Towards a Semiotic Toy

designing an interactive audio–visual artefact
for playful exercise of meaning construction

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The candidate confirms that the work submitted is her own and that appropriate credit has been given where reference has been made to the work of others.

Abstract

This thesis investigates the possibility of using the interactive power of digital media as an instrument for extending the observation skills and critical awareness of television viewers. To this intent it proposes the Semiotic Toy, an interactive audio-visual artefact for experimentation with syntagmatic and paradigmatic variations of narrative strategies commonly used in film and television.

The design of the Semiotic Toy commences with theoretical and empirical verifications of the premises subsumed in the proposal and their corollaries. Both the technological possibilities and the preferable means for achieving the intended results emerge from these investigations.

The thesis is composed of five chapters. Chapter 1 reviews a range of studies on the effects of television on its viewers, and proposes that some of the characteristics of the medium make it especially prone to critically unaware consumption. Chapter 2 discusses the general tendency to disregard the artificiality of the narrative conventions usually adopted in television, with examples from both cinema and television news. Chapter 3 initiates an investigation of the existing and potential applications of interactive media. To that end, a review is undertaken of both the origins and current state–of–the–art of various technologies and artefacts usually identified as 'interactive media'. The prolific universe of computer entertainment artefacts is discussed

separately in Chapter 4. The findings reached in each of these four chapters define the general design guidelines for the Semiotic Toy, described in Chapter 5. The Conclusion reviews the relationships between the initial chapters and the features proposed for the Semiotic Toy and discusses the appropriateness of the design specifications with respect to the initial intention of developing an artefact able to improve the critical awareness and observation skills of television viewers.

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to Robin
who makes my heart sing,

and Ian
who makes everything groovy.

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I am obliged to Dr. Peter Millican, of the Schools of Philosophy and Computing Science of the University of Leeds, for his assessment of the technical viability of the Semiotic Toy. I am also grateful to my supervisors Dr. Brent MacGregor and Dr. David Gauntlett for both their irreproachable professional performance and friendliness.

Several ideas from which this thesis originated were first introduced to me by Dr. Arlindo Machado, particularly the discussion of the objectivity of images generated with cameras and data on the development of narrative strategies in the early years of cinema. The American Cinematography Association videotape from which some of the images included in the second chapter were obtained was lent to me by Dr. Machado. Images captured from television brodcasts were provided by Dr. Graham Roberts. The example of the importance of the media in the Philippine revolution included in the third chapter was also extracted from Dr. Machado's lectures. The quotation on the same subject in page 114 was kindly handed to me by my departmental colleague Des Smith.

My husband Robin Lane played many roles in the development and completion of this thesis. His experience with computer games was a main contribution to the development of the classification proposed in Chapter 4. Robin also joined Dr. MacGregor in the crusade to improve my usage of English, in addition to undertaking countless hours of brainstorming and proof–reading.

Last but not the least, I shall express my gratitude to the competence, friendliness and assistance of the staff of the Institute of Communications Studies at the University of Leeds, particularly Andrew Thorpe, Justin Charlesworth and Christine Bailey.

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Introduction

The idea of the 'Semiotic Toy' derived from a concern with the apparent difficulty that most human beings experience when they attempt to express themselves using images[1]. The significant increase in the use of visual communications in technological societies over the last hundred years has not been accompanied by a corresponding increase in the capacity of non–specialists to create visually encoded messages. Even some scholars specifically concerned with the need for twentieth century citizens to acquire 'visual literacy' tend to concentrate on the ability to understand visually encoded messages, regarding the capacity to produce such visual utterances as being of secondary importance (Hobbs, n. d., n. p.).

The dominance of verbal modes of expression in most human cultures has its roots in a major design flaw of mankind: the lack of innate structures for generating visual statements. In the words of Hermann Maurer,

> our second most important organ, the ear, has an active counterpart: the mouth, which is capable of generating utterances understood by the ear. Our most important sensory organ, the eye, has no analogous counterpart: humans have no physiological construct to display any kind of picture! (Maurer, 1993, p. 9).

