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Digital Poetry as a Dublin City Data Interface*

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Abstract:

This paper explores placemaking as an interdisciplinary concept between the field of digital humanities and human geography. Literary placemaking techniques are used in a critical analysis to unpack methods of meaning making and uncover paths for future development of literary interfaces.

Keywords: City, Data, Dublin, Interface, Poetry

1. Introduction

A sense of place is a characteristic or quality often discussed with reference to literature but also in human geography as a way of describing the process of placemaking or sense of attachment to place. Mundell (2018) explores literary placemaking through the eyes of the creator. She believes that creative writers face a unique challenge in that they must "imaginatively evoke textual place in a way that resonates meaningfully for a diversity of readers" (8). Mundell talks of how "places and stories are innately entwined" (x) and her paper *Crafting "Literary Sense of Place": The Generative Work of Literary Place-Making* offers a model of "place-oriented experiential techniques" (POET) that lists five modes: *Retrospective Techniques*, *Immersive Techniques*, *Collaborative Techniques, Vicarious Techniques* and *Nebulous Techniques*. These modes, Mundell argues can be used to demystify and theorise the process of literary place making, and she (10) explains that creative writing is a literary form of place making. Could

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then these same techniques be similarly applied to a kind of "virtual placemaking" based on real geographical space such as those digital landscapes that can be found in Virtual Geographic Environments (VGEs)? Furthermore, can literary placemaking techniques be used to evaluate the creation process of digital literary texts? Also, can the incorporation of literary elements and techniques create digital texts that can act as a gateway or interface to meaningful, contextual, and embodied urban data experiences for citizens? This paper considers questions such as these through the use of a case study examination of *The River Poem* an extended reality (XR) digital poem that is one component of a larger interactive installation created by the Building City Dashboards research project called *Data City* that features a variety of digital city data dashboard technologies and solutions that include data visualisations projected onto 3D printed scale models of Dublin and Cork cities. The need for interfaces into city data is connected to the paradigm shift in city planning and the drive toward increased smartness, that permeates official urban strategies and development plans (Meijer and Bolívar 2016). Even if we do not necessarily buy into the smart city hype it is hard not to see the pervasiveness of digital technologies, logics and aesthetics in urban space and the whole discourse on cities (Aurigi 2016; Zubizarreta, Seravalli, Arrizabalaga 2016). Byte by byte digital layers of information have become constituents of the city as important as bricks and mortar (Graham 2013), which has some serious consequences on the way in which cities are governed and their everyday mobilities, spatialities, and the production of space itself (Crang, Crosbie, Graham 2007; Gordon and de Souza e Silva 2011; Kitchin and Dodge 2011, Zubizarreta, Seravalli, Arrizabalaga 2016). Increasing numbers of sensors, meters and transponders regulate the heartbeat of the city (Coletta and Kitchin 2017). As city dwellers, we must therefore negotiate our interactions with urban space through the use of various intertwined interfaces from electronic tickets and smart cards, through mobile apps used for renting city bikes and cars, to urban dashboards (Mattern 2017; Young, Kitchin, Naji 2021). This is often a daunting task, given the forceful nature of sociotechnical imaginaries put forward by corporate actors, that shape the way we perceive our role as smart citizens (Townsend 2013; White 2016; Sadowski and Bendor 2019) and has been focused on technocratic nature of smart technologies, supporting neoliberal or even autocratic forms of governance (Datta 2018; Sadowski and Pasquale 2015; Luque-Ayala and Marvin 2016; Kitchin 2017). Notably, the digital technologies themselves also take part in the everyday urban spatiality (Leszczynski 2015) and even more importantly influence the practices of placemaking (Halegoua 2020). It is crucial to look at those processes beyond techno-deterministic narratives and into their human, social dimensions (Odendaal 2021). We, therefore, investigate the role of XR, narrative immersion and literary placemaking as a possibility of providing an alternative interface to the city data, that goes beyond the technological and utilizes the inherent place-based spatiality of interaction with urban spaces.

