The "Black's Wheel": a technique to develop hypermedia narratives.

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Abstract
This work presents a technique for the nonlinear narratives project that can be applied to the development of special hypermedia reports and aims at facilitating nonlinear content design with user focus. This technique, called "The Black's Wheel", has been applied since 2005 in many web projects in undergraduate online journalism discipline that has proved its applicability as a case study. This technique has been improved by the experience accumulated over time.

Key words
Online journalism, Hypermedia special reports, Hypermedia design, Webwriting, Nonlinear narratives, Nonlinear content design, User centered design, Human-computer interaction.

1 INTRODUCTION

This paper is part of a larger, multi-year research project analyzing human-centered hypermedia design in the context of a world in transition that particularly affects journalism, which is changing faster than traditional courses can keep up with.

Although online journalism is still dominated by breaking news coverage, new genres are emerging that differentiate it more and more from old media journalism (STEENSEN, 2009). This work is based on one of the most innovative models employed in the creation of online contents, commonly called the "Special Report".

MIELNICZUK (2003) distinguishes three differentiated spaces for the webjournal information treatment: breaking news, daily coverage and special

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reports. Special reports, usually refer to more extensive information material, elaborated with more time, that occupy specific sections of the webjournal and that can be applied to sites in a permanent and cumulative manner, considering a certain encyclopedic way.

Special reports have the potential to intensively use many of the six distinctive characteristics that add value to online journalism: hipertextuality, multimediality, interactivity, personalization, memory and continuous update - instantaneity- (BARDOEL & DEUZE, 2000; PALACIOS & MIELNICZUCK, 2002). It has mainly been explored in the called "third generation digital journalism" (MIELNICZUK, 2003), that is characterized by the launching of initiatives adapted to cyberspace characteristics, thus creating exclusive content for the online medium.

It is a more elaborated genre which requires different abilities and knowledge to be developed, such as hypermedia design methodology, graphics design, programming, databases, webwriting, and nonlinear edition, among others, which normally require the formation of interdisciplinary project teams.

This paper presents some nonlinear narrative construction concepts in third generation digital journalism and systemizes them, presenting a technique for producing hypermedia stories.

This technique, called "The Black's Wheel", has been used since 2005 in online journalism classes of the University of São Paulo[3], Brazil. This name was chosen as a homage to Roger Black, a designer and editor of some important North-American publications, and his team, that use a narrative wheel technique described by John Miller from Black's Interactive Bureau Company (BLACK & ELDER, 1997). This technique has been developed and improved through years of research and use in classes. A case study of the technique application is also presented.

1.1 Understanding and integrating user into hypermedia design

"The next wave of online journalism is all about partnering with end-users -- and giving them what they want." Pryor (2002)

The online media is dialogic; the same person can be the emitter and receiver of information. Technologies increasingly facilitate the user's full control on

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[3] University of São Paulo (USP) is one of the most important universities of Brazil and Latin America.

the access, production, edition and distribution of contents. This causes a rupture in the media traditional models. In order to survive in this environment, the journalist has to more and more take the users' perspective into account, understanding their interests and facilitating their participation.

On the other hand, the concept of hypertext for Pierre LÉVY (1990) and BALASUBRAMANIAN (1994) acquires a more biological and human meaning, related to human cognition. Human cognition is essentially organized as a semantic network, in which concepts are related (linked) by associations. Hypertext and hypermedia systems seek to explore this basic nature of cognition and also favor its development, as states LEÃO (1999). An individual's cognitive hypermedia network is also built by means of the social experience and of the culture of the environment in which one is inserted.

> "Working, living, talking fraternally to other beings, navigate a bit of their history, this means, among other things, to build a bunch of common references and associations, a unified hypertextual network, a shared context, capable of reducing the risks of misunderstanding." (LÉVY, 1990, pg. 72)

The level of understanding and the navigation easiness in a nonlinear story depend on the ability, on whom it interacts with, on building a coherent mental representation in contact with it (BALASUBRAMANIAN, 1994). However, it is the author's responsibility to ensure the hypermedia design construction as a coherent and significant entity to the user and this is a design problem. Hence, the importance of user-centered Design and Usability study areas that have been gaining increasing relevance in webdesign.

A good hypermedia design needs to be conceived, planned, articulated, considered, and tested, before being implemented. Users need to be known, understood and taken care of. A good nonlinear narrative would have to be easy to incorporate to the mental model of whomever uses it and to its net of meanings, adding value to it.

An important challenge to overcome is the contents project in an interface adapted to the main user profiles that propitiates satisfaction, effectiveness and efficiency of use. To face this challenge, the work presented is part of a larger hypermedia design project that finds its main theoretical support in Human-Computer Interaction (HCI) and User Centered Design (UCD) research fields.

It uses and adapts a user-centered design method developed by Martinez's Ph.D. dissertation (MARTINEZ, 2002), and improved through years of research, teaching and application[4].

1.2 Information architecture x Webwriting: composing hypermedia narratives

When transposing the nonlinearity concepts to the hypermedia systems design, two important components have to be faced: Information architecture (IA) and Webwriting.

Information architecture designs the nodes and links structure of the website as a whole, including narrative, institutional information, services, contact and authorship information, among others, and permeates all the hypermedia systems.

Webwriting focuses on the narrative content (either text or multimedia) of the information system: the development of the story nodes and its nonlinear structure. It may be found in information and news applications and is part of the Information architecture.

On the other hand, webwriting usually focuses on two aspects. The first approaches the way in which the text has to be written (or the content codified), within each node of the hypermedia network, taking the best advantage possible of the environment characteristics and language. The second is about the way in which the story has to be thought through the links network, introducing different interactive pathways, yet keeping the narrative consistent.

Several studies and recommendations approach mainly the first aspect as Mario Garcia's glass of champagne for the online journalistic discourse, GARCIA (2002), and the studies in NIELSEN (1997a), NIELSEN (1997b), MORKES & NIELSEN (1998) and Stanford-Poynter Project, DE VIGAL (2003), on how the web is read and should be written, among others. The second aspect is approached by Rich's storyboard, RICH (1998), and by the lying pyramid by CANAVILHAS (2006), among others. This is not an exhaustive list; it merely depicts some works as example.

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[4] At 2006, the usability evaluation of the JEMS portal (the Journal and Event Management System –JEMS - is the online system used by the Brazilian Computer Society to submit papers to scientific events), oriented by this method, was award winner of the Usability Evaluation Competition's Graduate Category in the Symposium on Human Factors in Computing Systems sponsored by the Brazilian Computer Society, and co-sponsored by ACM, Association for Computing Machinery (MARTINEZ et al., 2006).

The technique presented herein shows to be especially useful to develop the second aspect, conceptualizing the hypermedia network, without disregarding the first one.