Maurer offers the fact that about half of the human neocortex is dedicated solely to processing visual information as evidence that human beings are heavily dependent upon visual input (Maurer, 1993, p. 9). The human body does have the means to generate visual information, for example through

[1] The reported difficulty has been repeatedly observed by the author both as an Architecture and Fine Arts student and as a lecturer, and more generally in daily life.

gestures and facial expressions, but such visual signals are not appropriate to perform certain specific communication functions, specifically those of describing and narrating. Despite the human brain being significantly weighted towards the processing of visual stimuli, the availability of a more developed system for generating aural output, i.e., the phonetic equipment, combines with the restrictions inherent to gestural communication to promote the use of verbal modes of expression. It is not surprising that media, described as 'the extensions of man' by Marshall McLuhan (1967), initially reinforced this natural tendency towards verbal modes of expression. The most successful technology of communication, printing, is dedicated to storage and circulation of information externalised as words but received as visual input.

The impact of development of the photographic emulsified card in the nineteenth century for visual communications can be meaningfully compared to the significance of Gutenberg's printing machine for the dissemination of the written word. Photography automatised the ancient technique of the *camera obscura* and allowed indistinguishable reproductions of each discrete piece of visual information to be produced in ways directly parallel to that of the relation between printing and the alphabet. Shortly afterwards, the ability to represent movement was added to photorealistic images with the advent of cinema. Television provided moving images with the power of apparent simultaneity and the distributional possibilities of broadcasting.

Beyond their primary role as extensions of the human senses, visual media came to liberate the techniques for producing simple visual utterances from their former dependence upon specific artistic skills. With the advent of home movie and video equipment, motion was added to the technologically mediated production that had been made possible by photography. Digital paint-systems that allowed the manipulation of digitised photographic images, and three-dimensional computer modelling, provided means to create technologically mediated representations of imaginary objects. More recent technological advances, essentially the digital convergence of media, have been claimed to be the ultimate step to overcoming the lack of means to produce pictures with the human body.

> It is our contention that hypermedia[2] systems are going to become better and better substitutes for our missing picture generating organ. As software tools and interface mechanisms continuously improve, the externalisation of mental imagery will become progressively easier. Initially, and right now, this means that the effort required to express our ideas using pictures, diagrams, animation sequences, movies, etc. is going to reduce more and more; eventually (maybe) the tools will become sophisticated enough to be used in real time: in the same way that we are more or less capable of externalising our thoughts in real time by speaking (note that for a good presentation we do need some

[2] The expression hypermedia is used by Maurer alluding to the convergence between hypertext and multimedia systems. The word multimedia is currently used to refer to the integration within a single computer application of different modes of presentation of data, such as text, graphics, video and sound. Definitions of the terms hypertext and hypermedia are provided by Paul Kahn and Bernard J. Haan: "[i]n a hypertext system, the computer is used to create and maintain persistent connections (called *links*) between selections (called *anchors*) in documents. The user may navigate through the information by selecting and following these links. Hypermedia is an extension of this concept to include information that is not limited to text, such as various forms of graphic images, animation and motion-video" (Kahn and Haan, 1991, p. 353).

> preparation!) we might someday be able to externalise our thoughts by producing, in real time, a presentation consisting of acoustic and visual elements using a suitable technological surrogate for our missing picture generating organ. (Maurer, 1993, p. 10).

Evidence of an increase in the ability to understand visual information encoded according to the principles of central perspective, including those images generated with cameras, has been given by many authors, for example Ernst H. Gombrich (1960 and 1988) and Erwin Panofsky (1980). Acquisition of the capability to understand the low resolution moving images of television and the narratives they construct has been reported as taking place in infancy (Lemish, 1987). Such skills for interpreting visually encoded messages, typically possessed within twentieth century Western cultures, are the visual equivalents of the ability to understand spoken language. Producing meaning with images, however, as the analogous competence for expression in writing, demands another category of proficiency. Whilst writing can be learned as visual re-encoding of meaning first expressed in spoken words, there is no picture-generating organ with which to externalise an initial level of codification to be transcribed into technological visual expression.

