Narrative and Hypertext 2011 Proceedings
a Workshop at ACM Hypertext 2011, Eindhoven

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Foreword

This narrative and hypertext workshop was a part of the workshops conducted at ACM Hypertext 2011. The workshop aimed to provide an interdisciplinary forum to bring together individuals from the humanities and science communities to share research and discuss state-of-the-art work on narrative from both a technical and aesthetic perspective.

Narrative could be considered as the presentation of an ordered series of experiences. Understanding of narrative includes a wide range of elements including plot, theme, authorial voice, style and genre. The systems that work at constructing, presenting, or analysing these might be called narrative systems. As hypertext systems link and structure information into experiences for their users many hypertext systems could in turn be considered narrative systems.

Narratives are complex creations prevalent in our entertainment, communication, and understanding of the world and its events. By building better models of narrative along with methods for generation, adaption, and presentation we enable narrative systems to become more effective but also improve our understanding of narrative structures.

Narrative might also be used as a discursive representation of knowledge, allowing for the capture of expert understanding. The potential for grander narratives to be formed from collections of information or discourse on the web (for example from social media) means that knowledge or identity might emerge from otherwise seemingly disparate sources.

The hypertext conference often has a history of publishing work related to narrative research ranging from explorations of criticism and the creation of digital narrative to authoring hypertext fiction and semantic narrative systems. This workshop offered a focus for a cross-discipline community to share research, offer solutions and contributions to the challenges faced in the study of narrative and the development of narrative systems, and offered a platform of discussion for potential collaboration for members of the hypertext community working with narrative.

These proceedings cover accepted peer reviewed work submitted to the workshop.

Linking Locations: Storytelling with Pervasive Technology

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ABSTRACT

With online location-aware smart phones in more and more pockets, storytelling is moving to the streets. Simultaneously, an increasing abundance of Linked Data is being made available, complete with geographical information. In this paper, we review the state of the art and suggest approaches to, and issues with, a storytelling system that combines these two technologies.

1. INTRODUCTION

Storytelling has always been part of the way in which people communicate, but recent technological developments are opening up new ways to engage in this activity. Location-aware technologies are now readily available and in regular use by many people, opening up increased possibilities for location-based storytelling. Recent developments, such as Wanderlust Stories[1] and Broadcastr[2], have begun to bring this to fruition, but we believe the quantity and structure of available data provides scope for a far richer experience.

Writing is subject to influence (conscious or otherwise) from all sorts of aspects: past events, locations visited, and people met. An incident in a book or film may be inspired by an event from the past, and a line of dialogue may be based on reality. Video games push this further: STALKER is set in Chernobyl[3]; Fallout 3[4] is based in a post-apocalyptic Washington DC; Grand Theft Auto[5] borrows locations generously from all over America. Locations in- and out-of-game match almost exactly: photo-realistically in places. Plot lines and interactions are drawn on top of the existing canvas of reality. These fictions are set in altered realities: in this paper we ask whether we can build fiction altered by reality.

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[1] http://wanderluststories.com
[2] http://beta.broadcastr.com
[3] http://www.stalker-videogame.com
[4] http://fallout.bethsoft.com
[5] http://www.rockstargames.com/grandtheftauto

To approach this challenge, it is first necessary to attain a collection of structured factual data - an area in which Linked Data shines. Cross-references between different data sources provide a vast amount of information, most structured in such a way that there is commonality between concepts. There are ontologies for geography, eating establishments, people, and even narrative itself. There is an exciting opportunity to combine the huge amount of location data available in Linked Data stores with the events that occur within a story, factual or fictional. All that is required is an approach to bridge the device and the content that is intuitive to authors and readers.

In this paper we will examine some existing location-aware systems; describe the Stories Ontology, its current applications, and other useful ontologies; and explore some of the possibilities that are available by coalescing mobile devices, location data, and narrative.

2. LOCATION SYSTEMS

With the introduction of GPS-enabled mobile devices, geographically inspired games and services have become increasingly prevalent. The former include games with the aim of discovering new locations, following paths to achieve goals, and competing against friends to 'own' geographical zones. The latter provide facilities to aid in tasks from finding nearby pubs to locating events in the user's vicinity. All manner of location-based systems are coming into common usage, from scavenger hunts to 'status-based' social networking systems.

Informative location-based services are generally oriented around answering "where's my nearest...?" questions. For example, Yelp[6] offers listings of local businesses based on one's current location; various applications, including The Weather Channel's Weather.com application, show local weather; and work has examined location-based services for recommending events[4]. Other information-based locational services focus on information about people who are in transit: for example, Neer[7] is concerned with dynamically sharing your location with an 'inner circle' of family and close friends.

By contrast, Foursquare[8] and SCVNGR[9] are both exam-

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[6] http://www.yelp.com/yelpmobile
[7] http://www.neerlife.com
[8] https://foursquare.com/
[9] http://www.scvngr.com/

ples of more 'playful' services oriented around 'checking in' to a location. Both services have initiated partnerships with public and private organisations, building promotions that encourage their userbase to check into places. Such systems, another example of which is Gowalla[10], let people check into locations with mobile web apps. Users can see where their contacts have been most recently, post or browse photographs of locations, and see who else is at (or has been at) their location. Some systems have gaming elements: for example, Gowalla users can find virtual tokens at some spots, and can collect or swap these. Other such systems include Brightkite, Hotspot, and Facebook Places.

Geocaching[11] is an example of locational gaming. It is a collaboratively organised scavenger hunt: people use GPS coordinates and clues given on a website to find "caches". While the game has clear antecedents in pre-digital treasure hunts, geocaching using GPS began in 2000 after private citizens were given access to far more accurate signals than previously, allowing more precise locations to be found. Today the game revolves around its website, which provides a database of caches and forums for discussion, and there are several dedicated apps for various mobile phones. Geocaching has been used in novel ways to tell stories, for example about the local history of an area, or to engage in a fictional tale which moves between different spots.

Broadcastr[12] is an example of a different kind of location-based system, one which is designed to support storytelling: users can share their memories – or perhaps their fiction – about specific locations with an online audience.

The majority of these systems operate from their own databases of locations and metadata, with little overlap between them. This lack of interoperability spawns competition over the accuracy and quantity of data available to the system: the Eiffel Tower in a location-aware game may have very different metadata to that in a system suggesting sight-seeing opportunities, even though they are both referring to the same location.

3.   LINKED DATA RESOURCES

Fundamental to any locational narrative technology are, naturally, geographical resources. GeoNames[13] provides an extensive dataset for this purpose, with over 8 million place-names. Their ontology defines the latitude and longitude of these places; their spatial relationships to other locations, such as neighbours, contained regions, and regions containing the locations; and data associated with the places, such as the type of location (e.g. lighthouse, pier, beacon), postal codes, and related resources in other datasets. GeoNames also provides services to look up these places given a longitude and latitude.

From the GeoNames dataset, one of the most fruitful links is to DBpedia[14]. This offers a wealth of data, primarily ex-

tracted from structured data on Wikipedia[15]. In the case of Paris, for example, DBpedia offers information on population, famous Parisians, campuses, battles, and even precipitation! Aside from countries, it also contains information regarding establishments (e.g. restaurants, churches, libraries, etc). With a little extension, it would be possible to find all restaurants in Paris that sold coffee.

Ontologies, and datasets, are also available for information about people. FOAF[1] is the most prevalent, with the FOAF Project commencing in 2000. An instance of the FOAF Person class can include details about names, birthdate, projects, and links to other people - though the latter is only at a high level. Bio[16] extends this with events (e.g. Birth, Death) and relationships (e.g. mother, father), and the Relationship Ontology[17] provides more varied relationships (e.g. mentor of, would like to know).

Finally, to ease the creation of Linked Data-backed stories, there are ontologies for the description of narratives. The Stories Ontology[2][6] is a purposefully light ontology, derived from the OntoMedia ontologies for multimedia annotation[3]. A Story is defined, at its simplest, as being a set of Events with a subject. These Events, modelled with the Event Ontology[5], contain information about the people, places, and things involved in the event, and the time at which it began/ended. Individuals may then build Interpretations of these events, and indicate facts that they believe are asserted as a result of their occurrence.

By using the Stories ontology in tandem with existing datasets, it is possible to build a narrative wherein the Events refer to people, places, and events that have been previously annotated. These may be fictional or factual, allowing for an exciting blend of information.

4.   LOCATION-AWARE NARRATIVE

Given the data described above, it is possible to investigate how this can influence generated narrative. Figure 1 shows a potential input structure for such a system. A narrative using this structure could portray an event set in a coffee shop, with the protagonist drinking, and the next scene taking place in a nearby church. Using the structure implicit in our Linked Data, we can amend the story based on the reader's location.
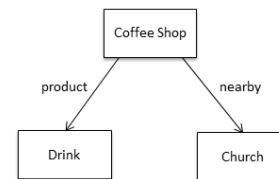
Figure 1: A possible input structure for a piece of narrative.

4.1   Class Specialisation

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[10] http://www.gowalla.com
[11] http://www.geocaching.com
[12] http://beta.broadcastr.com
[13] http://www.geonames.org/ontology
[14] http://dbpedia.org
[15] http://www.wikipedia.org
[16] http://vocab.org/bio/0.1
[17] http://vocab.org/relationship/

Class Specialisation suggests the navigation of the class hierarchy downwards, thus reaching concepts which are more specific than those given as input to the narrative. For example, if we know that the reader is in a specific coffee shop, we can alter the story to give detail based on this information. Furthermore, we could then apply specialisation to properties connected to this location, where possible. Figure 2 illustrates the hierarchy within the data (Costa being a Coffee Shop that sells Mochas), and how this could alter the details in the narrative. The right-hand portion of the figure shows the information attained from data sources (maybe a coffee shop-specific source).
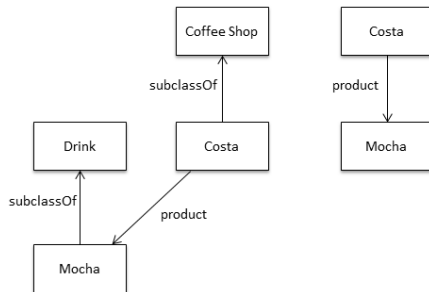

Figure 2: Figure 1 adapted, given more details about the coffee shop.

4.2 Class Generalisation

The inverse of the previous approach, generalisation navigates up the class hierarchy. For example, the reader may be in a location which sells drinks, but is not a Coffee Shop (see Figure 3). With a defined maximum distance, the system could alter the narrative, providing that the required properties still existed at the higher level. As such, a story may discuss a Restaurant: the location is similar to that required, but tailored to be closer to one pertaining to the reader's location.
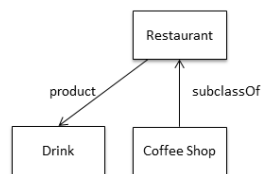

Figure 3: An example of class generalisation: Restaurant has the same properties as Coffee Shop but is more general, so is a viable candidate when the reader is in that location.

4.3 Spatial Adaptation

Moving away from a single location reference, there is naturally a spatial relation between locations in a narrative. A character may travel to a new area, or one may be mentioned either by a character or a narrative. It might be described relative to a prior location (e.g. nearby, far away, within, containing). All of these relations are described by the GeoNames ontology, and thus we can use the ideas of

specialisation and generalisation described above to further personalise the narrative.

For example, a simple case could be 'He sat in a restaurant in London.'. If the reader was actually in Newcastle, the content could change to 'He sat in a restaurant in Newcastle.'. After applying class specialisation, it may further alter to 'He sat in a pizzeria in Newcastle.'

A more complex case could be 'He flew to Newcastle Airport, and made his way to the hotel that overlooked the Tyne.' Here two geographical conditions have to hold: the location of the airport must be near the location of the hotel, which must be near the location of the river. By first generalising the classes to 'airport', 'hotel', and 'river', a query could be built to retrieve potential options for the personalised narrative.

4.4 Narrative / Spatial Flow

There are some readily apparent issues to building location-influenced narrative:

1. What should be shown if the reader isn't in a suitable location?

2. What do we do if the reader changes location mid-story?

3. Should we expect the reader to move to a new location to continue a story?

The first case can be handled readily with suitable authoring: if class generalisation and specialisation cannot amend the narrative appropriately, the original text can be used. As such, it would simply read as a regular, non-personalised, story. It may be that the reader has previously visited a suitable location, in which case this data could be used to ensure a coherent thread.

This thread may be further disrupted should the reader change location while reading - especially if stories are generated in sections, rather than in their entirety. One possibility is to use their initial location throughout, but to provide an option to 'rewrite' the story based on their new position. This could also allow for interesting interactivity options for readers: they may wish to rewrite their story in a different location to see how things change.

Finally, there is an issue regarding the amount of work required to read a story. Some existing locational games, such as Wanderlust mentioned earlier, only reveal the next part of the story once the reader is in the correct location. While this adds significant context to the narrative, it also acts as a block to readers who can't get to these locations. Our approach wouldn't require that the reader move, but it could allow for more detailed information to be added to the story if they were in the correct place. As such it is an optional feature, which would provide exciting personalisation if the reader would like it, but would not detract from the story if the locational data was not available.

5. CONCLUSIONS AND DISCUSSION

In this paper we have outlined a potential approach to narrative personalisation based on locational linked data. Due to its support for varying levels of detail, it provides a mechanism which does not place restrictions on the reader, but instead offers added richness if they wish it to be available. Our use of linked data would remove the need to build data resources at the time of writing, and instead suggests an incentive for domain experts to supply their data in machine-readable representations. If their location is available in this form, it may be placed into a story!

Locational storytelling offers the ability to use social information. How might one's reading of a locational tale change if friends are involved? One approach could be to make the reader the protagonist, reading the story from a particular character's point of view, while a friend reads the other half of the story from the perspective of a different character. An alternative might be to personalise stories by including relevant references to friends. If Alice reads a story set in New York and we can see that her Gowalla contact Bill frequents a cafe featured in the story, we could have the protagonist pass Bill on her way into the cafe. Would changes like these facilitate greater reader engagement?

The answers to these questions are also coloured by the extent of autonomy given to readers to control characters. For example, authors may wish to let readers influence the course of the story with their location: if the protagonist visits the church before the coffee house, she may not meet the newspaper salesman who becomes important later on. It is hard to predict whether such changes would increase reader engagement or be perceived as a burden and ignored. Multiplayer interactive fiction and group-built roleplaying games could be a source of inspiration for work in this area, but meanwhile we would like to consider what level of functionality everyday technologies support.

There are also issues from the authorship perspective. Creating locational narratives requires an additional layer of support: some authors will be happy to explore these technologies without that support, but it is safe to assume that many authors would appreciate access to suitable tools. We need tools to let authors define locational variables as well as to sketch out the overall structure of their tales and put flesh on the bones of their narrative. At the time of writing, we are uncertain of what priorities authors would have in this area, and this is a particularly important question that we would like to pursue.

The area of locational narratives holds an enormous amount of potential, especially now that relevant technologies are in commonplace use. We believe that this paper has outlined some key areas of interest, and hope that it stimulates further dialogue on suitable next steps.

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Towards a Politics of Reading:
Narrative, Literary Hypertext and Meaning

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ABSTRACT

One of the problems of hypertext research is that it is balkanized. Literary hypertext represents an opportunity for writers, scholars of literature and computer science to find common ground, though their respective approaches, methodologies and research questions may seem strange and exotic. In this paper we broadly explain our interest in participating in the Workshop on Narrative and Hypertext (at the ACM's 2011 Hypertext Conference). We welcome the opportunity to present and discuss our ongoing research into the overarching question of the rôle of the hyperlink in narrative. We ask: does the hyperlink presume, demand, or require a new way of thinking about reading? Does literary hypertext change the relationship of text and reader? How do we synthesize competing theoretical models of reading in order to address the challenges of literary hypertext?

Categories and Subject Descriptors

J.5 [**Arts and Humanities**]: Literature. A.0 [**General Literature**]: General – *General literary works.* H.5.4 [**Information Interfaces and Presentation**]: Hypertext/Hypermedia – *user issues.*

General Terms

Theory.

Keywords

Literary criticism; Hypertext; Interactive fiction; Narrative.

1. INTRODUCTION

In "No War Machine," Stuart Moulthrop proposes a thought project:

> Consider a generation for whom 'words that yield' are a regular occurrence, not a discursive anomaly. Consider readers and writers for whom jumps out of the system are commonplace, and who regularly articulate both hypertextual and hypotextual structures. Though this generation would still be undeniably linked by tradition and cultural continuity to our own, would they not have a fundamentally different understanding of texts

and textual enterprises? — Stuart Moulthrop, "No War Machine"

The question of what is the textual enterprise is not new. However, we are in a moment when theories of reading and writing are proliferating, in part as a way of addressing works in a growing digital canon. Some of the theoretical work is predicated on the assumption that "hypertext is a new *set of textual conventions* and not [necessarily] a new textual *form*" [1]. In this light, theorizing about hypertext is merely a continuation of previous literary endeavors. Jim Rosenberg, expressing a quite different view, articulates a vision with the promise of a new syntax [13].

2. THE QUESTION

We have begun to develop a praxis of reading (how readers make sense from text). To begin we address the question, does the hyperlink demand, require, or presume a new way of thinking about reading? As literary critics, we are asked, for instance, to negotiate the paradox which pits subjective experience (phenomenology) against the building of, what Stanley Fish called, interpretive community (reader-response) [8]. As readers, the language of theory sometimes seems to fail to capture the attractions of literary hypertext and hypertext environments: can there be simple pleasure, what Douglas calls "satisfaction," aesthetic or otherwise? [5] or is that an anachronistic desire?

Related questions which we will address are: how do literary hypertexts make meaning? Are the features commonly associated with hypertext: choice, fragmentation, indeterminacy, non-linearity, closure, multivocality, immateriality, navigation, found in other literary modes? And how do these features shape or challenge readers ability to make meaning?

Designers and authors may well ask themselves why do I return to the form? Does the conceit better reify my objective or is it exhausted? [4]

2.1 Our Approach

Using Barthes's *The Pleasure of the Text*, Stanley Fish's concept of "interpretive community," Wolfgang Iser's observation that 'Th[e] virtual dimension is not the text itself, nor it is the imagination of the reader: it is the coming together or text and imagination" [9, p.215]; and Peter Rabinowitz's *Before Reading: Narrative Conventions and the Politics of Interpretation* as touchstones, we are taking three or four literary hypertexts as

exemplars/case studies to ask how do people read and make meaning from such texts.

2.2 The Texts

Specifically, we draw attention to older hypertexts, trying to apply these theories to see how much they account for in the experience of making meaning, and a later generation hypertext to work towards a politics of reading literary hypertext. We use Joey Dubuc's *Neither Either Nor Or* (2003; an existential parody of a children's Choose-Your-Own-Adventure narrative, written and illustrated by Dubuc), David Markson's *Vanishing Point* (2004; a postmodern epigrammatic novel), Raymond Federman's *Double of Nothing* (1971; an experimental novel which explores the traumatic effects of The Shoah on an immigrant to 1960s America) and Linda Carroli and Josephine Wilson's "A Woman is Standing" (1998; http://ensemble.va.com.au/water/). How do readers experience works like these? Can we unpack the theory and get to a praxis of reading?

To recap: we ask how readers make meaning from 'words that yield', texts with features that demand strategies of active reading and engagement with the text and its interface or material artifact. Likewise we will be examining the language theory gives us for talking about the triad of reader, text, and artifact. Then we are going to try to come to a working model of how readers making meaning from hypertexts.

We welcome the opportunity to share the conclusions from early stages of this work and to generate discussion of these topics across disciplines.

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SPARQLing Conversation: Automating The Bechdel-Wallace Test

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Keywords
Narrative, Semantic Web, Ontology, TEI, RDF, SPARQL

1. INTRODUCTION
One of the goals in digital narrative is to describe the elements within a story in such a way that they can be analysed and queried. In this paper we present one attempt at representing and applying a well-known rubric, the Bechdel-Wallace test, to a work of fiction. While the final results were disappointing we describe the process that we undertook and highlight the areas of difficulty and complexity which we found and which we will need to address in future work.

2. LINKED DATA FROM TEI
Jewell[2] presented a methodology for the automated creation of RDF from TEI encoded scripts. This procedure allowed us to generate basic descriptions of the events that occur within a narrative including location, involved characters and referenced characters. Although in its initial stages this work has created a resource which can be accessed via a SPARQL endpoint or via an editing interface which is currently under development (see figure 1). Two test datasets were used for the purposes of the work detailed below - a small dataset which was manually created to include example cases and the larger one which represented the narrative storyline of A Midsummer Night's Dream[6]. This second dataset was automatically generated from the TEI encoded version of the play held at the Perseus Digital Library.

