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Products in Genre Discussion. Enhanced Approach with the Media Reference Model (MRM)

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Abstract

Documents are artifacts, based on an idea and following a plan produced by human beings. From a management point of view they are the results of a design - an engineering, manufacturing, and communication process. This paper presents and discusses a methodical approach, which is based on the thesis that genre theory and the fundamental analysis and managed application of genres is of the utmost importance in the new product development process. Furthermore, we assume that a new digital product can only be implemented successfully with an adequate communication strategy based on common and shared knowledge - a common logical system - between consumers and producers. We present the Media Reference Model (MRM) as an enhanced approach to genre theory. Research regarding digital genres and the further development of digital genres profit from this methodical approach, since each design area can be examined from different view points. The MRM's potential for digital genre research is illustrated by the analysis of an innovative web application product.

1. Introduction

With the development and rapid diffusion of information- and communication technology (ICT) as well as of network infrastructure new digital document types were established. There are basically two categories of new types. The first category is a group of documents that are enabled by the technical means and possibilities the new channels offer (examples of this category are email, chat rooms, home page, weblogs, etc.). The second category is composed of existing and familiar document types which were transposed into a new ICT channel, adding channel-specific features (e.g. ebooks, online product reviews and order forms). An early analysis of categories in the World Wide Web can be found by Crowston and Williams [1].

Both categories represent new digital genre systems [2], particularly since the previously mentioned channel-specific features of the WWW influenced respectively developed the content, form and function of these documents in a fundamental and lasting way.

This paper presents a methodical approach, which is based on the thesis that genre theory and the fundamental analysis and managed application of genres is of utmost importance in the new product development process. We assume that a new digital product can only be implemented successfully together with an adequate communication strategy that is based on common and shared knowledge - a common logical system - between consumers and producers. At this point we agree with Fowler who suggests that "communication is impossible without the agreed codes of genre"[3]. Furthermore, we underline that genres do not typify a static system with a clear number of listable items [4]; on the contrary they represent an evolutionary system which continues to be influenced by social, economic and technological factors as well as by changing audience preferences [5]. Changes within a certain genre over time and space belong to the system but can normally only be perceived ex post. This paper discusses the Media Reference Model (MRM) [6] as an enhanced approach, which not only structures the components that constitute a digital artifact, but also contains the potential to design digital genres ex ante.

The contents are structured as follows: after the introduction, section 2 incorporates the theory section where we suggest discussion should focus on digital products instead of digital documents and introduce the Media Reference Model (MRM), which is presented as a proven tool able to structure digital products and potentially describe emerging digital genres. Section 3 is dedicated to illustrating the potential of the MRM by means of applying it to a sports-infotainment product. Section 4 follows with a discussion of the findings.

2. Theory

The objective of this section is to explain why we prefer using the term "digital product" instead of "digital document" and to support this statement by referring to proven models about media and digital products. The Media Reference Model and its use in structuring digital products takes center stage here.

2.1. Genre Discussion

Genre theory, which goes back in its origins to Aristotle, is used as a method for classifying artifacts. Its application takes place both in literature studies and in art and film studies as well as in the information sciences, to mention only a few disciplines. The term cybergenres has been established as an adaptation for digital genres. Crowston, Williams, Shepherd and Watters [1, 7, 8] were among the first to discuss the importance of genre theory with respect to analysis of communication structure in the Internet.

From an overview position we can ascertain a wide range of genre definitions deriving from various disciplines. The absorption of the various definitions shows a completely heterogeneous image of the genre concept. Even so we can identify a common denominator: classification of genres is based on the interaction between artifact and recipient. We subsequently follow the definition of genres presented by Orlikowski and Yates [9]. They describe genres "as an institutionalized template for social interaction - an organizing structure - that influences the ongoing communicative action of members through their use of it within and across their community." At this point we underline that genres are not only determined by the production and existence of an artifact but also, and critically so, by the community using the artifact. Thus the core competence of genres can be located in the fact that they represent common knowledge in a specific community from which network externalities can result. This means (a) that the benefit of the product increases exponentially through the diffusion of common knowledge [10] and (b) that genres can generate community building. Crowston remarks that "recognition of particular genre is one sign of membership in a particular community." [1] Yates and Orlikowski further state that genres support a structuration process within organizational communication: "In the context of organizational communication, it may be applied to recognized types of communication (e.g., letters, memoranda, or meetings) characterized by structural, linguistic, and substantive conventions. These genres can be viewed as social institutions that both shape and are shaped by individuals' communicative actions." [11].