Most people have attempted expression with still images, usually in the forms of drawing or photography, through this exercise acquiring a capacity for *depicting* at least at a very basic conceptual level. Construction of visual narratives, i.e., the ability to chain images together in spatial, temporal and causal sequence, requires a greater degree of visual literacy than simple depiction. Despite the fact that such narratives are constantly seen in cinema

and television, the required competence is not commonly found. This lack of a sufficient degree of visual literacy can in part explain the low response to opportunities for public production offered by open television channels in the United States of America (Mattuck, 1992, p. 114) which is often attributed to absence of content to be presented. The apathy hypothetically characteristic of television viewers has been identified amongst other damaging influences of the medium on its public such as the alleged encouragement of violent behaviour, the reinforcement of prejudices and the impairment of cognitive development (Gauntlett, 1995). Attempts to control such harmful effects of television have varied from direct censorship to the provision of various sorts of incentives for programmess considered to be of educational merit. Approaching the question of television influences from a point of view akin to Umberto Eco's proposal of a 'semiotic guerrilla warfare', a number of initiatives for the development of 'television literacy' started to emerge relatively recently. The common factor amongst these initiatives is that, in Eco's words, "[t]he battle for the survival of man as a responsible being in the Communications Era is not to be won where the communication originates, but where it arrives" (Eco, 1987, p. 142). The various proposals for teaching critical television viewing skills that comprise what is also called 'video literacy' or 'media literacy' movement have concentrated on *ex cathedra* lectures on television contents and economics. Aimèe Dorr summarises the features commonly encountered in several North American television literacy curricula:

> All involve imparting information about production and the television industry to children, most using the traditional methods of reading, lecture, and discussion and some including role playing, visiting production and broadcasting facilities, and viewing films and television programs. Virtually none uses video systems with which children produce their own programs. By and large, then, television literacy is not taught with television (Dorr, 1986, pp. 138-140).

The use of video in teaching television literacy tends to lead to the use of multimedia technology. This is the basis of some of the opposition to the constructive use of video within the teaching of media literacy. For example Wally Bowen in *Summary of Harvard Institute on Media Education* follows a section on teaching 'through' media, as opposed to 'about' media with a warning concerning "school boards jumping on the computers-in-the-school bandwagon". He claims that television literacy should "explore the 'limitations' of media technologies, a critical approach that is all too rare in a culture enamoured with hardware and the linear concept of progress" (Bowen, n. d., n. p.).

Rather surprising when formulated by the same individuals who praise video literacy as "the turn-key that opens the door to new ways of teaching and learning" (Bowen, n. d., n. p.), such resistance to the adoption of technologically mediated teaching methods can be understood as a reaction to the frequently overstated claims about the liberating power resulting from the digital convergence of media. Granting the supposedly passive television viewer a presumably more active role, interactivity appeals to the imagination of the producers of mass media as the ultimate empowering feature of digital

media. Interactive film, home shopping, home banking, computer games and the Internet have constantly been praised as challenging the underlying structure of traditional media production and passive consumption. These claims, however, are largely as yet unsubstantiated. It is advisable, nevertheless, not to underestimate the possibilities of media convergence, and particularly the potential for interactivity inherent in digital media. The minimum that can reasonably be expected is for more widespread and versatile use of pictorial information, even providing the means for experimentation with construction of narratives with images as part of the future of home entertainment.

Beyond media content and economics, becoming video literate requires an understanding of how meaning is constructed within television. In respect to this particular aspect of television literacy, practical exercises as implicitly proposed by Dorr appear likely to be more productive than the purely theoretical approach defended by Bowen. Support for this proposition can be found, for example, in reports of courses on film making in which the value of practical film study in the context of education has been examined, such as: Douglas Lowndes' evaluative description of a course offered by the Hornsey College of Art to selected students between 12 and 16 years of age drawn from schools in the Greater London area (Lowndes, 1968), and Frank Eadie, Brain Sutton-Smith and Michael Griffin's analysis of the methods and procedures adopted in the film making workshops of the Young Filmmakers Foundation of New York (Eadie *et al.*, 1983). Lowndes describes as the primary motive of the Hornsey course "to inculcate among students an

analytical, critical, discerning attitude about films themselves", and considered that "[b]y learning to make a film, the student inevitably develops a knowledge of film methods and film values. His attitude as a viewer changes from that of passive spectator, to active adjudicator" (Lowndes, 1968, p. 10). Similarly, the study by Eadie *et al.* was considered "to have provided very considerable evidence that the persistent exercise of a medium can lead to important impacts on various measures of perceptual, cognitive, and characterological comprehension" (Eadie *et al.*, 1983, p. 74).