1.3 Black and the Narrative Wheel

As says John Miller, in a non-academic book but with a great metaphor about narrative wheel: on the web, the storytelling approach may be different since "the traditional linear news story doesn't work" (BLACK & ELDER, 1997). He describes the narrative structure used by Black's team that places narrative elements in a wheel-like format in such a way which each narrative element is independent of others but is inserted into the narrative context, complementing it. Ideally, the user wouldn't need to go through other elements, nor cross the wheel's center, to understand the story. The navigation must be able to start and to finish at any element without making it necessary to cross all of them. The wheel hub (the axis or center) can be thought of as a magazine cover with a summary of the story and calls for each narrative spoke.

John Miller points out that:

"Traditional storytelling is linear. The inverted pyramid structure is taught to journalists for a reason: people want to understand the story immediately and then dig deeper – turn the page – if they want more. But magazines use a number of elements to draw the reader in, believing (correctly) that a good lead is not enough. A feature story is studded with photos, pull quotes, and drop caps, all designed to draw the reader to the whole package. They are side shows arrayed around the main event. The editor's job is then that of barker and ringmaster, and a well-edited story should direct your attention to all the surrounding elements while keeping your eyes on the prize." (BLACK & ELDER, 1997, pg. 106).

Next, the proposed technique that has been called "The Black's Wheel", was introduced. It was developed and improved since 2005, although, since 2004 we has taught and applied Miller's ideas described by BLACK & ELDER (1997).

2 THE BLACK'S WHEEL TECHNIQUE

In 2005 we created the technique called "The Black's Wheel", introducing: (1) the graphic expression to make a diagram of the narrative wheel concept, and (2) some directives for applying the technique. In 2009 we improve it again creating, (3) the "Elaboration Documents" of the narrative elements. All of them become important in the education and development of this concept.

We also identified some variables to evaluate the overall hypermedia project created using this technique.

2.1 Using graphic expression to represent "The Black's Wheel"

The graphic representation of the narrative wheel was called "the Black's wheel diagram" and is shown in Figure 1. Blue circles represent narrative elements. The number of narrative elements that describe the interaction with the story will depend on the amount of available information, the number of independent narrative contents and the detailing level of story.

The straight lines connecting the circles show the hierarchy of the wheel narrative elements: the central element or "axis" and the secondary ones or "spokes", but they do not necessarily represent links of the hypermedia net.

Hypermedia links that constitute the nonlinear narrative can generate a more complex diagram, for instance, as shown in Figure 2. The links structure must allow the user to command his/her own experience in contact with contents in a satisfactory and efficient way and has to be planned and designed carefully.
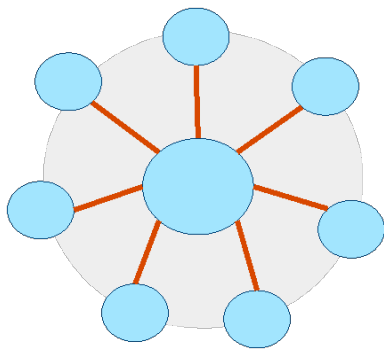
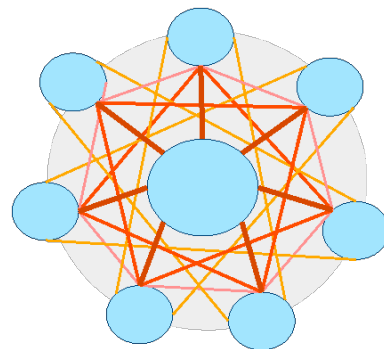Figure 1 - An abstract sketch of the Black's Wheel diagram.

Figure 2 - The Black's Wheel diagram with a link representation connecting elements.

2.1.1 The navigation

The Black's Wheel diagram initially simply represented the narrative segmentation of the hypermedia story. The navigation between these elements was discussed in class and was later described in the final project, together with the information architecture of the site that hosted the hypermedia special report article. A more thorough reflection allowed incorporating the navigation discussion into Black's Wheel, writing its results into the diagram and into the Elaboration Documents. Figure 2 shows one possible link representation, but there are many other possibilities. Case Study 1 presents another creative solution found by the team to represent navigation in the Black's Wheel diagram.

2.1.2   The narrative elements

Figure 1 represents a unit structure of Black's Wheel; this structure can be replicated in one or more spokes of the wheel that represent a more complex narrative part, resulting in something similar to the diagram in Figure 3, as follows.
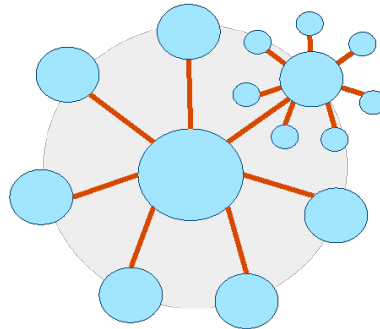

Figure 3 - Black's Wheel with a replica of the unit structure representing a more complex narrative spoke.

As described before, it should be noted that each of the narrative elements has to be self-contained and independent of the others, but should be inserted within the narrative context, complementing it. Ideally, the user should not have to go through other elements or through the center, to have a general overview of the story. Navigation can begin and finish at any element, without the need of going through all of them.

2.1.3   The Black's Wheel VS. Information Architecture

When carried to the hypermedia system, each element of the Narrative Wheel can be represented by one or more knots of the hypermedia content. Thus, Black's Wheel does not constitute the information architecture (IA) of the site. The information architecture can also incorporate services and other information that withdraws from main narrative purpose and that are not represented by Black's Wheel. The IA also could give other organization to content elements for visibility purpose.

2.1.4   Dominant approaches for the online journalistic speech

Today, the three dominant approaches to the online journalistic speech seems to be the inverted Pyramid, Lying down Pyramid (speech broken up into depth levels or chunks - CANAVILHAS, 2006), and Champagne Effect (GARCIA, 2002).

> "Websites are not like newspapers, magazines or television. In fact, they resemble the book more than any other medium." … "In terms of writing, books keep us interested throughout the

narrative. Web sites should attempt to do the same. I believe that the use of the traditional pattern of journalistic writing – the inverted pyramid – may not be the best form to present information on news sites. Instead, knowing that the average computer screen allows about twenty-one lines of text before the user must scroll, we should abandon the inverted pyramid for more of a champagne glass structure, where every twenty-one lines or so the writer makes an effort to keep us interested. Anyone who likes champagne knows that every time the glass is empty, it is nice to have it refilled, and to watch new bubbles rise to the surface. " (GARCIA, 2002, pg.22).

At Black's Wheel self-contained and independent narrative elements (that constitute the spokes of the wheel) are worked on, but they share the same background and contribute to enrich the whole story. Each one of these spokes of the wheel can use any one of the three approaches, depending on the content developed in the analyzed spoke. For example, the inverted pyramid can function well in Hard News; Lying pyramid or Champagne effect can be used in Soft News. On the other hand, for instance, while the Lying Pyramid could be better related to the development of the content net, the development of the local node content could be approached by the Champagne Effect.

