

Tiree Tales: A Co-operative Inquiry into the Poetics of Location-Based Narratives

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ABSTRACT

In a location-based story a reader's movement through physical space is translated into movement through narrative space, typically by presenting them with text fragments on a smart device triggered by location changes. Despite the increasing popularity of such systems their poetics are poorly understood, meaning limited guidance for authors, and few authoring tools. To explore these poetics we present a co-operative inquiry into the authoring of an interactive location-based narrative, 'The Isle of Brine', set on the island of Tiree. Our inquiry reveals both pragmatic and aesthetic considerations driven by the locations themselves, that affect the design of both the Story (narrative structure) and Fabula (events within the story). These include the importance of paths, bottlenecks, and junctions as a physical manifestation of calligraphic patterns, the need for coherent narrative areas, and the requirement to use evocative places and to manage thematic and tonal discord between the landscape and the narrative.

CCS CONCEPTS

• **Human-centered computing** → **Hypertext / hypermedia**;

KEYWORDS

Location-Based Narrative, Sculptural Hypertext

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1 INTRODUCTION

Location-based narratives are digital stories, read on a smart device, that are aware of the user's location. Typically the stories require readers to move through a space, making new story nodes available as a result. They differ from traditional hypertext narratives in that navigation is a result of physical movement rather than link traversal, and are thus similar in their interactivity to game narratives, where narrative choices are associated with player actions. However, the location-based narratives created to date have mostly been exploratory, and little work has been undertaken to understand the poetics of location-based writing (in contrast to the body of theory on hypertext writing and poetics). Without this understanding it is difficult to produce effective tools for creating location-based narratives, or to educate writers about the possibilities.

Our StoryPlaces project is a collaboration between Computer Scientists and English Scholars to explore the poetics of location-based narratives. There have been a number of attempts to develop critical theory or design frameworks for digital narratives, but as location-based systems are relatively new, the theory behind them is in its early stages; examples include attempts to explore the boundaries between storytelling and games [10], considering the user's interaction as a trajectory through complex spaces [4].

In StoryPlaces we have taken a co-design approach, where domain experts (in this case English academics and authors) are brought into the design team and actively take part in decisions. In our project we are the technology experts, and through our interaction with domain experts have begun to understand some of the issues around authoring interactive location-based stories, an approach that we have used successfully in the past [31]. However, it became clear that this understanding would always be deficient unless we attempted to create a story ourselves and experienced the issues first hand. We also felt that we were more likely to push the technological boundaries of what was possible (for example, by using more complex interactive structures) as we were more comfortable with those aspects of the technology, and less conscious of the negative impacts that this focus might have on the resulting text.

In short, we were likely to create a less well crafted story, but one that better demonstrated the edges of what was possible with the technology, an experience that could usefully feedback into the co-design. Our approach is thus an extension, or adjunct, to traditional co-design. It does not seek to replace the main activity of working hand-in-hand with genuine domain experts, but rather to support an oft-overlooked aspect of the process, namely educating the technologists about the domain and fostering empathy between participants in order to support the ongoing conversation.

The Tíree Tech Wave, a ‘hands on making and meeting event’ on the Scottish island of Tíree provided us with the opportunity of a safe space where, as technology experts, we could take on the role of authors without the fear of criticism, and where the risk of failure was minimal. We attended the April 2016 Tech Wave, and spent five days on the island, using this time to research local history, explore geographical locations, and draft a story structure in the StoryPlaces format.

This paper contains a reflection and analysis of that experience, focusing on what we learned about writing interactive location-based stories from our time on the island. We approached the work as a *Co-operative Inquiry* a qualitative method that places emphasis on experiential reflection and analysis [26], and report the authorial process we undertook, give a brief structural description of the story we created, and present our observations and analysis of our experience.

2 BACKGROUND

Some of the earliest examples of location-based narrative systems were designed as tour guides, for example the HIPS system [9] which connected location-aware software to a knowledge base of information in order to generate personalised information pages based on current location. Many early systems focused on dealing with location inaccuracy, for example GUIDE which dynamically constructed pages with possible locations for the user to choose from [13]. More recent examples depend on more reliable location data, and the focus has moved to the experience itself, often through the use of more evocative stories, for example location sensitive historical plays [8] or tapestries of personal stories that overlay a visited space to build up a cultural picture [22].

Interactive educational tools such as ‘Gaius’ Day in Egnathia’ [2] push the interactive elements of this kind of storytelling by giving participants goals, in the case of Gaius’ Day this is in the form of exploration targets that they must identify by collecting location-based clues. The Chawton House project [30] also supports an educational experience, but in Chawton (set in the grounds of a period house) the activities themselves are non-digital (for example, for the

children to act out a scene between two characters, or pause and create a short poem).

