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Dynamic and interactive typography in digital art

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Abstract

The objective of this investigation was to produce a work that demonstrates the potential of typography as a subject matter for a contemporary artistic discourse by exploiting the dynamism and interactivity of digital typography.

This paper describes the process of the conceptual development and implementation of an interactive multimedia installation based on the history of writing and typography.

The main aspects of the methodology that inspired the building of an installation are emphasised and it is argued that in arts, technology is meant to serve a concept and poetics, not the opposite way round.

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Keywords: Dynamic and interactive typography; Visual and scenic quality of typography; Interactive multimedia

1. Introduction

The purpose of this paper is to present an overview of the development of a work of Digital Art. The work was motivated by the wish to investigate new possibilities of typography, as an artistic, dynamic and interactive element, which can be offered by computer systems.

The concept of this work appeared almost as a consequence of the study of the history of writing and typography and its strong relationship with the arts throughout the 20th century.

When exploring bibliographical avenues of research, the beauty of primitive writing blended easily with modern typography, with painting and the light forms on the screen. Here, on this place of light, arose the desire to experiment with the idea of proceeding with a piece of work resulting from interaction between thinking and doing.

The objective of the work that was developed not only involved the idea of systematising knowledge and answering questions deemed pertinent but also the need to express a conviction; namely, a work that transforms the aesthetical quality of the typographical element into a living experience by the use of computer technologies.

The letter is no longer one-dimensional, capable of expressing sound alone, obeying a rigid set of rules. It may become the vehicle of multiple meanings ... freeing itself of its mere phonetic significance, withdrawing from a row of words and sentences [1].

Although made by means of photographic material, this presentation of the work only allows a rough idea of the project, partly because of its scale, but mainly because of the environment.

The paper is organised as follows: first, the conceptual framework on which the work is based is presented. Then, the physical installation, where the dynamic and interactive typographical concepts were tested, is described. Finally, a set of conclusions and future work is drawn up.

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2. Conceptual development

2.1. Concept and creation—organisation of the stories

The desire to conceive a multimedia installation, capable of involving visitors in an interactive narration in which typography would play the main part, was driven by an interest in the evolution of writing and typography on the part of the authors, as well as in their appearance as an argument in the arts.

The first conceptual orientation, which was called the historical axis, resulted from an analysis of the chronological map with respect to three outstanding fascinating events: the appearance of embryonic writing, the invention of printing by means of movable-type faces (Gutenberg) and the emergence of the digital era.

In remote times, long before the birth of the alphabet, men used to keep records of special events by making drawings. These drawings on rough cave walls often were more than mere writings: they were works of art.

The fascination with the magic of the symbolic predecessors of the Latin alphabet became obvious right from the beginning of bibliographic data collection, which guided this whole process.

Among these predecessors, special emphasis must be given to the most ancient forms of embryonic writing; namely, schematic figures of animals, geometric patterns and other objects.

The second conceptual axis—the ontological one—arose from the theories that have tried to establish links between the embryonic writing and appearance of the alphabet: links that lay in their visual similarities (Fig. 1).

The various stages of the evolution of the Western alphabet, according to these theories, are shown in a table (Fig. 2).

If, at first sight, this table was of interest for understanding the evolution from embryonic writing to the letters of the alphabet, it now favoured an opposite understanding. It could now be seen as a codifying element for writing with pictograms, as it was possible to translate a word into an ancient visual symbol or symbols.

These hieroglyphs are still present in our alphabet even though in a different form [3].

When exploring this possibility with the word TYPOGRAPHY (in Portuguese TIPOGRAFIA), the

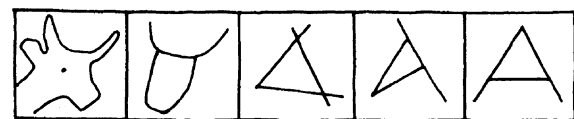


Fig. 1. Example of the characters of the Greco-Latin system originating from ancient pictograms [2].