1.1 VGE and XR in Urban Planning

XR is an umbrella term for a broad spectrum of technologies that include, but are not limited to, augmented reality (AR), Mixed Reality (MR), and Virtual Reality (VR) (Cöltekin, Griffin, Slingsby *et al.* 2020). VGE was defined by Lin and Gong as "environments pertaining to the relationship between post-humans and 3-D virtual worlds" (2001, 2). They can also be described as explicitly geographical environments that provide the possibility of deeply embedded experience (Lin and Batty 2009), aiding the transfer of geographical knowledge (Lin, Min, Lü *et al.* 2013). From a practical point of view, XR often overlaps with the concept

of VGE (Chen, Lin, Lü 2017), and they are sometimes used interchangeably. VGE is a much broader theoretical framework – not all VGEs are created using XR technology, and not all XR solutions can be considered VGE, as they often focus mainly on visualizations. However, the combination of VGEs and XR is instrumental in urban planning (Batty 2008; Kamel Boulos, Lu, Guerrero *et al.* 2017). While the visualization of complex socio-environmental models with XR and VGE needs to be correctly designed to be beneficial (Voinov, Çöltekin, Chen *et al.* 2018), the potential rewards are promising. There are many examples of XR and VGE concepts being successfully applied for the management and planning of cities to provide access to places that cannot be reached in material space (Portman, Natapov, and Fisher-Gewirtzman 2015) or to allow interaction with objects that only exist as planned possibilities (Cirulis and Brigmanis Brigis 2013). Another use case is multisensory community planning platforms (van Leeuwen, Hermans, Jylhä *et al.* 2018) that help participatory processes. In Canberra VR based Esri City Engine has been used to visualize the effects of light rail development (Schubert 2017), and recently in London's Square Mile new planning proposals can utilize a detailed digital twin model of Square Mile to gauge the potential changes (VU.CITY, 2020). It is well established then that VGEs are well suited for planning purposes (Lin and Gong 2001), and Chen and Lin (2018) identified "predicted and planned future geographic environments" (329) as one of the three main types of VGEs. Kitchin, Young, Dawkins (2021, 362) and Lin, Chen, Lü *et al.* (2013) outline that, urban planners believe that VGEs can be beneficial for strategic visioning, pre-planning and public consultation along with traditional planning practices. In this case, we can expect people with various backgrounds and with various knowledge to participate in processes that will involve VGE at some point, as virtual environments are increasingly perceived as one of the ways in which people can engage with modern cities' dataspaces (Dawkins 2017). Therefore, it is important to design semantically deep systems that will allow space for meaningful engagements, not only for people possessing technological and domain-specific knowledge to interact with the model, but also for people that can only involve themselves with VGE using place-based approaches that they use in everyday interactions with the material world. For example, Saddiqa, Magnussen, Larsen *et al.* (2021) outline the challenges of integrating open data into an educational system, namely that the availability of open data alone is not enough, in fact, the primary challenge is contextualising the data in a way that provides perspectives and potential uses for non-specialist users such as public-school teachers. To achieve this, developers and designers can employ XR environments that increase immersion and presence. The first term, otherwise known as system immersion (Slater 1999), can be understood as a semi-objective measure of the ability of a given visualisation to replace the real world with a virtual one. Highly immersive systems are believed to be able to induce the feeling of presence – "being" in another place and time (Minsky 1980; Slater, Linakis, Usoh *et al.* 1996; Konecny 2011). This in turn is helpful in providing spatial context that allows information to be processed in a more natural manner (Lü, Chen, Yuan *et al.* 2018) as embedded experience (Lin and Batty 2009). However, technological measures are but one way of inducing immersion and presence. It is perfectly possible to create them using text and narrative (Adams and Rollings 2006) or through entirely analogue media (Schubert and Crusius 2002). The *Data City* interactive installation and its *River Poem* component are interesting examples to discuss here as they offer exactly the type of contextual use of display of potential functionality that Saddiqa, Magnussen, Larsen *et al.* (2021) argue for.

2. Case Studies

The *Data City* interactive installation is an example of a spatially augmented reality (Bimber and Raskar 2005) that uses a projection mapping process and open city data. The model's physical dimensions are 3.5m x 2m which yield an accurate topographical representation of 28 sq km of the urban area at a scale of 1:2000, yielding a representation of 28 sq km of terrain in each model. The installation can be used to show air quality and noise levels, building use classifications, geodemographic analyses, AirBnB properties, historic maps, the Urban Atlas maps of urban land use and a simulation of Dublin Luas tram movements (BCD[1]). The public exhibition was due to be staged in the summer of 2020 but due to Coronavirus pandemic lockdowns, it was instead staged privately and locally on campus at Maynooth University and documented and transferred online to the project's website[2]. In *Data City* the user can examine projected data visualisations (Figure 1) onto a rigorously designed and developed 3D printed model of Dublin city developed by an interdisciplinary team of Geographers and Media Studies researchers.