In this cited shaping-process we would emphasize a necessary interdependency between producers and consumers and emergence of genres, as it seems to be difficult to purposely design new genres due to their spontaneously

emergent nature. We understand them to be like the shaping-process of fashion and lifestyles which emerge in communities and often are driven by the so-called "chaotic" phenomena. This does not contradict Yates and Orlikowski [11] who state - based on structuration theory - that "genres are social institutions that are produced, reproduced or modified (...)" by human agents.

We strive to specify a genre model which structures all the components which are necessary to trigger such phenomena. Therein we join the efforts of Yoshioka et al. who formulated their key questions as the 5W1H framework (Why, What, Who/Whom, When, Where, and How) [2]. With the MRM [6] we enhance this approach.

2.2. Introducing the product to genre discussion

Digital genres classify digital artifacts into groups of comparable or identical characteristics. They encompass digital documents as well as other digital services such as computer games, email, digital personal assistants, etc.

Since both the term "document" and "digital document" are strongly associated with the conventional image of a text document (e.g. letter, analog or digital contract, doc-file) we propose replacing the term digital document with digital product, in order to make it clear that documents such as multimedia files, digitized tradable goods, search engines and the like are included, and also to match the colloquial understanding.

Digital products are artifacts based on an idea and following a plan produced by human beings. From a management point of view they are the results of a design - an engineering, manufacturing, and communication process [12]. Digital products are created by ICT. They may be a representative (avatar) of a real product, or a sign denoting it (as in a CAD plan), or they can exist in digital form only (software).

Digital products are networked, although not only the hypertext paradigm but also the paradigm of object-oriented programming applies to describe them. A digital product allows for a range of different views which integrates it into information systems (IS). Creating such IS means implementing them in the target audience in a twofold way, as Schmid [13] states: A product must be created in the tangible world where its function (use) can be accessed - his "Implementation one" - and in a symbolic world where its meaning (usefulness) is created - his "Implementation two". In fact, IS only exist when they are communicated. We pursue the thought of a digital product as IS, implemented as function (product in a channel) and as sign (knowledge in a community).

2.3. The Media Reference Model (MRM)

The MRM is a proven tool for structuring the components which constitute a digital genre. It models the "social

institutions" [11] in the context of their determining factors and processes. The MRM, after Schmid [6, 14-18], was developed to enhance the understanding of media, which are interpreted as interaction spaces [12, 19, 20]. The MRM focuses on the interaction of a - of any - community surrounding a given area of interest. It has been applied to model, among other things, e-business communities [14, 18], knowledge management processes [17], community supporting platforms [15, 16] and product design [12] - the last-mentioned category is also the applicable category for this paper.

The MRM formalizes interaction processes in communities with a framework of four layers and four phases. The layers allow for different views on the medium, i.e. on the subject of interaction. The phases separate the different interaction types with the medium (Figure 1).

Figure 1: The layer-phase architecture of the MRM
(source: Schmid [6], [14])

The layers of the MRM refer to the static components of a medium as follows:

- O, the organizational component with reference to the community view: Agents appear in given roles and in given situations. The roles are defined as types which program the agents' actions. A role is thus declarative, as has been well investigated in sociology and psychology [19, 20]. The same applies to objects, they can be modeled as functions. Actions refer to objects and are performed by agents. Actions must be recognized as concepts, must be allocated to types of roles and be known to all agents. The interplay of a community is thus defined by subjects, i.e. roles or agent types, by objects (object types), by concepts of action and their appropriate categorization into situations.
- I, the processes component with reference to the interaction view: Interactions determine the "game" going on in the community [12, 19]. Interaction patterns create and eventually define (new) types of agents, of objects and their derivations, as well as new interaction patterns. As mentioned above, interaction relies on the

services supporting it, which mirror the phases of interaction (for further details, see below).