3. THE BECHDEL-WALLACE TEST
The Bechdel-Wallace (B-W) test was popularised in an 1985 online comic strip 'The Rule'[1] in which a character claimed never to watch a film unless it passed three criteria which she listed as:

1. It has to have at least two women in it,

Figure 1: Screenshot of the Event Viewer page of the Shakespeare Editor

2. Who talk to each other,

3. About something other than a man

While not passing judgement on the quality of an individual work being assessed, this rule has been seen as an interesting thinking-point both in regards to single pieces and for looking at, and raising awareness of, trends of representation across bodies of works. A frequently used variation takes this rule even further to require that the female characters in question are named i.e. that the characters have a name and are not just referred to by their description or job title in the credits.

The OntoMedia ontology[3] was developed to allow the description of narrative content in such a way as to allow this type of query, and the Bechdel test seemed an ideal test scenario for our data. Since the TEI encoding of the Shakespeare play did not include the gender of the characters and the RDF editor interface was not, at the time of writing, able to allow descriptive expansions, this information was added manually. Other than these changes the data was not corrected and the ways in which the roughness of the data affected the results of our queries will be discussed below.

4. TALKING ABOUT SOMETHING OTHER THAN A MEN
The automated RDF creation tool that was used to generate the data interprets the TEI speech tags as representing an

`ome:Event` in which the speaker (as indicated by the original TEI) is the primary entity within the event. The tool then assumed that every other character who was calculated to be in the same location as the speaker was involved in that particular `ome:Event` on the basis that they were deemed to be within hearing distance. It was recognised that this was not universally valid but it was felt that this offered a reasonable default position given the information that was available via the encoding. Within the OntoMedia ontology conversations are generally classed as social events and with no further details guaranteed the broadest categorisation was used rendering all such events of the class `ome:Social`.

Using this as a premise we can construct a simple query based on the first two requirements of the B-W rule, complete with named-characters variation:

```
SELECT DISTINCT ?event ?label ?name1 ?name2
    WHERE {
?event a <http://purl.org/ontomedia/core/
    expression#Social>;
        <http://purl.org/ontomedia/core/
            expression#has-subject-entity> ?
            char1 ;
        <http://purl.org/ontomedia/core/
            expression#involves> ?char2 ;
    rdfs:label ?label .
?char1 <http://purl.org/ontomedia/ext/
    common/trait#has-trait> <http://
    contextus.net/resource/meta/Female>;
        <http://xmlns.com/foaf/0.1/name> ?name1
        .
?char2 <http://purl.org/ontomedia/ext/
    common/trait#has-trait> <http://
    contextus.net/resource/meta/Female>;
        <http://xmlns.com/foaf/0.1/name> ?name2
        .
FILTER (?char1 != ?char2) .
}
```

One noted lack in SPARQL 1.0 is an simple way to carry out queries containing negation. The simplest way to implement bound negation is through use of the OPTIONAL command (see below).

```
SELECT ?event ?label ?name1 ?name2 WHERE {
?event a <http://purl.org/ontomedia/core/
    expression#Social>;
        <http://purl.org/ontomedia/core/
            expression#has-subject-entity> ?
            char1 ;
        <http://purl.org/ontomedia/core/
            expression#involves> ?char2 ;
    rdfs:label ?label .
?char1 <http://purl.org/ontomedia/ext/
    common/trait#has-trait> <http://
    contextus.net/resource/meta/Female>;
        <http://xmlns.com/foaf/0.1/name> ?name1
        .
?char2 <http://purl.org/ontomedia/ext/
    common/trait#has-trait> <http://
    contextus.net/resource/meta/Female>;
        <http://xmlns.com/foaf/0.1/name> ?name2
        .
OPTIONAL { ?event <http://purl.org/
```

```
    ontomedia/core/expression#refers-to> ?
    char3 .
?char3 <http://purl.org/ontomedia/ext/
    common/trait#has-trait> ?gender . }
FILTER (?char1 != ?char2 && (!bound(?gender
    ) || ?gender != <http://contextus.net/
    resource/meta/Male>)) .
} ORDER BY ?event
```

This query was successfully run on the test data but when it was applied to Midsummer Night's Dream it was quickly apparent that it was not returning the desired results because in those situations where multiple characters were referred to within the speech then the event was returned as long as at least one of the characters referred to did not have the trait 'Male'.

Event	References	Gender	Returned	Desired
13	-	-	Yes	Yes
40	Helena	Female	Yes	Yes
171	Hermia	Female	Yes	No
171	Lysander	Male	No	
304	Demetrius	Male	No	No
304	Lysander	Male	No	
336	Lysander	Male	No	No

Queries of this type are notoriously problematic in SPARQL 1.0 but it is hoped that with the advent of increased support for the extended negation features in SPARQL 1.1 we can revisit this question. It was also noted that a number of the events that were returned should not have been, since to a human eye they clearly reference a male character but not by name. For example, in event 13 Hermia says "I would my father look'd but with my eyes" (Act 1: Scene 1) but the automated process did not identify the reference 'father' with the character of Egeus. A more sophisticated analysis might be able to identify and encode these indirect references thus improving the accuracy of the system. The intention was that the automated description would be superseded by a corrected version of events and the supplementation of the base information with missed references was one aspect of this error checking procedure. It is in cases such as this that the results would be immediately valuable.

In the rest of this paper we will consider some of the other issues that were raised during the investigation.

5. REFINING THE QUESTION
5.1 What is a Conversation?
There is debate among those who apply the Bechdel-Wallace test as to how rigorously the rule should be applied. If a conversation has multiple topics, as a long exchange might well do, then does a reference to a man at any point within the conversation invalidate the entire exchange? Or can one section of the conversation be regarded as meeting the requirements and therefore validate the exchange even if other parts do not satisfy the criteria? In the latter case, how do we define the start and end of a conversational exchange? The given understanding is that the test is intended to be a low barrier and, on that basis, we will take the minimum possible definition, i.e. a single exchange, and regard that as all that is needed for the work to pass.

Entities are deemed to have three levels of inclusion in events: the subject (the main/active entity), the object (secondary entity) and at the most generic level any other character who is in any way part of the event is defined as involved. This latter may represent characters who are merely witnesses to the event occurrence. Since the automation system was not able to divine from the TEI which of the potential listeners was being addressed at any given time it was not possible to promote any entity, or group or entities, to being status of event object. Ideally the initial component of the query would reflect that a conversation between characters would be modelled as occurring between the subject and object entities [1]

```
?event a <http://purl.org/ontomedia/core/
    expression#Social >;
    <http://purl.org/ontomedia/core/
        expression#has-subject-entity> ?
        char1 ;
    <http://purl.org/ontomedia/core/
        expression#has-object-entity> ?
        char2 ;
    rdfs:label ?label .
```

In this case a single event could be held to fulfill the necessary criteria and its existence would indicate that the work passed the test. Lacking this specificity, we must question how we model the concept of talking to someone. We would argue that a character can be understood to be part of the conversation rather than just witnessing it if they respond. This can be represented by expanding the query to require an exchange of speech between two given female characters where neither part of the exchange refers to a male character.

```
SELECT DISTINCT ?event ?label ?name1 ?name2
    WHERE {
?event a <http://purl.org/ontomedia/core/
    expression#Social >;
    <http://purl.org/ontomedia/core/
        expression#has-subject-entity> ?
        char1 ;
    <http://purl.org/ontomedia/core/
        expression#involves> ?char2 ;
    rdfs:label ?label .
OPTIONAL { ?event ?link ?event2 .
    ?event2 a <http://purl.org/ontomedia/
        core/expression#Social >;
    <http://purl.org/ontomedia/core/
        expression#has-subject-entity> ?
        char2 ;
    <http://purl.org/ontomedia/core/
        expression#involves> ?char1 ;
    rdfs:label ?label2 . }
...
FILTER (bound(?event2) && (?link = <http://
    purl.org/ontomedia/core/expression#
    precedes> || ?link = <http://purl.org/
    ontomedia/core/expression#follows >)).
} ORDER BY ?event
```

The final stage of this query refinement would be to allow for either pattern to matched as valid and therefore return

a result set comprised of the union of any matching single event where the object is defined and any matching paired events in which the speaker is either replying to or replied to by a female character who is otherwise involved in the event.

5.2 Female? Male? Moving Beyond Binary Gender Classifications

In the examples above we have used two of the four top-level gender classes, `omt:Male` and `omt:Female`, defined in the OntoMedia ontology. The OntoMedia ontology differentiates between `Sex` (the biological categorisation) and `Gender` (the social categorisation). This decision was taken to allow the description of situations where these two traits were not the same, however it maintains a relationship between the two through stating the gender identity that an instance of a given biological or psychological classification of sex is associated with. In this way it is possible to build up a much more complex model of an entity's gender and to link, compare and contrast the potentially different 'sexes' associated with a given character via the genders those attributes are identified with. However it is equally important to recognise the difference between a character cross-dressing, impersonating another gender or identifying with another gender and how this is presented within the fictional universe and beyond the bounds of its contextual universe to the audience.

With fiction we are often given a very surface representation of a character and so the default level of information that we as the audience are given are at the gender rather than the biological level. However some fictional narratives deliberately play on or reference this difference, from Shakespeare's superficial cross-dressing farces to serious dramas such as 'Transamerica'[7] or, more tangentially, 'Let The Right One In'[4] or 'Inception'[5]. In these examples, the Shakespearean characters may change their clothes and the gender that they project to other characters within the context of the universe but their gender identity remains unchanged. And while Bree (Transamerica) and Eli (Let The Right One In) should clearly be identified as female for the purposes of the test, it would be harder to argue that Eames (Inception) is ever anything other than male as his periods of time as a woman are presented as gender impersonation rather than as shift in gender identity.

While the first criteria in the Bechdel-Wallace test is that the work contains two women we would argue that this was intended as a short hand way of saying "two characters who are not men". However it is important to note that "[the work] has to have at least two women in it" and "[the work] has to have at least two !(men) in it" are not the same statement since the set !(men) is much larger than the set (women). We raise the issues above to show the complexities that need to be addressed and would argue that the first step in doing so would be to alter the gender identifier from specifying a female character to negating a male one.

```
...
?char1 <http://purl.org/ontomedia/ext/
    common/trait#has-trait> ?gender;
    <http://xmlns.com/foaf/0.1/name> ?name1
        .
?char2 <http://purl.org/ontomedia/ext/
```

---

[1] For the sake of simplicity I am presenting the case where subject and object are single entities rather than groups. This latter case will also have to be addressed.

```
    common/trait#has−trait> ?gender2 ;
    <http://xmlns.com/foaf/0.1/name> ?name2
        .
...
FILTER (?char1 != ?char2 && (!bound(?gender
    ) || ?gender != <http://contextus.net/
    resource/meta/Male>) && (!bound(?
    gender2) || ?gender2 != <http://
    contextus.net/resource/meta/Male>)) .
```

6. CONCLUSION

The work presented in this paper created more questions than results however these questions are ones that need to be considered. Our initial hope was to create a simple query which could be applied to any narrative description that used the OntoMedia ontology and discover immediately whether it passed the Bechdel-Wallace test and which specific sections of dialogue were responsible for that result. Instead we have raised a number of valuable issues both in how we interpret the questions that we want to ask and how we then formulate them.

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Narrative Analysis and the Design of Technologies to Support Research

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ABSTRACT

In this paper, I describe how I have used narrative analysis as a form of knowledge capture of research practices. I show how the personal narratives of research narrated by researchers provides an understanding of the immediate lived experience of research and of researcher's conceptions, feelings and questions about what it means to do research and propose that it is important to take these into account in designing technologies to support research.

Categories and Subject Descriptors

tbc

General Terms

Human Factors

Keywords

Narrative

1. INTRODUCTION

This work is part of the EPSRC funded project PATINA (Personal Architectonics Through INteraction with Artefacts) [4]. PATINA is an interdisciplinary project, which aims to develop a theory of research spaces as holistic 'architectonic' systems, or structures of experience, rather than distinct physical, virtual or mental worlds and to revolutionise the design of technologies for supporting research. The project will involve building wearable prototypes that can both enhance research objects by projecting related information back into their research space and provide researchers with the means to capture, record and replay their activities. This recording of research practice will also enable researchers to 'walk in the footsteps' of other researchers, allowing them to explore how the provenance of their developing ideas links with those of others, through shared objects that exist both online and in the real world.

But how exactly is this path travelled by the researcher to be recorded and represented and made retrievable to him or her and to others? If a researcher is to follow in another's footsteps, what exactly would these steps be? The sources consulted? The notes taken? The questions asked? The activities carried out? The stages completed? What is the experience of research that researchers would want to replay and retrace? What are the narratives of research that would be produced?

The significance of this question is quickly apparent if one compares and contrasts differing forms of dissemination of research that are now current, e.g a research paper, a blog, or a

series of tweets. In each case the researcher narrates his or her research in different ways, probably at different stages, and produces different narratives. If the possibilities afforded to the researcher of capturing and disseminating their process of research were further expanded how might these narratives change and vary further?

My own role on the project is as a narrative researcher and, as part of my research to begin to answer these questions, I asked academic researchers from a range of subject disciplines to write a personal narrative describing a day of research. The aim was to get a sense of the different ways in which researchers experience the process of research and the meanings they find in it. In this paper I present a summary of my readings of these narratives and propose how they might inform further work towards the recording and replaying of research practice as part of the project.

2. BACKGROUND

2.1 Narratology

The relationship between the experience and practice of research and its dissemination in papers, blogs, tweets etc. might be thought of as having the same relation as that between the narratological terms 'story' and 'discourse' (used by Hargood et al in their work on on narrative generation [2]) where the story is the raw material and the discourse the way that it is told. Discourse encompasses point of view, as in the film *Rashomon* [3] in which the same event is told by three different participants who interpret it quite differently. It can also be a question of style or tone, e.g the same story could be told as a comedy or a tragedy. It might equally consist in a particular ordering of events. When a narrative starts at the beginning and goes on to the end, it tends to focus on **what** happens at the end. If, on the other hand, like many modern narratives it starts at the end and goes back to the beginning, the focus shifts onto the **why** and the **how** rather than the **what**. Telling a story in a different way thus fundamentally changes the story. Indeed it is the story.

In this paper, I use another narratological term 'narration' (see [1]) rather than 'discourse' to indicate the way that the story is told. This is partly because 'discourse', when removed from its strict pairing with 'story' is an increasingly widely used term, beyond the study of narrative, and also because narration intimates the presence of a narrator, which is appropriate in the context of the narratives I am discussing.

2.2 Narrative Analysis

Narrative enquiry and analysis in the social sciences employs the methods and conventions used in the production and

interpretation of fictional narratives to present and interpret narratives taken from life. One important reason for using this particular method is as a way of counteracting a common tendency in science both to abstract out from the individual to the structure, from the particular to the general, and also to assume an objectivity on the part of the researcher and what they observe that may well be illusory. Narrative enquiry assumes instead the subjectivity of experience. Its interest is in how people make sense of their own lives through narrative and it recognises and expects that the same situation, process or event may be narrated differently (See [5]). Within the context of the design of technologies to support research, narrative analysis focuses attention on research as part of the life of an individual, rather than as a set of abstracted structures or processes. This should provide relevant insights into the ways that researchers might want to capture and replay their process of research.

3. NARRATIVES OF RESEARCH
3.1 Methodology and Aims
I asked a group of researchers from a range of subject disciplines, including computer science, design, architecture and arts and humanities, to write about their experience of research. Researchers were asked to choose, as far as possible, a typical, rather than an atypical day of research; to note down their activities, where and when they took place, and, above all, what they were thinking and feeling about these various elements. They were then asked to write up these notes as a narrative of the day.

The writing up of the narratives was chosen instead of interview, in order to achieve greater detail than a verbal account and an extra level of conscious narration and meaning making. I wanted to see how people wrote up the intimate **process** of research, compared to how they write up its **results** for publication, and to see what meanings they found in it.

3.2 Researchers' narrations of research
The same unit of a day produced in fact quite different narrations by different researchers. For at least two of the researchers, moreover, the 'day in the life' chronology that I had suggested appeared inappropriate to the experience of research that they wanted to narrate and they substituted their own alternative structure in its place.

One researcher produced a generalised model of research, conceived as a five stage process that he moves through as a researcher from beginning to end of any particular project: *'unfocussed reading'; 'get an idea/identify a problem that needs a solution'; 'focussed reading'; 'develop solution'; 'write up solution'.*

Another researcher framed the process of research quite differently, telling her **life story** as a researcher: beginning with her experience as a student and charting her ups and downs through various professional academic structures and institutions, up to the present day. Research for her constitutes a personal and

professional journey, in which she has undergone a series of personal and professional metamorphoses, travelling through various professional and academic institutions. Her narrative focuses attention on the way that the narratives of research produced and circulated within institutions can either help or hinder researchers and indeed can define their identities and determine to a large extent their professional and personal trajectories.

Both these narrations in fact reflect the professional and research structures within which each of these researchers operate. The first researcher is a computer scientist whose own research involves the production of generalisable models. The second researcher is a manager whose job it is to oversee and facilitate research structures and environments. These larger narratives of research are interwoven very clearly with their personal narratives.

Those researchers who wrote up their research process as a 'day in the life' also produced a variety of narrative forms. One researcher wrote a 'stream of consciousness' narrative in the present tense, which provides a kind of cross-section of research processes put under the microscope as he spends the day working from home. His narrative is a dense tapestry of interwoven threads of thinking, reading, writing, responding to emails, organising, scheduling, book-keeping, raising purchase orders, discussion, making coffee, eating, shopping and other domestic chores. This tapestry of threads is kept from becoming an unmanageable tangle, however, by his ability, as a thinking, feeling individual, to move between multiple strands of thought and activity. Moreover he takes pleasure in this holistic mix of activities, writing *'This is work! Answering emails, thinking, making coffee, writing, talking and spending time with my son. Worth the rubbish bits'* and terms it *'a privilege'*.

Another researcher controls the multiple strands of activity he has running simultaneously in his research by structuring his narrative of his day into one to two hour slots, which provide discreet containers to separate off and manage the his diverse activities. He characterises his day as *'a mix of control and anarchy'*.

Indeed, most researchers presented the process of research as a varied, often quite fragmented activity, even as it is productive. Although they experience and manage research in different ways, researchers seem to agree that research combines 'focussed' with 'unfocussed' activity, in which chance, gut feeling, hunches, personal and collective inspirations and enthusiasms, brainstorming, discussion and collaboration play an important part.

3.3 Time-spaces of research
As well as producing a range of narratives, which ordered the experience of research in different ways, researchers also narrated their experience of time and space as part of the research process, providing insights into key time-space formations through which research is structured. These include the experience of collaborative research; the particular properties of digital time and space; the importance of liminal spaces, such as trains, planes and other journeys, where much productive research takes place, and the existence of a time-space of thinking: in which a train of thought is integrated with a physical movement through space, such as walking, cycling or indeed writing, sketching and doodling. For all the researchers, research as an activity is dispersed across space and time, spanning personal, physical and digital space.

4. CONCLUSIONS AND FURTHER WORK

The capture and analysis of these personal narratives of research provides an understanding of the immediate lived experience of research and of researcher's conceptions, feelings and questions about what it means to do research: including what kind of research they value or otherwise, the problems they face and the strategies they employ. Research as an experience is narrated differently by different researchers, giving a sense of the variety and subjectivity of human experience. A researcher might variously experience their research process as an ongoing journal of activities; as an important episode in their life story; as the key stages in the cycle of a project; as a particular theme connecting various projects, or as part of a particular cluster of interdisciplinary activity around a particular concept or subject.

Each different structure of experience, if represented to others as 'footsteps to follow in' could provide different insights: such as how the researcher structures their process; how long it takes them; where a researcher's particular interests lie; geographical concentrations of particular types of research, or interdisciplinary sites of interest. The time-space of research might equally constitute a map of achievements, or a step on a career path that stretches into the future.

At the same time these research narratives also suggest some experiences that researchers seem to have in common. Researchers seem to agree that research combines 'focussed' with 'unfocussed' activity, in which chance, gut feeling, hunches, personal and collective inspirations and enthusiasms, brainstorming, discussion and collaboration play an important part. Developing effective ways of understanding and representing these processes would produce very different narratives of research to those narrated in research papers.

Furthermore, particular time-space formations, such as collaborative, digital, liminal and the time-space of thinking, seem to emerge as common themes, even if the individual experiences of them differ.