2.2 Directives to assist the Black's Wheel design

Eight guidelines were elaborated in order to assist the construction of the Black's Wheel that has been improved by the experience accumulated over time.

(1) USER CONCERN. Make a brainstorm. Think about the user. What does he need? How could the story affect him? How would he like to interact with it? Does he need a community sense? What would you like the reader to remember about story? Which are the key points that must be designed? If you can, enroll a User Experience Designer at this stage. Possibly he/she will tell you about techniques to validate the imagined user profile.

(2) ELEMENTS IDENTIFICATION. Think about story identifying independent contents that will form each element of the Wheel (spoke or center). Remember that the element must be self-contained: the story must be understood without going through the center or any another element. Also remember that each element could be a navigation starting or final point.

(3) INTERACTIVITY. Consider possible interaction forms that you could use in each element. Interactivity is the main web differential.

(4) MULTIMEDIALITY. Think if multimedia contents such as sounds, infographics or video could add value to the story. Use them only if they add value to it!

(5) PERSONALIZATION. If you have two or more prominent and different user profiles think if some way of content personalization, in each narrative element, could add value to your story. Audience fragmentation is one of the characteristics of online medium. Think about personalizing spaces that see to small groups that share the same interest in some kind of information.

(6) NAVIGATION. Create a coherent link structure that connects elements, that forms the Wheel spokes and the Wheel axis. Remember that this structure must allow the user to command her/his own experience when in contact with contents in a satisfactory and efficient way.

(7) LABELING. Choose some significant labels for each narrative element. The label can be abbreviation short form of the full name due to graphic presentation concerns.

(8) DOCUMENTATION. Make an Elaboration Document for each wheel' element and verify if your idea is complete.

2.3 The Elaboration Document of the narrative element

The Elaboration Document was incorporated to the technique in 2009, aiming to systemize considerations previously made during the development of the wheel without a clear method.

Each wheel narrative element is described by an Elaboration Document filled with additional information that stimulates reflection and facilitates its creation:

(1) Name of the narrative element;

(2) Label;

(3) Contents summary;

(4) Journalistic speech to be adopted;

(5) Interactive contents: description of the interactive content into each element and of the user interaction possibilities;

(6) Quality of interaction - determinants of the interaction quality that can be used to guide the user experience design and the usability goals such as: "it will be fast to download", "understandable field names to fill in", "content with continuous updating need", "easy to remember after some weeks", "easy to read by people with special needs", etc.

(7) Multimedia contents to be used that could add value to the narrative into the wheel's element, and

(8) Incorporated functionalities (tools and services) such as: a form, a tag cloud, a wall notes, a navigation map, etc.

3 CASE STUDY

In order to present the case study conducted at the University of São Paulo (Brazil), to assess The Black's Wheel technique, we begin with an introduction and a description sections to familiarize the reader with the case organization; following sections explore the case methodology, its application, and results.

3.1 Introduction

This case was conducted at the Journalism and Publishing Department at the University of São Paulo[5] and focuses on the analysis of the Black's Wheel technique applied to hypermedia narratives developed by journalism student teams in Online Journalism classes given in the two semesters of 2005 and of 2007 and in the first semester of 2009 [6].

At each term, classes are given once a week for about four months. In approximately 16 3h30m-meetings, the discipline work is conducted. The class is usually divided into 3 to 6 student teams, but other compositions can be made depending on the complexity of the proposed project. Nearly 5 to 6 teams work simultaneously per semester.

The technique called "The Black's Wheel" has been applied to the hypermedia special reports project, as part of a more general user-centered web design method presented by MARTINEZ (2002)[7]. This method aims to study users,

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[5] The Journalism and Publishing Department of the University of São Paulo has been affected by the fast technology evolution that made it rethink the undergraduate disciplines curricula especially Online Journalism. From 2003, 2nd semester, Prof. Martinez and the journalist MSc. Paula Puliti, were asked by the Department to take on the Online Journalism classes. At the time, a websites conception work was started by the discipline focusing on hypermedia design and nonlinear narrative of journalistic contents that includes webwriting and user-centered web design concepts. In 2005, due to the journalist withdraw to conclude her PhD program, Prof. Martinez was asked by the Department to continue with the work that had been initiated. At that moment it was decided that the focus of the discipline would continue being hypermedia design and nonlinear narrative of Special Reports. In 2009, the discipline name changed to Hypermedia Design, allowing new disciplines that cover other aspects of Online Journalism.

[6] In the other terms, the work did not have enough documentation due to the two maternity leaves of the professor or to the adoption of other evaluation methods such as seminars.

[7] The full hypermedia design methodology, taught along the term, involves the following stages: (1) requirement analysis, including the analyses of the users' profile and context of use, (2) interface and content specifications, including information architecture, webwriting and usability evaluation as well as (3) implementation and distribution specifications of the final site.

their objectives, the business vision, technological possibilities of the medium, usability goals, information architecture, among other concepts related to the narrative being developed.

So as to study, conceptualize and build a hypermedia narrative, participants start by choosing a Special Report created by a team member for a traditional medium (printed or video reporting), meeting the goal of other disciplines or attending the market. This choice allows focusing on the theoretical and practical study of hypermedia design in the short span of time available in the semester.

Despite being a story developed for another medium, the hypermedia transformation of the story structure often highlights spaces unused by the traditional media and requires recreating the agenda, by planning the creation of new multimedia and textual contents.

The application of the technique by the teams is based on discussions and brainstorming, which aim to identify the composition of the elements of the narrative wheel and its graphic representation. The narrative described by the Black's Wheel and the interface specifications projected in the semester guide the final prototyping of the site[8].

At the end of the semester, the teams compulsorily hand in a written documentation of all the stages of the hypermedia design conceptualization and construction including the non-linear narrative.

3.2 Description

A multiple case study is presented, as conceptualized by YIN (2005), in order to validate the Black's Wheel Technique replicating its use in class by applying it to students' projects.

It is important to point out that the current study is concerned only about validating the proposed technique and not the students' work.

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[8] The implementation of the website project usually requires the existence of a multidisciplinary team, involving at least the ability of both: a programmer and a designer. Given the lack of specialized people, participants are accepted to create a website with a simplified version of the developed and documented project and which serves as a proof of concept. For this reason, the final term evaluation places more value on the documented site than on the implemented one. It is also accepted that the team dedicates more time and effort to the conceptual design and do not implement the website. In this case, the final part of the documentation emphasizes the paper prototyping of the site when the main screens are drawn according to the design specification.

This qualitative research does not present an exhaustive validation of the model. This case is the first stage of such a research, although our final report presents some useful results and conclusions.