- L, the logic component with reference to the common language: A common understanding of the context of interaction must embed all the layers and the phases of the MRM, otherwise communication cannot be successful. The common understanding relies on the congruent interpretation of behaviour, of signs, styles and iconology [21]. The shape of these is conditioned by the channel in which they appear - the potential of a message (agent, product, service) is limited by the possibilities the channel in which the product is "staged" can offer [12]. Each channel system has inherent restrictions and advantages for designing a product.
- C, the channel component with reference to the service view and to the infrastructure view: Interaction takes place at interfaces and is engaged in exchanging objects or furnishing services. The MRM divides the channel component into (1) the service layer which provides an interface with a cluster of service access points (SAPs) and (2) the ICT infrastructure layer which is characterized by the IS paradigm (hypertext based, internet networked, etc.), i.e. which carries the SAPs.

The phases of the MRM refer to the performative components of a medium, which evolve, causally determined, in chronological order according to the different interaction goals of the agents. The phases affect all layers of the MRM and can roughly be structured as follows:

1. Knowledge phase: to inform. Here, the updating and alignment of knowledge between the interacting agents takes place, by means of information exchange.
2. Intention phase: to signal. Here, the agents' intentions are signaled and terms are offered, e.g. the trading conditions.
3. Negotiation or contracting phase: to commit. Here, the agents enter into a commitment, binding engagements, contract obligations. In this phase, the appropriate required services must be available.
4. Execution phase: to settle. Here, the contracts are executed on an operational level.

2.4. The MRM applied to digital products

For our purpose here, we apply the MRM as a conceptual framework to structure the components which generate new products and new genres of products.

From a theoretical perspective, we suppose that if we can show the structure of the determining factors and processes which bring forth the phenomena we are discussing with genre theory, we are on the right track to eventually understanding not only how, but also why these phenomena emerge. This might lead us from a descriptive to a prescriptive position in genre theory - which would be of great interest to the market for digital products. In the field of the mobile services market it is widely understood that

there is a huge demand for new products and that new genres will emerge. Many would like to know what the winning design pattern will be. But although much is known about the necessary ingredients (from ICT infrastructure and the desired range of transaction services to the organization of the stakeholders), little has been deduced yet from this structural knowledge. An application of the MRM to the mobile service community might bring a deeper understanding of the required design patterns.

The following section displays our application of the MRM to the example of the Virtual Spectator, an innovative sports-infotainment product. We will also allocate the key questions of the 5W1H framework (Why, What, Who/Whom, When, Where, and How) presented by Yoshioka et al. [2] to the MRM layers. Subsequently we will deduce the levels and aspects the two models have in common and at what point they act complementary. We will see that the MRM provides an enhanced approach to the understanding of a digital product.

3. Application of the MRM to Virtual Spectator

The following section is an attempt to explain how the MRM can be applied to a concrete example. We have chosen a digital product which is a combination of diverse genres from different media encompassing features which can only be incorporated by means of the Internet. The following presented product - the web application Virtual Spectator - represents a new genre in sports communication.

3.1. Description of the example

Virtual Spectator International (www.virtualspectator.com) is a subsidiary of Endeavour Capital Limited, a New Zealand based venture capital investment company. This enterprise was among the first to combine GPS data and 3D animation for live television broadcasting. Today the main focus of Virtual Spectator lies in presenting sport events on the Internet. Prominent examples are the Louis Vuitton Cup (named for its main sponsor), the America's Cup races, and the World Rally Championship (WRC) in 2002/03. In its proprietary client Virtual Spectator combines different media assets such as live 3D animations, streaming text, still images, and video. These assets are linked via a hypertext base. To watch the races the user needs a permanent Internet connection because the data will be streamed from dedicated servers. The 3D data are enriched with GPS data sent directly - in the example of the Louis Vuitton Cup - from the sailing boats to Virtual Spectator by an appropriate infrastructure. Virtual Spectator encrypts the race data and delivers it via the Akamai network to the Internet and provides its subscribers a live streaming web-cast. A detailed technology diagram can be found in chapter 3.5 Channel Design (C-Structure).

Figure 2: Main view Virtual Spectator, from the America's Cup (source: Virtual Spectator web site, May 2003)

Virtual Spectator provides the only medium available today to watch the Louis Vuitton Cup and America's Cup Races on demand in the Internet. There it provides a high interactivity. Users can personalize their views by choosing different camera angles, can fade in and out streamed news on a text basis, pause, rewind, replay races, and view statistics including weather conditions, speed and distance between competitors.