Attempting to make effective use of the interactive power of digital media as an instrument for extending observation and critical awareness of television viewers, this thesis proposes an interactive audio-visual artefact for experimenting with variations of narrative strategies commonly used in film and television. The design of such an artefact, hereafter refered to as the Semiotic Toy, requires the verification of the various assumptions discussed in this Introduction and their corollaries. From this process design guidelines concerning technological possibilities and the preferable means for the Semiotic Toy to achieve its intended results are expected to emerge.

Chapter 1, Watching Television, starts with a review of the various approaches to the question of television's influence on its public, and attempts to identify the peculiarities that make television especially prone to critically unaware consumption. To this end the reputation of verisimilitude and the impression of immediacy usually associated with television are discussed. Particulars of television reception are paralleled to Christian Metz's

considerations of the circumstances of cinema consumption, giving rise to the possibility of the existence of a singular convergence of fiction and real life that emerges from the television viewing situation.

The existence of formal conventions according to which meaning is constructed on television is verified in Chapter 2, Understanding Television. In order to objectify formal conventions of television that more through habit than accuracy of representation tend to remain unnoticed, exemplification with the necessary level of 'cultural strangeness' was borrowed from the history of cinema. The choice for illustrating the discussion with examples from the history of cinema does not imply the assumption that cinema and television are identical, but only the recognition that both media use moving images and sound in order to convey narratives. Returning to the question of the role of television in the construction of beliefs of Western individuals, Chapter 2 proceeds to discuss the specific case of television news.

Chapter 3, Interactive Media, reviews the origins and state-of-the-art of various technologies aggregated under the label 'interactive media', and attempts to confirm if and to what extent the digital convergence of media is leading towards any real empowerment of the so-called 'passive' television viewer. Hardware development, the Internet, and applications targeting the home market are discussed. Special attention is given to both educational software and interactive narration.

The importance of entertainment artefacts within the universe of interactive software leads to their separate analysis in Chapter 4, Electronic

Entertainment. After a brief analysis of the concept of play, the text proceeds to discuss characteristics of so-called 'computer games'. Despite the commercial success and cultural importance of entertainment software, the literature on the subject is sparse and composed of works that tend to concentrate on one particular aspect of the subject, often without necessary rigour. In order to overcome this lack of systematic information, an extensive review of existing entertainment software was undertaken. The results gave rise to a classification of entertainment software[3]. The final section of Chapter 4 is dedicated to the analysis of non-competitive entertainment artefacts, with special attention to computer toys dedicated to storytelling and narration. An Appendix provides descriptions of all the artefacts mentioned in Chapter 4.

In Chapter 5, Towards a Semiotic Toy, the conclusions of the four first chapters are integrated with further considerations to aspects directly regarding the proposed artefact, and the general design guidelines for the Semiotic Toy are specified. The chapter proceeds with the design of the Semiotic Toy, which is described in terms of its modes of interaction with hypothetical users. Software description is restricted to the realm of Human Computer Interaction, and does not include any code specification.

The Conclusion reviews the findings of the chapters of this thesis. It discusses the proposed Semiotic Toy regarding the initial intention of developing an artefact for experimenting with syntagmatic and paradigmatic variations of

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[3] Part of the section concerning computer games, specifically their sub-classification by genre, was submitted for presentation in the *4th International Research Symposium on Visual Verbal Literacy*, Holland, 1996. It has been published in Velders, T. (1996), *Selected Readings from the 4th International Research Symposium on Visual Verbal Literacy,* pp. 61-67.

narrative strategies commonly used in film and television, using the interactive power of digital media as an instrument for extending the observation and critical awareness of television viewers.

Some conventions adopted throughout the text need to be described before proceeding to the main corpus of the thesis. Terms borrowed from the realm of verbal communications are applied to visual media without specific reference to the science of Semiology, or the work of Ferdinand de Saussure, from which such practice is derived. The name Semiotics has been, on the other hand, reserved for considerations directly related to the work of Charles Sanders Peirce.

All quotes are in English. The original text has been included as a footnote whenever translation has been performed by the author os this thesis.