3.3   Case Study Design Methodology.

The next steps were adopted to make case studies:

(1) Formulation of the research questions to be investigated. This questions should guide both the selection of cases to be investigated and the research methods used.

(2) Selection of the research methods and the data collection principles.

(3) Development of a case study protocol in order to ensure the use of the same data collection procedures for each case.

(5) Analysis of the cases and results report.

3.3.1   Research questions to be investigated

The goals include an examination of the three questions below. Our research questions were expected to be refined as new and previously unexpected aspects of the technique application came to light, resembling what Parlett and Hamilton apud HAAS (2009) called Progressive Focusing.

(1) Is the technique understandable and applicable by journalists?

Some related questions: Is the Black's Wheel design intuitive? Is the graphic representation easy to understand? Is it easy to develop? Is the Elaboration Document easy to understand? Is it easy to develop?

(2) Is it useful?

Some related questions: Does the graphic representation help the design process of the nonlinear narratives? And, the Elaboration Documents? Does the technique support the cognitive and creative process of the hypermedia design? Could the technique somehow improve or enhance the hypermedia project? Does the technique allow planning and analyzing the story structure, contributing to its quality?

(3) Is it complete?

Some related questions: Does the technique approach the most important and necessary aspects of hypermedia narratives design? Can the technique adapt to new cognitive and creative articulations that designers are faced with during the continuous technological changes?

The Elaboration Documents, due to their recent introduction and application to the technique, could not be evaluated in this case study yet. Future works will allow the research of these questions related to them. Thus, the focus of this work will be the Black's Wheel technique evaluation, without the Elaboration Documents analysis.

3.3.2 Research methods

The case study is based on the analysis of the hypermedia design documentation made by students' teams. The Black's wheel diagram, the documented text, the Information Architecture diagram and the prototyped website will be observed to get information and insights in order to assess the Black's Wheel. The observation of the activities in classroom is also considered; nevertheless, the documental analysis will be the principal source of data collection since the observations made in class were not organized nor recorded. In order to protect privacy in all data collections, team project authors will not be identified.

On the other hand, the assessment could focus on two probably correlated aspects: (1) the quality of the technique itself and (2) the quality of the hypermedia design generated. However, only the first aspect will be focused on. Although hypermedia design is not being assessed but the technique application is, it is worth observing if it is possible to evaluate hypermedia design using the same variables. A great challenge is to identify variables that allow us to conduct this analysis efficaciously.

3.3.3 Case Study Protocol

This analysis is guided by the protocol described next that ensures the use of the same data collection procedures for each analyzed case.

Tables 1 and 2 present a list of the information variables identified as protocol components. Two groups were found: **Global** variables, related to the whole diagram of the Black's Wheel, and **Local** variables, related to each wheel element. These local variables are similar to those created for the Elaboration Documents (previously introduced in item 2.3), as they have the same study object. Both Global and Local variables are applied to analyze the wheel diagram.

As the focus is evaluating the technique (not hypermedia design) Local variables analysis will be only applied to two elements of each Black's wheel analyzed.

Table 1 - A list of the protocol's Global information variables.

Global information Variables **about the all Black's Wheel diagram**
1. **Original Title** (of the nonlinear narrative). 2. **Language** (in which the title and narrative were written). **3. Title in English.** 4. **When it was developed** (term/semester, year). 5. **Where** (University, Company,…). 6. **Manager** (Person, Teacher or Discipline). 7. **Brief Description** of the hypermedia narrative. 8. **User profile** (some brief characteristics relevant to this hypermedia project). **9. The Black's Wheel Diagram.** 10. **Wheel Unit Replication.** Does the graphic representation use the replication of the Wheel Unit (such as the ramification of a bunch of grapes)? Response values= {Yes, No}. 11. **Navigation Representation.** Does the Black's Wheel Diagram application have some concern representing navigation? Response values= {Yes, No}. 12. **Independency between Wheel Spokes**. Do the wheel spokes present independent contents from each other? Response values= {Yes, No}. 13. **Non-content elements**. Are all elements in the Black's Wheel about content or there are elements that do not belong to the narrative but do to the Information Architecture? How many? Response values = N, where N is a whole number representing the no-content elements in the Black's Wheel (0 represents "No" – that is, all of them are content elements). 14. **Size**. The number of wheel elements (spokes and axis). Response values= N, where N is a whole number.

Table 2 - A list of the protocol's Local information variables.

Local Information Variables **about Elements of the Black's Wheel**
1. **Original label** (of the Wheel element or spoke). 2. **Label in English**. 3. **Hierarchy level.** Elements on spokes connected to the center are in the 1st level of the hierarchy. Those connected to the 1st level elements are in the 2nd level of hierarchy, and so on. Response values= (N, "Father" name), where N is a whole number representing the hierarchy level, and "Father" name is the name of the Element in a minor hierarchy. Father's name of the first hierarchy elements is "Center / Axis" of the Wheel. 4. **Summary**. 5. **Journalistic speech**. 6. **Interactive elements**. 7. **Quality of interaction**.

> 8. **Multimedia elements**.
> 9. **Functionalities** (tools and services)

There were chosen variables that showed to be more evident and significant to the technique representation quality. Nevertheless, the variable selection does not intend to be unique or final. With the research evolution, introducing new variables could be required.

4 COLLECTING AND ANALYZING DATA

For the data collection and analysis that follow, the abbreviation IA will be used for "Information Architecture" and BW for "The Black's Wheel".

4.1 The sample universe

Since 2005, 30 hypermedia design projects of a journalistic special report had been produced. In 2004, other 11 hypermedia projects were conducted; however, at this time neither the diagrams nor the guidelines, later introduced by the technique proposed, were used yet, and therefore they were discarded from the sample.

Some of the 30 works conducted by the student teams since 2005, using the proposed technique, were selected to form the sample universe. The selection criteria was that they had used graphic expression to describe the Black's Wheel. Even having used the Black's Wheel concept, only 17 ou of 30 (57%) developed it graphically. Those who described the Black's Wheel textually, but failed to draw the diagram were discarded. From the universe of 17 works selected, two were chosen to be analyzed, that present somehow differentiated graphic representations of the Black's Wheel. Case 1 shows a creative navigation representation into the wheel's diagram and Case 2 was represented using a unit wheel with many first level elements all connected with each others. This choice aims the assessment of the Black's Wheel technique, which does not disqualify any of the sample universe works. The final term evaluation of these works meets other project criteria.

4.2 Case 1: Human Beings Traffic

4.2.1 Global Information

Table 3 – Global information protocol applied to Case 1.