Virtual Spectator stands for a new product genre by representing the event via avatars: staff on the boats, the boats itself, and the whole topology is presented in real-time rendered 3D graphics. Thus it is not only a simple example of convergence of different media assets but also, beyond this, represents a new genre by offering enriched information and makes accessible so far unavailable perspectives on a sailing race. So it is possible, for example, to compare the paths of the yachts (which are highlighted) with the different tactics. This possibility triggered by technological means offers new insights into the race and thus extends the spectator's level of information and suspense. This example shows how technology directly affects dramaturgy.

3.2. Organizational Design (O-Structure)

From a managerial point of view organizational design focuses on the organizational structure of the digital product. Mass media establish a common world among their community. Beside shared topics and a common language there also exists a common understanding of rules and obligations among the users interacting in the specific community. Habits, customs, social etiquette, and processes emerge - regulating the behavior and dialogue of the acting agents. A medium therefore necessarily needs a social component, which regulates the social organization of the agents [6]. Thus we allocate the following items to the O-Structure:

- situations in which product and customer meet; situations can be subdivided into acts and scenes (in analogy to the theater) which are held together by an overlaid narrative and plot;
- roles (subjects) which essentially define the characteristics of the product but also those of the customers;
- props (objects and services) understood as the tools and means of acting.

Relating to the 5W1H framework [2] the situations point to the "When and Where" questions, the roles to the "Who/Whom" question and the props refer to the "How" question. The following explanation shows how organisational design is presented in Virtual Spectator.

3.2.1. Situations. As shown in Figure 3 Virtual Spectator encompasses ten main situations (Home, Demo, Races, Results, etc.). These situations are again divided into sub-situations (Race Series, Louis Vuitton Cup, America's Cup, etc.). The connections between them are based on hyperlinks. The users can move from any situation to another. Numerous transitions are possible. As a race spectator I can, for example, at any time jump to the weather forecast to get the latest information about incoming winds, or I can visit the shop to check the price of a specific merchandising article. As the situations always remain on top as part of a permanently visible main menu there is no risk of losing one's orientation. Transitions between situations are structured despite the numerous possibilities. Furthermore, we regain our orientation in well known situations. We are for instance familiar with weather forecasts as standalone situations from television and the Internet and we can easily recognize its relevance to the main situation, the race. Thus, in a critical race situation with low velocity or an approaching turning maneuver, situation transitions - from situation 1 (race) to situation 2 (weather forecast) to situation 3 (tactics) and back - seem to be logical from an advanced spectator's view. This apparent familiar change between situations is based on a common repertoire of situations, shared by the members of the community.

Researchers such as Goffman [19] and Forgas [20] have shown that human interaction is based on a limited set of well known situations varying from community to community, depending on cultural and socioeconomic background of the members. McCarthy [23] described situations and their potential from an artificial intelligence (AI) point of view as follows: "A situation is a snapshot of the world at some instant. Situations are rich objects in that it is not possible to completely describe a situation, only to say some things about it. From facts about situations and general laws about the effects of actions and other events, it is possible to infer something about future situations."

The ensemble of the situations shapes the topography of the landscape - both in the real and in the virtual world - we are living in. In the product development process the

Figure 3: Identified situations in Virtual Spectator
(source: authors)

designers thus have to bear in mind mainly the complexity of the landscapes to be designed: complexity increases with the number of situations involved. Thus three preconditions are necessary for a digital product to be understood by its potential users: a) the individuals situations must be known by the users; b) the possibility of transitions between the situations needs to be declared explicitly; c) the number of transitions must be reasonable in the sense that efficiency is supported. Designers neglecting these conditions risk disturbing users and losing their attention. Schmid [12] suggests visualizing and thus managing the transitions via a Situation Transition Diagram as it is used, for example, in Multi Agent Systems (MAS) design (Figure 4).

Figure 4: Situation Transition Diagram
(source : Schmid [12])

In a hypertext environment different means exist for indicating situation transitions. There are hyperlinks, drop down menus, cursor changes, rollover items, etc. which find their expression either through a sign or a symbol. On a more sophisticated level, visual situation transition diagrams exist in form of site maps or even animated tours. In Virtual Spectator we find the following repertoire of indicators for situation transitions: menu bars, drop-down list boxes, table views with hyperlinks, time sliders. We call these graphical user interface (GUI) elements implicit situation transition indicators, as opposed to a sitemap which shows the whole topography and makes the transitions explicit by indicating all possible transitions. In Virtual Spectator such a sitemap is missing; nevertheless the user does not lose control, due to the limited set of situations. Figure 5 shows a selection of situations from Virtual Spectator.