A conception of research time-space, which recognises this variety of research narratives might facilitate the design of more effective technologies to document and retrieve research processes.

What would be the implications, for instance, of designing a research space drawing on a paradigm of research as a tapestry evolving through time? Or indeed of conceiving of research as the life story of a researcher, shaped by the institutions of research; or again as the daily chronicle of what has been achieved; as the compartments in which the researcher sorts her different activities; as a train of thought, begun in a conversation, turned over in one's head on a cycle ride, sketched out in a notebook in a cafe, put on the shelf for two months, expanded with reading etc; or as the collaborative time-space of communication, spanning countries and continents and thinking that is created in discussions and collaborative work on shared documents and in telcos?

These are some of the questions that we will go on to explore.

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The Player's Role
Understanding agency in digital game narratives

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ABSTRACT
Critics of games' narrative ability fail to recognize that narrative impact in games is established differently than in traditional media. This paper demonstrates how agency and avatar relationships affect game narratives. Understanding these relationships may lead to improved understanding of the medium's limitations or allow games to take on new types of narratives.

Categories and Subject Descriptors
H5.4 [**Hypertext/Hypermedia**]: Theory. I7.2 [**Document Preparation**]: hypertext/hypermedia

General Terms

Documentation, Design, Human Factors,

Keywords

Hypertext, narrative, games, agency, avatar

1. INTRODUCTION
Film critic Roger Ebert famously argued [6] that "video games can never be art." Games have an objective, he says, which distracts from their ability to arouse emotion or beauty. Games' artificial constraints prevent them from inciting such powerful emotions as books and film. This approach fails to recognize that games tell stories and evoke emotion through different means than traditional media.

This paper seeks to suggest ways in which the narrative practices of games might differ from other media. Perhaps we have been making false comparisons all along.

2. DEFINITIONS
Narrative is " 'recounted story', a 'narrative text' a 'text' carrying a 'narrative'" [13]. By this definition, all

stories and accounts are delivered through narrative.

A game is "a rule-based formal system with a variable and quantifiable outcome, where different outcomes are assigned different values, the player exerts effort in order to influence the outcome, the player feels attached to the outcome, and the consequences of the activity are optional and negotiable" [11]. This paper focuses on narrative as it is told through digital games.

Though I focus on digital games and use "games" throughout the paper as shorthand for "digital games," some of these ideas might apply to non-digital narrative games (those games, however, tend to apply narrative practices in slightly different ways, and therefore require proper research in their own right).

Let me be clear that I do not argue that games are inherently narrative or intrinsically artistic. Nor, when discussing narrative, do I mean to discuss the metanarrative that occurs when two players engage in a game of chess. This paper focuses only on a subset of digital games that seek to recount an intrinsic narrative—games whose narrative can be said to be deliberate content within the game.

3. STORIES IN TRADITIONAL MEDIA
Narrative has endured for millennia through the traditional practice of a narrator recounting events to an audience. Communication is generally one-sided. The audience endures the story, and must either accept or reject the author's account. The pleasure from the narrative experience is rooted in self-comparison and judgment: in romance or melodrama, perhaps we imagine the story events happening to us. In tragedy, we might derive pleasure from the catharsis of the pity or fear we feel for the protagonist [3]. Perhaps we also delight in esteeming ourselves devoid of the hero's tragic flaw.

Our identification with an element of the story—usually the protagonist, but possibly also other characters—creates emotional impact. We experience empathy for our hero, though sometimes we experience distrust or moral superiority as well. Empathizing with the protagonist, we laugh at her jokes, rejoice at her success, and cry at her loss. Perhaps we connect with her because we see characteristics of ourselves in her and can imagine how we would feel or behave in her place. If we disagree with her actions, we may or may not forgive her, but

either way we will understand her motives and then judge her accordingly.

We are not responsible for the protagonist's actions. They are not *our* actions. Nor do we tend to feel doubt or frustration in situations where the protagonist does, because we did not make her decisions ourselves. Our relationship to the protagonist is felt at a certain level of remove.

Though we may suspend disbelief and enter the perfluent dream of fictional worlds [8], we only observe events; we don't actually take part in them. The reader's pleasure is that of a voyeur; the player's pleasure comes from influence [1].

4. GAMES ARE DIFFERENT
Several factors differentiate games from other modes of storytelling, but perhaps the most important is that games provide the player with agency. Drawing on the work of Janet Murray [17], Michael Mateas describes agency [14] thus:

> *Agency is the feeling of empowerment that comes from being able to take actions in the world whose effects relate to the player's intention. This is not mere interface activity. If there are many buttons and knobs for the player to twiddle, but all this twiddling has little effect on the experience, there is no agency. Furthermore, the effect must relate to the player intention. If, in manipulating the interface elements, the player does have an effect on the world, but they are not the effects that the player intended (perhaps the player was randomly trying things because they didn't know what to do, or perhaps the player thought that an action would have one effect, but it instead had another), then there is no agency.*

The idea of agency in electronic literature has led to much debate over ideas of authorship and control [4][12]. Many forms of hypertext literature allow the reader to choose the order of story events or perhaps to choose one of a few predefined outcomes. The reader chiefly influences the story's plot or presentation; she does not change the story itself.

In electronic literature, choices may involve a sense of "missing out" on a path the reader did not take, but if a character dies, she does not blame herself for killing the character. In Michael Joyce's *afternoon, a story*, we might empathize with Peter, the narrator who may have seen his son die [10], but we do not share his guilt. Hypertexts that do highlight the reader's agency and influence, have also tended to have a distinct objective, and the appearance of an objective which leads to the player's vested interest in the outcome, thus categorizing the work as a game.

Games depend on the reader's awareness of her own agency. Because of the constraints and rules, understanding the limits of what a player is allowed to do within a game world is essential to understanding the game and creating the expectations upon which agency depends. If the player does not understand the games' constraints, she cannot have realistic expectations about how her own influence will affect the storyworld.

Players can only successfully project themselves into the storyworld if the interface behaves in expected ways and if they become fluent enough with the game's control systems to enter a perfluent dream, much like a reader. Some of these ideas carry over to reading: after all, a reader cannot become immersed in story if she struggles with the mechanical operations of a book. The control systems of a game, however, penetrate into the storyworld itself where the mechanical operations of turning a page do not.

The player must be able to directly affect the storyworld in expected ways not only through interface operation, but also through decisions having intended consequences within the storyworld. This agency and the awareness of that agency is essential to creating and enjoying narratives within games [18].

5. FOSTERED CONNECTION WITH THE AVATAR
A player's sense of agency serves not only as a connection to the storyworld, but it creates a deeper relationship between the player and avatar. The reader's ability to manipulate the storyworld obscures the distinction between the player and avatar.

Extensive use of second-person in digital games seeks to draw players into the storyworld through a deep connection with the avatar. Even the earliest narrative games, text-based adventure games (now the predecessors of the text-based Interactive Fiction genre) like *Adventure* [5] and *Zork* [2], connected the player to the avatar in this manner. In *Zork*, upon entering a dark area

```
It is pitch black.  You are likely to be
eaten by a grue.
```

If the player continues into the dark area

```
Oh no! You have walked into the slavering
fangs of a lurking grue!
****   You have died.   ****
```

In this situation, the avatar has failed; the player made a bad decision. The player knows this, and thus is responsible for the avatar's demise. In most cases, the player does not have the luxury of dissociating from the avatar or disagreeing with its actions, because the avatar is entirely controlled by the player; its actions are really the player's.

The games' ambiguous use of the second person "you" further fosters the player-avatar relationship. When "*you* have walked into the fangs of a slavering grue," it is unclear whether the game means "you, the avatar, have been eaten by a grue" or "you, the player, have led the avatar to its demise by steering it into the jaws of a grue." The ambiguity actually brings the player closer to the avatar through a sense of responsibility for the avatar's actions.

Games also use death animations to encourage guilt for the avatar's fate and a sense of responsibility for the outcome of

the game. Death animations inform players that they have failed in their objectives. Over the years, these animations have become increasingly graphic. An underwater death in *Super Mario Bros. 3* [15] led to Mario falling off the screen in a shrugging pose. A decade later, in *Super Mario 64* [16], our hero grabs his throat and kicks as he gasps for air, then his lifeless body floats, slumped, toward the surface. *You* have killed Mario, and watching our hero drown is meant to make you feel guilt over the avatar's fate.

6. IMPACT ON THE PLAYER

The player-avatar connection has serious implications within the narrative framework of games and in creating deeper emotional experiences within their narratives.

In Infinity Ward's *Call of Duty: Modern Warfare 2* [9], the avatar character is an undercover operative infiltrating a terrorist organization. He accompanies the terrorist group as they bomb an airport and murder civilians. Within the constraints of the game, the player must kill these civilians lest she be discovered by the terrorists. However, the player may struggle with shooting terrified women and children. The game deliberately capitalizes on the player's agency, the fact that she is *choosing* to murder innocent people, and evokes guilt and doubt—the same feelings the fictional avatar would have. These feelings are not evoked through a sense of empathy, however. They result from the player's deliberate choice to carry out an action.

This scene contributes to the overall narrative of the game, which argues that war and terrorism are bleak and pointless endeavors, and that detached politicians are too quick to throw away their soldiers' lives. A novel might portray this similarly, with the reader empathizing with the protagonists' frustrations, but the game is able to make the player feel that frustration directly.

7. IMPLICATIONS FOR NARRATIVE

Though developers have sought to draw players into the gameworld for decades, they are only recently starting to move games toward more complex narratives that address larger issues. More and more critics and developers want games to be taken seriously as a creative and expressive medium [7][19].

Understanding agency and avatar connection as they relate to narrative immersion is key to understanding the narrative limitations inherent in the medium. Games seem to be better-suited to eliciting certain emotions: it is easier to make the player feel frustration, fear, pride, or guilt than to make her feel love, grief, or to create emotional connections with non-player characters. Understanding how agency affects a player's ability to relate to game events or intended emotional experiences will also provide a better understanding of the types of narratives to which games might be best-suited. This understanding might allow games to branch into narrative fields in which they have been previously unsuccessful, or allow for better narrative adaptations across media.

8. ACKNOWLEDGMENTS

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Measuring Narrative Cohesion: A Five Variables Approach

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ABSTRACT

In this paper we present a five variable approach to measuring narrative cohesion. Increasingly narratives are dynamically adapted for presentation to enhance personalisation or fit different presentational objectives. Narrative generation systems seek to either automatically generate stories from scratch or, create stories from predefined conditions. With the rise of machines as co-authors it is important to consider what the affect is upon the cohesion of the narratives represented or created in this way. Typically, in existing work, this is limited to an analysis of the use of textual language within the narrative to communicate a coherent message. However we find that beyond linguistic connections narrative elements are coherently bound together through other concepts and structures such as themes, genre, narrator, and style. We present these variables, and features that may be used to identify their presence, as an alternative approach to measuring narrative cohesion and demonstrate their application on two generated narratives.

Categories and Subject Descriptors

H.1 [**Models and Principles**]: General

General Terms

Standardization, Human Factors, Experimentation

Keywords

Narrative, Narrative Systems, Narrative Metrics, Narrative Cohesion

1. INTRODUCTION

Narrative systems, such as narrative generation and adaptive hypermedia projects with narrative elements, are often concerned with the literal content of the story such as the plot [18] or the language used within its presentation [5]. However, the literal content gives rise to more complicated

subtle structures and factors within the narrative such as themes [20], authorial voice [3], and cohesion. Collectively such inexplicit structures could be called the narrative subtext. While seeking to improve narrative generation, analysis, and presentation with better models of narrative content it is also important to consider how to model the subtext of a narrative and make it machine understandable.

In previous work we have explored the concept of modelling themes in narrative [8][9][10] and how we might model individual motifs and their connection to different themes to enable embedding themes in narrative generation or thematic analysis. Part of the motivation behind this is to improve the thematic cohesion of generated narratives or alter and emphasise themes in a presented narrative. Further to our own work on thematically adaptive or generated narrative, there is a variety of different systems that work in adaptive narratives (such as projects in the field of adaptive hypermedia [4][17]), computationally generating media for users through dynamic adaptation of existing narratives.

As use of adaptivity and automatic generation increases so does the need to understand the effect of the adaptivity on the narrative. Narrative cohesion refers to the way in which the component elements of a narrative are bound together in a discourse through the coherent use of language, consistent underlying concepts (such as themes), and a consistent relationship between author and audience. With existing narrative systems primarily concerned with content it is possible that adaption may damage the cohesion of presented narratives or that generated narratives could be incoherent.

In this paper we present an investigation into how narrative (not purely linguistic) cohesion may be measured. We identify, based on existing work, key variables associated with cohesion and how they could be used to measure narrative cohesion with regards to the effect of adaptation or the result of generation.

2. NARRATIVE COHESION

The idea of cohesion as a way of tying text together to aide flow and understanding has been explored in a range of research fields, and we can use this work to identify some important variables related to narrative cohesion.

Narrative cohesion is explored by Hudson from the perspective of investigating children's understanding of narratives based on what a child can explain or recall [11]. The work compares straightforward stories with a high cohesion to more difficult incoherent stories, and analyses the coherence of stories constructed by the children. Hudson's 'cohesive devices' are largely centred around the logical sense

of the narratives and are partly based upon the coherence categories of John-Steiner and Panofsky in their work on children's narratives [12]. Hudson measures the logical sense that a narrative makes through the presence of conjunction (connective terms in four categories ranging from the simple such as 'and' to the temporal such as 'then'), prepositional phrases and relative clauses (relative explanations triggered by words such as 'who' and 'that'), and anaphoric reference (referring to earlier imparted information). It is clear from Hudson's work that how much logical sense a narrative makes is an important aspect of its cohesion, whether it be temporal, referral, or explanatory in nature.

As well as the specifics of the language used it is possible to consider the coherence of a narrative's subtext. Tomashevsky discussed in his essay on 'Thematics' the importance of themes to narrative [20]. He explains that narratives are given meaning by themes and that themes unite the separate elements of a narrative giving it cohesion. Work by Ferret in [6] also explores the link between themes and cohesion, demonstrating how lexical coherence based on collocation can be used to show thematic coherence in segments of narrative. The collocation network based upon earlier machine readable dictionary work by Kozima using lexical similarity [13] allows Ferret to measure the cohesion between terms in a section of text in order to infer the discussion of a similar concept and infer thematic cohesion. The network Ferret uses is similar to the thematic definitions used by our own thematic prototype [9] in that it is a collection of terms and relationships that can be used for understanding thematic content. However, it is based on co-location (co-occurrence) not semiotics, which we have found to be less effective in the cases we have tested. The notion of theme is core to cohesion from the structuralist point of view in that it binds the narrative together with meaning. It is also possible it could be closely connected with the coherent use of language and the logical sense of the narrative as demonstrated by Ferret.

Genre is a common classification of narrative based upon a set of reoccurring features drawn from content and plot that position a narrative culturally within the context of other narratives. Tomashevsky pointed out that the motifs present that lead to the presence of a theme are intrinsically connected to the genre of a narrative, suggesting that the genre of the narrative limits the available motifs. The Coh-Metrix project worked towards creating a system for analysing the coherence of texts through several metrics [7]. The metrics used were a variety of text based lexical analyses such as latent semantic analysis, term frequency and density, and concept clarity. The measuring of these metrics however was intrinsically based upon the pre-identified genre of the narrative which they identified in their initial Coh-Metrix report as important to coherence [15]. The work done by the Coh-Metrix project supports the importance both of logical language used and identifiable genre to measuring the coherence of narrative.

There are other aspects of narrative we have not yet considered that could play an important factor in narrative cohesion. Booth explains how the authorial voice may be used either implicitly of explicitly to deliver plot and build a relationship of short or long distance with the reader [3]. As the narrator is core to the telling of the story, coherence in how the narrator is presented is also important to the cohesion of the story itself. McAdams explains from the perspective of modern psychology that people become nar-

rators in order to make sense of a series of events or stories, thus it is the presence of a narrator that leads to coherence in a story [14]. The consistency with which a narrator is presented in a story effects how the story is perceived as being communicated and may be used to build a relationship with the narrative's audience. As such, the strength of a narrator's presence in a narrative could be considered as a variable that affects that narrative's coherence.

We have already discussed how the logical use of language may affect the coherence of a narrative however there are other linguistic choices made in the telling of a story that might affect its coherence. Structuralist works, such as in work by Barthes [2] and Bal [1], have considered narrative to be comprised of layers, often of story and discourse (or a close to equivalent model). Story models the collection of elements that comprise content and discourse for how the story is told through the selection and presentation of elements. Features of discourse have been already been identified here; themes, genre, narrator, but these cannot be said to completely account for the language choices made in a narrative's discourse through the presentation of individual elements. The way different narrators approach and use a style of language can have an effect on its coherence. Style can be said to be a composite of attitude, tone, and mood of a narrative, representing decisions made on the presentation of elements at the discourse level. But also style represents the conventions an author has set for themself either in previous narratives or earlier in the narrative in question. The stylistic cohesion of a narrative could be said to be in part the extent to which an author when making decisions about language used convenes to their own conventions.

3. COHESION VARIABLES

From our above investigation we can identify five key variables for measuring cohesion.

- **Logical Sense:** the connective language used to explain the content of the narrative.

- **Themes:** the concepts communicated implicitly throughout the narrative.

- **Genre:** the presence of reoccurring features that culturally contextualize the narrative.

- **Narrator:** the presence of an identifiable storyteller communicating the narrative.

- **Style:** the way narrative elements are presented within the discourse.

Measured appropriately, and considered together, these may be used as a basis to understand the level of cohesion within a narrative. However, in order for such a series of variables to be effective we consider the features that would suggest evidence towards the value of each variable. These features might be specific ways of formally measuring a value for each variable or less formal feature lists that may be spotted by hand and might later have more formal systems of measure developed for them.

Table 1 lists positive and negative features for each variable; each feature is based upon either existing work exploring the area or our own definitions of these variables. The presence of a positive feature within a narrative can be considered evidence to suggest strength for the relevant variable

whereas the presence of a negative variable could be considered weakness. It is to be noted that some parts of this could potentially be automated, in particular Coh-Metrix [7] might provide a way for several measures of logical sense and perhaps genre cohesion. However for the purposes of this paper we present the root features that could be identified by hand connected to each cohesion variable

The features presented in table 1 should be considered examples as a starting point, and by no means exhaustive definitions. Each of them represents evidence that as a starting point eludes to positive or negative reflection within a given variable. It can also be said that the inverse of a feature has inverse effects; for example the absence of a positive feature is in itself a negative feature, and vica versa.

4. EXAMPLE ANALYSIS

In this section we demonstrate how these variables might be applied to narratives created from narrative generation in order to capture an impression of the narrative cohesion of these stories. For the purpose of this exercise we use an early but prominent character centric narrative generator; TaleSpin [16], and a more modern author centric narrative generator; ArtEquAKT [21]. TaleSpin generates stories about predefined characters with predefined goals in predefined settings. The system resolves a simple assessment of each characters actions in turn and reports on each as a sentence in a simplistic manner until their goals are resolved, it is in a sense simulating the characters actions and exposing them to form an emergent narrative. ArtEquAKT on the other hand automatically generates biographys on artists by linking together relevant narrative segments taken from web resources into a biography structure. For the purpose of this paper we used a TaleSpin story about 'George Ant' as shown in figure 1 and an ArtEquAKT biography of Rembrandt as shown in figure 2.

'George Ant' shows some of the limitations often seen in early text generation systems in that outside of the structure, sentences are generated regardless of the content in each other. It cannot be said to make good use of conjunction with sentences kept entirely separate when they might be more coherently joined. However it is chronological, there is no contradiction, and the content is not only not obfuscated but directly explicit. Thematically speaking the story exudes no core themes, except for possibly 'survival' or 'debt' (which are very weakly exposed). The story does conform to the genre of a 'fable' in that it anthropomorphises animals/insects and has a moral lesson, and this is present through out. There is no identifiable storyteller process and indeed the disjointed way the text is presented gives it a very inhuman feel. Finally stylistically the story is consistent and its disjointed style is coherent with other works by TaleSpin. Based on the presence of these features 'Geroge Ant' could be considered to have a high genre and style cohesion, a mixed logical sense cohesion, and very low thematic and narrator cohesion.

The ArtEquAKT biography of Rembrandt has some similar traits but also demonstrates some differences. It has good use of conjunction but is not chronological (presenting a paragraph on his later works before his earlier works) and missuses anaphoric reference by referring to a 'capitulation of the ideals [in his] first ten years' without expressing what these are. The content couldn't be considered obfuscated but a few text generation errors make parts slightly unclear.