Ancient name	Possible meaning	Greek name	Cretan pictograms	Phoenicians	Ancient Greek	Classical Greek	Latin	Modern Spanish
Áleph	Bull	Alfa	𐤀	𐤀	Α	Α	A	A
Bêth	House	Beta	𐤁	𐤁	Β	Β	B	B
Gimel	Camel	Gama	𐤂	𐤂	Γ	Γ	C	C
Dâleth	Folding door	Delta	𐤃	𐤃	Δ	Δ	D	D
Hê	Window with bars	Épsilon	𐤄	𐤄	Ε	Ε	E	E
Wâw	Hook, nail or claw		𐤅	𐤅	Ϝ		F	F
Zayin	Weapon	Zeta	𐤆	𐤆	Ζ	Ζ	G	G
Hîeth	Fence, barrier	Eta	𐤇	𐤇	Η	Η	H	H
Têth	Twist or screw (?)	Theta	𐤈	𐤈	Θ	Θ	I	I
Yôd	Hand	Iota	𐤉	𐤉	Ι	Ι	J	J
Kaph	Twisted hand	Cappa	𐤊	𐤊	Κ	Κ	K	K
Lâmed	Sting or thorn bull	Lambda	𐤋	𐤋	Λ	Λ	L	L
Mêm	Water	Mu	𐤌	𐤌	Μ	Μ	M	M
Nûn	Fish	Nu	𐤍	𐤍	Ν	Ν	N	N
Sâmek	Support or rest (?)	Xi	𐤎	𐤎	Ξ	Ξ	O	O
'Ayin	Eye	Ou	𐤏	𐤏	Ο	Ο	P	P
Pê	Mouth	Pi	𐤐	𐤐	Π	Π	Q	Q
Sâdê	Hook fish (?)		𐤑	𐤑	Ρ		R	R
Kôph	Needle eye (?)	Kopa	𐤒	𐤒	Ϝ		S	S
Rêsh	Head	Rho	𐤓	𐤓	Ρ	Ρ	T	T
Shin, sir	Tooth	Sigma	𐤔	𐤔	Σ	Σ	U	U
Taw	Mark	Tau	𐤕	𐤕	Τ	Τ	V	V
						Υ	W	W
						Χ	X	X
						Υ	Y	Y
						Ζ	Z	Z

Fig. 2. Diagram showing different stages of the evolution of the Western alphabets [4].

problem arose of the absence of a pictogram for the letter G. Thus, it was decided to apply this 'translation' strategy to the word TYPO (which means letter or character or TIPO in Portuguese).

Looking at the column of possible meaning in the table (Fig. 2), it was determined that the letter T could mean 'mark' (a sign made on any object to distinguish or recognise it or to use it as a reference); I meant 'hand' up to the classical Greek (the alphabet which eventually led to Latin writing); P meant 'mouth' and O meant 'eye' (Fig. 3).

Curiously, the word TIPO (in English TYPO) does not only stand for typographic letter, but it also could be

1 associated, symbolically, (and by heritage) to three of
2 the senses of human beings (touch, taste and sight).

3 Trying to deal with the letter T (potentially meaning
4 ‘mark’) by means of an associated mechanism, the idea
5 of Identity was easily reached; likewise, the definition of
6 a rule that led to the association of some new meanings
7 for each of the TIPO suggested by the Cretan
8 pictograms was reached.

9 The ontological dimension of the identity problem
10 suggested this rule, especially because writing, typogra-
11 phy and the arts blended into a representation of
12 thoughts, anxiety, anguish about the existence of men
13 and their surroundings.

14 Thus, the letter Y (the pictogram of which represents
15 hand) was linked to the idea of Survival, to technology,
16 or to the built-up world as the answer to natural
17 instincts.

18 Mouth (represented by the letter P) led to the oral, to
19 traditions transmitted to the next generation and,
20 therefore, to Time.

21 Finally, the letter O (eye) became related to Space.

22 The next step consisted in a geometric operation.

23 The points previously determined (Fig. 4) acted as the
24 co-ordinates in this system with two axes—the historical
25 and the ontological—and enabled the calculation of 12
26 points in the defined plan.

57 Each of these points represents a point in the
58 evolution of mankind and must correspond to a tale
59 or a story.

61 2.2. Exploration and development—content of the stories

62 The themes of the 12 tales (little stories) are shown
63 schematically in Fig. 5.

64 For brevity, only three of the twelve stories are
65 presented as examples and all of them along the Identity
66 vector.

67 *From the unknown to the myth.* Mankind over-
68 comes his fears and apprehensions by means of rituals.