3.2.2. Roles. In each situation we find protagonists enacting specific roles. In a classical western for example the roles of the good guy and the outlaw are predominant. As experienced western consumers we anticipate a life-and-death struggle between these protagonist, culminating in a

final show down. In a sport event we identify the competitors as predominant actors. Other actors (e.g. jury, timekeeper, sponsor etc.) - we call them agents - and their roles complete the ensemble. Table 1 shows agents and their roles in Virtual Spectator.

Situation: Race Schedule

The user can choose a specific round and race day from an archive. If a race is taking place at that moment, there will also be a link to the live webcast. The user can also choose between different teams.

Situation: Results

The user can access archived results from different rounds and teams at any time. Statistical race data (e.g. Leg, Gain, Delta, Time, Elapsed, Lead) will be presented and the user can choose a replay of a specific race at any time.

Situation: Tactics

In this situation the user can obtain information about the starting area, upwind, and downwind tactics. Additionally, the user will be informed about the rules of the race.

Situation: Store

In the store the user can choose and configure his or her preferred merchandising articles and order the items.

Figure 5: Some specific situations from Virtual Spectator (source: graphics from Virtual Spectator web site, May 2003)

Table 1: Analysis of agents and roles in Virtual Spectator (source: interpretation after [22])

Agent	Role
Product	Represents a real event in a virtual environment. "Virtual Spectator transforms events by making visible the unseen parts of sport (for example, highlighting the path of America's Cup yachts so that tactics can be compared and understood)." [see: www.virtual-spectator.com]
Customer (Spectator)	Is able to interact with the other agents. He can act as a "passive" director. > Consumer, Fan
Competitor	> Protagonist, Leading Actor
Jury	> Judiciary Instance
Live-Comentator	> Expert
Timekeeper	> Trustworthy Instance
Promotor	> Producer
Sponsor	> Financier
Photographer	> Reporter
Merchandise	> Salesclerk
Tutor	> Helpdesk
Software-Developer	> Developer, Engineer, Executive Producer

Agents and their roles need to follow established rules and conventions to be plausible. Thus we need an unequivocal design of their function and representation. A design which neglects knowledge already present among the members of the community must instead establish new habits and common knowledge. This can be successful - in the sense that we are "fishing" for attention by presenting something "new" and previously unseen - but due to complex and time consuming adoption processes it is a risky and expensive strategy. Designing agents and their roles, however, requires a clear understanding of all involved stakeholders and the product's context of use. To achieve these goals in the product development process widely accepted procedures exist, derived from the field of human-centred design (HCD) according to the ISO 13407 standard (ISO, 1999). A detailed discussion of this aspect can be found in Maguire [24].

3.2.3. Props. Props in this context are understood as the tools and means to act: they represent interfaces to service access points (SAP). SAP predominate in a digital environment and thus can be interpreted rather as roles than as

props. As props we understand items such as configurable user profiles, configurable software or platform options, help functions and information services related to the digital product etc. (see Table 2).

3.3. Interaction Design (I-Structure)

Interaction Design encompasses the story and the plot of the digital product. But it is not a prose story; it is rather comparable to a script or screenplay which makes interactions between agents explicit. Interaction Design is an outline of narrative traces and their possible connections. Thus the story is co-designed and influenced by the consumer's expectation and the extent to which common knowledge associated with a specific genre - in this case a sports event - can be quoted. As the technique of screenwriting in the film industry is highly elaborated and structured, a range of indispensable screenplay items can be derived from it (e.g. see Vale [25] and Table 3). Referring to the 5W1H framework, interaction design encompasses the "What" question and points to the intentions and purposes of the stakeholders.

Table 2: Props in Virtual Spectator

Prop	Function
Options and Settings	Graphic Settings: Selection of the level that best matches the system configuration. Automatic Detail Level: Automatic mode lets the 3D engine decide which graphics level to use. Network Settings: Connection settings, definition of a proxy server to connect to the Internet. User Profile Settings: Name, Password, Newsletter subscription, Virtual Spectator Privacy Policy.
Order and Transaction Service	Shop Transaction: Product selection, Price information, Cart, Delivery Information, Terms, Transaction, Confirmation.
Virtual Spectator Help	Overview: Welcome, Getting Started, Tutorial, Online Helpdesk, Online Discussion Forum. Demo: Using the Demo, Registration, View a Demo Race. Purchase: Purchasing Live Yachting Coverage, Price Information, Information about Security of Transaction. How to use this product: Extensive Tutorial. More help: Link to online discussion forum.
Tactics	Specific Information: Information about race planning and race conditions, discussion and visualization of different tactics (starting, upwind, and downwind tactics).