The piece is absent of themes, though in maintaining the factual voice of a biography this may be deliberate. The narrative does strongly conform to the conventions of a biography with initial details of key dates, a discussion of his early life, and then the details of his work, for which the system has been purposely designed. There is no key identifiable storyteller presence tying the work together, though again this could be said to be a deliberate feature of the genre where the presence of a personal perspective might compramise the biographies impartial nature. Stylistic choices are coherent throughout and consistent with what is expected from ArtEquAKT. Based on our summary of these features we might find this story similar to 'George Ant' (High genre and style, mixed logical sense, and low thematic and narrator) however there are some differences to consider. First of these is that the genre of the ArtEquAKT narrative (biography) predisposes it to be weakly themed and without the presence of a narrator to maintain its factual nature, as supposed to the TaleSpin story whose genre (fable) might of benefited the active inclusion of themes and a storyteller. Secondly though both had mixed features for logical cohesion each demonstrated different features, TaleSpin's more simplistic style avoiding the need for more complicated back reference or structure (on which ArtEquAKT's story failed) but at the same it lacked the flowing sentences and conjunction ArtEquAKT demonstrated (thanks largely to its use of preconstructed prose).

What this process demonstrates to us is that an evaluation of different generated narratives cohesion is possible using our five variable approach. The listed features allow for the spotting of individual parts of a narrative that might cause the story as a whole to be coherent or incoherent. However the incomplete, example, nature of such a list demonstrates there is further work and discussion to be done on the identification of cohesion features. As part of the analysis the fact that high cohesion is not always positive was demonstrated; a lack of lower presence of particular cohesion variables can be used for specific narrative effect or as part of the conventions of a genre. The cohesion evaluation of ArtEquAKT could be considered near perfect for that narratives objectives as its factual nature and style could be weakened by the presence of heavy themes or a narrator perspective. Where as the evaluation of TaleSpins story, despite being similar, is less ideal as the objectives of the narrative might of been enhanced by the presence of both themes and a storyteller. How these different variables of cohesion are connected to different genres, and purposes of writing is a connection yet to be clearly established, and key to detailed evaluation of the role of cohesion within a narrative.

From this process we can draw some observations on the cohesion of generated narratives, though it is to be noted these observations are based only on what we have seen from two systems and do not represent a complete survay. What has been shown is that automatically generated narratives can demonstrate similar traits, as both were shown to have high genre and style cohesion and low thematic and narrator cohesion. Stylistically speaking a generated narrative is likely to show high cohesion as each passage of text is generated with a similar, if not the same, method. However it is possible that systems which rely on resources written else where, such as ArtEquAKTs use of online material, might experience a collision of styles in some cases where material from two very different writers is used. It is also possible that

Variable	Positive Features	Negative Features
Logical Sense	- Correct use of conjunction - Correct use of preposition and anaphoric reference - Story is chonologically presented	- Content is Obfuscated - Content is contradictory/not causal
Theme	- Core themes are identifiable - Core themes are present throughout	- Sub-themes conflicts with core themes
Genre	- Story fits conventions of an identifiable genre - Story follows genre conventions throughout	- Story fits multiple genres
Narrator	- Story has dramatised/explicit/identifiable implicit storyteller - Storyteller is present throughout	- Storyteller changes character/personality
Style	- Language and Style used fits authors own previous conventions - Tone and mood of each scene is relevant to its content	- Style is not identifiable

Table 1: Cohesion metric variables and features

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ONCE UPON A TIME GEORGE ANT LIVED NEAR A PATCH OF GROUND. THERE WAS A NEST IN AN ASH TREE. WILMA
BIRD LIVED IN THE NEST. THERE WAS SOME WATER IN A RIVER. WILMA KNEW THAT THE WATER WAS IN THE
RIVER. GEORGE KNEW THAT THE WATER WAS IN THE RIVER. ONE DAY WILMA WAS VERY THIRSTY. WILMA WANTED
TO GET NEAR SOME WATER. WILMA FLEW FROM HER NEST ACROSS THE MEADOW THROUGH A VALLEY TO THE RIVER.
WILMA DRANK THE WATER. WILMA WASN'T THIRSTY ANYMORE.
GEORGE WAS VERY THIRSTY. GEORGE WANTED TO GET NEAR SOME WATER. GEORGE WALKED FROM HIS PATCH OF
GROUND ACROSS THE MEADOW THROUGH THE VALLEY TO A RIVER. GEORGE FELL INTO THE WATER. GEORGE WANTED
TO GET NEAR THE VALLEY. GEORGE COULDN'T GET NEAR THE VALLEY. GEORGE WANTED TO GET NEAR THE
MEADOW. GEORGE COULDN'T GET NEAR THE MEADOW. WILMA WANTED TO GET NEAR GEORGE. WILMA GRABBED
GEORGE WITH HER CLAW. WILMA TOOK GEORGE FROM THE RIVER THROUGH THE VALLEY TO THE MEADOW. GEORGE
WAS DEVOTED TO WILMA. GEORGE OWED EVERYTHING TO WILMA. WILMA LET GO OF GEORGE. GEORGE FELL TO THE
MEADOW. THE END.
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Figure 1: A TaleSpin narrative.

Figure 2: An ArtEquAKT narrative.

the conventions of a genre are easier to capture then that of the presence of a narrator (as suggested in our findings) but this is too simplistic an analysis to make such a claim and it is important to consider that one of the systems used is purposely built to follow the conventions of a genre and that we might of found something similar for the narrator variable had we used a system that has purposefully considered narrator presentation such as the virtual storyteller [19]. Thematics however, is an aspect largely un-modelled by most narrative generation systems and as such something we would expect to score lowly, we are pursuing this area in our own work elsewhere [8][9][10].

5. CONCLUSION AND FUTURE WORK

In this paper we have presented a series of variables for measuring the narrative cohesion of stories that might be

used to get a measure of the effect on cohesion of adaptive presentation of narrative or of the cohesive qualities of generated narratives. Narrative cohesion goes beyond linguistic cohesion and includes devices and concepts such as themes and genre that can be used to unify the elements of a narrative and promote a flow in storytelling. Our identified variables are based upon a combination of existing research both in cohesion and narrative and existing attempts by systems to capture the cohesion of a narrative. We have loosely defined our variables thus far using example features that could be identified within a narrative to demonstrate positive or negative cohesion within each area. Using two stories from two different narrative demonstrators we then provide an example of how our variables might be applied to evaluate narrative cohesion.

To conclude we find that while linguistic cohesion is a key element of a cohesive story there are other significant concepts that can be used to bind a story together which may be affected by dynamic presentation or generation of narrative. While these can be identified from existing work and arguably classified into different variables measuring these accurately can be difficult in part due to the subjective nature of identifying the presence of each variable. By identifying features for each variable we can begin to form a method where we consider what evidence is present within a narrative to suggest positive or negative cohesion.

To begin to apply these variables as a metric of cohesion a formal process of measurement needs to be defined. Future work should aim to identify complete sets of formally defined features for each variable and systematic methods for measuring each. This may lead to a formal process of cohesion assessment or potentially to a tool for the automatic measurement of narrative cohesion. Furthermore the effect of different genres and narrative forms (which might deliberately avoid particular forms of cohesion) on each variable must be ascertained and appropriately considered when measuring the effective cohesion of different narratives.

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Social Media and Emergent Organizational Narratives

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ABSTRACT
Organizational identity is a key part of managing commercial, governmental and charitable organizations. It informs relations to external stakeholders, and also affects the internal working culture. One way of understanding organizational identity is to look at how it is shaped through narratives, and increasingly these narratives are happening on the Web and through Social Media. In this position paper we outline some of the existing work in organizational identity and narrative systems, and argue that narrative systems might be able to help human analysts identify and manage emerging organizational narratives. To this end we propose a high-level framework of how such a system might function and identify some initial technical challenges.

Categories and Subject Descriptors
H.5.4 [**Hypertext/Hypermedia**]: Theory.
H.2.8 [**Database Applications**]: Data mining.

General Terms
Management, Theory

Keywords
Identity, Brand, Social Media

1. INTRODUCTION
Organizational (or Brand) Identity is key to organizations, whether they are based in the commercial, governmental or charitable sectors. Not only does a strong sense of identity help an organization connect with its key partners and customers, but it also has an internal function to help stakeholders in the organization make sense of both the institution as a collective entity and their place within it.

Identity is a complex phenomenon but one approach to understanding it is to look at how it is shaped and defined through narratives. These narratives may be the stories that the organization uses to describe itself, examples of practice, or grand narratives about its history and place in the world. But much of the narrative that helps shape identity is outside of the control of the organization itself, and occurs in the wider world in communication and media, and increasingly in social media such as the Blogosphere and Twitterverse.

Organizations that wish to manage their identity and reputation need to understand these narratives as they emerge, in order to respond to them either through engaging with the conversation, or changing the underlying behavior and activities that are motivating and driving them.

This engagement with the social media milieu can be very straightforward, such as companies that employ customer services staff to respond to customer complaints on Twitter, but it can also be very complex and form part of a broader public relations strategy. Unfortunately this is not yet well understood, as demonstrated by the 'Pepsi Refresh' Social Media campaign, which saw Pepsi-Cola invest in a multi-million pound social media marketing project, only to see little impact on sales or reputation[1].

In this paper we argue that there is a need to develop technical tools that help organizations model and monitor emergent narratives, and thus develop business strategies to help them respond. We present a brief overview of some of the literature in organizational identity and brand reputation, explore how computational narrative systems have been used to identify emerging narratives, and discuss how technical methods of narrative analysis could potentially be applied to the problem of organizational identity in social media.

2. ORGANIZATIONAL IDENTITY
The concept of identity is becoming central to understanding what it means to be an organization in today's society [12]. The field has flourished since Albert and Whetten's seminal study [2], with researchers taking many different theoretical and methodological approaches to the concept in a variety of settings.

Whetten defines identity as "the central and enduring attributes of an organization that distinguish it from other organizations" [25], and proposes a tripartite formation of organizational identity with aspects that are ideational (members shared belief in 'who we are'), definitional (the central, enduring and distinctive features of an organization), and phenomenological (discourse in conjunction with organizational experiences). Brickson builds on research in individual identity and argues that organizations have three distinct identity orientations [5]: individualistic (their traits and views), relational (dyadic connections to others), and collectivistic (participants in a larger social group).

Despite these attempts to define and describe identity many practitioners have divergent views of the fundamental components of identity and its relationship to organizational culture [17].

Other researchers have made links between identity and reputation management, which can be defined as the more or less favorable regard in which a firm is held by its stakeholders [10]. For

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[1] The Ad Contrarian. 'Social Media's Massive Failure', March 21,

example Uncles showed how brands develop through consistent and positive consumer experience over time [23].

However, identity is more than the perception of an organization, it is an intrinsic part of that organization. Nag et al. describes how the sense of identity in an organization is entwined with its knowledge processes [18], and present a case study where a strategic change in identity met resistance from those protecting expert working practices. And Fiol describes the organizational identity paradox: that a strong sense of identity will bind people together in an organization, but can blind them to the possibilities of change [9].

Identity construction is not just a one-off, but an ongoing process [8]. In other words, identity is not fixed, it is polyphonic and context dependent. For any organization there is no one essential identity or reputation that can be examined, but a dynamic set of interlocking narratives. This narrative identity changes over time as the narratives about an organization evolve [15], and problems can quickly arise if there is a mismatch between internal and external perspectives on the reputation of an organization.

3. COMPUTATIONAL NARRATIVES

Narrative has long been a subject of technical research, with interest from computational linguists, hypertext systems engineers and researchers in artificial intelligence.

For example, narrative systems have been used to generate the text of simple stories and prose (based on lexical rules and grammar) [7], to orchestrate the actions of characters in virtual environments [3] and to guide visitors around exhibition areas in UbiComp settings [14].

The Web and Social Media are a rich set of potential resources for narrative systems to mine and reuse. For example, in the author's own ArtEquAKT project [24], biographies of artists are generated through an author-centric narrative generation approach that populates a grammar with relevant media automatically harvested from a variety of web sources.

The 'Memories for Life' grand challenge is about using technology to supplement human memory[2]. Memories for life projects use data mining techniques and narrative creation strategies that are similar to the ones needed to understand organizational narratives.

For example, the SemanticLIFE project uses various techniques to examine personal data and communications in order to create a queryable semantic database of work-related knowledge [1]. The MyLifeBits system took a similar approach with more personal data and used simple narrative constructs to present memory stories back to users [11].

The Semantic Logger and Photocopain Image Annotator aggregated data from many different personal sources (such as GPS, iCal, Browser History, etc.) in order to create semantic data that can both be reasoned about, and used with heuristics (such as clustering) to create second order information about a person [21]. This is then used to choose images to populate narrative scripts and build simple stories from personal photo collections.

These autobiographical narrative systems show that it possible to extract information from both the open web and personal information stores and use it to recreate narratives that help users

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[2] The Memories for Life Network:
http://www.memoriesforlife.org/

make sense of that information. It is a short leap from this to the idea that automatic narrative analysis could be used to identify emerging organizational narratives in social media.

4. TECHNIQUES FOR EMERGING ORGANISATIONAL NARRATIVES

So what are the appropriate narrative methods and tools to apply to social media (and other web content) in order to build sensible organizational narratives?

In our view it is highly unlikely that any automated tools (at least with todays level of sophistication) will be able to construct complete and lucid organizational narratives, so we argue that any automated organizational narrative tools need to aim to produce a first-pass narrative analysis that can be used by human analysts as the starting point for a more nuanced investigation that would itself lead to management strategies.

We propose a five-stage framework that could provide this first-pass analysis:

1. Content Selection and Analysis

2. Categorization into Sub-Narratives

3. Identification of Key Events

4. Annotation of Key Elements

5. Classification

Content Selection and Analysis: In order to utilize third-party material (such as blog posts or twitter comments) the content must be understood to some degree. Techniques such as term co-occurrence [6, 16] allow for *sentiment analysis* [22], where the opinion of an author in a piece on a particular matter may be ascertained by examining the relationships between topics and positive and negative terms. Tags and annotations can also be used to understand the Mood [4] and (in our own work) Theme [13] of a set of content.

Categorization into Sub-Narratives: Organizational stories are likely to be complex, with multi-layered and overlapping sub-narratives. These sub-narratives can be identified from the analysis of the collected media using the meta-data generated through the content analysis process. Heuristic tools such as automatic classifiers and clustering algorithms could tease related content from the broader collection, and numerical analysis would reveal significant threads.

Identification of Key Events: Narratives are likely to be most interesting to analysts when there is some detectable change. By analyzing the key terms within the narrative using term frequency and keyword extraction methods [16] it should be possible to detect when this pattern of key terms changes significantly. This could represent a change in story arc for the organization and potentially could be seen in terms of Todorov's theory of equilibrium [20] where a disturbance of equilibrium and the subsequent reforming of a new one identifies a plot. A challenge for the system will therefore be in distinguishing a rapidly changing narrative from two sub-narratives.

Annotation of Key Elements: Within any identified plot structure the key roles that individual elements play might be further identified by analyzing the effect of significant terms that reoccur (representing concepts, people, and events associated with the organization) or individual sources of media themselves. Such roles might be identified either using sentiment analysis to reveal

substantially positive or negative elements or the level of attention the element receives in proximity to times of equilibrium or disequilibrium to reveal typically chaotic or peaceful elements. This may lead to the identification of character archetypes within the organizations narratives in a way that parallels Propp's formalist approach to fairy tales [19] where 'villains' and 'heroes' and other archetypes might begin to form a model of narrative elements and their roles within an organizations story. For this to be successful we would need to build a model of how individual roles are represented within the narrative and populate this with definitions so that they might be identified.

Classification: Finally the sub-narratives could be classified in order to help determine their importance to organizational identity. Analysis might be done to detect the genre of each sub-narrative by identifying the presence of identified conventions. While these might hold parallels with traditional narrative genres ('comedy' and 'thriller' for example) more likely this will lead to the need to identify particular genres of organizational narrative by analyzing the pattern of particular reoccurring terms and the attention they receive. This would allow for the identification initially of beginning narratives that are likely to follow a similar pattern as those that have preceded it within its genre. Genre identification might also be used to predict the occurrence of particular reoccurring elements (and their associated roles) that have been associated with that genre in the past. However for this to be possible a significant investigation of what characterizes a genre within organizational narrative would need to be performed and individual genres defined based on a history of organizational narratives. The identification or reoccurring themes within both the grander narratives and sub-narratives would lend further evidence on which to base both genre identification and association between elements and particular roles. This would be done utilizing a thematic model such as demonstrated in our previous work [13] which when correctly populated might be used to identify themes through the presence of motifs associated with defined keywords.

5. CONCLUSION

In this position paper we have argued that there is a potential for narrative systems to address the serious challenge of managing organizational identity in a world of social media and public commentary. We have outlined the importance of organizational identity and explored how narrative techniques could be employed to support human analysts working in this area.

We have also proposed a five-stage framework for organizational narrative analysis consisting of content selection and analysis, categorization into sub-narratives, identification of key events, annotation of key elements and final classification. This has revealed a number of technical challenges that would need to be addressed including the problem of distinguishing either side of a Todorov equilibrium from two separate narratives, and the need for models of structural roles, themes and genres within organizational narratives.

Social media represents a serious challenge for organizations, but also an exciting opportunity to engage with stakeholders outside of the organization and help establish a healthy culture within the organization. This is not only true for commercial organizations, who wish to build good customer relations and run effective marketing campaigns, but also for governmental and charitable organizations who need to engage effectively with society in order to function at their best.

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Hypertextual Narratives

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ABSTRACT

In this paper, I outline my proposition for the workshop on Narrative and Hypertext. Using Mark Z. Danielewski's *House of Leaves* and Jason Shiga's *Meanwhile* as examples, I describe how the hypertext can be used within physical, printed books, and how its characteristics multiply the possibilities of the book in general.

Categories and Subject Descriptors

A.0. [**General Literature**]: Fiction.

General Terms

Languages, Theory.

Keywords

Hypertextuality, Interactive, Narration.

1. INTRODUCTION

In the course of my PhD research, focused on the relationship between pictures and text in contemporary literature, I have devoted part of my work to the study of new kinds of narration, especially those relying on the hypertext. What interests me is not so much how the hypertext is used in, say, online or digital fiction, but rather how it is conveyed physically.

2. PROPOSITION

2.1 The hypertext as a reading function

Books, and more specifically novels, are by nature hypertextual objects. On a very general level, we could say that all words are linked together, and only make sense (as sentences) when considered in relation one with the other; this is basic linguistics.

However, the unit of the sentence is not the only place where hypertext is present in a book; we also find such relations between different paragraphs, or, more interestingly, between different pages. The latter is "more interesting" because when the reader is navigating back and forth between different pages, he involves the physical space in addition to the fictional space of the novel. For example, in a given chapter, a character who had not appeared for a long time reenters the narrative; the reader will thus be forced to pause his reading for a while, and go back several pages to find the previous mention of this character, recollect his main features, his motives, and generally replace him in the narrative before being able to go on. Such actions are frequent when reading a novel, and almost automatic, and yet they are crucial because they force the reader out of the diegetic universe of the novel, and back into his own. Thus, the proverbial "suspension of disbelief", and the immersion into a fictional universe, is broken, and the novel reminds its reader of the fictionality, the artificiality of what he is reading, sometimes brutally. By using the hypertext in such a way, even subtly, the book (through its author) also emphasizes its physicality since the reader will mark his current position in the narrative, flip back several pages, maybe even pick up another book if the narrative is divided between several tomes.

2.2 Hypertextual books

This is one way of using the hypertext in fiction, in a slightly interactive way; but some works go further and use the hypertext to the fullest extent possible. In the course of my work, I have focused primarily on two works: one novel – *House of Leaves* by Mark Z. Danielewski – and one comic book – *Meanwhile* by Jason Shiga.