Bibliographic references for each chapter, including this Introduction, have been placed at the end of the relevant section. The general Bibliography for the thesis can be found after the Conclusion. Individual articles organised within a single publication have been listed independently in the bibliographic references sections of the chapters. In the general Bibliography, however, volumes that were considered fully relevant for this thesis have been listed solely under the name of the editors. The format adopted for references from on–line sources is an adaptation of suggestions from *A Guide to Citing Internet Sources* (Cross and Towle, 1997) to the University of Leeds' bibliographic guidelines.

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Chapter 1 – Watching Television

An extensive body of work has been dedicated to the study of the effects of television on the thinking and behaviour of its audience, often attributing to the medium the power of a puppet master whose viewers are critically naïve and fully susceptible to manipulation. Aimèe. Dorr quotes S. I. Hayakawa's comparison of television to a sorcerer whose spell led to 'disastrous' effects:

> Suppose . . . that your children . . . are snatched away from you for three or four hours a day by a powerful sorcerer. This sorcerer is a story–teller and a spinner of dreams. He plays enchanting music; he is an unfailingly entertaining companion. He makes the children laugh; he teaches them jingles to sing; he is constantly suggesting good things to eat and wonderful toys for their parents to buy them. . . . The sorcerer is always fascinating so that [children] sit there as if drugged, absorbing messages that parents did not originate and often do not even know about (Dorr, 1986, pp. 64–65)

Television has been accused of instigating violent, sexist and racist behaviour (for example in Condry, 1989; Lefkowitz et al., 1977; Liebert & Sprafkin, 1988), desensitising viewers to the same issues (for example in Lefkowitz and Huesmann, 1980; van Evra, 1990), impairing scholastic achievement (for example in Comstock, 1991). and even of being carcinogenic (Mander, 1978). A few voices, it is only fair to stress, have risen in defence of television. These have concentrated on the possible benefits of the medium, above all as an educational instrument (for example Palmer and Dorr, 1980), with potential positive 'pro–social' influences on viewers beliefs and behaviour (for example Johnston and Ettema, 1982). David Gauntlett (1995). discusses a wide range of such studies on 'effects' of television, and concludes:

> All too often the television effects research evidence is interpreted as 'inconclusive', or as showing nothing, In fact, if nothing else, it *has* answered its own question: television does not have predictable, direct effects (Gauntlett, 1995, p. 115).

E. Katz and P. Lazarfeld emphasise that the early conception of media messages as "a direct and powerful stimulus to action which would illicit immediate response" was based on a nineteenth century model of society that emphasised the breakdown of interpersonal relations and the social structure derived from industrial urban life (Katz and Lazarfeld, 1955, pp. 16–17). This conception has since become a less normative, behaviouristic approach as the social and psychological characteristics of television public were added to the message–effect equation. Recognised as individuals and as part of social groups, the members of television audiences were acknowledged to selectively choose and interpret media messages, being more prone to disconsider than to accept contents hostile to their personal beliefs (Morley, 1980, p. 6). In 1969, for example, the broadcast of the NASA moon landing was dismissed as 'just a television trick' by some people, who had experience of North American propaganda and thus were more prone to think that what they were seeing was a fake, rather then believe it could actually be human beings walking on the surface of the moon[4]. This example seems to confirm Aristotle's hypothesis that "what is possible is believable; we do not believe that what has never happened is possible, but things which have happened are obviously possible– they would not have happened, if they were impossible" (Aristotle, 1987, 51b17, p. 12). The realm of the believable,

[4] The author particularly remembers her school teacher investigating how many 6 year old students believed one or other hypothesis. The teacher's parents and grandparents reputedly had not accepted the possibility of a real moon landing.

however, is broader and more subtle than that formulated by Aristotle. People grant plausibility not only to what has already happened, but to anything that fits in with the patterns of their web of beliefs, as confirmed for example by the well–known case of Orson Welles' radio broadcast *War of the Worlds*. In October 1938, part of the population of the east coast of the United States of America was driven to panic by Welles' presentation of a Martian invasion. The reaction was not caused by previous experiences of attacks by extraplanetary enemies, as Aristotle's hypothesis would demand, but by the projection of Welles' fictional representation on the imagination of a public stressed by the circumstances of that particular period of North American history.