Table 3: Recommendations for Screenplays / Presentation in Virtual Spectator

To be designed elements (Screenplay)	Description	Presentation in Virtual Spectator
Exposition of - Theme (Motif) - Intention - Objective	- Action of (human) agents - Definition of an objective which shall be reached - Future event; Objective = Motif + Intention	- Competition (defender and challenger) - Beat the competitor - Next rounds, final race
Exposition of - Protagonists - Locations - Time - Events	Declaration: gives the consumer orientation in the landscape and identification possibilities with the topology and its characteristics.	- Curriculum vitae of the teams - Maps - Race schedules - Racing features and timetables
Elements of a successful plot	Definition	Presentation in Virtual Spectator
Suspense	- Gap between intention and objective - Controlled uncertainty of the recipients - Secrets	provided by the genre of sports communication: shared features in sports entertainment
Comprehensibility	- Common landscape - Common emotions - Common characters (agents)	provided by the genre of sports communication: shared features in sports entertainment
Plausibility	- Realistic - Reliable - Validation is theoretically possible	provided by the genre of sports communication: shared features in sports entertainment
Identification	- Familiarity - "sym-pathos" (pity, compassion, sympathy) - "larger than life"-protagonists	provided by the genre of sports communication: shared features in sports entertainment

3.4. Logical Design (L-Structure)

The encompassing L-Design in Virtual Spectator provides a common language (i.e. common syntax, semantics, and pragmatic rules) on all layers (O, I, C) and among all stakeholders as shown in Table 4. Furthermore, L-Design shapes and makes explicit the specific environment of the event by presenting the rules, situations and props. Thus it includes inferred events, which can be assumed to be common knowledge. L-Design of the I-Structure introduces the protocol. As requirements we can identify a common genre knowledge, implicit knowledge about dramaturgy as well as a common narrative infrastructure. As shown in Figure 6, L-Design of the I-Structure not only includes the explicitly presented event but also nondiegetic material (greek: *genesis* = recounted story).

Figure 6: Interdependence of Story and Plot
(source: Bordwell [26])

This nondiegetic material refers to the protocol which is familiar to spectators from sports events in general and from sailing races in particular. The story thus brings together knowledge of the explicitly presented event and preceding events.

L-Design of the C-Structure defines the Service Access Points. This design encompasses the involved channels and information carriers as well as the design of the interface. On a "handicraft" level this includes the specific design of a user interface, an appropriate allocation of media assets, intuitive navigation, assistance with orientation etc. according to user expectations, focussing on their digital literacy. On a higher level a stringent graphical

style focused on the target audience has to be developed.

Here we can identify an additional link to the 5W1H framework: the Logical Design points to the "How" question with its key questions regarding structural features, medium, and linguistic features [2]. The analogy between MRM and 5W1H is as follows: O-Design (MRM) focuses on structural features (5W1H); C-Design (MRM) points to the medium (5W1H); L-Design (MRM) is partially represented by linguistic features (5W1H).

A further link to the 5W1H framework at the level of the L-structure can be made to the "Why" question. As we understand a (digital) product primarily as a solution to a problem, offered by the producer to the consumer, the L-Design points essentially to the purpose of the (digital) product. The main task of the L-Design is to establish a congruent understanding among producer and consumer.

3.5. Channel Design (C-Structure)

Virtual Spectator encompasses a bundle of information sources (e.g. technical information on the boats, weather information, GPS data, real time 3D data, streaming text, images, videos) which are assembled and can be viewed via a proprietary client in the Internet: "Virtual Spectator transforms events by making visible the unseen parts of sport (for example, highlighting the path of America's Cup yachts so that tactics can be compared and understood)." (Virtual Spectator web site, May 2003) This digital product is essentially driven by technology; it takes advantage of high-end network, graphic, and rendering technology.

Figure 7 paradigmatically shows how new products can emerge by using the Internet. Virtual Spectator is a new product in sports communication: it enables views of and insights into an event which are not possible via other channels such as TV, radio or newspapers. Although it combines respectively converges media assets from all the above channels it is not simply a result of convergence.