1. Original Title	Tráfico de Seres Humanos
2. Language	Portuguese
3.Title in English	Human Beings Traffic
4. When it was developed	2005, 2nd semester

5. Where	University of São Paulo, Journalism and Publishing Department
6. Responsible	Online Journalism Discipline (CJE 0599)
7. Brief Description	The hypermedia narrative composes a site that aims mainly at fighting against human beings traffic, particularly those for the purpose of women sexual exploration, providing informative sources about this subject.
8. User profile	(1) Mainly pattern makers (such as political leaders, journalists and professors), and (2) In a smaller number, former victims of traffic.
9. The Black's Wheel Diagram	

Figure 4 - The Black's Wheel diagram of Case 1: Human Beings Traffic.

10. Wheel Unit Replication.	YES, 3 (three spokes of the wheel replicates: "Indústria do Tráfico" -Traffic Industry-, "Combate" –Combat-, and "Histórias" –Stories-)
11. Navigation Representation.	YES (the team represented the navigation in a creative form, using curved arrows).
12. Independency between Wheel Spokes.	YES (The spokes present independent narrative contents but which share the same background about human beings traffic).
13. Non-content elements	0
14. Size.	12

Some Considerations: The previous 10th to 13th statements answers show that it was a good work. The Black's Wheel technique was well applied to the diagram construction.

4.2.2 Local Information

Table 4 – Local information protocol applied to Case 1.

Case 1: Human Beings Traffic	Element 1	Element 2
1. Original label	A indústria do tráfico	Denuncie
2. Label in English	The traffic industry	Denounce
3. Hierarchy Level	1st, "Apresentação" (Presentation) Element.	2nd, "Combate" (Combat) Element.
4. Summary	Some data and statistics about the human traffic industry in Brazil and in the world.	A short invitation that stimulates user to denounce those who traffic with the due agencies contact information and some help information.
5. Journalistic speech	They applied Nielsen rules and Inverted Pyramid to this local content.	They applied Nielsen rules to this local content.
6. Interactive elements	Only Links	User can submit new content.
7. Quality of interaction	Good download speed	Contents always updated, readable, easy and fast to load.
8. Multimedia elements	Only Text	Only Text
9. Functionalities (tools and services)	Not applied.	Forms to let user submit new content.

The analysis of the first element "The Traffic Industry" indicates that interaction is a weak point of the storytelling. Concerning to multimedia variable, it could be enriched with the use of an infograph.

Already, the analysis of the second one, "Combat", shows that it correctly uses text only as it should provide fast information.

Even though "Denounce" is a 2nd level element within the "Combat" sphere, its relevance is strong for the site user, and this indicate that it should therefore be highlighted in the information architecture.

4.2.3 Comparing the Black's Wheel diagram with the Information Architecture diagram.

For analysis purposes, the Information Architecture diagram (see Figure 5) is compared with the Black's Wheel diagram (see Figure 4).

The comparative analysis evidences inconsistencies between Information Architecture (IA) and the Black's Wheel (BW). BW failed to represent 3 elements that are present in the IA named "Envie sua história" (Send us your story), "Documentos" (Documents) and "O que falta fazer?" (What needs to be done?). That suggests that the team failed to update the last IA corrections into BW. This probably happened because the team made the BW before the IA design. Observations made in class suggest that the work had developed in this between due to more reflection, effort, brainstorming and study.

On the other hand, the spokes named "Combate" (Fight) and "Denuncie" (Denounce) have different hierarchy positions in the BW (Fight is in the first level spoke, and Denounce is in the second one, deriving from the first one). Besides, both occupy the same hierarchy position at the IA first navigation level. That suggests that the team (rightly) decided to put the 'denounce' element in evidence during IA design.

Then again, looking at BW, "Denounce" is noticed not to be linked with "Traffic industry" or to "Stories". When the IA places it at the first navigation level, this element starts to visualize all the other 1st-level BW elements. In BW, the element Denounce should be connected to the others.
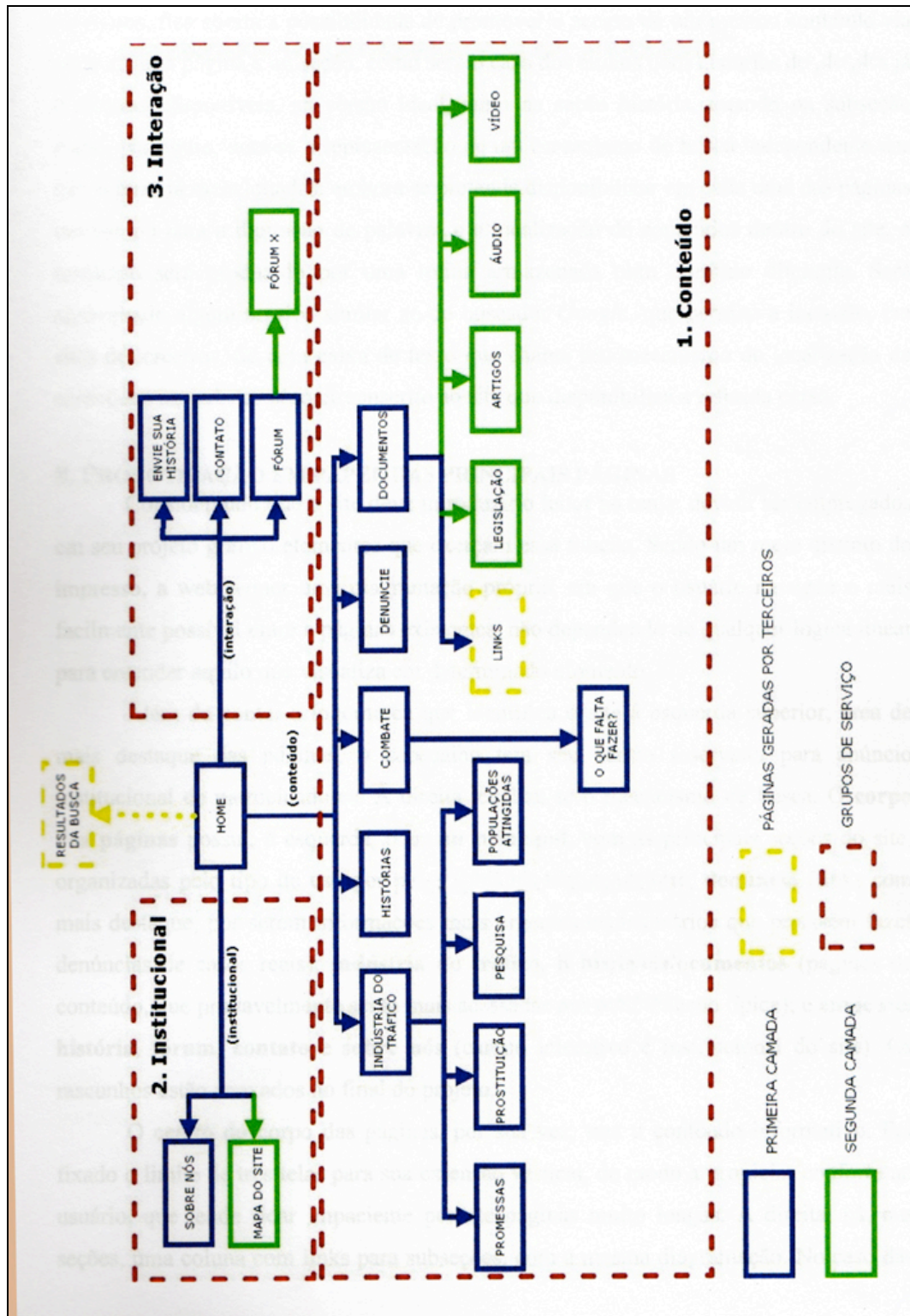
Figure 5 - Information Architecture diagram of Case 1: Human Beings Traffic.