Figure 1 – *Data City* 2021 Building City Dashboards

The River Poem is one component of the larger interactive installation created by the Building City Dashboards research project that features data visualisations projected onto 3D printed scale models of Dublin and Cork cities, which can be seen as an example of a spatially augmented reality (Bimber and Raskar 2011) that uses projection mapping process. *The River Poem* uses the same 3D printed model as *Data City* and so was developed to be accessed in tandem with the

[1] Available at: <https://dashboards.maynoothuniversity.ie/> (05/2022).
[2] <https://dashboards.maynoothuniversity.ie/exhibition> (05/2022).

Data City piece. It is an example of a digital text that is spatially situated in the same way that urban planning VGEs are but also incorporates some aspects of literary placemaking and multimodal communicative dimensions such as kinetic text and atmospheric audio. Characteristics such as these can be found in the field of digital humanities in born-digital literary texts such as electronic literature and its sub-genre of digital poetry. *The River Poem* is a digital poem made in collaboration with Maynooth University's Building City Dashboards research project, this poem projects snippets of text generated by the Generative Pretrained Transformer 2 machine learning algorithm onto a 3D model of Dublin City. The words themselves were generated by a GPT-2 machine learning algorithm that was trained on James Joyce's *Finnegan's Wake*. Joyce's *Finnegan's Wake* published in 1939 is a narrative that is ideally suited to transposition to the digital medium because of its multilinear stream of consciousness style and its neologistic language. *The River Poem* intends to offer audiences an alternative approach to viewing the city by projecting words onto the Building City Dashboard's 3D model as seen in the image below (Figure 2) which is a screenshot from a low-resolution test video of *The River Poem*.

Figure 2 – *The River Poem*, 2019

Snippets of phrases were removed from the algorithm's output by the human authors and then placed in a spreadsheet. Python code in TouchDesigner software then randomly selects a new quote from the spreadsheet at specific intervals and places it into a queue. This queue forms a long string of text which is animated along a path that follows the route of Dublin's River Liffey. When a quote reaches the end of the path, it is automatically swapped out for a new random quote. Using texture instancing in TouchDesigner software kept processing power to a minimum and each letter is generated only once and instanced each time it is used in the long string of text. The path is also dynamic, as it can be edited in real time to fit into different scenarios (Figure 3).

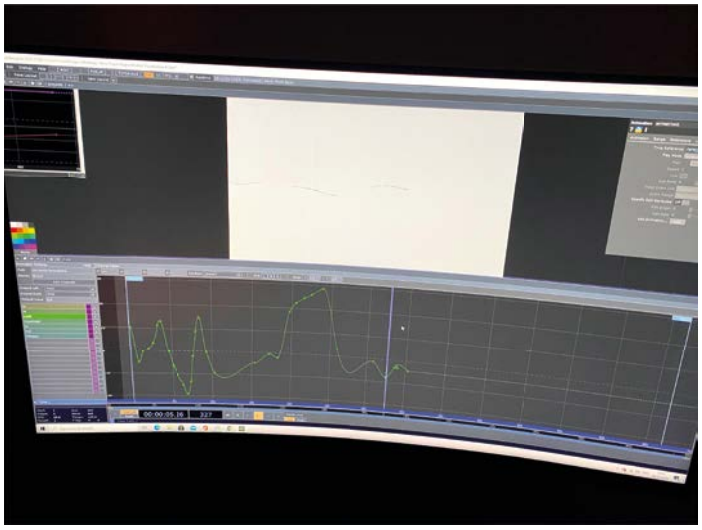

Figure 3 – Photo of *The River Poem* digital workspace, Building City Dashboards

The final output seeks to create a dynamic unique literary experience for each instance of play and explores notions of human versus machine agency and multimodal data communication within contemporary cityscapes. The original inspiration for *The River Poem* was cento poetry which is a kind of patchwork poetry that is composed of lines from other poems. However, the addition of the machine learning aspect has produced a contemporary literary artefact that calls into question the boundary between human literary expression and algorithmic agency. This paper proposes to examine the potentialities of digital texts such as *The River Poem* to act as interfaces to city data. The user in this instance can examine a rigorously designed and developed 3D printed model of Dublin city developed by an interdisciplinary team of Geographers and Media Studies researchers. The addition of kinetic text that draws on a well-known literary text mediated through the digital apparatus and algorithms combined with sound effects of running water and situated in a spatially accurate Dublin city representation can help evoke a sense of place for the user.