Table 4: L-Design on O-, I-, C-structure

	L-Design	Requirements and tasks	Patterns from Virtual Spectator
O- Structure	<ul style="list-style-type: none"> - Organization for the agents - Interaction of the agents and objects 	<ul style="list-style-type: none"> - Stakeholder analysis - Environment (topology) configuration > Defining the story 	<ul style="list-style-type: none"> - Competitor, producer, sponsor, etc. (see Table 1) - Social interaction - Sports infotainment
I- Structure	<ul style="list-style-type: none"> - Protocol - Script 	<ul style="list-style-type: none"> - Genre knowledge - Dramaturgy - Narrative infrastructure > Defining the plot 	<ul style="list-style-type: none"> - Sport event - Sailing - Competition/match - Intentions of the competitors - Actions of the competitors - Objectives of the competitors
C- Structure	<ul style="list-style-type: none"> - Information carrier - Interfaces 	<ul style="list-style-type: none"> - Communication channels - Technology - Applications > Defining the service access points 	<ul style="list-style-type: none"> - Internet (encompassing a variety of media assets) - 3D real time rendered graphics (near realistic) - Proprietary software (based on known hypertext techn.) - Visual metaphors (e.g. video controller) and genuine digital signs (drop down menus)

Figure 7: Technology Diagram Virtual Spectator
(source: [22])

By introducing situation transitions which can be freely chosen and by providing a high level of user interaction combined with real time 3D data a new digital product has emerged: the boats, the topology, the race, i.e. the whole event is represented by avatars.

4. Discussion

We have shown the staging of a product in the digital media, and discussed the challenges this poses to its design. Since the product is an interactively communicating agent which - as opposed to conventional machines which are located in one spot - can appear in many shapes and at many different locations simultaneously, its design requires the organization of its retinue of representatives. And since the product appears in places where rival digital products are present, its representatives must have attributes which let them stand out, evoke attention and interest. Even more - their appearance and performance must quickly create familiarity and engagement on the part of the customer.

Such concerns are not new. For a long time they were passed off as the assigned task of marketing. What is new is this concern's implementation into the new media: The refraction of a digital product into a thousand worlds (resembling the effect of a kaleidoscope), and its interactivity in the digital media which will soon converge the qualities of paper and television, of hypertext and film, etc., requires thorough stage-management. And therefore, what is also new is that the digital product interconnects the organization's know-how of sales and customer service with the dramatic know-how of theatre and of cinematics.

We have suggested a procedure which divides the design process of a product into a concept phase and an implementation phase. We have discussed the concept phase, comprising the O.I.L.-design, i.e.

- the organizational structuring of the stages, where the multitude of product representatives (the retinue) is classified, and
- the interaction protocol, where communication and transactions between the product or service and its stakeholders is defined, and

- the common logic, where terminology and style determine the context, is agreed upon.

With respect to this division of the design process we see a coincidence between the 5W1H framework and the MRM regarding the key questions. However there is no absolute congruence between the two frameworks. The differences between 5W1H and MRM are mainly located in their divergent purposes. While 5W1H intends to establish a clear genre taxonomy which acts as "a knowledge repository of communicative structures or 'typified actions'" [2] the MRM aims to structure the production process by implementing the digital product in a twofold way: "physically" into matter and function, and "virtually" into the awareness and knowledge of the customer. We call these two ways Implementation one and Implementation two:

- Implementation one: The product design must be defined in such a way that it can be sent to the production machinery. The organization processes are to be defined and planned in such a way that the customer's needs will be met optimally over the whole lifecycle of the product.
- Implementation two: Here, the product design aims at the attraction, the interest, the desire and the action of the customer, at his or her awareness of and knowledge about a product. To make the customer understand the product and its function, the product should be self-declarative. But generally, much of the knowledge a product requires for its proper handling is already common knowledge in a society. In fact, Implementation two design is largely pre-defined by the general knowledge of a customer's community. The product design as well as the entrepreneur's communication management must strive to integrate the product into the community's existing knowledge as much as possible. Thus, the management of this design task is communication in its original sense, integrating the customer, an intermediary, other users of the product, the producer and further actors into the same network of knowledge.

Digital media are universal in the sense of Alan Turing's machine. Corresponding to that, digital media contain many new possibilities as yet unexplored. Designing the products in the digital medium means to enter a learning process which still has a long way to go.

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