We have also seen researchers explore new ways of fusing location-based narratives with real world context. For example, in ‘Viking Ghost Hunt’ [21] where players hunt down the ghosts of Dublin using an augmented reality system, or ‘University of Death’ [10] a hybrid reality system that requires its players to adopt specific roles and behaviours and utilise real world props and clues alongside digital information.

In contrast, the narratives that we are concerned with in our research are better classed as interactive fiction with a focus on delivering an engaging story as opposed to location description or interactive play. Some, such as The ‘iLand of Madeira’ rely on the effectiveness of a simple mosaic of story nodes that are gradually revealed [14], while other systems like ‘San Servolo, travel into the memory of an island’ have more complex rules, based not just on location but other contextual factors such as weather and reader history [25].

Location-based interactive fictions are analogous to ‘Walking Sims’, games where readers explore virtual spaces and interact with objects triggering narrative sequences, San Servolo and Tíree even echo the first popular example ‘Dear Esther’ which also takes place on an island [23]. The main difference being that authors of walking sims have full control over the environment, designing both the virtual world and the narrative together, whereas location-based narratives are written to existing places and locations, and must deal with a changing environment that is beyond the control of the author. In this regard they are in the tradition of psychogeography, which seeks to challenge the traditional relationships that individuals have to place and encourages playful and exploratory behaviour [12].

Despite this prior work we still understand little about the way in which location-based stories are constructed by authors, and how they use their physical locations for narrative effect. As a counter-example it is worth considering the world of literary hypertext. Writers such as Rosenberg have contemplated the aesthetics of link types and effects [28], while others have explored the impact of textual nodes on overall coherence and experience [24], and seminal pieces, such as Michael Joyce’s ‘afternoon, a story’ have been analysed critically [29].

Models of hypertext can be applied to location-based stories, in particular *Sculptural Hypertext* systems model all nodes as potentially available, but at any point in the interaction ‘sculpt away’ a number of nodes depending on the reader’s state (normally derived by cumulatively applying rules that are attached to each node)[6, 32]. If location is modeled as part of the reader’s state then it can be used as a factor in what is removed - effectively meaning that as the reader moves around in space different nodes become

available to read. This model has been shown to be sufficient to describe a range of location-based narratives [20].

Therefore we could see location-based narrative authoring as similar to the authoring of sculptural hypertexts. Several authoring systems do exist for sculptural hypertext, for example StoryNexus is an online system that frames these variables as *qualities*, and the rules as *consequences* - thus attempting to give a more friendly vocabulary to something this is effectively a state machine. In addition it identifies different types of qualities (such as quest, progress, or accomplishments) that help authors to understand how the system may be used. Similarly the latest version of StorySpace [7] takes the notion of guard fields (conditions attached to links) and extends them to a full sculptural hypertext system that can be authored visually.

Our long term goal is to apply these ideas to location-based systems, focusing initially on creating a poetics of location-based narrative that we can use to inform the creation of new authoring tools. This was the purpose of our co-design activity, and the motivation behind our trip to the Tiree Tech Wave was to directly experience the challenges of creating a location-based narrative, in order to develop those poetics.

3 METHODOLOGY AND EXPERIENCE

Experiential Inquiry is a qualitative approach that attempts to go beyond positivist scientific methods, especially in regard to understanding human behaviour. In Experiential Inquiry “the agent himself (sic) engages systematically in a self-directed exploration of his own experience and behaviour and attends fully to the experience and behaviour of other agents who are similarly engaged in interaction with him” [17]. Co-operative inquiry is a specific methodology that emphasises the experiential reflection and analysis of a group of researchers working on a particular problem [26], as such it is similar to both Action Research and Ethnography but with greater emphasis on the researchers themselves, and less concern with the broader social and political contexts [11]. Co-operative Inquiry may involve working with domain experts (to co-operatively solve a problem), however it is interpreted widely, and can also mean a group of people coming to together to collaboratively solve a problem, in this case two technologists (the authors) approaching the co-creation of a location-based story.

A Co-operative inquiry cycles through four phases [27]. In the first phase the researchers come together and identify the agreed area for inquiry, in the second they become co-subjects - engaging in the actions they have agreed and recording the process and outcomes, in the third they become fully immersed in the activity and elaborate on their initial superficial understanding, and in the fourth they come together after an appropriate time to share their data and analyse their

experience in order to achieve new levels of understanding. In our work the creation of a location-based story on the island was the focus of the inquiry, and the Tech Wave the mechanism by which we came together and engaged with the task (phase one of co-operative inquiry).