This flaw is evidenced by the variables and diagram analysis. The site, that implemented a simpler version of the project as a proof of concept, also evidences this problem. Next Figure 6, shows the "Denounce" section page. The items in the navigation menu are: Combat, Denounce, Home, Traffic Industry, Stories,

Documents, Send us your story, Forum, Contact, About us. These are the sections and elements of the wheel with which "Denounce" is connected.

Figure 6 - HTML prototype of Case 1 (Human Beings Traffic) Denounces Page.

4.3 Case 2: Guiana

4.3.1 Global information

Table 5 – Global information protocol applied to Case 2.

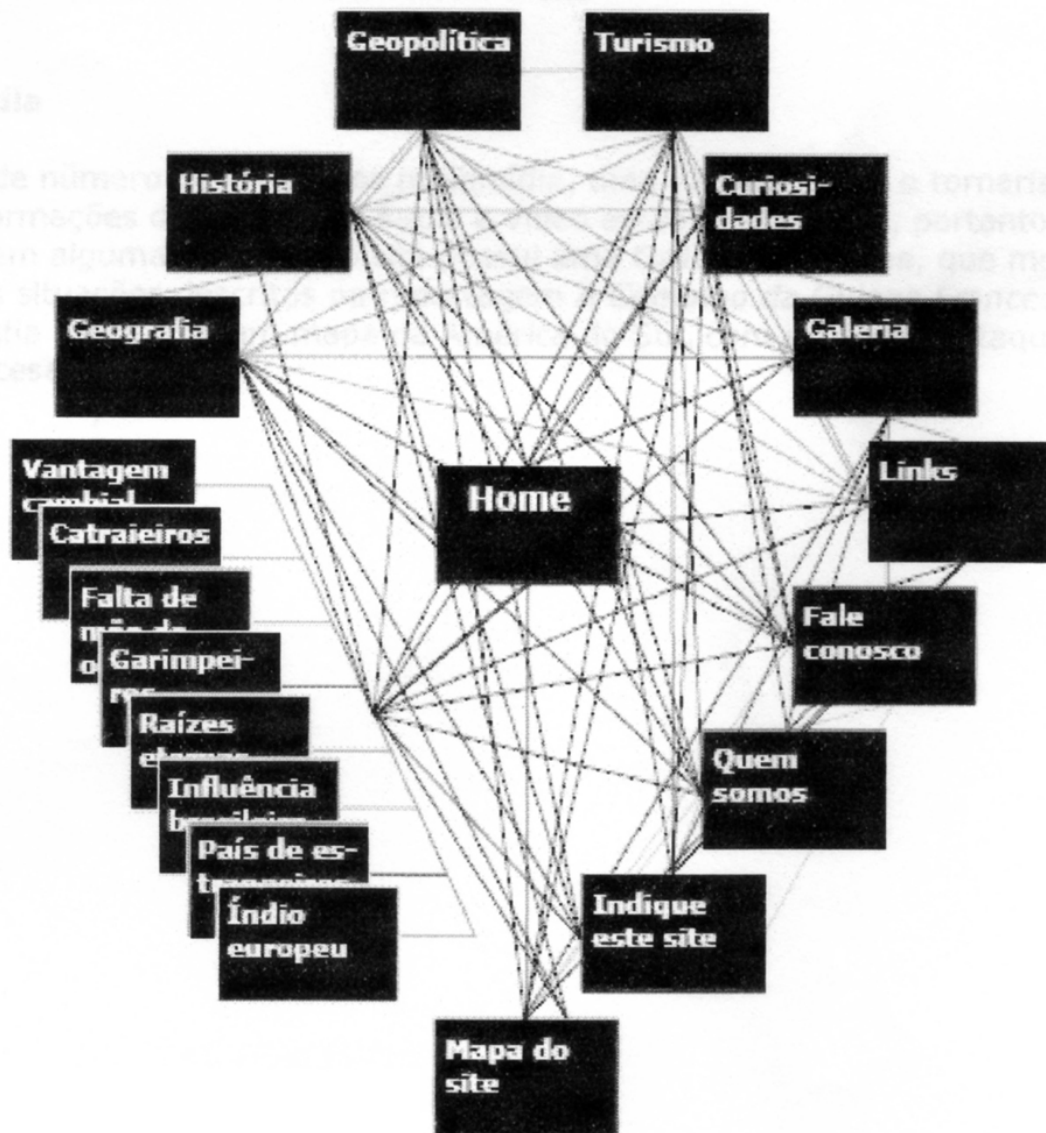|	
1. Original Title	Guiana
2. Language	Portuguese
3.Title in English	Guiana
4. When it was developed	2005, 1st semester
5. Where	University of São Paulo, Journalism and Publishing Department
6. Responsible	Online Journalism Discipline (CJE 0599)
7. Brief Description	Special report, made *in loco* by a team's student/reporter, on the French Guiana, a country neighboring Brazil, by means of human stories of a region that does not usually receive attention from the media. The purpose of the group was to present the news as it was originally conceived, adding background information to it.
8. User profile	A and B social-economic classes with interest in trip and cultural issues. High educational level and internet familiarity.
9. The Black's Wheel Diagram	

Figure 7 - Black's Wheel diagram of Case 2: Guiana.

10.Wheel's Unit Replication.	NO. Spokes are not replicated in new spokes.
11. Navigation Representation.	YES. All the elements visualize all the others. We can move from one to any other.
12. Independency between Wheel's Spokes.	YES. The spokes work on independent contents of the narrative, but which share the same background when discussing Guiana.
13. Non-content elements.	4. Black's Wheel presents four elements not integrated to the narrative: "Who we are", "Site map", "Recommend this site" and "Contact" which are not part of the narrative content under development. This evidences that the technique proposed was not well understood.
14. Size.	20

4.3.2   Local Information

Table 6 – Local information protocol applied to Case 2.