2.2 The River Poem *as a Literary Interface*

In all digital texts, the interface mediates the experience for the user, interfaces matter and are an important component of the meaning making process for the user. In this paper, we argue that viewing *The River Poem* as an interface to *Data City* can offer a path for future development of XR VGEs that incorporate humanistic elements in an embodied and meaningful manner to the benefit of their audiences. Ruberg *et. al* (2018, 110) point out that as feminist scholars they know well that computational tools are not apolitical, they have an impact, they structure meaning, and visualisations craft interpretation. As such an interface can be seen as a space in which meaningful embodied interaction takes place in a networked environment, or an interface can be seen as a component of a digital work in which case it operates more like an index to specific content (Drucker 2019, 3). This paper builds on Drucker's (2019) premises regarding interfaces by suggesting that *The River Poem*, a digital literary work in fact operates as an interface that draws the user in and through to *Data City* in order to provide a

space for structured, contextualised, and relativised meaningful interaction and understanding for a non-expert audience. Drucker (2019) refers to literary interfaces as interfaces for digital literature or electronic literature works. However this paper modifies this approach slightly to offer a work of digital literature as an interface in itself to open city data. Drucker (2019, 2) tells us that an interface can be narrowly defined in terms of onscreen features that unfold a text but more broadly defined as to include the user's embodied experience and relationships with not only the technologies, text, and networks they are engaging with but also, more broadly, the broader cultural conditions in which these interactions take place. Concurrently, Mundell (2018) cites Saunders (2010) plea to literary geographers to view writing as an embodied practice instead of simply examining the literary artefacts alone. Thinking about embodied experiences in the digital space in this manner can allow us to consider and take into account more broadly the entirety of the user's experience in a networked environment as opposed to restrictively only considering a singular artefact.

The human-computer interaction (HCI) term "embodied interaction" builds on Hutchby's concepts of technological affordances from his 2001 paper "Technologies, Texts and Affordances" and is also a useful term to use in the analysis of human meaning making in order to recognise the contextual, fluid and collaborative nature of meaning making in the digital realm (Naji 2021, 47). Embodied interaction is discussed by Paul Dourish (2004) as an approach from the field of human-computer interaction that is based on the understanding that "users create and communicate meaning through their interaction with the system (and with each other, through the system)" (*Where the Action Is* n.d.). In this paper, we suggest that *The River Poem* operates as a literary interface to the *Data City* piece that draws more explicitly on open city data. Participatory members of the public or smart citizens may not be able to accurately read a graph and identify meaning from the contents of a VGE; however, when spatial data is communicated through using literary placemaking techniques it can offer increased entry points for audiences and engagement potential. Digital poetry and literary interfaces can offer interactivity, nonlinearity and multiple entry points for users and can offer new spaces for perceiving and interacting with stories in spaces that would be otherwise out of reach (Barber 2016, 1). Furthermore, research on health data communication has concluded that "high interactivity in data visualization showed significant indirect effects on participants' attitudes toward policy change, only when presented with the highly interactive narrative" (Oh, Sally Lim, Copple *et al.* 2018, 1755). Similarly, Rostami, Rossitto and Waern (2018, 15) when discussing mixed-reality performances that used virtual reality and 360-degree video, concluded that allowing users to take a more active role in digital texts is what can make digital stories engaging and coherent rather than the completely immersive natures of technologies. Culturally driven, creative multimodal content can potentially move 3D graphs and static data visualisations beyond literal visual representations of geographic data and incorporate various dimensions of imagination and interaction that can embody the unique characteristics of a place.

3. Placemaking

Texts such as *The River Poem* have the potential to enrich citizen understandings of place and therefore contribute to more effective and engaged urban planning processes. The ability to extract individual narratives, locate them in space, and compare larger trends through content analysis, contributes to new perspectives on place and how people openly express their experiences of a place (MacEachren, Jaiswal, Robinson *et al.* 2011). This integration of qualitative, narrative-style data with spatiotemporal analysis and visual analytic affordances has encouraged a