In co-operative inquiry the account itself is of high importance, and the process aims to bring out the subjective experiences of the participants, using their knowledge to interpret and make sense of what occurred, rather than attempt a more objective analysis (for example, by thematic coding). Hence throughout the trip we kept a photo record of our visit and recorded the GPS co-ordinates of likely locations. We used Google Docs as a scratchpad for our story - using it to draft story nodes, store the JSON definitions required by the our software, and to record a daily journal of our activities. We have reported the account of our authorial experience in Section 4 below, and our reflections in Section 6.

Our plan was to spend the first day researching the history of the island and developing the high level story concept and structure (phase two of co-operative inquiry). The second and third days would be spent scouting locations, recording GPS positions, and drafting the first versions of the story nodes (phase three of co-operative inquiry). The goal being to have a bare bones functioning story by the time we left, that could be fleshed out in the weeks following our visit.

We held three brainstorming meetings to review our records and make sense of our experience (phase four of co-operative inquiry). The first at the end of day three, the second a week after we had returned, and the third around eight weeks after the trip (when the majority of the story nodes had been written). These notes were then added to the Google Doc and used as the basis for the reflection presented here.

4 AN ACCOUNT OF OUR AUTHORIAL PROCESS

On day one we began the process by discussing the key themes that we wanted to explore, the starting premise, and the sorts of narrative and sculptural structures that we might want to use. Our experience of flying to the island, especially the last leg sharing a small and ageing propeller plane with only a handful of passengers, evoked the idea of the ‘professional stranger’, someone who brings their expertise into a foreign world. In an effort to make our story reflect our own experience of travelling to a remote island, we decided that our protagonist should be a professional visiting a foreign land in the spirit of Lovecraft’s ‘The Mountains of Madness’. This is a common trope that has also appeared in film’s such as ‘The Wicker Man’, the twist being that although the stranger brings their expertise into a new place in order to apply it (typically with a sense of superiority), in the end it is the place that teaches them new things about themselves and the world.

We also discussed the structure that the story should take, and decided to base it around three acts unfolding across three separate areas of the island. Again we were informed by our own experience, as we had been advised to hire a car to travel around the island. Our structure would enable readers to drive between acts, but then walk and explore the nodes within the act. In preparation for our trip it had become clear that there were excellent local resources about the myths of the island, and our idea was to link one of these with our protagonist. As they progressed through the Acts of the story, these links would become clearer. We also discovered a rich local resource in the form of a mapping of English, Gaelic and Norse place names to survey data. This inspired us to make our protagonist a surveyor, and we reasoned we could use this resource to populate a number of nodes about the island and its history.

Tonally we wanted Act 1 to be a straight account of the surveyor's work. Act 2 would begin to play with the reader's perception of the surveyor as a reliable narrator, and hint at some connection to the island. Act 3 would more obviously descend into delusion, but would reveal that connection, and present a resolution. With this rough structure in mind we visited the island's museum to search for appropriate historical stories and legends. But rather than one or two key stories, the island is replete with local legends and tales - spanning from Viking invasion to the island's role in World War II. Throughout the stories we noted key themes of Death and the Sea, as many referred to the hard life of the islanders and their symbiotic relationship with the Atlantic. Travelling around the island we were also struck by how unusually low-lying it is, as if part of the ocean itself. We therefore decided to change our plan, and have our surveyor encounter many of these stories on his travels, and to make his past connection not to one story in particular, but to some traumatic event at sea - which the stories could thematically allude to in Acts 1 and 2, and then explicitly link with in Act 3.

For the remainder of day one we used our time to expand our narrative structure. In particular adding a second parallel three act structure, that expanded the history of the surveyor and his reasons for visiting the island, and act as an interactive element in the story (as readers would experience the story differently pending the juxtaposition of the Acts). We also began to plan the location elements of the story, mapping the stories we had identified to places on the island with the help of locals attending the Tech Wave Event. Some were directly linked to the stories, but others could be linked thematically (or the locations were not known, and we could therefore take artistic license). It was also important to us that the structure of the locations matched the structure of our narrative, especially that the denouement of the story

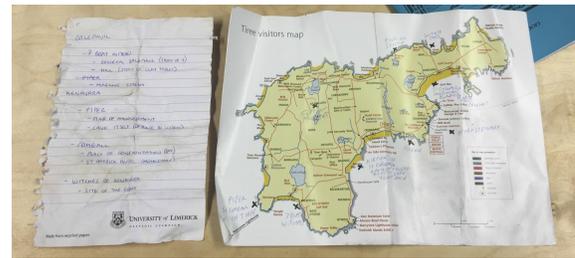


Figure 1: Annotated Map and booklet

should occur in a meaningful place. We created a simple written manifest of locations for each area, listing the sorts of location we would need to match our stories (an example is shown in Figure 1). On the following two days we visited the areas, located appropriate starting places (where we could park), and then walked around the area using Fieldtrip GB to record location stamps, and our camera to capture a visual record of each spot. Our choice of location stamps was partly practical (was it on an effective path or route), partly logical (could you see things that were referenced in the stories), and partly aesthetic (was the location evocative of the things described in the stories).