2.2.1 House of Leaves

House of Leaves uses the hypertext in a number of ways, the most obvious one being its prominent use of footnotes, in which portions of the narrative are hiding. Throughout the book, the reader navigates between different levels of narration (and of diegesis), one of them being a "commentator" of the main narrative, speaking solely in footnotes which sometimes take up whole pages. This narrative is fragmented, and therefore requires physical navigation from the reader, who will have to go back and forth between pages to obtain a coherent narration. Moreover, footnotes often call other footnotes, sometimes hundreds of pages away, which again force the reader to physically manipulate the book; and even sometimes go in circles in a labyrinth of footnotes, which lead nowhere but further away from the main narrative. A chapter in the book illustrates this in particular, reflecting this labyrinthine quality in its layout, reminiscent of a maze. The novel also frequently refers to appendixes, some present at the end of the book, other consisting of blank or "lost" pages. Other appendixes are photographs or drawing, which causes another kind of hypertext: the navigation between different semiotic systems. The novel also contains many codes or ciphers along its narrative, some relevant to the story, other being simply clever jokes; whole message boards are however dedicated to tracking, identifying and analyzing such ciphers, which many believe to hold the true meaning of a very dense and complex narrative. Footnotes also contain numerous allusions to other books, films, or paintings, inscribing *House of Leaves* into a web of real and fictional references. Finally, Danielewski has further emphasized the hypertextual nature of *House of Leaves* by leaving allusions to its universe in other works, such as The *Whales toe Letters* or Only *Revolutions*); thus the hypertext is not only within the book, it is also outside it.

2.2.2 Meanwhile

Meanwhile is a singular comic book, maybe closer to the "choose your own adventure books". In those books, the narrative is extremely fragmented, and the reader is forced to pause frequently in his reading, and actually decide where the narrative is going to go. *Meanwhile* takes this notion of interactivity one step further by using a visual medium. Several scholars on comics, from Scott McCloud to Thierry Groensteen, have said that one

of its main characteristics was the relation between two panels, and more specifically the fact that it was the reader's role to bridge the gap between two panels, and to piece the narrative together. This is particularly the case in Meanwhile, in which neither the narrative nor the layout of panels on the page is linear. Not only does the reader have to navigate through series of panels spread on the page in unusual patterns, but also he also frequently has to choose which way the narrative is going to go. Each time a choice is made, the reader has to follow a thread going out of the panel into the side of the page, which leads him to somewhere else in the book, through a clever system of tabs. Therefore, once again, the physicality of the book is reminded to the reader again and again, and the interactivity of the comic book form is multiplied tenfold. Furthermore, Shiga, like Danielewski, has hidden many codes and secrets in his book, not only to entertain the reader but also to allow him to have access to a broader and more complex narrative.

3. CONCLUSION

To conclude, we see that in two very different mediums, the hypertext is used in similar ways, to achieve various goals. First, using the hypertext allows these authors to insist on the physicality of the medium they are using, as well as its interactivity. It also allows them to use this interactivity much more fully than they would have been able to in a classic, linear narrative; and finally, through playfulness, it allows them to achieve a more active relationship with their readers, which are more solicited than they probably are used to.

During the workshop, I would like to expand my brief outline of those two works, using them as examples of hypertextuality in traditional fiction. Other examples, which I have not talked about here (*Jimmy Corrigan* by Chris Ware, The *Raw Shark Texts* by Stephen Hall, etc.) can also be used to talk about hypertextuality. I would be interested to see what those examples could tell us about ways to use the hypertext more frequently in fiction, the advantages and drawbacks it could bring to novels and comic books. It would also be challenging to see how such models of hypertextuality could be used with other narratives, such as films, plays, or even musical works. Finally, we could ask ourselves if the physicality of such works is a necessity for them to use the hypertext to its fullest

extent, or if the same techniques could be used with
similar results in e-books or digital comics.

Wandering Monsters!
on the problem of coherent hypertext narrative

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ABSTRACT
In recent years, hypertext researchers have worked hard to find ways to ensure coherence and continuity in hypertext narrative. The difficulty may have been exaggerated.

Categories and Subject Descriptors
H5.4 [**Hypertext/Hypermedia**]: Theory. I7.2 [**Document Preparation**]: hypertext/hypermedia

General Terms
Documentation, Design, Human Factors,

Keywords
Hypertext, narrative, narratology, fiction.

1. INTRODUCTION
A great deal of recent work in hypertext narrative has been motivated by the problem of finding, restoring, or preserving coherence in hypertext narrative. In motivating their Fluid reading project, Zellweger and Mangen [33] speculated that

> An intriguing issue is whether, why, and to what extent, hypertext writing tools (or even hypertext itself) are incompatible with the telling of typically immersive narratives, as for instance, detective or mystery stories.

Hargood, Millard, and Weal have studied thematic illustration as a route to maintain and enhance the cohesion of hypertext narrative [14]. Szilas [31] and Cavazza [19] have each explored interactive dramatic worlds in which coherence in the face of interaction is prominent concern. At Hypertext 2011, Chilukuri and Indurkhya [7] explore just how much non-linearity readers will tolerate. In the popular press, Nicholas Carr [6] revives the tendentious studies of Miall [24] to claim that hypertext is inherently incompatible with serious thought.

Is coherence actually difficult?

2. TERMINOLOGY
To begin, let me touch on familiar concepts to establish some terminological conventions.

A *narrative* is an account of some events that unfolded in time. The *story* is what notionally happened, the *plot* selects some of the things that happened and arranges them, and the *presentation* describes the words, sounds, or images used to convey the plot[1].

Transitions among scenes or episode in a hypertext may be divided in four classes: recursus, timeshift, renewal, and annotation[16].

3. WHAT HAPPENS NEXT?
I argued in "On Hypertext Narrative" [1] that hypertextual variation of plot, rather than story, is likely to prove most fruitful and desirable. The arguments I made there seem compelling and I know of no attempt to refute them. Nonetheless, let us contemplate variation in story and its impact on narrative coherence.

In principle, story variation could lead to incoherence. This is especially true in systems in which the reader takes the part of a protagonist[2]:

> If the reader's point of view is a hero protagonist, for example, the reader is led naturally to test the limits of the possible. That's what heroes do. The drama rapidly devolves into a negotiation between the reader and the world model; the reader asks to do the unexpected, the system typically responds with incomprehension. Ironic detachment makes things worse, not better; the reader-protagonist still wants to test the rules, and detachment invites the frigidity and sophomoric contempt that so often mar computer entertainments.

At any given moment, many things could happen that resolve, collapse, or redirect the story. If we identify with Antigone and are asked to solve her problems, our Antigone might give up, or leave town, or arrange for enemy soldiers to bury her brother. She might get Creon drunk, or depose him, or hire ninja warriors to assassinate him. Creon might come to his senses. Antigone might disguise herself as a man, bury Polyneices, and arrange an alibi. She might suborn an oracle, summon a god to hide her or to defend her, or find a magic ring that conveys invisibility but has certain drawbacks. Ismene might knock her unconscious with a distaff in order to save her obdurate sister, or she might set fire to the palace to buy time, or she might impersonate the student of a foreign jurist to argue that Creon's interpretation of the law is wrong. The Persian cavalry might appear over the next hill.

Some of these events are improbable, but they need not be incoherent or even difficult for readers to follow. The reader, moreover, will gladly invent intermediate details to explain

transitions. Some of these, to be sure, create faulty dramas in the terms of Lowe's model of Western narrative [18], but a reader-protagonist might reasonably prefer to displease an audience (which does not exist in her frame anyway) to pain and death. Our problem here is not that we don't understand the story or that the story is insufficiently coherent; our problem is that the story that emerged is not as interesting as the story we envisioned.

The difficulty with varying story, rather than plot, is not incoherence but rather Borgesian excess; if we specify that our work must allow significant variation of story, it might soon need to be large enough to contain all stories [4]. The challenge presented by variation of story is not enforcing narrative coherence but rather finding credible narrative constraint.

4. THE WANDERING MONSTER

Might we constrain variation in story to allow meaningful variation without combinatoric explosion?

We might design our story [29] to accommodate changes in predictable ways. In one familiar and excellent class of stories, the hero is separated from the object of desire by a series of obstacles which the hero must overcome. This is the story of Odysseus and Parsifal and *Die Zauberflöte*, of course, but also of Jo March and Mattie Ross, of James T. Kirk and John Smiley. The realization that the Parsifal story remains coherent and entertaining without regard to the sequence or even the precise number and nature of the obstacles was the distinctive (and distinctively hypertextual) step in the development of the role-playing game [13]. Simple algorithms can easily add and modify the perils of these encounters as the story develops, leading to engaging narratives that seem to emerge almost spontaneously. Hypertextual adaptation can easily respond to user profile and to context, adjusting the nature and difficulty of the encounters whilst retaining their essential elements.

Here, again, coherence poses no challenge: a wandering monster might appear at any moment, and that is the point of the quest.

5. NARRATIVIST GAMES

Though early role-playing games offered the promise of collaboratively-generated stories, the ambiguous role of the "game master" led a number of writers to explore game-like systems that generate complex role-playing narratives while reducing or eliminating the role of the master arbiter. In *Stalin's Story,* for example, the dungeon-master is injected into the story in the role of Josef Stalin, an angry arbitrary, and capricious audience and judge of the stories the players (and the algorithm) create [12]. In *Doom and Cookies,* Andrew Peregrine [28] removes the game-master's authority over plot and setting, instead rewarding players for complicating their own story. Jason Morningstar's *Fiasco* [26] eliminates the game master entirely.

The danger of incoherence might be even greater in collaborative storytelling, especially in the context of a game in which each participant might reasonably consider themselves the protagonist. Each of these systems constrains the actor's freedom of action in interesting ways while problematizing the very notion of success. Conspicuous success in pleasing Stalin, for example, is highly undesirable, for every minister and courtier will scheme to purge the new favorite. In *Fiasco,* consistent and spectacular failure is just as desirable as splendid success, while mediocrity leads to misery and despair.

Most notably, complex and coherent narratives emerge in these games from algorithmically-selected fragments and cues. Morningstar, for example, generates complex narrative tension by positing a network of relationships amongst the players and then adding a few inhomogeneous desires, locations, or objects selected from random lists. These lists themselves have a certain lyrical charm (Table 1).

Table 1: Situation table B2 (Toward Love and Enthusiasm) from *Gray Ranks* [25], a role-playing game about teenagers caught in the 1944 Warsaw uprising.

Edmund Telakowski, dashing partisan and liar.
A resourceful grandparent with a gift.
My parents are ashamed.
A notebook crammed with observations of German military movements out of Praga station over four years.
A best friend steps in.
Why can't we talk to each other?
The Bank of Poland in City Center, on family business.
The Marie Curie Cancer Institute in Ochota.
Rags, empty wine bottles, and ten liters of gasoline.
Lacy undergarments.

The serpent that opens *Die Zauberflöte* might instead be a lion or three witches or any wandering monster, but these "situations" the characters in Table 2 hardly appear equivalent or interchangeable. Nonetheless, one of these is randomly selected as a narrative cue for a scene for a character whose past inclines them equally toward falling in love with another character or immersing themselves in the cause.

Montage [9] and cinematic closure [22] lead readers to connect disparate elements in coherent and causal patterns; these can indeed be disrupted by ambiguity or contradiction [8], but to do so conclusively is surprisingly difficult. Juxtaposing arbitrary elements – a wasteland, a boy, a man, and a sandwich – might not seem a likely route to compelling realist fiction. Yet this leads directly to Pip and Magwitch in *Great Expectations,* to Frodo and Gollum in the Dead Marshes, to Harry Potter and Albertus Dumbledore to Satan and Uriel in *Paradise Lost,* and to multitudes of loaves and fishes [30].

6. TELL ME AGAIN

The identification of the reader with the protagonist threatens to explode the story into Borges's library. Classic hypertexts avoid the problem by avoiding variation of story. Parsifal stories retain narrative coherence by breaking the narrative into isolated encounters. Narrativist games attain coherence through cinematic closure. But we can also circumvent the reader's desire to win, and thus avoid the catastrophic focus on the boundaries of the storyworld, by making the outcome evident before the struggle has begun.

In *Gray Ranks,* conventional victory is inconceivable. We know that the Warsaw uprising is doomed, and perhaps the characters know this, too. They do what they can and they do what they must. But so must Hamlet and Rufus T. Firefly.

Seeing a character in a dramatic situation, the audience wants to know what happens next [20]. Our eagerness to see the outcome is not eliminated because we already know it. Children relish hearing the same stories, time and again, but this is not merely a sign of immaturity. Many people see performances of plays they have seen or read before, and a performance of *Don Giovanni* is not less exciting because we know how it ends. It seems likely that everyone in the audience on the night of the premier knew how it would end.

People who enjoy reading almost invariably also enjoy rereading. Though Pauline Kael famously claimed never to have seen a film twice, it is difficult to imagine a literary critic working without rereading. In hypertext fiction, moreover, rereading is not merely a recreational indulgence or a scholarly duty. Because only through rereading can we perceive a hypertext's structure or understand how our choices matter, hypertext reading compels rereading[1; 16].

Historical fiction deserves much closer attention than it has previously received in the hypertext community. Late Modernism deplored historical fiction as an escapist evasion, but historical fiction is increasingly seen as integral to contemporary literature [5] or, perhaps, as the medium of our era [10]. A central attraction of historical fiction is the constraint our knowledge imposes on story; in *Wolf Hall,* we know that Thomas Cromwell is headed to Wolf Hall even though he only decides to go there on the last page of the novel. We also know where he will end up, even though that *dénouement* remains in his (and our) future [21]. We know that Ensign Keith survives the Caine Mutiny [32]; he is telling the story. We know within a few pages that *Jack Maggs* reimagines *Great Expectations* and that *On Beauty* responds to *Howard's End*, and so we can anticipate a great deal of what is to happen.

Writers frequently reveal the outcome of the events they are about to describe, not because they are inept, but to focus attention on how people acted and felt rather than on how things turned out.

Reading a hypertext necessarily demands intervals of deliberation and decision; if the readers does not sometimes pause to choose one link and not another, the work is not a hypertext. The gap between the link's source and destination is a potent source of meaning, but often poses tricky questions of craft and composition. These demands are congruent to the familiar requirements of much historical fiction which frequently (though not always) moves over a broad canvas of place and time. The problems of arrival and departure do not belong to hypertext alone, and its solutions – documentary, epistolary, or artifactual texts, framing stories, rhetorical transitions – find many precedents in historical narrative.

7. WHERE WE WENT WRONG

We are frequently assured that the natural tendency of hypertext fiction is to be confusing, fragmented, distracted, and difficult. I see no reason to believe this claim, and abundant reason – in games, in cinema, in popular contemporary fiction, and in our own experience of writing – to doubt it.

What critics and researchers mean, in practice, is that they have found specific hypertexts – *afternoon* and *Victory Garden* and *Patchwork Girl, 253* and *From Lexia to Perplexia* – confusing, fragmented, distracting, and difficult.

This generalization ignores the context of composition and, most significantly, the economic circumstances of their creators in the emerging new media economy [3]. Early hypertext was often tied to the laboratory, and contemporary writing is pervasively connected to the academy [23]. Naturally, the kinds of writing to which early writers were drawn, and for which they were rewarded, was frequently the sort of writing that was praised by their peers, that received awards, that earned their writers fellowships and professorships.

Table 2. Selected literary awards 1987-1992

	Nobel	PEN/Faulkner	Booker
1987	Joseph Brodsky	Richard Wiley	Penelope Lively
1988	Naguib Mahfouz	T. Coraghessan Boyle	Peter Carey
1989	Camilo José Cela	James Salter	Kazuo Ishiguro
1990	Octavio Paz	E. L. Doctorow	A. S. Byatt
1991	Nadine Gordimer	John Edgar Wideman	Ben Okri
1992	Derek Walcott	Don DeLillo	Michael Ondaatje

In this period, the Cannes *Palme d'Or* was won by Maurice Pialat, Bille August (twice), Steven Soderbergh, David Lynch, and the Coen brothers. None of these films won (or was nominated for) an Academy Award for either best picture or best director. This was not, in short, an era where "typically immersive narratives, as for instance, detective or mystery stories" [33] were a reliable route to academic acclaim.

> But Amy [Tan] was right: nobody ever asks about the language. They ask the DeLillos and the Updikes and the Styrons, but they don't ask popular novelists. Yes many of us proles also care about the language, in our humble way, and care passionately about the art and craft of telling stories on paper. – Stephen King [17].

Conversely, though Joyce and Bolter [15] may not have demonstrated the role of hypertext narrative in enacting the perfluent dream [11] of Holodeck Hamlet [27], *Harry the Ape* – the story written to demonstrate fluid reading – may not have been the ideal vehicle for refutation.

We should be careful to distinguish as well between the supposed problems of coherence in hypertext fiction and the challenges presented in generative storytelling – in producing narratives from comprehensive but abstract representations of story worlds. The immediate aim of such research is not to create excellent, memorable, or compelling stories, but rather to evaluate and use the underlying representational models and, in so doing, develop new understanding of representation and language. Coherence was indeed a challenge here, especially in the 1980s when planning was poorly understood and natural language generation was entirely novel. But the point of the stories of Winograd and Schank is literally to probe the nature and role of story in thought, not to make us think.

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Arbor Inversa – The SIC Method and the Reverse Engineering of Hypertext

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ABSTRACT

The purpose of this paper is to introduce the SIC project as a foremost example of web-based, scientifically devised collective production of literary works, to examine the qualities of its narrative production, to analyze its literary implications, and to discuss the connections between production of collective literature, hypertext and derivative works.

Categories and Subject Descriptors

H.5.4 [**Information interfaces and presentation**]: Hypertext/ Hypermedia – *architectures, theory.*

J.5 [**Computer Applications**]: Arts and Humanities – *literature.*

K.4.3 [**Computers and society**]: Organizational Impacts – *computer-supported collaborative work.*

General Terms

Documentation, Experimentation, Theory.

Keywords

Hypertext, Collaborative writing, Writing methods.

1.THE SIC METHOD

According to the first description published in the SIC website, www.scritturacollettiva.org: "SIC indica un metodo di scrittura collettiva e la comunità aperta di scrittori che lo utilizzano"[1] (SIC indicates a collective writing method and the open community that uses it). The project, whose conceptual roots dig in combinatory literature, open-source software development and role playing games, was first made public on May 12, 2007 at the Turin International Book Fair. In the following years, the SIC method was tested and developed through the production of five short stories (each one having 4-6 authors), and once it was well-adjusted, was used to produce the first 100 authors novel in history.

The first declared goal of the project was "far diventare la scrittura collettiva una prassi letteraria" (to make collective writing a literary praxis). Collective writing always suffered a bad reputation in modern literature. Even when practiced, it was almost always "for fun", or the authors hid themselves behind *noms de plume*: that is to say, that even them implicitly or explicitly denied its literary status. The second declared goal was writing a solid novel with the SIC method, hence the SIC method aimed at demonstrating that a) Collective writing can produce works of literary dignity, b) Collective writing can be or become a "normal" writing practice.

The guiding principles and the mechanisms of the SIC method were devised through the observation of the pros and cons of various collective writing practices, such as "round-robin" practices (where every part or chapter is written by a different author, in rounds), crowdsourcing writing (like *A Million Penguins*) and novels by Luther Blissett and Wu Ming. Every practice had its own advantages, but none seemed to be able to fully exploit the potential of teamwork. We wanted to overcome the expressive limitations inherent to round-robin writing, to tap into the creative freedom of wikis while curbing the tendency of authors to control and determine every aspect of their work, and create a method so objective and effective that would allow even people who don't know each other to produce good text.

The first innovation introduced was the division of the narration into parts, not only sequences, but characters, places and so on, each one addressed in a specific file or "sheet".

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[1] lettiva.org/documentazione/metodo-sic

The second innovation was to divide the participants in two different roles: writers and art directors. The latter edit, but don't write. They have a regulatory and organizational function, necessary to minimize the problems arising from group work, like the said tendency to egocentrism of writers. Since the AD doesn't participate to writing, she is impartial, and can tie her judgment to parameters of quality and usefulness.

Each sheet is filled out by a group of three or more writers. The AD collects the individual sheets and "composes" them. The process of composition is an innovation of the SIC method: it consists in the selection of the best, most useful or most coherent parts of each individual sheet, which are then all meshed together in a new "final" sheet. More than a description, a fictional example can be useful to understand how composition works. Let's assume that the AD has received two individual mini-sheets, or cards:

(1a) To be, or not to be: that is the issue

(1b) Existence is indeed a big question

Her task is just to discover, as if it were hidden between the two:

(1c) To be, or not to be: that is the question

When the AD completes the composition of a sheet, he forwards it back to the writers (and puts it in the online "sources section") for reading. When all the elements of the story have been written, composed and returned to the writers, the drafting begins, with the same procedure of individual sheets and their composition. After the last sheet, the AD edits all the final draft sheets together (needless to say, the composition process, which involves lots of copy/paste, cuts and redraftings, is viable only thanks to modern word-editing software).

This mechanism should ensure the maximization of the two main benefits of having "many heads" available:

1. According to a purely quantitative principle, the more material is produced, the more good quality material is produced as well (whichever the quality standard employed). We call this "principle of redundancy": in group work, it is better to have many different versions of the same thing to choose from, as well as many different options for the development of a story, than relying on a fixed path. The principle is reflected by the SIC motto, "Tutti scrivono tutto" – "everyone writes everything": no part of the text is ever written by a single person.