new way of understanding place through the public expressions and interactions of social media and the concept of a Geospatial Web (Herring 1994). Digital texts such as *The River Poem* and *Data City* can potentially communicate information to a specific audience. In this instance, they are spatially located through being projected onto a printed 3D model and they are also interactive. In these projected spatially mapped digital texts, space and place are important, though we may find ourselves lost in virtual space we are still very much rooted in our bodies in a place. Ryan, Foote and Azaryahu note that the science and humanities use the terms space, place and "sense of place" in a number of ways (2016, 6). These terms are central to the work of geographers but also to writers and storytellers. In 2015, narrative theorist Marie-Laure Ryan alludes to the human geographer Yi-Fu Tuan's celebrated concepts of both space and place as contrasting entities. Ryan explains that space is abstract, whereas place concerns itself with a "concrete environment invested with emotional value" (2015, 87-89). Similarly, interaction design researchers Harrison and Dourish (1996) choose to further differentiate between human concepts of space and place. Space, they suggest, relates to the structure of the world, the three-dimensional environment in which we inhabit. However, in their theory of place, they contrast cultural understandings with those which frame innate human-behaviour (Naji, Young, Stehle 2018, 3). Placemaking is one of the terms that can describe a set of social processes involved in creating the meaning of place (Sweeney, Mee, McGuirk *et al.* 2018; Ghavampour and Vale 2019). While it is a broad concept with many definitions (Courage 2020), often connected to the push toward democratization of spatial planning, it is also a crucial part of the individual spatial experience, helping create and re-create everyday lived geographies (Pierce, Martin, Murphy 2011). Digital technologies take an increasingly important part in this process in the form of spatial media, as we are accustomed to being able to share, create and change digital representations of place. At some point, this transforms into a more embodied digital practice that utilizes tools like social media and digital filters (Halegoua and Ghiyong 2021; Wilken and Humphreys 2021). It becomes clear then that place whether digital or analogue remains an important aspect of human identity and therefore there is value in considering how that sense of place, or placemaking, is crafted and expressed in digital spaces.

3.1 Digital Placemaking

Digital placemaking is a concept and practice in which the affordances of digital media are used to evoke a sense of place that offers an emotional attachment to a place that allows social actors to craft and express their identities. However, it is a practice that can re-emphasise existing inequalities and so it is important to consider a wide and varied practice of digital placemaking when possible, in order to offer an as wide and inclusive approach to a core societal impetus to evoke a sense of place (Halegoua and Polson 2021). In Halegoua and Polson's introduction (2021) to their special issue on digital placemaking, they reference a variety of digital placemaking practices, many of which are hybrid, drawing on both digital and analogue space and practices. For example, the Afrofuturist hacked urban payphone called Sankofa Red (Stokes, Bar, Baumann *et al.* 2021) used the digital media tools of a Raspberry Pi computer, tablet, and speaker with an adapted piece of urban furniture and community-focused collaborative design practices. Sankofa Red is an example of a digital placemaking project that facilitated citizen engagement and intervention in urban planning processes. One example of its uses is when it helped a predominantly Black neighbourhood convert a car-centred street into a pedestrian plaza. Sankofa Red was also placed in an art gallery where it helped visitors from across the city record stories about race, and then in another iteration, it was placed in a predominantly white

neighbourhood where it facilitated an urban history game (Stokes, Bar, Baumann *et al*. 2021, 714). As long as the manner in which digital placemaking projects are designed using collaborative practices with communities just as the Sankofa Red project did, then digital placemaking projects that allow citizens to form a sense of place can facilitate meaningful interventions in urban processes for non-experts. Of course, in this instance, it is not only the "technical" aspects of digital media such as the Raspberry Pi computer, etc. That Sankofa Red used that, categorise it as an example of digital placemaking but also the potential for participatory user engagement is recognised as an affordance of digital media.

3.2 Digital Literary Placemaking

Digital Literary Placemaking not only draws on methods of digital placemaking (as discussed above in its use of the affordances of digital media) but also, as the name implies, draws on literary placemaking methods which we will discuss using Mundell's (2018) framework. This paper uses Mundell's (2018) process-based framework for literary placemaking as a method through which we can analyse in more depth *The River Poem* as an embodied space with meaning making potential. Mundell (2018) refers to geographers' definitions of space as humanised (Tuan 1977, 188) and infused with emotional responses (Wilson 2003; Withers 2009). There is some crossover here with Drucker's (2019) previously mentioned conceptualisations of interface as a networked space embodied with meaning as Mundell refers to geographer Canter (1997) who defines spaces as experiential and meaningful areas. The five place-oriented experiential techniques (POETs) that Mundell (2018) proposes are *Retrospective, Immersive, Collaborative, Vicarious, and Nebulous*.