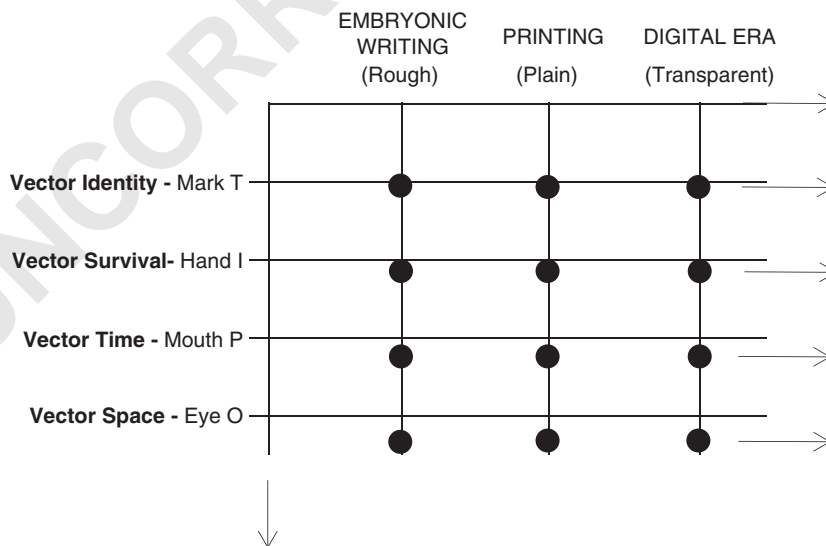
69 Men respond to questions such as life and death by
70 repeated appeals to the divine forces that seem to rule
71 the universe (Fig. 6(a)).

72 *The fear of difference.* During their movements
73 and migrations, different races, cultures, people, iden-
74 tities and religions blend together. This being an
75 essential factor of human evolution, it also involves,
76 for the dominant people, great struggles to impose
77 ideologies and religions on others, as well as tries to
78 unite the world and make it homogeneous in compliance
79 with their own rules and habits. Such intellectual and
80 ideological impositions lead to the slavery of racism and
81 xenophobia (Fig. 6(b)).

82 *All equal, all different.* This third phase is char-
83 acterised by human hope. Cultural movements arise,
84 bringing innovative aesthetical and literary concepts that
85 call for the triumph of individual freedom and abolition
86 of religious, political, cultural and racial bondage.
87 Unions proclaim struggles against inequality and
88 dependence and clamour in favour of freedom. Freedom



33 Fig. 3. Visual correlation between the letters of the word TIPO
34 in the Latin alphabet and the pictograms.



56 Fig. 4. Table with two directional axes: namely, historical and ontological.

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1	T (mark)	FROM THE	THE FEAR	ALL EQUAL,	57
3	→ Vector	UNKNOWN TO	OF	ALL DIFFERENT	59
5	Identity	THE MYTH	DIFFERENCE		61
7	I (hand)	FROM SURVIVAL	FROM TECHNIQUE	SUPERFLUITY	63
9	→ Vector	TO	TO THE WISH OF	AND	65
11	Survival	TECHNIQUE	TRANSFORMING	CONSCIENCE	67
13	P (mouth)	FROM THE INTUITIVE	FROM THE EXPERIENCE	IMMEDIACY	69
15	→ Vector	TIME TO THE	OF TIME TO THE TIME	AND THE	71
17	Time	MEASURED TIME	OF EXPERIENCE	REAL TIME	73
19	O (eye)	FROM A NOMADIC	FROM SEDENTARINESS	VIRTUALISATION	75
21	→ Vector	TO A SEDENTARY	TO THE LONGING	OF THE	77
23	Space	WAY OF LIFE	FOR HORIZONS	HORIZONS	79

Fig. 5. Schematic table of the 12 stories.

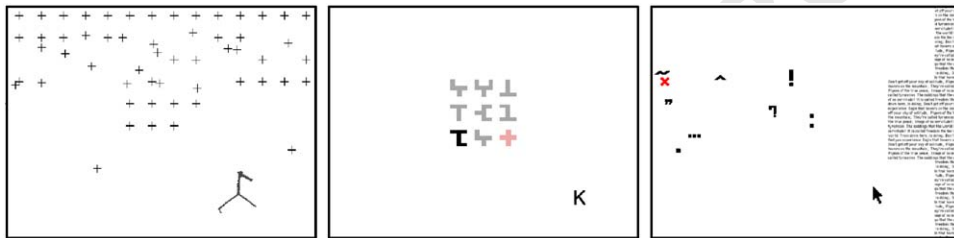


Fig. 6. Animated piece corresponding to the Identity vector: (a) from the unknown to the myth; (b) the fear of difference; (c) all equal, all different.

allows each and every person to assert his/her rights and identity (Fig. 6(c)).