Different attitudes to television content have arisen from the recognition of television as only one influence amongst many others rather than sufficient cause for audience behaviour. For example, various levels of censorship have been practised not only in diverse parts of the world but also at different times in the same place. Age–based guidelines are set for many programs to protect younger viewers from 'inappropriate' material. These combined with warnings about the use of 'bad language', sex or violence are supposed to warn sensitive viewers about 'unsuitable' programs. The broadcasting of 'non–acceptable' contents has often been forbidden in daytime. In some cases more radical censorship has been applied and programs are banned regardless of their transmission times.

More positive approaches to the question of television content have tried to improve the quality of the material available to viewers by providing financial

support for educative programs. For example, commercially–based television is counterbalanced, to some degree, by an educative broadcasting service provided by most states in the Brazilian Federal Republic.

Attempts to improve the quality of the choice offered by television are regarded as being based on a higher respect for the public's perceived desire for freedom of choice than would be allowable with any form of censoring endeavour. It ought to be taken into account, however, that the public sees television as a source of entertainment rather than education. TV Cultura, the educative television channel run by the São Paulo state government, consistently maintains the third highest level of audience amongst the seven broadcast services available in that metropolitan region. This comparative result, however, becomes a little less impressive when absolute numbers and types of programme are considered. The three most popular items shown by TV Cultura between March and September 1997, for example, were children's programmes and did not achieve more than 10 Ibope[5] points (equivalent to 406 thousand households tuned in that channel), while Rede Globo and SBT[6] respectively attained up to 51 and 27 Ibope points with their prime time *novelas*[7] (equivalent to 2,139 and 1,093 thousand households). The

[5] *Ibope* is an acronym for *Instituto Brasileiro de Opinião Pública e Estatísticas*, the 'Brazilian Institute of Public Opinion and Statistics'. It was created in 1942, and its analyses are the basic instrument in the evaluation of television programmes in Brazil (Mattelart and Mattelart, 1987, pp. 57–58).

[6] *Rede Globo de Televisão* is the dominant Brazilian television network and, according to Mattelart and Mattelart, was in 1987 the 4th biggest television network in the world. It is one of the strongest branches of a Multimedia Conglomerate composed of newspapers, radio stations, advertising companies and cultural foundations (Mattelart and Mattelart, 1987, p. 43). SBT is an acronym for *Sistema Brasileiro de Televisão,* the second most popular television broadcasting group in Brazil.

[7] The Portuguese word *novela* has not been translated to the English term 'soap opera' as important differences between the two kinds of programme make doing so inappropriate. Unlike *novelas,* soap operas typically do not have a main story, and their narrative does not develop towards global closure. For a more detailed analysis of both soap operas and *novelas*,

Ibope point scores of other broadcast channels varied between 2 and 10 at the time, corresponding to the transmission of *novelas*, films, football matches and talk shows (Telejornal, *O Estado de S. Paulo*, 2 March to 28 September 1997).

As the commercial television industry can not afford to forget, the extent to which the public can be attracted to programs is limited. Well constructed promotion campaigns can stimulate people into trying a program, but keeping the audience depends on whether viewers are satisfied. Children do not watch *Sesame Street*[8], for example, to learn the numbers or letters, but because the programme is highly entertaining.

Despite how prompt most people are to criticise television content in general, viewers tend to be confident about the quality of their own choices (Dorr, 1986, p.20). Discussing patterns of television consumption, David Morley argues that audiences tend to select their viewing based on their familiarity with certain types of programmes. "The audience has easier access to familiar genres partly because they understand the language and conventions and also because they already know the social meaning of this type of output with some certainty" (Elliot, 1973, p. 21). Catering for a hypothetical average public that sees the medium as a means of entertainment and relaxation, commercial television stations tend to concentrate on light entertainment programmes. As the anticipated return obtained by such standard formats

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see for example R. C. Allen, 1992, "Audience–Oriented Criticism and Television", and R. Ortiz *et al.,* 1991, *Telenovela: história e produção*.

[8] *Sesame Street* is an internationally successful children's programme, created in North America.

feeds back into scheduling, the same conventional solutions are repeated and spread until the viewing public expects, even demands, predictability.