On each day we returned to base to convert our field notes into stubs for the story (JSON objects in the Google doc). One of our assumptions was that it would be easy to add to a sculptural hypertext organically, and therefore we could fully develop a handful of nodes into a working story and expand it from there. In reality we had to carefully plan all the elements of the story, including all the locations, points of story revelation, and how those fitted into the high level structure, meaning that we could not simply add new nodes at a later time. As a result what we actually completed during the trip was a skeleton of the full story, including all the nodes and their locations, conditions and rules (but with actual content for only a handful of nodes, this content was then added in subsequent weeks after we had met to flesh out the story premise that we outlined while on the island).

5 OUR STORY: THE ISLE OF BRINE

Our story is called 'The Isle of Brine', the protagonist is a surveyor, sent from the mainland (for unclear reasons) to survey Tیره, replete with notes on its history and legends. As the story progresses it becomes clear that he has some other connection to the island, and that he is haunted by an event from his past. As the reader moves around the island, reality and myth become blurred, until the surveyor is forced to confront the decisions he has made to bring him there.

Previous work on Sculptural Hypertext has revealed a number of common patterns that author's use to build their narratives [15]. Our three act structure matched a pattern

called *Phasing*, where a story progresses through key defined phases and only nodes in the current phase are available - at some point reading a node triggers a change to the next phase.

Another pattern is *parallel threads* where two or more sequenced nodes develop independently of one another (for example, following the Points of View of different characters). Each node in the thread requires the previous to have been read, but the threads are independent. *Isle of Brine* applies this pattern but at the level of phases. The main phases (Acts 1 to 3) follow the surveyor as he moves across the island, and develops the story of why he and the island are linked. A secondary set of phases progress backwards in time, and tell in flashback how he came to visit Tiree. This juxtaposition of phases provides an element of hypertextuality to the story, as a reader's interpretation of events will depend on their relative positions in each set of phases.

The largest phases are the ones representing the main three Acts (comprising 40 nodes, compared to 12 nodes in the secondary phases). Each Act starts with an intro phase, with a start node at a beginning location that can be reached by car, once this is read the story moves into the main phase for the Act containing nodes that can be read in any order. In both intro and main phases a node that is available regardless of location gives a brief description of the current state of the story, and some advice on how to proceed. Within each main phase there is one node that will transition the story to the next act, we used another pattern *un-locking* to ensure that this only became available once half the nodes in the act had been read.

The secondary phases are the ones that describe the events leading up to the trip to Tiree. All the nodes in the phase must be read before it changes to the next phase. Every node in all three of these secondary phases are mapped to three different locations, one in each of the areas of island used for the main phases (the three acts). This means that the nodes are available locally to the current Act whatever combination of main and secondary phases are active. Figure 2 shows a graphical version of the structure [16], and Figure 3 shows how Act 1 appears on our mobile viewer.

6 ANALYSIS AND REFLECTION

This section records the outcome of the fourth phase of our co-operative inquiry, and is the result of analysis and reflection meetings held in the two months following our return from Tiree. Reflecting on our experience has led us to a number of pragmatic and aesthetic considerations that were part of the story design process, and has led us to consider how locations can be seen as Text in traditional narratological terms.

Pragmatic Considerations

When faced with constructing our own location-based story, it became clear that the pragmatics of the locations themselves are of paramount importance. Everything that a reader experiences in the story is done through the lens of location, and in particular the navigation of those locations, if the navigation is not practical, then there is a very real chance the reader will give up and never fully experience the story. In our story we quickly realised that, we would need the locations to reflect the transportation options open to our readers. Points of arrival and departure are especially important. This led us to have three areas, with the intention that the readers would drive between those areas and then explore locally on foot, with clear starting nodes linked to places to park.

It was also clear that the locations of the story should be meaningful in the context of that story, and probably linked to the narrative design. In our case this meant linking three areas of the island to the three main Acts of the story, thus associating navigation between those areas with tonal shifts in our narrative. This could be taken to the point where it supersedes practical concerns, e.g. one can imagine stories where the confusion and challenge of widely dispersed locations had narrative resonance with the story being told, but this should be an intentional decision by the author.