The figures (Fig. 6) are snapshots extracted from the installation and show the moment of the visual result deriving from the interpretation of each of the tales.

The topics of the 12 stories appear subordinate to the themes appearing in the previous diagram.

Visual/concrete poetry, cubism and futurism provide further information on the presence of the text as a pictorial element within a composition.

As a simultaneous homage to all poets who dared to give a visual dimension to their poems and to the quality of the Portuguese poetry, excerpts from poems by Portuguese authors were chosen to be included in the installation. Each excerpt is linked to one of the 12 tales.

The study of some reference works and artists in different areas (Holography, Video Art, Computer Art, Net Art) was also important for the project, including among others Eduardo Kac (“Accident”, 1994); Gary Hill (“Beacon”, 1990); Jeffrey Shaw (“The Legibility City”, 1990); John Maeda (“Tap Type Write”, 1998);

Rafael Lozano-Hemmer (“Re: Positioning Fear”, 1997); David Small and Tom White (“Steams of Consciousness”).

2.3. Physical and visual configuration

As mentioned above, writing started in pre-history on the rough walls of caves and men have developed writing through typography and passed it on through the support of a plain printed sheet of paper. In this digital era, typography is light and transparent on screens of computers and projected or choreographed according to a given scenario. Thus, rough, plain, and transparent have appeared as synonyms for the three moments of the historical axis of this work.

The studies also were major determinants of the physical and visual configuration of the installation. Thus, the cylindrical shape derives from a visual interest in the Phaistos disk (discovered in Crete in 1908) not only because of its writing on both sides but also because of the spiral form of the writing (Fig. 7).



Fig. 7. Phaistos disk (2000 BC) [5].



Fig. 8. Babylonian inscriptions (7th century BC) [6].

The organic shape and the way the ancient inscriptions are displayed in a circle were one of the inspirations for this work.

Yet another type of inscription exists, which is dated from the seventh century BC (Fig. 8) and comes from Babylonia. It underlines the idea of the circular shape and the way writing could be organised.

3. Project installation

3.1. Overall description

The project consists of a cylindrical interactive multimedia installation. Three projectors spread the information onto three retro-projection screens—a transparent, a plain and a rough/creased one—to express through these supports the historical axis of the work. The creased screen is linked to the moment of the birth of writing (stone), the plain one to the invention of printing (paper) and the transparent one represents, symbolically, the screen (Fig. 9).

These three screens are surrounded by another one—cylindrical and transparent—whose purpose is to represent the globalisation of information in both space and time (Fig. 10).

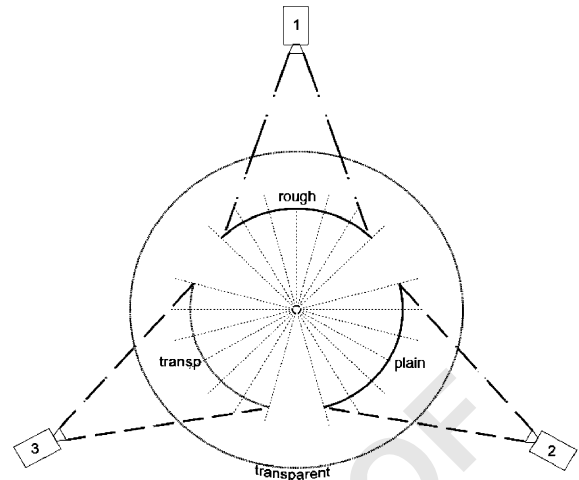


Fig. 9. Scheme of the project/installation seen from above.

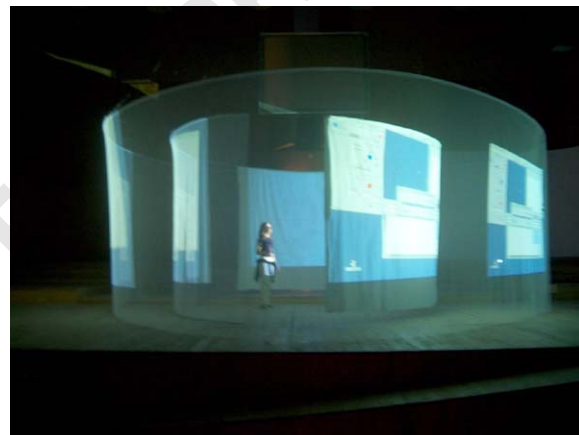


Fig. 10. Photograph of the installation.