Case 2: GUIANA	Element 1	Element 2
1. Original label	História	Garimpeiros
2. Label in English	History	Gold washers
3. Hierarchy Level	1st, "Home" Element.	1st, "Home" Element.
4. Summary	A text with relevant facts on the story, showing the tensions for local autonomy between the European elite and the Guianese majority.	A short text on the region labor profile illustrated by the gold washer Roberto Silva interview.
5. Journalistic speech	Follows Nielsen's and Morkes's tips. Inverted Pyramid.	Follows Nielsen's and Morkes's tips. Inverted Pyramid.
6. Interactive elements	None	None
7. Quality of interaction	Page load speed. Good text readability.	Page load speed. Good text readability.
8. Multimedia elements	Text	Text
9. Functionalities (tools and services)	Not applicable	Not applicable

The analysis of the BW elements evidences very similar content to that of the printed version. There are lacking of iterative and multimedia elements that could add value to the story. This information shown at BW analysis is also corroborated by the team's written report:

"... the site is basically static; there is no continuous content feeding. That is, it always depends on new visitors to keep a good audience – it is not exactly the kind of site people would frequently return to. It would be advisable to think of alternatives to ensure the survival of the address in the future: maybe expanding it, turning it into a great site with news on exotic places, for example, or trying to host it in some large journalistic portal, or even in a students or tourism site."

Besides the solutions devised by the students, the problem of the static content could be solved by creating spaces for participative contents, such as telling a story, sending photos of the region, creating a blog with tips and information to and by ecological tourist teams interested in the region, among others. All these technologies were already known in 2005, when the project was conducted; the greatest constraint at that time was the connection speed that limited the use of hypermedia elements, mainly of videos.

4.3.3 Comparing the Black's Wheel diagram with the Information Architecture diagram.

This group, practically replicated the IA in the BW, inserting elements in the latter not belonging to the narrative, such as "Who we are", "Site Map", "Recommend this site" and "Contact". A first explanation approach indicates that the group applied the technique in the first semester in 2005, when it was still very incipient and the guidelines for its application were not very elaborated or clear. Later observations, however, contradict this explanation, as even more recent teams also had difficulty in distinguishing these two concepts.
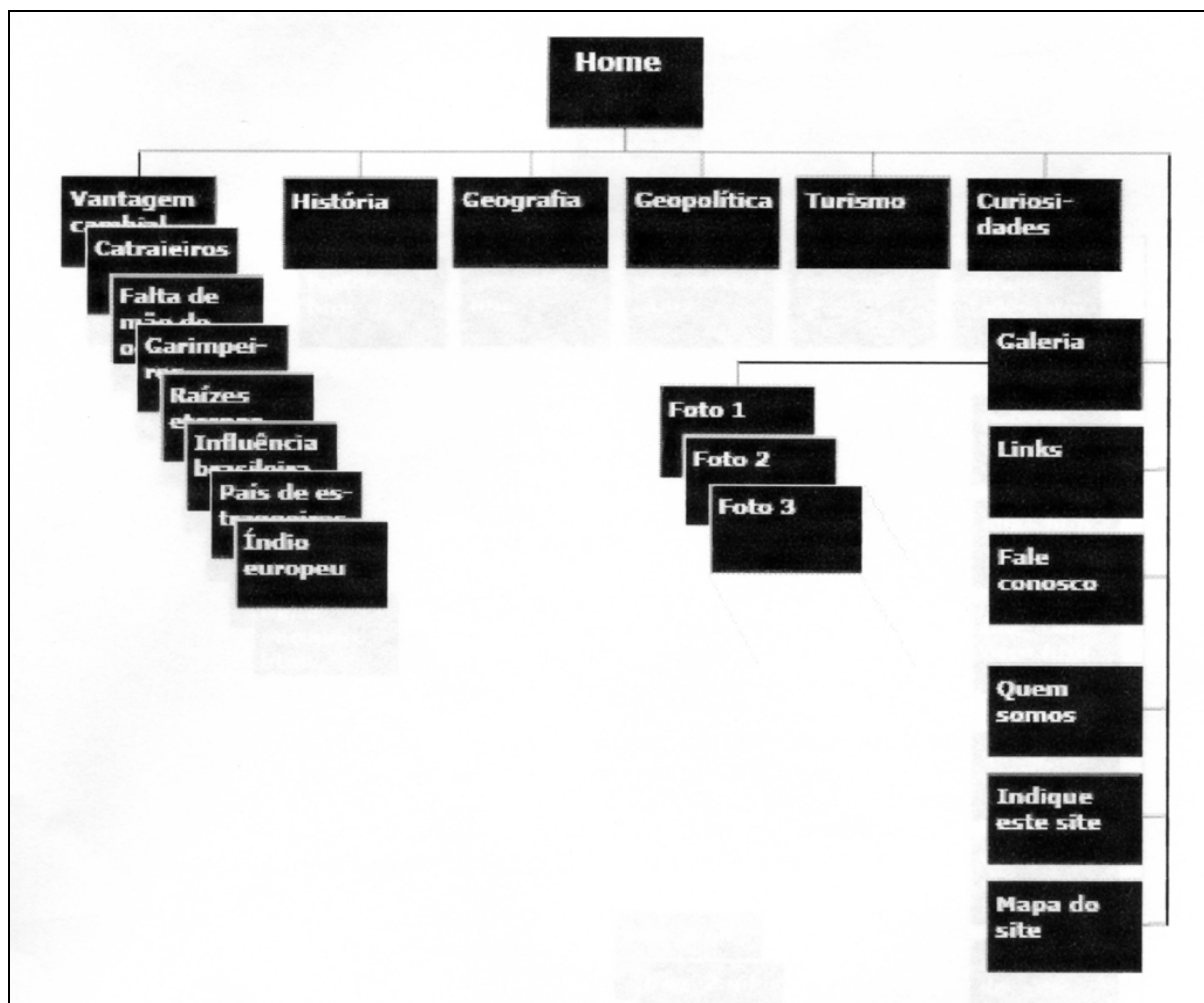

Figure 8 - Information Architecture diagram of Case 2: Guiana.

Both IA and BW show that each element in the site is connected to (visualizes) all the others. This characteristic implies having a large number of navigation items on the site pages, which could cause a possible cognitive overload problem.

Figure 9 - HTML prototype of Case 2 (Guiana) Home Page.

However, the navigation display on the site, as shown in Figure 9, brought a creative solution to the problem. The students divided the information into two groups: (1) story background information: History, Geography, Geopolitics, Tourism and Curiosities, and (2) news composing the report made *in loco* by the student/reporter: "Escala 1: Brasil X França" (Scale 1: Brazil x France), "Escala 2:Vantagem cambial" (Scale 2: Exchange advantage), "Escala 3:Catraieiros" (Scale 3: Boatmen), "Escala 4:Falta de mão-de-obra" (Scale 4: Lack of labor), "Escala 5:Garimpeiros" (Scale 5: Gold washers), "Escala 6:Brasileiros" (Scale 6: Brazilians), "Escala 7:País de estrangeiros" (Scale 7: Land of foreigners), and "Escala 8:Índio europeu" (Scale 8: European Indian). Those of the first group were placed in the left lateral menu, whereas those of the second were placed at the top of the page on a winding red path; the links to that story parts are circular stations along the path[9].