2. The second principle is qualitative. When a collective text undergoes a number of rounds of writing, revision, editing, a positive feedback cycle can arise that makes the participants more individually conscious and collectively attuned. This contributes to a better quality. In the SIC method, the crucial moment that closes the feedback ring happens when the AD hands a final sheet to the writers, who then read it and retune their idea of the character/place/situation with the collective version. We call this "principle of sublimation".[2]

2. REVERSE ENGINEERING

The peculiar field of application of the SIC method – fiction – suggests an opportunity to consider an often overlooked facet of collaborative writing: that a text written by many is by nature a text *of its own kind*. The traces of the participants, of the way the worked together, do not disappear when the text is completed. The text does not flatten to a neutral surface, indifferent to its genesis. Suture lines and structural nodes, which are at the same time unavoidable leftovers and useful reference points for writers, are still visible. Of course, the conversion of a text into a literary product involves a work of concealment and erasure of such "bumps", but the SIC text permits to bring them back in sight, as an intertextual database of the completed sheets is always available to writers and readers, thus acquiring a new hypertextual dimension, which is established by the relation between the text and the system of sources used to generate it.

If we imagine a SIC text where the names of characters and places link back to their respective sheets, its inherently hypertextual nature immediately strikes the eye – it is worth noting that, during its generation, a SIC text is a "reversed" hypertextual tree: the authors start from the leaves, the single elements of the story, to get to the trunk, the final text. What is more, SIC fiction does not hide but shows a natural feature of any literary work: the fact that it draws from other texts which came before it. Hence, a SIC text can be "reverse engineered": it already carries within itself its first philological and narratological analysis.

Middle Age and Early Modernity writers found natural to take possession of previous writings for alterations, continuations, remakes, while, later, authorial culture favoured a shift in the relation between author and tradition, giving more value to unicity and originality of the work: to difference from previous works, instead of continuity. A SIC text does not "feel ashamed" of showing out its debts: instead, it carries around its own little "tradition", not one created by the slow workings of past generations, but with a guided and accelerated path of hoarding and distillation.

3. THE GREAT SIC NOVEL

With the undertaking of the ultimate goal of the SIC project, the Great Novel the method was modified to handle and coordinate online a much larger group of writers. While the short novels had 4-6 writers, the Great Novel would have at least fifty – eventually they would be twice as many.

At first, we asked writers to send us stories and anecdotes of events occurred to their relatives and their acquaintances during World War II in Italy. They could send what they wanted, the only requirement was that they sent storied passed down orally and not yet coded by historiography. We outlined a story based on these recounts[3]: an historical drama that tells three parallel stories of an Italian naval officer stranded after the armistice of September 8, 1943; of his sister, alone and in distress in a Milan subject to devastating bombings, eventually becoming a factory worker and later a partisan; and of her husband, who spends the war hiding in a garret in the countryside, where he gradually loses his mind.

The sheets phase was accomplished through a system of online reservations: every sheet had between 4 and 8 available slots, depending on its importance. We prepared a staggered schedule for the delivery of the sheets, so that the ADs could handle the production of an average of 4 final sheets per week.

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[2] The rationale and theoretic position of the SIC method is discussed in depth in Magini, La Scrittura Industriale Collettiva, 2008, University of Florence.

[3] Available at
http://www.scritturacollettiva.org/gruppo/1205/soggetto.

First, we completed the sheets about characters and locations. Then, we focused on the "treatment" – a term borrowed from cinema – which consisted in an elaboration of the story aimed at providing us a detailed specification of every scene of the novel. Lastly, we proceeded to drafting. The whole work took fifteen months.

Some statistics:

1. 8 Art Directors (4 from the beginning, 4 more promoted from the ranks of the writers as the work proceeded).

2. 41 "war stories" inspired the plot.

3. 78 writers delivered at least one sheet or an anecdote. 40 of them delivered at least 10.

4. 20 proofreaders, historic editors and translators (the novel features many dialogues written in various Italian dialects).

5. 935 individual sheets delivered.

6. 170 final sheets: 24 characters, 35 locations, 18 treatments, 93 drafts.[4]

4. SIC – ESSENTIAL CHRONOLOGY

2006

November	Ideation of the SIC method.

2007

March	SIC short story #1, *Il Principe*, is completed and published.
May 12	Presentation of the project at the Turin International Book Fair.
June	SIC short story #2, *Un viaggio d'affari*, is completed and published.
June 19	Lecture about the SIC project at the University of Siena.

2008

February	SIC short story #3, *Alba di piombo*, is completed and published.
May	SIC short story #4, *Notturni per ipermercato*, is completed and published.
June 3	Participation in the New Italian Epic debate with the essay *Verso il realismo liquido*, published in Carmilla literary magazine.
October 2	Lecture on "Italian perspective on metahistorical fiction" at the University of London's Institute of Germanic and Romance Studies, whose content was later published in Carmilla magazine with the title *Letteratura come network*.
December	SIC short story #5: *Il sopralluogo*, is completed and published.

2009

February	Opening of subscriptions for participation in the "Grande Romanzo SIC".
April 25	The production of the "Grande Romanzo SIC" starts.
October 23	Lecture at "Scrittori all'Arsenale" seminar, promoted by the University of Venice, whose content was later published as an essay with the title *Solve et coagula*.

2010

January	After the production of characters, locations and treatment, the "Grande Romanzo SIC" enters the drafting phase.
September	Simplicissimus book farm publishes the first five SIC short stories in e-book format.

2011

February	Participation in the book Rethinking the Historical Novel in Italy, curated by Margherita Ganeri, Marco Codebò and Sandra Waters (going to be published in 2012 by Legenda, London), with the essay *Elective Affinities: Historical Novel and Collective Writing in the Telematic Age*.
March 19	The "Grande Romanzo SIC" is completed.

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[4] The archive of the final sheets is available at http://www.scritturacollettiva.org/gruppo/1205/schede.

Using Bidirectionally Hyperlinked Concept Maps To Analyze Nonlinear Narratives

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ABSTRACT

This paper describes the use of bidirectional hyperlinking to enhance the applicability of concept maps to literary criticism by supporting discussion of recurring themes within a complex nonlinear narrative. The motivating example is an analysis of an episode of the television series, *The Sopranos,* selected for the central importance of cycles in its structure and themes. While hypermedia concept maps are ideal for enriched visualizations of television criticism, we aim to show that bidirectional hyperlinking provides additional support for the recurrence [1] necessary to communicate structure. Our example maps demonstrate not only that hypermedia concept mapping can support arguments for underappreciated connections between plot elements, but also that bidirectional hyperlinking between maps helps to express the importance of cycles [2] not only in hypertext composition but in analysis of nonlinear non-hypertext narratives.

Categories and Subject Descriptors

H.5.1 **[Information Interfaces and Presentation (I.7)**]: Multimedia Information Systems – *hypertext navigation and maps.*

General Terms

Documentation, Design, Experimentation, Human Factors

Keywords

Hypermedia, spatial hypertext, concept mapping, argument mapping, IBIS, bidirectional hyperlinking, literary criticism, television criticism

1. INTRODUCTION

This paper shows how bidirectional hyperlinking can increase the power of hypermedia concept mapping to analyze recurring themes within complex narratives. By providing bidirectional links outwards to maps of related narrative elements and back inwards to the point of origin, users can not only depart from but revisit nodes, increasing the understanding of cycles and reducing disorientation [2]. The narrative under discussion is the controversial and misunderstood final episode of the television

series *The Sopranos* [3]. The inconclusive ending was a source of confusion for many, and the cyclical presentation of themes over several series, essential both to the structure and the message of the programme, was not only underappreciated but misperceived by many viewers as "lazy" [4]. We have used example maps created with an existing open-source concept mapping application, Visual Understanding Environment (VUE) [5], which we have enhanced by adding bidirectional hyperlinking between maps. Our original purpose in implementing bidirectional linking was to offer grouping of sets of simpler maps as an alternative to single complex maps. In this paper, however, we show how bidirectional hyperlinking can be leveraged to reorient the audience's understanding by highlighting what Bernstein calls "the central importance of cycles" [2] in an analysis of a complex non-hypertext narrative with a nonlinear structure.

The next sub-section will introduce the software tools used to create the concept maps. Section 2 explains the question, *What happened at the ending of the Sopranos?* that the maps attempt to answer, and the role of bidirectional hyperlinking in answering it. Section 3 shows how the linked maps are used to answer the question. Section 4 discusses our findings and their applicability to other nonlinear narratives in popular culture. Section 5 explains how bidirectional hyperlinking of hypermedia concept maps has helped us to answer the question by highlighting the cyclical structure of the narrative.

1.1 Tool Support

We are in the process of enhancing the open source concept mapping application, VUE [5], which is file-based for easy sharing and has good support for embedding images. We have implemented additional functionality for bidirectional hyperlinking between maps, as well as support for IBIS [6] argument mapping, and have made use of these enhancements to create some example hypermedia concept maps.

2. RECURRENCE

Despite the popularity of the television series *The Sopranos* [3], many viewers were left with unanswered questions. Bernstein [2] wrote "As early worries about disorientation receded, writers adopted larger and more diverse structural schemes while relegating simple topologies to a less prominent role." A similar increase in complexity has been observed in popular television [7] as related technology has increased audiences' opportunities to view and discuss episodes on demand. Despite the proliferation of viewer discussions and analysis using various media, the question *What happened at the ending of the Sopranos?* remains vexed for many. The final scene [8] shows the main character, the Mafia capo Tony Soprano, in a restaurant with his family. The scene ends abruptly with a hard cut to black and 10 seconds of silence,

followed only by the credits. Viewers were confused and infuriated because they wanted to know whether Tony Soprano had or had not been killed. A Google search using the terms "ending of the Sopranos" brings forth an abundance of detailed analyses and arguments. The series creator, David Chase, maintains that all the necessary information is in plain sight: "Anybody who wants to watch it, it's all there." [9] This apparent commitment to ambiguity was viewed as "an easy out" by a number of viewers, including at least one television writer [10]. The ending is not the only aspect of the series that has been criticized in this way: "Some of the similarities in arcs as the story progressed seemed very lazy to me." [4] This paper shows how concept maps enhanced with bidirectional hyperlinking can be used to facilitate presentation of analysis that addresses these questions, despite the complexity of the narrative. A set of example maps have been created to show how the repetition and inconclusiveness is in fact essential to the message and structure of *The Sopranos* and how the cyclical structure itself provides the answer to the question apparently posed by the ending. In the next section we will show how concept maps can be used to gather examples from various media of recurring themes within the series, and how the use of bidirectional hyperlinking of these maps uses recurrence to impress upon the user the intentionally cyclical nature of these themes, augmenting the use of node layout to visualize these cycles in the maps themselves.

3. ARGUMENTATION

3.1 The Proposed Answer

The proposed answer to the question: *What happened at the end of The Sopranos?* Is *Adriana comes back as Schrödinger's Cat.* In the next section, we will show a straightforward usage of concept mapping to present the evidence for this assertion. In the following sections, we will show how we have used bidirectionally hyperlinked concept maps to explain why the answer *Adriana comes back as Schrödinger's Cat* is more satisfactory than other answers thus far proposed.

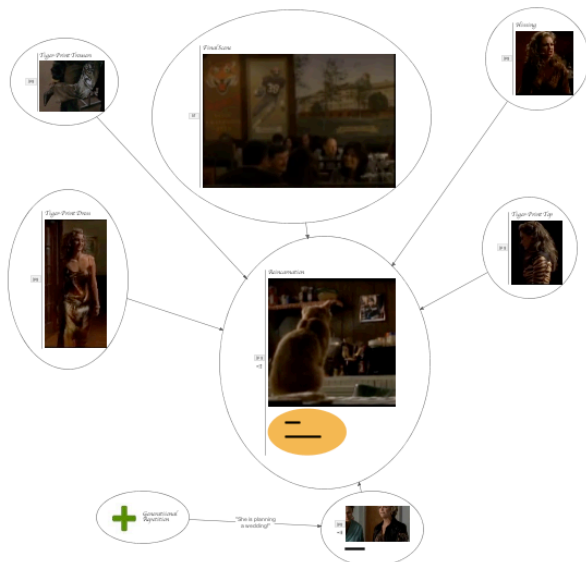### 3.2 Mapping the Evidence For Adriana's Reincarnation

Figure 1. Overview of map showing Adriana as a cat.

Figure 1 shows an overview of a map that presents some of the evidence for Adriana's reincarnation. The node at the centre of the map shows the cat that appears in the final episode. The cat spends its time gazing at a picture of Adriana's fiancé, who in recent episodes was murdered by Tony. Adriana herself was murdered on Tony's order in an earlier series. Around the central node are a number of stills clearly showing Adriana's preference for cat-printed clothing. Connected to the central node is a still of the mural in the diner where the final scene takes place; on the top left is the face of a tiger.

The assertion *Adriana comes back as Schrödinger's Cat* turns out to be simple to argue for. What has yet to be explained is why this is an answer to the question *What happens at the end of The Sopranos?* Here is where bidirectional hyperlinking can help us. In the next paragraph we will show how we have used bidirectional hyperlinking to highlight the recurrence of themes.

3.3 Bidirectional Hyperlinking of Recurrent Themes

It is not enough to assert that Adriana is reincarnated as Schrödinger's Cat without explaining why this answers the original question of how the story ends. There are two nodes of particular interest in showing how Adriana's reincarnation – itself an instance of recurrence – fits into the overall recurrent structure of *The Sopranos*. The first is nested within the central node showing Adriana reincarnated as a cat, and is shown in Figure 2. The second is nested within an image node. The image shows Adriana's mother, also wearing clothing with a cat print. The dialogue for that shot, shown in the accompanying link caption, is "She is planning a wedding!" – a stage in the cycle of life. The similar choice of clothing shows the child repeating the behaviour of the parent. The link, appearing more than once in this simple map, takes us to another more detailed map, which is shown in Figure 4. The next paragraph will explain how the bidirectional linking increases the expressiveness and clarity of both maps.
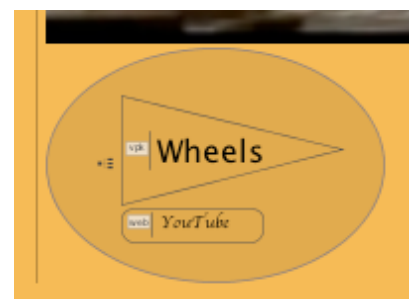

Figure 2. Bidirectional hyperlink to map showing circular structure from map showing Adriana as a cat.
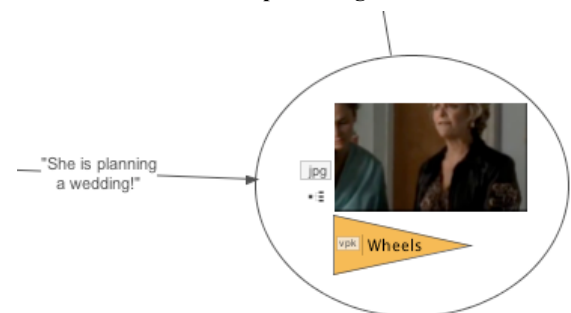

Figure 3. Bidirectional hyperlink to map showing circular structure from map showing Adriana as a cat.

3.4 Enriching Visualization of Structure with Recurrent Bidirectional Linking

Adriana's reincarnation becomes meaningful when one understands its place in the overall structure of the story. Figure 4 shows an overview of a map that argues for a cyclical view of The Sopranos structure and themes, drawing a circular path from birth through death.
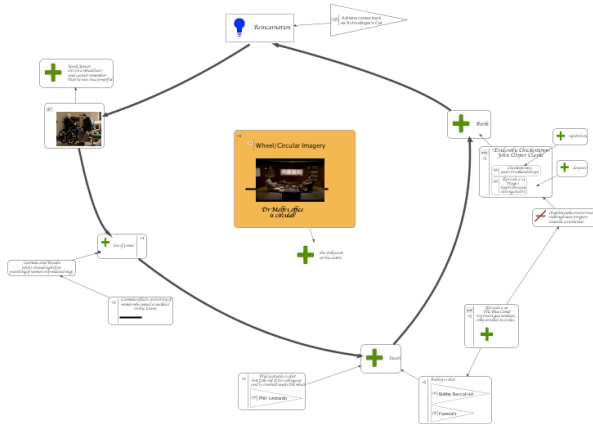

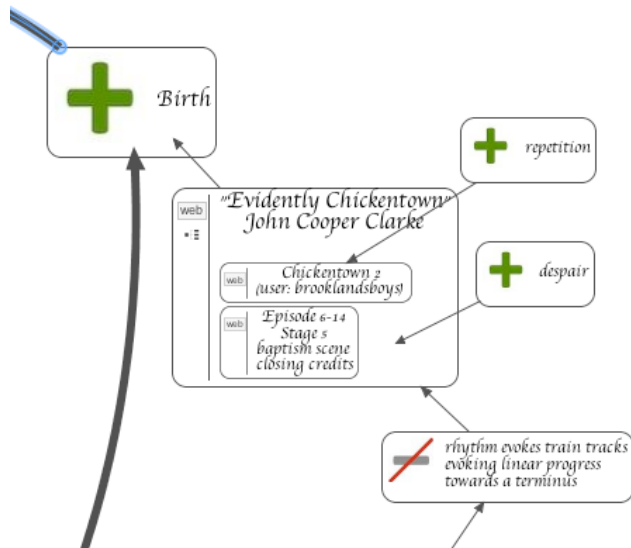Figure 4: Overview of map showing argumentation for circular structure.

Figure 5: Detail of map showing argumentation with links to external multimedia.

Figure 5 shows a detail of the map that argues for and against the use of circular symbolism relating to birth. Making full use of VUE's hypermedia potential, there is a unidirectional external link to a video file for a poem which was used as the closing credit music to a christening scene near the end of the series. [11] The audio strongly evokes linearity and the linked video file (which is not related to the television series) shows the view from a train moving in a straight line. IBIS nodes are used to show that this evidence fails to support an argument for plot linearity, by relating it to evidence shown in death scenes (specifically, a toy train moving endlessly around a circular track). The central node

shows a still of Tony in session with his psychotherapist, Dr. Melfi. The office is a circular room probably representing the still point at the centre. Various connected nodes contain bidirectional links which lead to, *and return from,* maps for relevant characters. This early draft of the map shows two bidirectional links to character pages, one link to the recurring theme of loss of power, one link to the recurring event of funerals, and one link to the map arguing that Adriana is reincarnated as a cat (Figure 6). As the map develops, more such links will be added, all departing from and returning to the map showing the series' recurring symbolism with circles. Note the light bulb in Figure 6, which is the IBIS symbol for "Answer"; as the argument is fleshed out with more evidence the answer will be marked as "Accepted".
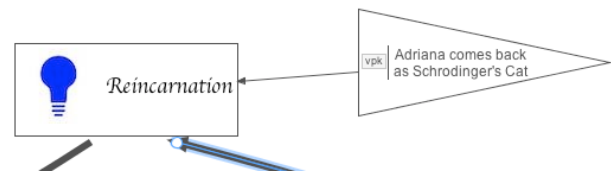

Figure 6: Node containing bidirectional link from the map of circular structure to the map of Adriana as a cat.

The maps can be developed further to relate Adriana's reincarnation to the inconclusive ending and show the evidence, already well argued by fans, that clues to a death scene were being presented [12]. Many insightful commentators have expressed their interpretations in essay-style blog posts with few links [13]. A number of analyses recognize that the ending of the series is not the outcome "Tony dies" or "Tony lives" but that the audience was denied the opportunity to observe the outcome. Some [14] have explicitly related it to Schrödinger's cat. However, only one commentator [15] has recognized the cat as Adriana and no-one has explicitly connected her reincarnation with a cyclical, rather than a linear, storytelling structure with a historical perspective on sinful human nature. It is noteworthy that nobody has explicitly connected these two interpretations even though making that connection is what gives us the answer to the question of how the story ended. While there is nothing about the essay format to prevent anyone from making that connection, we have not only shown a use of concept mapping to better enable meaningful connections between these interpretations [16] but used bidirectional hyperlinking to enforce recurrence and continually relate the part to the whole by returning the user again and again to the circle.

4. DISCUSSION

It is possible to show that bidirectionally hyperlinked concept maps are ideally suited for criticism of complex narratives, especially those that have a cyclical structure. What is not possible is to argue that because a given nonlinear narrative can be satisfactorily explained, audiences therefore ought to enjoy it [17]. Nevertheless, with or without a linear narrative, television series are increasingly complex, and a number of them, such as Buffy the Vampire Slayer [18], are demonstrably cyclical in structure [19], making bidirectionally hyperlinked concept mapping intrinsically well suited to their analysis and criticism.