At the present stage, the space may be ‘inhabited’ by various visitors simultaneously, but only one at a time may be able to interact with the installation. This visitor is given a wireless mouse that enables him/her to freely interact with the projections throughout the installation.

The visitor will be guided right into the centre of the installation by a set of fluorescent letters placed on the floor. The purpose of these letters is to guide the visitor across the space and to motivate him/her to explore the installation.

The initial projection sequence is meant to transmit, both graphically and conceptually, the project to the visitor. This sequence is also a screen saver which animates the space while there is no interaction.

When the visitor ‘communicates’ with the work, an activating process creates a slot machine-like alignment

1	of the cylinders where the different texts suggest the four ontological vectors.	57
3	Each one of the three cylinders of that slot machine records four of the 12 tales that can arrange themselves	59
5	into 64 stories. Thus, with each click of the mouse, the visitor can choose one of the 64 possibilities.	61
7	Through these combinations, the installation allows the visitor to 'live' the different stories and, by	63
9	interacting, to go through different experiences. As in a slot machine, the selection of the tales happens at	65
11	random.	
13	Each story is told through the action/interaction of the visitor. By means of rollovers, clicks or actions	67
15	brought about by the software itself, the story is told on the three screens, so as to let the visitor be involved in	69
17	the ambience of the installation.	
19	The luck of the draw may not always cause the alignment of the cylinders according to a single	71
21	ontological vector. In such cases, certain contexts are correlated with each other, e.g. 'the identity in time and	73
23	space' or 'how survival leaves marks that are our heritage'.	75
25	At any time, the visitor is free to choose another story. To gain access to the initial slot machine, one icon	77
27	remains permanently animated.	79
29	Visiting time is an important factor, not only because it allows the visitor to gain access to the information at	81
31	his/her own <i>tempo</i> , but also because the work has a capacity of self-animation when there is no interaction.	83
33	The difference of the duration of the scenes and the rhythm of the actions are vital for reinforcing the	85
35	importance of each phase of the history of writing and typography. According to the concept, each phase has a	87
37	different degree of interaction: from the visual elements in the embryonic writing with its almost immobile and	89
39	non-mutable projection to the great movement and interaction that represent the digital era where the	91
41	elements change into almost abstract fragments.	93
43	The projections with visual elements create fluid ambiances that animate the surface of the screens. These	95
45	ambiances are the result of light and shadow, opaqueness and transparency, sharp or out-of-focus images in	
47	an attempt to create a magical and ritualistic atmosphere. The spatial language of repetitions, oppositions	
49	and harmonies, light and shadow, visible and invisible, transparency and opaqueness creates different rhythms	
51	within the various phases of the concept.	
53	The projected images create sculptures on the body of the visitor who, therefore, becomes an integral part of	
55	the performance.	
	The face screams, and the vibrations produced by the sound cause the image to dissolve, leaving only the	
	equipment that made it appear. The reality of the piece is thus technology itself, which allows both to present	
	ourselves and contain our presence. The rest is only the product of our own imagination, fear, and hope [7].	
	The sound tries to anticipate the options of the visitor and reinforce the visual transitions and the passages	57
	between the various moments of interaction. It works like a guideline that enhances the conceptual dimension,	59
	i.e., there is a direct link between the sound and the three phases of the history of writing and typography. A tribal	61
	and mystical sound appears when the embryonic writing phase begins; the appearance of printing is backed up by	63
	a mechanical and repetitive sound; and for the digital era the sound is an electronic one.	65
	The flow of the sound gives a different atmosphere to each space and each moment. Thus, music leads the	67
	thoughts of the visitor to a certain place, moment or time.	69
	The project tries to offer a different experience at each interaction. However, in between the interactive	71
	moments, the music and the cursor may contribute to the understanding of this project. The cursor changes	73
	between a pictogram, a letter or an actual representation when the visitor points to the primitive writing, the	75
	printing or the digital era, respectively.	77
	Due to the random level of the installation, there are multiple aspects of the game with various parts for the	79
	visitor to interact:	81
	<ul style="list-style-type: none"> ● the part of a player by being in a game within a narration, the aim of which is telling a story and exploring the artistic characteristics of writing and typography and ● the part of an explorer by exploring the material and the immaterial space of the installation. 	83
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		87
		89
	Summing up, this is a game where recreation is shown as an aesthetical viewpoint from the participation of the	91
	spectator.	93
	<i>3.2. Implementation</i>	95
	The structure of the installation consists of two concentric cylinders with diameters approx. 15 and 25 m.	97
	The cylinders, made of different qualities of woven fabrics, are supported by means of several flexible steel	99
	tubes that fit together according to their respective diameters.	101
	The three projection screens (3.0 × 2.8 m) have been placed within the inner cylinder. Two of the screens are	103
	made of linen fabric with one being creased so as to suggest the roughness of stone, while the third one,	105
	which is made of tulle, is transparent and represents the screen.	107
	Another tulle screen is placed around the circumference of the outer cylinder (symbolising our digital era).	109
	The whole structure is suspended from a single point in the ceiling by means of several steel cables.	111

1 The visitor may enjoy the space between the two
2 cylinders and 'inhabit' the installation animated by the
3 projections.