Another example of how location impacted narrative design was in Act 1, where the reader is progressing along a beach towards a headland, given the rules it is likely that the transition node to Act 2 will appear behind them before they reach the end of the beach. Readers are then faced with the choice of when to turn around. Aware of this we ensured that the nodes at the far end of the beach contained no information that was needed to make the story coherent, but that instead were tonally consistent with Act 2 (bringing in elements of delusion), were a premonition of things to come, and acted as an Easter Egg for particularly vigilant readers.

In general the accessibility of locations is an important factor. Whether because of distance to other locations, or because of local conditions. For example, when choosing locations on the beach, we were aware that the tide might make certain places inaccessible, and that time might change the shape of the sand dunes and access to the tundra behind.

Whilst many of the models of location-based narratives include open areas that can be explored in any order (Plains [20]), the reality is that paths are pre-eminent and there is a lack of genuinely open spaces in real environments. For some areas of our story this means that despite the sculptural hypertext model we were using, the navigation began to look more like calligraphic patterns, where a reader's choices are constrained just as much as when confronted with links [5].

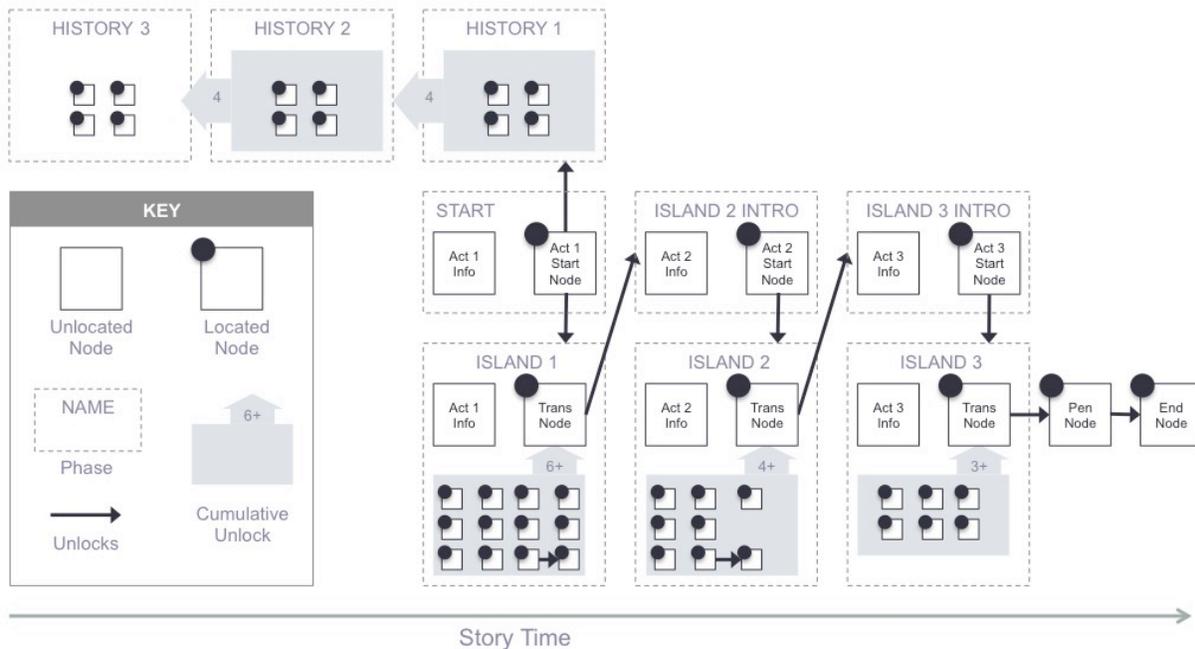


Figure 2: The sculptural structure of 'Isle of Brine'

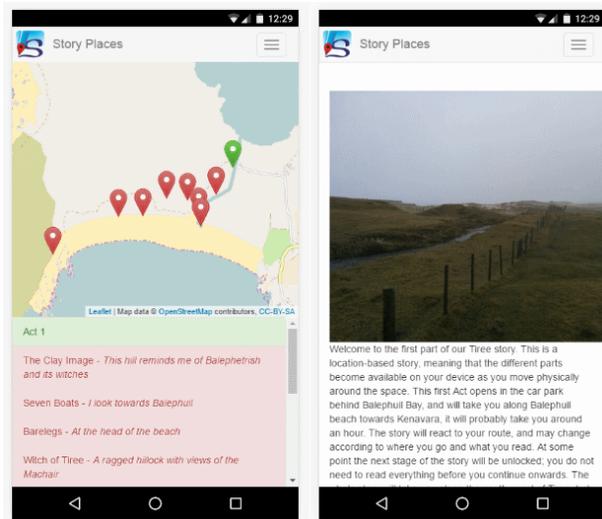


Figure 3: Screenshots of 'Isle of Brine'

Realising early on that paths and routes were essential to the navigation of the space, meant that it was important that we identified junctions and bottlenecks, as junctions were good places to situate choices and bottlenecks a good place for important nodes. It also meant that we could use the landscape to guide users rather than the digital rules of

the hypertext. For example, in Act 1 the car park is several hundred yards from the beach where most of the nodes are located, and there is only one path. Nodes placed on that path are highly likely to be seen by the readers before the ones on the beach.