One of the goals of the project that is developing VUE [20] is to enable new kinds of digital collaboration. Given this suitability, it would be good if this sort of hypermedia became a part of the mix of media available for critics and the public to analyze and discuss modern narratives.

5. CONCLUSION

This paper has shown a usage of bidirectional hyperlinking between hypermedia concept maps to analyze one of the complex narratives that are an increasingly common feature of popular culture. We have created example maps using a version of the hypermedia concept mapping application VUE [5] to which we have added enhancements including bidirectional hyperlinking. In

mapping the answer to the question *What happened at the end of the Sopranos?* we use the cyclical structure of the television series to show how bidirectional hyperlinking can encourage recurrent navigation to and from maps of recurring themes, thereby using what Bernstein calls "the central importance of cycles" [2] in hypertext to reorient the audience's understanding towards the central importance of cycles in a complex non-linear narrative of the kind that is increasingly prevalent in popular culture.

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Literary Criticism and Hypertext or: How I Learned to Stop Worrying and Love Paranoia?

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ABSTRACT

In a rare essay, Thomas Pynchon, the famously reclusive author, talks about the 'do-it-yourself hypertextualist', who fits into his discourse on paranoia. This paper will start to explore the questions of paranoia in both literary criticism and hypertext theory. It will focus on the paranoia inherent within one-to-one links from both general, authoritative systems, and the network of personal reader response using examples from literature including Thomas Pynchon and Vladimir Nabokov.

Categories and Subject Descriptors

J.5. [**Literature**].

General Terms

Human Factor

Keywords

Paranoia, Hypertext, Vladimir Nabokov, Thomas Pynchon.

1. INTRODUCTION

Ted Nelson believes 'hypertext is literature, and nothing but'.[15] This indicates the need for a greater focus in hypertext research on two particular interdisciplinary facets of hypertext that are sometimes overlooked: literary criticism and textual studies. Matthew Kirschenbaum has identified the latter as having richer possibilities in the long run for hypertext theorists than the pursuit of links between hypertext and the 'post-' theories of the Twentieth century[8]. From my own research, three interesting approaches to hypertext and narrative, stemming from textual criticism (aside from narratology), are the complex structures that underlie texts and can be empirically explored for a greater understanding of the text, genetic criticism and an empirical study of intertextuality in all its forms. With a fuller understanding of hypertextuality in print-based media through exploring these and other tropes, one can implement a system that exploits some of the inherent multi-dimensionality of text.

This paper will question if paranoia is an inevitable consequence within the discourse of both literary criticism and hypertext theory, and if it is possible, within the current frameworks of these systems, to allay the cries of paranoia within understanding narrative. In order to do so, I will briefly discuss selected works of Vladimir Nabokov and Thomas Pynchon. This paper will discuss the problems of paranoia that one might face when exploring deeper hypertext structures than the explicit one-to-one linking that is prevalent in current representations of literature online and

in print. Furthermore, I will consider how this affects the representation of print-based literary texts on electronic hypertext systems. There is clearly a paradox here in that reading literature either leads to falling into somebody else's linearity or creating connections that are not there and thus becoming paranoid.

2. LITERATURE REVIEW

The initial theories of hypertext, whether one believes the heir to be Bush, Nelson, or Engelbart, came out of the golden age of paranoid: the Cold War. This discourse arguably comes from Hofstadter's appraisal of American politics of the time period. David Trotter posits that in this form, 'paranoia ceased to provide a terminology for aspiration, and became instead the focus of a critique of social mimesis'. [25] In his seminal study, Hofstadter posits that the key aspect of paranoia is:

> a 'vast' or 'gigantic' conspiracy as *the motive force* in historical events. History *is* a conspiracy, set in motion by demonic forces of almost transcendent power, and what is felt to be needed to defeat it is not the usual methods of political give-and-take, but an all-out crusade[6]

This is the familiar 'them' against 'us' that literary paranoia suggests is the central binary of literature. One can even see similar tropes in hypertext theory, whereby it has been so often marginalized by other computer science communities, that it feels that it once more 'them' against 'us'. Michael Wood suggests that 'the great age of American paranoia, the age that began just before the Kennedy/King assassinations, and faded away somewhere in the early Nineties….[instead, now we are in the age of the] post-paranoid'. [26] Trotter repositions the idea of the post-paranoid, by suggesting that paranoia is now 'no longer a strategy for the acquisition of symbolic capital, it has become a form of symbolic capital.'[25] It is my supposition that paranoia, neither a positive or negative trope, can still be fine in both literary criticism and hypertext theory, since both critical industries are products of more paranoid times.

One of the strongest proponents of paranoid fiction is Thomas Pynchon, who preaches his paranoid manifesto most strongly in *The Crying of Lot 49* and *Gravity's Rainbow*, asserting paranoia of 'every degree… from the private to the cosmic'. [21] In *Gravity's Rainbow*, Pynchon defines paranoia as 'the onset, the leading edge, of the discovery that everything is connected, everything in the Creation, a secondary illumination—not yet blindingly One, but at least connected' [19], and the 'reflex of seeking other orders behind the visible'.[19] Stuart Moulthrop defines hypertext in a similar way when he describes it as

'promiscuous, pervasive, and polymorphously perverse connection' [13]. This fits Pynchon's conception of paranoia [see 13]. He further believes that paranoia provides the reader with 'an essential tool for understanding complex systems' [12]. Pynchon admits as much when he describes the amateur paranoid as a 'do-it-yourself hypertextualist' in terms of paranoia.[11] This is alarming, because the 'do-it-yourself hypertextualist' can also describe the empowered reader who makes his or her own trails through the text, rather than relying on the author's restrictive set of links, simply following interpretative dead-ends. Moulthrop posits 'in Pynchonian paranoia as in hypertext, the perception of structure is never a simple matter. Paranoids produce not just delusions but delusional systems' [12].

When describing the make-up of Pynchon's fictions, Stark posits that 'Epistemological themes, including searches for information and for patterns that create order, dominate his novels'.[24] I personally believe that all novels work in a similar way; in as far as they are all about the process of understanding and generating knowledge through the microcosm of the novel. The critical difference that Pynchon makes is that it is essential to interpret his texts in a paranoid manner, Hume argues that because of this process, 'to be an orthodox Pynchon critic, I should ritually confess to paranoia and express guilt over it, admit the trespass... and declare that interpretation is not what we must do when we engage this text'[7] In fact, at times it feels as though Pynchon criticism spends more time engaged on discourse about how to interpret Pynchon's novels, rather than discussing them on their own terms. This ironically is entering into the discourse of paranoia, since these critics[1] are creating connections that are not necessarily there on a plane above the actual novel. Part of the reason why this is such a common approach to Pynchon is because his novels are imbued with those feelings of alienation, helplessness and particularly paranoia that an overabundance of information can inspire[17] This has been considered a large problem in early hypertext scholarship, whereby researchers were exploring how to avoid the problem of overwhelming the reader with connections rather than letting them focus on the actual material. Here in Pynchon's novels, he is supplying an excessive amount of referenced material and it is forcing the reader to always be hunting clues to discover the source rather than focusing on working out the already disruptive narrative. Pynchon seems to single out the literary critics as a particular object of satire[18] because their interpretations of any text is a form of paranoia. Umberto Eco is more specific in his attempts to understand the problems with criticism, when he defines 'overinterpretation', another term for paranoid as Pynchon sees it, and suggests 'one can always invent a system that renders otherwise unconnected clues plausible'.[5] McHale further posits that Pynchon sets himself against the Modernist mindset by luring the Modernist into 'interpretative dark alleys'[7]. The characters in Pynchon's novels also travel without purpose down the same dark alleys in an attempt for organic 'connectedness'[23]. In the absence of any definitive organic connectedness, the paranoids, as critics, have to create their own delusional systems in order to satiate their need for order. In a similar fashion hypertext systems can often follow dark alleys that favour connectionism, rather than embracing the other riches within the text. The links overwhelm the content and thus deep reading does not become a plausible activity. Aaron Rosenfeld argues that 'to be paranoid is to be the

last and best reader of the text, the one for whom the text is written'. [2] In the parlance of post-structuralism and hypertext theory, this is the active reader, who engages with the hypertextual structure of the text. Rosenfeld expands on this, by arguing that it is 'the act of reading the world as if it were a book. And moreover, as if it were a bad book: the paranoid, insisting on an excessive correspondence between signs and things, refuses the looser signification of the metaphor for unambiguous certainty'. [2] The extent to which a literary critic or hypertext user wants everything to be connected may affect the degree to which they can be called paranoid.

The paranoid is also pervasive within the discourse of technology. Bersani posits that 'to put this in the contemporary jargon with which *Gravity's Rainbow* is obsessed: paranoia is a necessary product of all information systems', [4] and to further elucidate, 'technology can collect the information to draw connecting lines among the most disparate data, and the very drawing of those lines depends on what might be called a conspiratorial interconnectedness among those interested in data collection'. [4] With the scale of the World Wide Web and similar scale-free networks, we are now seeing patterns emerging that would never have been previously possible, perhaps a useful consequence of this paranoia. A further connection between literature and hypertext systems is the 'encyclopedim [that] has frequently been literature's defense against its exclusion from (or its marginal place in) the information systems, the political, economic, and scientific networks of power; and even the symbolic orders by which a society defines itself'. [4] The World Wide Web has a similar encyclopedic autonomy, whereby it positions itself as the absolute place for knowledge. Perhaps this is a response to its marginalization by mainstream media for so many years until it gained critical mass with the emergence of higher bandwidth and social media technocracies. Sanders argues that 'Pynchon reifies technology… [because he] has elevated technology into a metaphysical principle standing outside human control'.[21] Technology in Pynchon's fiction is another 'them' for 'us' to fight, although Pynchon did admit that he would support the personal computer and the Internet if it was used for human progress. [20] Most interestingly, Ted Nelson, in a self-reflexive article on initially conceptualizing open hypertext, posits that there might have been a paranoid aspect to his early work:

> Indeed, I didn't realize during those early years that people may have thought I was clinically insane. And, if paranoia is to believe what others do not believe, then clearly I was paranoid… Or, on the other hand, by the paranoid's effort and persistence he can persuade others to adopt the same view, thus freeing himself of the malady. This was my therapy of choice[16]

Thus, the tropes of paranoia run deep into the history of both hypertext scholarship and literary criticism, it remains that these issues need to be addressed.

The key question, therefore, is how to avoid this in both literary criticism and hypertext theory. This is a question that cannot be answered in the scope of this paper, but one that needs to be raised nonetheless, and as such, I will simply identify some of the current problems in this discourse. Take for example the *cul-de-sacs* of both hyperlinks on the World Wide Web or the idea of the single correct interpretation of a text that everyone has to follow. These are restrictive systems that favour 'them' over 'us'. Pynchon frames this paranoid system as the pillar of western civilization [22], demonstrating how engrained it is in our society,

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[1] I must also acknowledge the paranoia of this current paper too.

and thus how difficult it may be to reverse the trend. This suspicion could be confirmed by the etymology of paranoia as 'beyond the mind' [1] and intelligence as 'joining together'. [9] Hypertext is the natural extension of this definition of intelligence. Intelligence has reached its pinnacle with the representation of these connections, but how does one escape the feeling of paranoia? Ted Nelson argues that hypertext is not just simply linking through association, but a lot deeper, and this malaise is a deeper symptom of more than just hypertext with this definition of paranoia:

> Anything is associative! Text is associative! Lists, databases, spreadsheets, objects are associative! (To say nothing of neural nets!) To call hypertext ''associative'' says nothing whatsoever.[15]

It is the deeper structures that instead compelled Nelson to carry out his visionary research, while the resulting focus on links had led to this shift towards the paranoid. One way of eschewing this enforced structure was explored in the mid-Twentieth century by the print-based hypertexts, which eschewed the bounded limits of the novel, such as Marc Saporta's *Composition No. 1*, which has been criticized by critics otherwise enthused by hypertext, such as John Stark, who believes 'recent novelists have of course often abandoned this effort in favor of randomness, which reached its ultimate stage with the cutout novel that a reader can assemble in any order'. [24 see also 4] The cure to paranoia is definitely not 'randomness', or what in Pynchonian discourse has been called 'anti-paranoia'. One has to find the balance between the two polarities whereby order emerges from chaos.

3. DISCUSSION

Paranoia is an activity that consumes the characters of Pynchon's fiction through trying to figure the larger pattern within their lives. This is reflected by the reader, who sees the character's lives as a microcosm of the reality they inhabit and makes grander connections than most of the characters in these fictions can. Even in systems that are not explicitly paranoid, such as the world of Nabokov's novels, there remain paranoid tropes. Bader, an early critic of Nabokov argued that in *Pale Fire*, 'Shade … muses in his poem about the pleasures of perceiving in his life certain events which appear to be 'coincidences', but which on another level are games played by 'them''[3]. This is the familiar 'them' from Pynchon's definition of paranoia. These coincidences are a perennial feature of Nabokov's texts and often his 'greatest' artists are those who recognize the complex tapestry of events, which are affecting their trajectory. This is reminiscent of the discourse on paranoia. The problem is the extent to which these characters engage with their paranoia and render otherwise unconnected clues plausible[5]. Take for example, the on-going, bizarre debate on the 'true' authorship of 'Pale Fire' the poem and its surrounding commentary. Critics have explored the connections in the book, then added their own far beyond the reach of the novel in order to form theories that defy belief. They stretch the parameters of the text so fully that it would be a lot simpler to believe in the far more sensible and understandable explanation that both Kinbote and John Shade exist, and their roles are as stated. It is this rereading into connections that are not there disrupts an already disruptive text. It is perhaps a natural consequence of a text that invites rereading and connection making that it invites the most paranoid readings. In a real example of this that is more unbelievable is Ronald McHugh's *Annotations to Finnegans Wake*, a gloss to a text which can only

be reread and never read in a linear manner, riffs on Kinbote's suggestion at the end of his foreword to have two copies and create a new book whereby poem and commentary occupy the same space, when McHugh suggests:

> For extensive long-term use he or she may wish to dismantle the two books and fit alternating pages into a folder, or else possibly have a bookbinder make up a combined volume. [10]

This appears to be an essential activity in order to use McHugh's text comprehensively, since there is a distinct lack of markers otherwise on the page other than a few line numbers. The spatial representation of the text is very confusing and does not even work for some editions of the text. Thus, one has to often force the connections to work and become paranoid to fully utilize the text.

There is a tendency for hypertext systems often to be constructed around one-to-one explicit links denoted by some marker. This is often counter to many of the other one-to-one links that exist within a text that resound of both a general and personal level. Perhaps this is the caveat that enables hypertextualists to escape being labeled as paranoids, but it remains true that the predominant discourse in the hypertext community is linking and this may be paranoid. In literature, there are multiple types of one-to-one resonances in the text, most of which are not explicitly marked. These are divided, although the distinction is often blurred, between general links that exist in every system, and the reader's personal response to the text, which is perhaps the most important part of champion for hypertext theorists. An example of this reader response is that in rereading Pynchon, 'as familiarity increases, the text starts to establish links in each reader's mind to the broader literary tradition'.[7] There is not necessarily a standard level of understanding and connectionism within the text that all readers plateau at. Perhaps the majority of these connections are personal. Within the discourse of intertextuality, what is purposefully appropriated, and what is coincidence is often a very grey area. The reader has to become paranoid in order to understand the text. Nabokov encourages a similar approach when he argues 'curiously enough, one cannot read a book: one can only reread it. A good reader, a major reader, an active and creative reader is a rereader' [14]. If the idea of the rereader is the reader who makes connections that are not obviously there (this excludes references from being an aid to the rereader, since any reader can use them quite happily), then perhaps Nabokov's conception of the good reader in the paranoid reader, either following the systems that he created, or creating their own new paranoid systems. Both the author and the reader in the following forms create these connections:

- References (the form most commonly appropriated by hypertext systems as it can be explicitly demonstrated). This is the only form of linking that can only be from an authorial perspective and thus, it is the paranoia of one person bestowed on another.

- Allusions (that is the implicit indication that there is a connection being made, but not one that is necessarily tangible for those that do not get it – this kind of connection is difficult to mimic on a hypertextual platform currently without turning it into an explicit link), With allusions, the reader's response is often a slightly stronger factor. The author could have innocently used a certain phrase, or it might have been

intentional, but there is certainly a lot more seeing patterns emerge in this practice.

- Plagiarism (an important trope on the World Wide Web and in literary theory after the introduction of intertextuality, and the fact that plagiarism is practically unavoidable). This is the type of one-to-one connection that is perhaps least discussed in academic discourse. Again, this is a highly subjective matter usually as people can often simultaneously come up with the same idea at the same time. Nonetheless, this is an important part of connectionism, and one that could potentially be explored more.

All three different types of one-to-one links have tropes of paranoia in them. Mainly due to the tension between the general system that overwhelms the reader, or, on the other hand, if empowering the reader to make their own connections is going to make them connect where there is not necessarily any connection, something which can become a serious problem when one moves into the plagiarism type of connections. The balance of paranoia shifts from the paranoia of a greater being's authority with the explicit link, and then when one explores plagiarism, often the paranoia is entirely the reader's, whereby the imagine plagiarism where it is simple coincidences.

4. CONCLUSION

This brief and surface discussion of paranoia within literary interpretation and hypertext systems highlights some of the problems the continuing amalgamation of print-based literature and hypertext systems will face as it gains critical mass. Particularly as systems are developed that allow the reader to create their own trails through the text rather than simple rely on the authority of the link creator. Furthermore, I have identified a basic classification of degrees of paranoia within literary interpretation, which systematic paranoia, whereby one is simply dictated at by a higher being at one end with the explicit link, and at the other end the linking of plagiarism, which has the biggest risk of being personal paranoia, whereby one could easily accuse a writer of stealing a phrase somebody else. Thus, it may be difficult to find a balance between the two types of paranoia, but both literary criticism and hypertext theory is working towards that goal, and hopefully they will achieve that goal in tandem.

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Investigating Visual Languages for Argument Mapping

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ABSTRACT

In this paper, we suggest that one of the main challenges facing tools for mapping and visualizing argument structures is the usability and readability of the visualizations themselves. Motivated by this challenge, this paper argues for more work into designing visual languages for argument mapping, with suitable cues for helping the user to read and understand arguments, in much the same way that natural language has evolved linguistic cues to help readers understand narrative structure and make sense of a piece of text. The paper then presents a particular project that provides an experimental setting for investigating suitable visual languages for argument mapping. The project aims to facilitate online deliberation, which involves helping users to understand and reflect on where their considered opinions lie within a deliberation-narrative space.

Categories and Subject Descriptors

H.5.4 [**Information Interfaces and Presentation**]: Hypertext/Hypermedia – *navigation, theory, user issues.*

General Terms

Design, Human Factors, Languages, Theory, Legal Aspects, Verification.

Keywords

Argument visualization, spatial hypertext, cinematic hypertext, cognitive coherence relations

1. INTRODUCTION

As [1] reminds us, reading argumentative structures, whether in text or in graphical form has always been a difficult skill to acquire. This is because making sense of the argumentative structure requires both having a sense of the detail as well as having a sense of the whole (particularly how one detailed area relates to another detailed area).

But whereas natural-language text has evolved many cue words (e.g. "however" and "because") that signal the semantic connections between elements of a single argument or between multiple arguments, no similarly advanced evolution has occurred in the visual languages used to depict argumentation.

Indeed, generally speaking, most computer-supported argument visualization (CSAV) work has not adequately explored how the different elements of a visual language can represent the different elements of argumentation. Current tools tend to use a limited selection of visual features such as basic color textures and basic shapes.

Thus, we argue here that, as a priority, CSAV research needs to more thoroughly investigate the appropriate cues and features in a

visual language for depicting argumentation. In this regard, our current research will take as a starting point the contributions of [2] who investigated the use of visual languages for rendering discourse relations in hypertext. Using this and other related work, we will attempt to derive a set of visual principles that cover what is needed to visually depict argumentation. This research will be conducted within the setting of a particular research project, which we describe briefly at the end of the paper. The next section describes our preliminary investigation in this area.