This observation shows that graphic design can sometimes overcome the problems pointed out by the narrative analysis by using the BW diagram.

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[9] In the prototyped site, the stations are not labeled and there is no idea of what will be found until one clicks on the link.

5 DISCUSSION

5.1 Analysis of the 1st research question: Is it understandable and applicable by journalists?

The observations made in class show that students manage to apply the technique without much difficulty, also the documental analysis shows that Case 1 generally succeed applying the technique in 2005, second semester, and could distinguish between the Information architecture and the Black's Wheel concepts.

Nonetheless, some groups prefer to describe the elements in the wheel instead of drawing it. Only 17 out of the 30 projects (57%) drew the diagram, the others described it textually. This probably has happened because many of them think about the story using only a unit structure of Black's Wheel and they also do not think about the navigation in this stage of design, delaying this concern to the Information Architecture stage.

In addition, Case 2 included elements in the BW that do not belong to the story narrative content. As illustrated by Case 2, some teams still mix IA and BW.

A possible strategy to overcome both previous problems would be to use case study as part of the didactic strategy of the discipline, in order to teach this concepts and improve its applicability.

5.2 Analysis of the 2nd research question: Is it useful?

Observations made in class show that the application of the technique usually causes fruitful quarrels around the non-linear storytelling that help breaking traditional writing models deeply rooted in our students thinking.

The case studies documental analysis also show that the Black's Wheel also facilitates understanding at a glance the whole nonlinear story and its constituent elements and may highlight the lack of contents that could enhance the story.

On the other hand, the analyzed cases show that the global and local protocol variables used to analyze the Black's Wheel technique also showed to be useful to assess the hypermedia narrative by identifying the project weakness and strengths.

Local protocol variables used to evaluate the Black's Wheel technique are similar to those that have to be documented in the Black's Wheel Elaboration Document through the project design. That gave us the insight that working teams could use the resulting documentation in a recurring (iterative) creation-

assessment process which provides immediate feedback of the weakness and strengths of the project. As the Elaboration Documents were incorporated to the technique only in 2009, it is necessary more research to validate this insight.

Last arguments suggest that the technique is useful for the project and may influence the improvement of its quality and enrich its results.

5.3 Analysis of the 3rd research question: Is it complete?

Observations made of its use in classroom and the document analysis lead us to believe that the technique isn't complete, although it can be applied to the development of nonlinear narrative with relative success, as previously seen.

The graphic diagram needs a better discussion around navigation representation because there is still no clear model for it.

Also journalistic speech models need to be rethinking under multiple case perspectives. Its compatibility and co-existence into a hypermedia special report isn't a consensus.

The Elaboration Documents, has been created to help designing important points of the project and to improve its documentation, although, due to their recent introduction and application to the technique, could not be evaluated in this case study yet. Their application should be monitored. Future works will allow the research of these questions related to them.

It is an open technique and can be also enhanced with other people's contributions.

5.4 Future Works

Pointing to future works, some final goals deriving from this paper are listed.

(1) Developing an online database that could collect and document cases as an open repository, that would help the technique research and development. The protocol presented herein standardizes information collection and could help to build such an open database [10].

(2) Improving our research approach using different research methods to confirm findings. For instance, we would need to corroborate our findings through other means such as in-depth interviews and focus groups.

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[10] Probably the URL base will be http://www.cedus.usp.br/hypermedianarratives/

(3) Improve the participant observation method by developing an appropriate protocol.

6 CONCLUSION

This technique is at a development stage. It has been improved over time and the results obtained so far have proved its applicability.

Observations made of the Black's Wheel use in class help us create and improve the guidelines that have been enhanced with more clear and specific directives. Also the Wheel's Diagram has acquired new representation models replicating the unit Wheel into spokes and incorporating the navigation representation. The elaboration documents have been introduced recently and probably may also metamorphose over time.

Given the inherent complexity of the nonlinear narrative project, the Black's Wheel, has shown to be a technique that facilitates the visualization and construction of the hypermedia structure and also an efficient strategy for online Journalism classes. Those difficulties are minimized when students can visualize the logical structure of the non-linear story, its elements, and its relationship. Black's Wheel acts in this way allowing the designer to visualize the story components and its relations with the user, and facilitating the representation task of the conceptual model being studied.

This study also allowed identifying Global and Local variables that were useful to analyze the technique and could also be extended to analyze the quality of hypermedia design, identifying and assessing categories of hypermedia narratives. In this way, the technique could be appropriate to both: designing and evaluating the structure of nonlinear narratives improving each other in an iterative process.

The present assessment of the technique did not incorporate the Elaboration Documents due to its recent creation. However, a reflection on the previous informal use made of this document variable made us believe that its use can **add the following values to the Black's Wheel technique:**

• User concern. Through the Elaboration Document, the technique allows describing the user's experience in interacting with the story. This contributes to understanding how the user sees the story, thus allowing to keep the focus on the user, contributing to an improvement in narrative quality.

• Usability evaluation support. Black's Wheel provides support for the narrative usability assessment since the Elaboration Document allows suggesting performance measures for each interaction activity. As many performance measures as necessary may be suggested.

• Technology concern: The Elaboration Documents allow thinking about the technological tools and services (functionalities) to be incorporated by the narrative. This raises an important reflection concerning the computational technologies potential to cause modifications to the project, adapting it to the new cognitive and creative articulations users are subjected to over time.

Indeed, the constant technological novelties confer to the medium language a transitory character, in constant mutation. This does not change the story, but the way in which it is told. Hence, the websites and hypermedia narrative project, in particular, get obsolete in a few years and its design represents the language of a given moment of the Internet era.

• Hypermedia storytelling structure evaluation: The technique seems to suit both planning and analyzing nonlinear narratives, as suggested by the observations made in the Case Study and by the introduction of the Local and Global variables.

Although the results obtained refer to a narrative genre, the technique could also find other application fields. It would be interesting that further studies were conducted on the use of the technique in other hypermedia as well as informative applications such as transactional, entertainment, e-commerce, and services. The question is: Can Black's Wheel help to plan the structure of the site content in general, no matter whether or not a narrative is being composed?

Even if the application of the technique in other case studies is possible, it would be interesting to deepen it for journalistic applications and for those having narrative as their work main focus.

In conclusion, the technique can show to be largely useful for professionals in the communication area, especially those directly involved with the production of nonlinear narrative genres.

ACKNOWLEDGEMENTS

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