Aesthetic Considerations

An early observation was that we had naturally started writing in the first person present tense. Both of us did this unconsciously and independently. This could be because of the active and present nature of authoring in situ, or because of the discrete nature of the writing, lots of small textual nodes, which puts one in mind of writing a journal or diary (which also tend to be first-person present tense).

Something else that became clear early on was that the drama of the story needed to be matched to the dramatic landscape. The island is a striking place, and in some cases the locations made aesthetic demands of us, particularly obvious points of interest. Walkers (and thus readers) will be drawn to these spots. The author need not yield to these demands, but again that is an active choice that has consequences. A striking location that is silent may carry significant meaning.

We have already noted how the topology of the landscape (e.g. the paths and natural routes) is important to consider pragmatically, but its juxtaposition with the hypertext structures of the story also has an aesthetic affect, for example by

matching our three island areas with our three main phases we associate navigation between those areas with tonal transitions in our narrative - leaning on the sense of story as journey (progress through a landscape) that is often used in game design [1].

On our second day the weather was bad, but on the third day, the weather improved considerably. It was obvious to us, contrasting those two days, that the weather had a significant impact on our perceptions of the places. The poor weather on our first day could well explain the somewhat grim tone of our eventual story, which seemed slightly out of place when read in brilliant sunshine. Dealing with the changing aesthetics of a space (either because of weather or simple differences in time of day) is likely to be a challenge for location-based authors. The technology could potentially use these as part of its rules set, and this could get around problems of diegetic references in the text (for example, different nodes could describe a view differently depending on visibility), but it does not really help with the overall tone of the story. In some cases, readings in different contexts will be equally valuable and interesting to contrast, but in our case there was a clash between the feeling of the island on a sunny day, to the aesthetic of the story itself.

Location as Text

Many of the points that emerged from our reflection concern the practical difficulties of creating a location-based story and the relationship that those choices have with the narrative itself. We can draw comparisons between the poetic impact of this relationship and the idea of “The Medium is the Message” [19] or its similar counterpart from games design: Portnow’s concept of “Mechanics as Metaphor” as reported by Locke [18]. Through location design the author can create emphasis or otherwise alter the impact of their story, not just from the use of the setting of individual locations themselves (whose impact is inherent in location aware narrative) but in the structure of their linking. There are frameworks that can help us begin to make sense of this relationship.

In the structuralist tradition of narratology a three layer view of narrative is often taken. The precise terms used vary in English, French and Russian, but a useful overview is presented by Bal in her seminal book on narratology [3]. Bal talks about three layers: *Fabula*, the events, objects, characters and their interactions; *Story*, the way in which those events are organised into a telling, rarely in a purely chronological way; and *Text*, the textual artefact in which the story is engrained. Often the model is thought of from the ground up, i.e. things happen, they are arranged into a story, and that story is written down or told. But it is just as accurate to say that the form of the text means that the story must be told in a particular sequence, and that certain events have to

happen for that sequence to work. In other words, the layers are co-dependent on one another.

Framed in this way the pragmatic and aesthetic considerations concerning the reader’s physical location in a real environment with a smart device (the Text) can be seen to impact the narrative structure (the Story), and the things that occur within that story (the Fabula). Table 1 shows a summary of our observations within this framework. (We use ‘vs.’ purposely to indicate that both harmony and discord are possible choices for the author. E.g. topology may give walkers navigational choices, but these may or may not translate into narrative choices for a reader).

In the background section we mentioned the similarity of location-based narratives to walking sims, and it is interesting to reflect that our observations here – concerning building a narrative that fits the environment and parameters of a reader’s visit – may also apply to walking sims, but in that case are reversed and become requirements for the construction of the environment itself. This mirroring of design rationale is something that we intend to explore in our future work.

7 CALLIGRAPHIC PATTERNS AND LANDSCAPE

In our previous work on location-based storytelling we identified patterns within the sculptural hypertext; these patterns work on the logical structure of the narrative, and ultimately shape the possible routes through the hypertext [15]. However, as mentioned in the previous section it became clear through our own authoring activity that the topology of the landscape, the natural paths and routes found within the location, also shape the possible narrative routes. Thus a location-based narrative is shaped by both logical and topographical relationships, working simultaneously on the reader.