2. INVESTIGATING SPATIAL AND CINEMATIC HYPERTEXT

2.1 Spatial Montage for Complex Discourse Relations

As stated in the previous section, it is our contention that current CSAV tools tend to use a limited selection of visual features for depicting elements of argumentation. In particular, it is our view that these tools do not adequately utilize the spatial aspects of visualization (i.e. the meaning and significance of positioning one graphical element near or far from another element). This lack of emphasis on the spatial seems paradoxical since most CSAV work is given the umbrella term of "argument mapping" – thereby making an implicit link with real cartography but then subsequently ignoring cartography's emphasis on spatial features.

Most CSAV tools tend to fall into the "link mapping" category of hypertext[1]. According to [3], link mapping provides a spatialized overview of linked networks, most often in the form of boxes linked by arrows. The author distinguishes this kind of hypertext from spatial hypertext, which he notes "also constructs visual displays, but instead of showing link structures, it relies on our ability to assign meaning to spatial positions and relations."

Furthermore, argument visualizations as currently performed still privilege the "single-step link pattern", even though the link mapping visualizations sprawl over a large space. That is, most argument visualizations are depicted so that reading from one node to another involves just a single, linear rhetorical move. Thus, current argument visualization methods have not adequately evolved to represent more complex, multi=step link patterns where complex rhetorical moves can extend over more than a single step. Investigations of such complex, multi-step link patterns can be seen in [4], where the author identifies patterns such as cycles, counterpoints, mirror world, tangle, sieve, montage, neighborhood, split/join, tour, missing link, etc.)

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[1] Kolb [3] distinguishes four kinds of hypertext: page-and-link, stretchtext, link mapping, and spatial hypertext. He notes that a hypertext tool may include more than one of these kinds.

According to [5] "On the display screen, blank space opens a field of external relations for where-is and next-to and over-there and near-here relations among items that may represent all sorts of complex inner relations…" between elements of an argument. The author gives examples of well-known spatial hypertext systems such as the Visual Knowledge Browser and Tinderbox that make spatial manipulation and grouping the central action that the user can perform. Kolb [1] suggests that graphic manipulation of multiple spatially arranged text windows – what he refers to as a "spatial montage" – could enhance the presentation of argument on the Web. For him, spatial montage opens up a further dimension in which complex discourse relations can be expressed. This is one of the claims that we would like to examine within our research project.

2.2 Cinematic Hypertext and a Coherence-based Visual Language for Argument Mapping

Mancini [2] defines cinematic hypertext as "a distinct graphically enriched and animated form of hypertext that finds itself at the intersection between spatial hypertext, semantic hypertext, and page-based hypertext." She proposes that "discourse relations between hypertext nodes could be expressed following the same principles according to which discourse relations between cinematic shots are signalled through the consistent and concurrent use of visual features."

She then goes on to propose that cinematic hypertext could be useful in helping users to learn about a debate, specifically the relations between the different elements of a debate (claims, counter-claims, evidence, etc.). Mancini suggests that 'cinematic' hypertext could be used to present the debate to the users in order to help them understand this debate structure.

The novelty in Mancini's work consists of her application of text coherence and discourse comprehension[2] theory to the design of her cinematic hypertext application. In particular, she applies the theory of Cognitive Coherence Relations (CCR) [6], which postulates a set of primitive, cognitively grounded relation-parameters that account for how readers make sense of a discourse by making connections between the units of information in the discourse. These CCR parameters are used as "regulating principles for the consistent and congruent use of graphic features to connote the role of nodes with respect to one another and to allow the emerging of visual meta-discourse in hypertext." [2]. Thus, based on parallels existing between textual and visual processing, Mancini designs a prototype visual language for rendering cinematic hypertext links as discourse relations.

Taking Mancini's contributions as a starting point, we intend to investigate ways of extending the design of the basic graphical elements used to express discourse relations. One simple extension, for example, might involve extending the palette of colors used to go beyond the simple grey-scale used in Mancini's initial study.

3. EXPERIMENTAL SETTING

The setting for conducting this research will be within the EU-funded project IMPACT[3]. The IMPACT project is researching and developing a suite of tools for facilitating online, public deliberation of policies being proposed by governmental or non-governmental organizations. Our work within IMPACT involves, more specifically, developing an Argument Analysis, Tracking, and Visualization tool (AVT) as part of the larger toolbox.

The rationale for the AVT is grounded firstly in current e-participation research priorities, which seek technological support for improvements in the efficiency, inclusiveness, openness and accountability of public services and democratic processes. Specifically, the AVT is intended to support the work of relevant actors by enabling them to navigate through arguments contained in relevant consultation and policy documents. To adequately achieve this goal, the AVT will be based on the state-of-the-art methods and tools in the field of computer-supported argument visualization (CSAV).

Thus, our work aims to be at the intersection of CSAV and e-participation research, which means that in addition to developing the AVT tool and exploring how best to improve the readability of very large visualizations of arguments (often referred to as 'argument maps'), we will investigate the mediating role that such large, Web-based argument maps can play in e-participation scenarios.

One of our early design decisions was to reuse an existing CSAV platform in order to benefit from many of the advances made within that field. After a survey of the state of the art, we decided to reuse the Cohere tool[4] [7] as the platform on which to build the AVT in the IMPACT project.

Cohere is an open source, Web2.0 tool for argument analysis and argument visualization. We have decided to use Cohere as a platform for the AVT because it already supports a number of features that we believe the AVT should provide. These features include enabling users to create Web-based argument maps; to add, delete, and edit nodes and relations in an argument map; and to browse and zoom argument maps, making use of hyperlinks embedded in nodes to access further information (e.g. the original source data from which the node is derived).

Cohere also builds on existing work in developing the ClaiMaker tool [8]. The core data model of ClaiMaker has been carried through to Cohere and the visualizations are versions of those first prototyped in ClaiMaker. In this way, Cohere can trace intellectual lineage to work on incorporating CCR into the ClaiMaker.

Furthermore, as an open source tool it can be extended to include the new features as envisaged by the specific IMPACT project usage scenarios. For example, based on what is envisaged in the project, we will extend Cohere to Improve the capability to manipulate the layout of argument maps, particularly through the use of sophisticated layout algorithms, and to improve the browsing of argument maps at different levels of granularity.

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[2] Discourse comprehension research is concerned with the process by which readers are able to construct a *coherent* mental representation of the information conveyed by a given text. Such a coherent mental representation is constructed when the reader establishes meaningful connections between the different units of information in the discourse.

[3] IMPACT stands for **I**ntegrated **M**ethod for **P**olicy making using **A**rgument modelling and **C**omputer assisted **T**ext analysis: http://www.policy-impact.eu

[4] http://cohere.open.ac.uk/

4. CONCLUSION

This paper highlighted one of the main challenges facing tools for mapping and visualizing argument structures, namely the usability and readability of the visualizations themselves. The paper then motivated the following research question: *How can we fill the gap in CSAV research dealing with deriving a visual language for argument mapping?* This research question will guide our future work in building a Web-based argument-mapping tool as part of an EU-funded research project aimed at facilitating online deliberation. As well as developing such a tool, the output that we will generate to address this research question will be set of visual principles that describe the essential visual cues and features that are needed to visually depict argumentation to better support users in understanding and reflecting on the opinions that make up a particular deliberation-narrative space..

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Online sharing of written narrations to gain awareness of personal beliefs

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ABSTRACT

Addressing learners' beliefs is an effective way to improve education, and is considered particularly important in teacher training. It is, however, a difficult task, because beliefs are often unconscious. In this paper, we argue that sharing personal narrations with the support of web technology may constitute an effective approach to beliefs' elicitation. We illustrate this proposal by discussing two experiences in which a group of trainee teachers shared individual narrations online, intertwining and comparing them to form a concrete ground for joint reflection. In both cases the experience proved successful, which underlines the potential advantage of the proposed approach.

Categories and Subject Descriptors

K.3.1 [**Computers and Education**]: Computer Uses in Education – *Collaborative Learning*.

General Terms

Human Factors.

Keywords

Personal narrations, beliefs, online sharing, self-awareness, teacher training, narrative learning, collaborative learning.

1. INTRODUCTION

Beliefs are an important form of tacit knowledge [9]. They have increasingly been object of study in the educational field in the past couple of decades because they have been recognized to influence the way learners construct new knowledge [8] as well as teachers' instructional practice [13].

Addressing beliefs related to a disciplinary subject, as well as to its teaching and learning, is therefore very important in teacher education. This, however, is not trivial, because beliefs are often unconscious and difficult to elicit [8, 9, 13]. The approaches most usually applied to this end do not appear completely satisfactory in that the outcomes of direct investigation methods (interviews and questionnaires) may be biased by the respondents' conscious reasoning, hence missing to really reveal unconscious beliefs,

while indirect approaches (inferring beliefs by observing teachers' activity) may be unreliable because apparently similar practices may be determined by different underlying reasons.

In this paper, we argue that a suitable narrative activity carried out with the support of web technologies may provide an effective way to elicit beliefs. We illustrate this idea by discussing two experiences in which a group of trainee teachers shared online individual narrations, comparing and combining them to form a concrete ground for joint reflection. Some final comments discuss the dynamics carried out in the process.

2. WHY NARRATIVE?

The definitions of narrative given by scholars working in different fields [7] highlight the presence of causal and temporal connections instinctively perceived by humans among the sequence of elements that form a story: such elements, together, determine the overall meaning of the story and, at the same time, take meaning from their position within it. This allows people interacting with narrative (in the sense of both invented stories and narrations of events [12]) to infer more than it is explicitly said [2]. Such instinctive perception of logical connections among story elements leads people to understand stories as meshes of interrelated elements and gives them the potential to communicate ideas in a holistic way, conveying rich and possibly complex messages in simple form [4].

Narrative is recognized to be an important natural expressive form for human beings, who organize their experience and memory mainly in this way [1], and instinctively make good stories personally relevant [10]. Moreover, narrative can aid to overcome the difficulty of abstract thinking by helping reflection to be grounded in concrete examples. For all these reasons, narrative can provide a powerful frame to help people represent experiential knowledge and explicit tacit one, letting beliefs emerge from the description of facts, events and feelings and constituting a good starting point to support self-knowledge and reflection.

Awareness of beliefs and reflection are connected: as McDrury and Alterio [11] point out, reflection involves the self, helps spotting beliefs and favors the transformation of conceptual points of view. The concreteness introduced by narrative appears useful in this respect, because reflection is more empowered by reference to action and context than by abstract ideas.

It is not surprising, therefore, that narrative activities have been increasingly used in education, not only in school teaching but also in the training of both pre-service and in-service teachers. In relation to addressing teachers' beliefs, for instance, Chapman [3] applies a narrative approach in pre-services' self-study to detect beliefs possibly conflicting with the views of mathematics

education promoted in her training program. Her approach, however, differs from that applied in our examples because it does not include the online social sharing which, on the contrary, is a key point for the success of the experiences described in the next section.

3. TWO EXPERIENCES

3.1 A blog for trainee language teachers

Dettori and Lupi [5] report the case of a group of eleven pre-service language teachers who were requested to post stories of personal experiences on a shared blog created on purpose. This activity represented the online module of a blended course on multimedia technology for French teaching. Two narrative tasks were assigned, one after the other, specifying that a concrete story was requested, not general reflections. The first assignment concerned stories of good and bad language teachers that the trainees had experienced while students. The second task consisted in narrating some episodes which determined the trainees' interest for French language and culture. These narrations aimed to provide a concrete basis for reflection, helping the trainees to become aware that they had (possibly unconscious) beliefs, rooted in their student's experience, about being a good language teacher, as well as to call their attention on aspects they could exploit in their teaching to raise students' intrinsic motivation.

In order to stimulate the participants to actually read their colleagues' stories and comment on them, both narrations were associated with a sort of game, i.e., stories were posted anonymously on the blog and each trainee was requested to comment on each story, guessing who was its author. This game-like activity aimed to call attention to details, similarities and differences, stimulating the comparisons of ideas. In order to summarize the knowledge gathered with the two narrative activities, the trainees were finally requested to build a joint characterization of teaching practices to be supported or avoided, by confronting and discussing the variety of elements emerged in the stories. At the end of the course, a questionnaire was assigned with 5 closed questions and 7 open ones, to investigate if the trainees had enjoyed the experience and how much they felt the narrations had contributed to self-knowledge, reflection and professional growth. The questionnaire had the aim to contribute to activity evaluation by gathering trainees' opinions and at the same time to stimulate individual reflection on the experience carried out.

The activity produced satisfactory outcomes. All trainees posted their stories and most of them commented most of the posts, intrigued by the playful task of guessing the authors. They recalled what they liked and disliked in their school days, looking for the underlying reasons and acknowledging the importance of this recalling for a teacher ("*Remembering our student experience may be the key to understand our students and their problems*"). The stories about old teachers included a variety of aspects, both positive (e.g., "*His strength relied in his deep sense of impartiality*"; "*Behind her timidity she had a privileged world made of human values, culture and intelligence*") and negative ones ("*what was missing was the relational side*"; "*I thought she was a person with no competence*"). They also spotted what triggered learning and motivation ("*he was teaching not only some topic, but also the how and the why*"; "*Objectivity, …, enthusiasm, …, discipline*") and expressed missed opportunities ("*I feel very sorry for what I have not been able to learn*"), and

some regret (e.g., "*I would have liked to have more opportunities to get to know my class mates*"). They also acknowledge an increased awareness of their own thoughts due to the narrative recalling carried out ("*I realize now while I am writing that I esteemed and appreciated her*"; "*If I ask myself what is a good teacher, I would not be able to draw an ideal picture, but if I think back to my school days, I remember a smile, a funny word that made us forget for a moment our tiredness*").

The comments to the posts highlighted attitudes emerged from the stories that could help characterize, and therefore spot, the various authors ("*Love to travel is a clue, you must be C.*"; "*pragmatic, sensitive and never trivial, you are L.*"). They often pointed out similarities of view ("*You are right, listening to our students is essential*"; "*I agree with you, going to school is a burden, but it is also a privilege*") and often added some other personal memories in the same line.

In the end-of-course questionnaire, the trainees expressed appreciation for this online narrative activity, despite their initial skepticism. They acknowledged its effectiveness to recall one's own experience ("*Thinking back about our student's experiences, at the light of the teaching experiences that we are having now, made us focus more precisely which behaviors and attitudes a teacher should or should not have. This has been a powerful way to reflect on our pedagogical knowledge and on the contents we have been learning in this training school*"). They also claimed that the guessing game had stimulated comparison and resulted thought-provoking ("*Comments obliged us to repeat on the same points and this supported reflection*") and appreciated the fact that the narrative activity had been carried out collaboratively ("*This experience is the proof that sharing can only bring positive effects*") and online ("*Reflection is rooted in writing, reading what others write implies deepening and comparing*"; "*Brainstorming without looking in each others' eyes brings about deeper concentration*").

3.2 A forum for trainee mathematics teachers

Dettori and Morselli [6] describe the case of a group of sixteen secondary-school pre-service teachers who were taking a face-to-face course on Mathematics Education with a focus on the teaching and learning of mathematical proof. This is an important topic in mathematics learning, which is often neglected by school teachers because of unresolved difficulties they have with it and a consequent negative attitude.

A narrative activity was included at the beginning of the course to encourage the trainees to voice their own beliefs on the relevance and difficulties of proof, gaining awareness of the influence of previous personal experiences on their current standing: the trainees were asked, in the first class of the course, within a wider questionnaire aiming to investigate the trainees' competence and attitude on this topic, to individually write down a brief story of their relationship with proof. It was specified that a plain story was requested, leaving any reflection to a subsequent collaborative activity. Then all the individual stories were collected and posted, in anonymous form, in the course's online space, and the trainees were asked to read all stories and comment on them in a forum created on purpose. Additions and comments to one's own story, suggested by the reading of peers' posts, were encouraged.

Also in this case, the activity was successful. The trainees produced a variety of short narrations, reporting personal experiences as students, from which a variety of aspects emerged:

- inclinations and dispositions ("*Usually I don't remember the final proof, what I like is proving*");

- underlying motivations ("*I always loved proofs (even the most boring ones!), because they allow me to verify theses that I would be unwilling to accept otherwise*");

- awareness of difficulties ("*I have always seen proof as something boring. Something where someone smarter than me had been able to find the way to reach his goal*");

- acknowledgement of abilities acquired over the years ("*At the beginning I had difficulties in understanding how to proceed, especially in proofs by contradiction, but once I understood the logical-deductive method, over the time I learned, thanks to a good teacher I had*"),

- acknowledgement of influences received, both positive ("*I loved those proofs that were taught to me by teachers who loved mathematics*") and negative ones ("*I did not have the opportunity to see a lot of proofs. And I was never asked to prove by myself*").

The stories shared also revealed different views of proof (as process to be developed or product to be learned) and different reasons to use it (to convince or to explain). From these stories, beliefs and other affective factors emerged (e.g., feelings of pleasure or fear in relation to creating or understanding a proof; proving for interest or for duty).

The online discussion added some more story elements, together with reflections pointing out similarities or differences and reasons behind behaviors, sometimes objective (e.g. "*for me proof was a necessity, because I never remember things*"), sometimes disguising some difficulty ("*I conceived proof as "something that must be done"… but I never felt a strong motivation to reach the end. I'm a little lazy in this. I prefer to get proofs already done*").

The emergence of all these aspects in the stories and in the online discussion had an influence on the face-to-face course. Spotting strengths and weaknesses had a positive influence on the course development because it highlighted learning needs in relation to mathematical proof that were successively addressed. Comparing positive and negative relationships with proof helped the most proof-oriented trainees to focus on difficulties with this matter of which they were not fully aware before (which they, therefore, were likely not going to address in their future teaching); the trainees who were still experiencing a negative relationship with proof, on the other hand, learned from peers' positive attitudes how they could improve their competence and skills in this respect.

4. DISCUSSION AND CONCLUSION

Three elements appear crucial to determine the success of both activities: the narrative assignment, the support of the web-based communication tools, the sharing within a community of peers.

In both cases, narrations were used to boost trainees' discussion and reflection by rooting them in practical examples from the participants' personal experiences. This introduced a concreteness element in the reflection more than starting from scholarly essays could possibly do. Even though very similar, the assigned narrative tasks focus on different aspects which are of relevance in teacher preparation; in the case of the mathematics teachers, the focus is content-related, as proof is a crucially central topic in mathematics learning; in the case of the language teachers the

focus is rather on teachers' ability to communicate with their students and raise motivation. These differences depend on the different aims of the two courses. Congruence of narrative task and educational aims is an important aspect to care when planning a narrative learning activity.

The use of online platforms for sharing and discussion helped to give a structure to the collaborative activity, granting the trainees the possibility to share the stories in non-volatile way, pay attention to details and reflect at individual pace, carrying out in parallel several conversation streams; this allowed all stories and elements emerged to be given equal possibilities to be discussed. The kinds of platform used appeared very much in line with the slightly different character of the discussions carried out in the two cases: the blog helped to put emphasis on each of the stories shared (which were much longer than the stories collected in the other case, and had a rather cared literary form), supporting an easy implementation of the guessing game. The forum, on the other hand, offered a clear and logical view of the discussion threads, which was much appreciated by the mathematics trainees.

Finally, sharing stories among a group of people rather than reflecting individually on one's own experiences, amplified the space of self-knowledge created by the narrative activity. Getting in touch with the stories and reflections of peers stimulated the participants to widen and evaluate their own memories.

Such sharing process aiming to elaborate a wide-angle view on a considered issue gives rise to a kind of collective, hypertextual base of knowledge in which the comments made by the participants highlighting similarities and differences creates links among the chunks of information individually contributed, as schematically shown in Figure 1. This helps the participants to increase awareness of their own position, frame it in a wider context, organize their own knowledge and actually learn from each other.
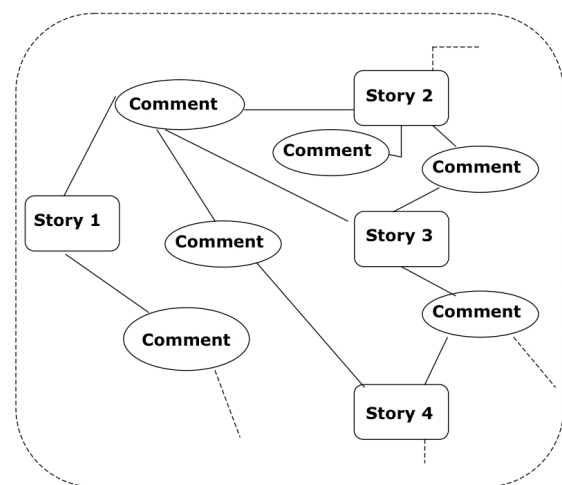

Figure 1. The hypertextual knowledge space created by sharing personal narrations and comments about them. Comments may concern single stories, as well as other comments, or connect several of them.

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