4 A system with three graphic plates (co-ordinated so as
5 to provide a continuous scenario) made it possible to
6 work with three monitors (representing the three phases
7 of the history of writing and typography). In the final
8 installation, these monitors were replaced by projectors.

9 To interact with the installation, it was necessary to
10 find a device to control the cursor on the projection
11 screens. This wireless interactive device (Gyromouse)
12 not only translates the physical movements of the
13 visitor/user within the space but also controls the
14 movements of the cursor during the projection.

15 The Gyromouse uses the technologies of radio
16 frequency and gyroscope. The gyroscope allows the
17 mouse to be used without a firm support (in the air) and
18 the radio technology makes it possible to keep control
19 over the cursor even at a great distance from the CPU
20 (Fig. 11).

21 The programme designed with the Macromedia
22 Director software Lingo explores the control of events
23 pertaining to this very type of language allowing the
24 creation of interaction supports (rollovers, mouse up,
25 mouse down, etc.), but it also takes advantage of the
26 reading of the position of the cursor during projections,
27 thus inducing logical events. As an example, in certain
28 circumstances, the cursor acts as a magnet either
29 attracting or deviating graphic elements during its
30 passage.



31 Fig. 11. Gyromouse—interaction device sold by GYRATION.

32 Another relevant aspect of the programme is the
33 frequent use of devices that creates random events in
34 order to cause surprising factors in the different
35 experiences provided by the stories (Fig. 12).

36 4. Conclusions and future work 63

37 This paper has tried to reveal the process of the
38 conceptual development of the creation of an interactive
39 multimedia installation based upon the evolution of
40 writing and typography.

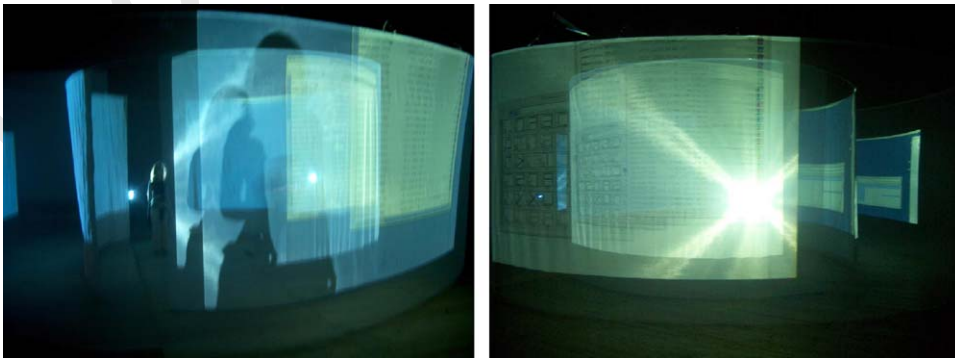
41 By emphasising the conceptual aspects of this
42 installation, which has been built by means of standard
43 computer techniques, the intention was to show the
44 differences between digital arts and purely technical or
45 scientific achievements.

46 The prototype was tested by approximately 20 people.
47 However, their opinions and suggestions forecast the
48 following future developments:

- 49 ● inclusion of sensors that allow knowledge of the
50 position of the visitor and that can be used in the
51 development of the narration, especially in situations
52 where the interaction with the 'mouse' is non-
53 existent;
- 54 ● different levels of 'legibility' of the stories, depending
55 on the choice of the visitor; and
- 56 ● strategies to make it possible for several people to
57 interact, simultaneously, with the installation.

58 Another important aspect is the possibility of carrying
59 out some tests to allow us a better understanding of the
60 behaviour of people during their interaction with this
61 type of installations.

62 The diversity of language games appears as the
63 diversity of media. Different media require different
64 voices and different voices require different communica-
65 tion strategies [8].



66 Fig. 12. Photographs of the installation.

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