: Urban Low Impact Developments as low carbon solutions? In *Cities and Low Carbon Transitions*; Routledge: London, UK, 2010.
23. Baeumler, A.; Ijjasz-Vasquez, E.; Mehndiratta, S. *Sustainable Low-Carbon City Development in China*; World Bank Publications: Washington, DC, USA, 2012.
24. Mulugetta, Y.; Urban, F. Deliberating on low carbon development. *Energy Policy* **2010**, *38*, 7546–7549. [[CrossRef](#)]
25. Gossop, C. Low carbon cities: An introduction to the special issue. *Cities* **2011**, *28*, 495–497. [[CrossRef](#)]
26. Köpsel, V.; Walsh, C.; Leyshon, C. Landscape narratives in practice: Implications for climate change adaptation. *Geogr. J.* **2017**, *183*, 175–186. [[CrossRef](#)]
27. Sheppard, S.R. *Visualizing Climate Change: A Guide to Visual Communication of Climate Change and Developing Local Solutions*; Routledge: Abingdon, UK, 2012.
28. Leiserowitz, A.A. American risk perceptions: Is climate change dangerous? *Risk Anal. Int. J.* **2005**, *25*, 1433–1442. [[CrossRef](#)] [[PubMed](#)]
29. Moser, S.C.; Pike, C. Community engagement on adaptation: Meeting a growing capacity need. *Urban Clim.* **2015**, *14*, 111–115. [[CrossRef](#)]
30. Iturriza, M.; Hernantes, J.; Abdelgawad, A.A.; Labaka, L. Are Cities Aware Enough? A Framework for Developing City Awareness to Climate Change. *Sustainability* **2020**, *12*, 2168. [[CrossRef](#)]
31. Lenzholzer, S.; Carsjens, G.-J.; Brown, R.D.; Tavares, S.; Vanos, J.; Kim, Y.; Lee, K. Urban climate awareness and urgency to adapt: An international overview. *Urban Clim.* **2020**, *33*, 100667. [[CrossRef](#)]
32. Moser, S.C.; Dilling, L. *Creating a Climate for Change: Communicating Climate Change and Facilitating Social Change*; Cambridge University Press: Cambridge, UK, 2007.
33. Bulkeley, H.; Broto, V.C.; Hodson, M.; Marvin, S. (Eds.) *Cities and the Low Carbon Transition*; Routledge: Abingdon, UK, 2011; pp. 24–27.
34. Sheppard, S.R.J. Landscape visualisation and climate change: The potential for influencing perceptions and behaviour. *Environ. Sci. Policy* **2005**, *8*, 637–654. [[CrossRef](#)]
35. Sheppard, S.R. Bridging the sustainability gap with landscape visualisation in community visioning hubs. *Integr. Assess. J.* **2006**, *6*, 79–108.

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