This means that structures can manifest both within the rules of the hypertext and in the layout of the locations. For example, a sequence of nodes where each node has the previous node as a prerequisite (a Canyon [20]) will cause the reader to experience those nodes in that sequence, however, the same set of nodes arranged in an open logical structure with no prerequisites (a Plain [20]) when placed along a road will implicitly create the same linear structure due to the topology. More complex topology has more complex effects, for example the locations for Act 1 of ‘Isle of Brine’ (as shown in Figure 3) are set around a beach with tundra behind, to move from the beach to the tundra is possible, but requires climbing and is practical at only a few points. So while this is technically an open set of nodes the inclination to walk from the car down the beach and back again on the tundra (in a loop) will mean a very predictable linear experience for many readers (as shown in figure 4).

Table 1: Aesthetic and Pragmatic Affects of Location Text on Story and Fabula

	Aesthetic Affects	Pragmatic Effects
Story	<ul style="list-style-type: none"> • Topology vs. hypertext structure (e.g. using landscape to establish coherent narrative areas) 	<ul style="list-style-type: none"> • Establishing points of sensible Arrival/Departure (good places for key phase changes) • Using topology to supplement logical control of the narrative. E.g. Paths (sequences, cycles) and Junctions (choices)
Fabula	<ul style="list-style-type: none"> • Authorial Voice (situated and present) • Landscape points of Interest vs. narrative events of interest. • Theme/tone of the Space (which typically will change over time) vs. theme/tone of the Narrative (which typically will not) 	<ul style="list-style-type: none"> • Diegetic references (which may become inaccurate) • Using landscape to managing the experience. E.g. choosing locations with reasonable distance for mode of travel • Using bottlenecks (e.g. for placing key events) • Identifying high cost locations (that are far away, difficult to access, or restricted; these should only be used for non-key events, and could be considered rewards for reader effort).

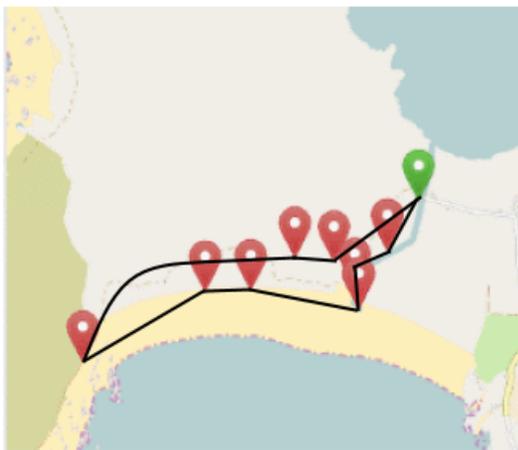


Figure 4: Act 1 locations are open but form a natural cycle.

If sculptural patterns describe the logical structures of a location-based narrative hypertext, then we could return to Bernstein’s calligraphic patterns to describe the topographical patterns through the landscape. The *Cycle* for example is a good match for the ‘Isle of Brine’ beach example above. “In the Cycle, the reader returns to a previously-visited node and eventually departs along a new path” [5], although there are two important differences. Firstly, that the node returned to is in the same location, but is actually a different node (the start is a welcome node in the beach car park, the end a different node in the same car park), this means that unlike a traditional hypertext where one of the key functions of the cycle is to reinterpret the text on a second (or third or fourth) viewing, here it is a reinterpretation of the location –

firstly as a point of arrival, then later of departure. Second, the overall function of the cycle in a calligraphic hypertext is often to emphasise parts of the narrative by encouraging this sort of re-reading and reinterpretation, while in a location-based story due to the effort of revisiting, this seems a less-likely approach (not least because of the physical effort of revisiting many nodes).

In our story we use a cycle to zone the first act of the narrative, allowing the leap to Act 2 to occur only at the root of the cycle. *Contours* are made of several cycles that interlink together, and although we do not have contours in “Isle of Brine” (they seem more likely in an urban landscape of buildings and blocks) they also seem a potentially useful way to zone a location-based story, allowing the reader to choose different paths and move between those paths, but again the emphasis is on choosing the reading order rather than on re-reading.

We also use *Neighbourhoods* to give coherence to the story, using three regions of the island to denote three distinct stages of the story. Neighbourhoods are the most obvious example of calligraphic patterns applying to location, and location is even used as an analogy in Bernstein’s original definition “just as a prominent church spire shows a walker that two spots separated by long, winding streets are still in the same neighborhood, deliberate display of commonality in a hypertext can express relationships that individual links might not emphasize.” As a significant reflection we explicitly identified the use of landscape to establish coherent narrative areas (see Table 1).