To apply each of these techniques to *The River Poem* in order to evaluate its' methods of production of literary placemaking and concurrently the depth of potentiality it offers for embodied and meaningful spatial and literary interactions, we will first begin with *Retrospective techniques*. These refer to the past and remembering and seek to exploit personal memories as powerful catalysts of meaning. In this instance, providing the 3D model of Dublin city will for most users, particularly Irish and even more particularly Dublin citizens, evoke a memory linked to specific places. Similarly, the nod or "recreation" of the Joycean form by the machine learning algorithm can also potentially evoke specific memories or nuances of the past for users, in this sense *The River Poem* does not fall short. Next are *Immersive techniques* that refer to direct encounters with place whereas *Retrospective techniques* referred to past places. Again, the 3D model will refer users to a geolocated place but not necessarily in the same way Mundell outlines when she refers to Australian writer Birch's writing practice in that he would never write about a place without visiting it (Mundell 2018, 5). Mundell's model is aimed at the processes of practice so in this manner, the authors of *The River Poem* have all (and some still do) lived in Dublin and so have memories of the place and direct encounters of the city. Next, Mundell (2018, 10) refers to *Collaborative techniques* that use shared or cultural understandings of place which can be seen in the way that *The River Poem* draws on Joyce's literary work *Finnegan's Wake* and of course then concurrently that most famous of Joyce's works rooted firmly in Dublin city, *Ulysses*. It is interesting to note also that the urban furniture example of *Sankofa Red*, which was mentioned earlier in this paper with reference to digital placemaking, also evidences collaborative creation practices, however in a more participatory design sense which also operates on systems of shared cultural understandings. Next are *Vicarious techniques* that refer to the more empathetic affective aspects of a work that can offer employ point of view perspectives in literary narratives. It is this aspect that *The River Poem* does not appear

to engage with at all as its process of creation using the 3D printed model of Dublin city can offer a somewhat disengaged "god like" view over the city and so further thought on offering a point of view perspective in order to provide greater capacity for viewers to empathise might be useful here. Finally, Mundell (2018, 10) mentions *Nebulous techniques* which refer to the "*genius loci* (spirit of place)" (9) the imaginaries or more dreamlike, elusive content and aspects of a literary placemaking work. The digitised and abstract audio of water trickling in *The River Poem* can be placed in this category adding an atmospheric dreamlike dimension to the experience.

4. Reflections and Conclusion

This paper highlighted the growing trend of the use of VGEs and XRs and digital placemaking practices as a way of expanding the non-expert audience element in urban planning. This trend comes as a result of the recognised importance of allowing social agents the opportunity to contextualise data about their city and develop a sense of place of their surroundings as a way of communicating their identities and prompting more engagement in their localities. Interfaces were recognized as core components of digital texts and understood in this paper to represent a place for an embodied interactive experience that draws on texts, technologies, and social and cultural relationships as per Drucker (2019). The case study of *The River Poem* was described and analysed within a literary placemaking model (Mundell 2018) that allows a critical examination of literary placemaking techniques in the piece itself. We then argued that a sense of place is a quality traditionally evoked by artistic practices such as literary endeavours and human geography which is why a literary placemaking model (Mundell 2018) was used in order to explore the potentiality of digital poetry to act as an interface to a literary placemaking experience for Dublin city citizens in order to contextualise and engage with open data about their city. The increasingly popular practice of digital placemaking was also highlighted in order to contextualise digital literary placemaking as a potential emerging practice that offers many of the same benefits of digital placemaking and literary placemaking, namely allowing users the opportunity to reflect and contextualise data about their city as well as evoking a personalised sense of place. The application of Mundell's (2018) POET techniques allows for a more thorough analysis of the process of digital creation and revealed a path for further development of *The River Poem* in order to increase its literary placemaking potentiality and become a more effective interface for Dublin city open data. The information uncovered by the application of Mundell's (2018) literary placemaking techniques provided much needed data to shape the future development of *The River Poem* given the absence of rigorous user testing data due to Coronavirus restrictions and pandemic lockdowns. Namely, in order to maximise *The River Poem*'s literary placemaking potentiality so that it may engage citizens, it would benefit by employing *Vicarious techniques* that can offer specific points of view to draw out the empathetic qualities of a work. In doing so we have drawn attention to some extremely interesting examples of digital and literary placemaking such as *The River Poem* and *Sankofa Red* projects and discussed them from a creation and practice perspective rather than focusing only on the finished artefact which allows for a more nuanced and complex analysis of contemporary emerging practices situated in hybrid modalities of digital and analogue places that reflect more accurately the contemporary subjectivities of human kind. Hybrid analysis of these kinds is important as human subjectivities are increasingly situated in both modalities and the digital is reified even more legitimately into our everyday sense of identities however we are all as ever located in geolocated spaces.

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