A *Sieve* is an example of a pattern that applies in both the narrative logic and the landscape. In the logic it is essentially

a Delta [20], implemented as choices between nodes, and the subsequent unlocking of alternative nodes to take the story forward. However, it can also be applied to junctions in the landscape, and we used it in the third Act of “Isle of Brine” where the reader can choose whether to explore the graveyard in Balinoe, or move into the village proper. Similarly a *Tangle* could potentially be implemented using a complex set of sculptural unlocking relationships to disorientate the reader, or it could be said to represent a plain, where the landscape is open, and thus any node (within a given set) could potentially be visited from any other node. We expected to use this a lot for our story, as each Act is essentially a plain, however in practice the paths in the landscape make many of the navigational choices unlikely, turning a tangle into a defacto Contour, or in the case of our first Act a single Cycle.

Other calligraphic patterns do match the sculptural patterns. For example, a *Counterpoint* is where two voices alternate, with the reader following links between. We previously identified this in sculptural hypertext as Parallel Threads, and “Isle of Brine” uses this approach, presenting both historical and contemporary nodes (the History and Island phases respectively) presented in the same regions and sometimes sharing locations. Similarly you might see the three acts of “Isle of Brine” as *Split/Joins* (with the splits and joins happening at the transition nodes), certainly the final denouement of the story, a linear sequence of three nodes at the culmination of Act Three (Island 3), is an ultimate join that brings the readers back to a common experience whatever their wanderings to that point.

Finally some calligraphic patterns have the potential to be applied in new ways in a location-based story. *Mirrorworlds* are hypertexts with (near) symmetrical structure, but where each side of the mirror gives a different perspective. This could translate to a location-based story across a common set of locations, but where an early choice determined which version (or proportion) of the nodes were revealed. We could have done this in “Isle of Brine” with our History nodes, but ultimately wanted to decouple the progress through that part of the story from the progress the reader made across the island, hence all the History nodes map to three locations, one in each of the areas used for the main Acts of the story.

8 CONCLUSIONS

The authoring process for the creation of interactive location-based narratives is not well understood, despite the existence of many examples of the genre in the research literature, and increasing numbers of commercial examples available for smart devices. This limits the tools that can be developed, and the educational resources available for potential authors. We are currently involved in an interdisciplinary project that aims to address this problem by using co-design to explore

the poetics of location-based storytelling. However, as technologists working alongside writers and English scholars we do not get the opportunity to develop our own experiential understanding of the authoring process.

In this paper we have described how we took the opportunity of a safe space, the Tiree Tech Wave, to take on the role of authors and undertake a co-operative inquiry into the authoring process. We developed our own story, ‘The Isle of Brine’, that was substantially more complex than the other examples developed in our research (via working with traditional authors). Our experience highlighted the complexity of author’s choices, and is to our knowledge the first time that the authoring process for a location-based story has been explored independently of an evaluation of the technology of deployment.

In the co-operative inquiry method the analysis is emergent from the experience of the participants themselves and is thus rooted in their perspective, drawing from their discussions and based on the way that they rationalise and explain their own behaviour and decision making. When physically visiting the places where the story occurred the absolute primacy of those locations for the reader experience was stark, and immediately impacted our thinking as authors. On reflection the locations had both a pragmatic and aesthetic impact on the Story and Fabula of our narrative. Whereas it might be imagined that a story can be overlaid relatively simply on a place, in fact we discovered a deeply interconnected set of decisions that show that narrative structure, location topology, and story events are co-dependent. As authors we had to develop these simultaneously in order to create a workable and coherent narrative. We also observe that the topological structure of the landscape demonstrates a number of features which may impact the resulting poetics directly, and that these features are similar in form (if not quite function) to traditional calligraphic patterns. This leads us to the conclusion that location aware narrative is a marriage between sculptural patterns at the logical level of the narrative and calligraphic patterns at the level of the landscape.

In our broader co-design work in StoryPlaces we have worked with over 45 different authors, and in all cases they struggled to appreciate the primacy of location to their reader’s experience, and to understand how to address this in their own narratives. Authors are not typically game designers or technologists who might think more broadly about the process of user interaction, and their focus on the story world and the narrative structure hides the ways in which location might impact their readers. The findings expressed in Table 1 have already given us some very concrete guidance that we have been able to give to authors in subsequent co-design

sessions, and will form the basis of a toolkit for authors and an associated authoring tool.

We are not in a position to judge whether 'Isle of Brine' has been successful, and a high quality text was not the aim of the activity, but our experience will feed back into the co-design process for our research informing the design of new authoring tools and training materials for writers. Our hope is that the observations reported here will inform other researchers and developers, encourage them to experience the authoring process first hand themselves, and ultimately will help them to work more effectively with writers of location-based stories, with the aim of opening up this intriguing new medium to a wider range of authors and voices.

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