Based on the assumption that viewers do not make the best possible use of media in general, and television in particular, efforts to teach critical viewing skills have given rise in the last few decades to a number of initiatives for the development of 'media literacy'. While still in dispute about what it is that media literacy consists of[9], scholars have so far agreed on some points about how to improve it. For a large number of them, television is "a powerful force that needs counteracting with special training", and the classroom seems to have been elected as the most appropriate site for educating television viewers (Desmond, 1994, n. p.). Amongst the goals of most television literacy curricula are the understanding of how, and for what purposes, television content is produced; critical awareness of the goals and techniques of television advertising; recognition and rejection of stereotypical and antisocial values in programme content; reduction of the time spent watching television, and qualitative improvement of programme choices (adapted from Dorr, 1986, p. 138).

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[9] Wally Bowen gives the general Canadian definition according to which "Media Literacy is the ability to understand and evaluate all the symbol systems of a society" and introduces the following definition, developed by the Institute on Media Education at the Harvard Graduate School of Education: "Media Literacy is the ability to access, analyse, evaluate and produce communications in a diversity of forms"(Bowen, n. d., n. p.). R. Desmond expands this definition to include the role of 'effortfulness' and the interrelations of "prior knowledge, media comprehension and the 'real world'" in extracting more and qualitatively better information from media (Desmond, 1994, n. p.). John Pungente disputes the former approaches and gives the official definition of the Ontario Department of Education, included in the *Media Literacy Resource Guide*: "Media literacy is concerned with helping students develop an informed and critical understanding of the nature of the mass media, the techniques used by them, and the impact of these techniques. More specifically, it is education that aims to increase students' understanding and enjoyment of how the media work, how they produce meaning, how they are organised, and how they construct reality. Media literacy also aims to provide students with the ability to create media products" (Pungente, n. d., n. p.).

Many ‘educational’ efforts in the realm of critical television viewing skills are based on anecdotal evidence about the lack of media literacy of the public, and have been driven by authoritarian principles. When Roger Desmond differentiates between illiterate and educated television spectators by stating that “the literate viewer knows the difference between a satire like “The Simpsons” and a documentary about family life” (Desmond, 1994, n. p.), it is difficult to join the pleas for television literacy as an essential addition in school curricula.

Recommendations about qualitatively better programs from which more relevant content can be extracted are frequently limited in their ambition by a similar underestimation of the critical abilities of television audiences. The praise of programs presenting non–discriminatory attitudes and ‘high moral values’ is often based on the assumption, or even the expectation, that viewers mimic on–screen behaviour with the proponents of the programmes claiming the moral high ground. Michael J. Robinson, for example, proposes that, in North America, “belief in the worth and appropriateness of our government structures and belief in our own capacity to know and understand politics” is declining as a consequence of the television news system (Robinson, 1981, pp. 314–315), and proposes that “[e]very society must teach itself and its young that its basic values are good and its institutions are appropriate for achieving those values. . . . every nation must teach, train, socialise and indoctrinate its own *by conditioning them to believe*” (Robinson, 1981, p. 346, emphasis added). Recommendations of specific media content and otehr such solutions do not aim to enhance the development of viewers’ critical capability, but to “nurture, instruct and socialise children so that they become

productive, *supportive* members of our culture, able in their turn to produce and rear another generation of productive, *supportive* people" (Dorr, 1986, p. 16, emphasis added). Such recommendations also assume that programmes have only one meaning, that is accessible only by using the correct interpretation framework, implying, as Stuart Hall puts it when discussing L. Althusser's criticism of the concept of 'false ideology', that

> true knowledge must be subject to a sort of masking, the source of which is very difficult to identify, but which prevents people from "recognising the real". In this conception, it is always other people, never ourselves, who are in false consciousness, who are bewitched by the dominant ideology, who are the dupes of history (Hall, 1985, p. 97).

Not surprisingly, the same programs have been both acclaimed as masterpieces of 'pro–social' content and accused of instigating aggressive behaviour or fostering racial and sexist beliefs. *Sesame Street*, for example, is typically considered, by scholars and parents alike, to be an exemplary programme promoting social attitudes and increasing cognitive abilities. S. B. Neumann notes that analyses based on 'short–term gratifications theory', which focuses on the processes of learning rather than on cognitive outcomes, considered that "the overstimulating pace of *Sesame Street* and other programs geared to preschoolers contributed to hyperactivity and frantic behaviour" (Neumann, 1991, p. 94).

Understanding television programmes, as in reading any kind of text, is not simply a matter of following an exact formula until the message is decoded in the only possible way. A good example of the multiple possible interpretations

of a single text is given by Horace M. Newcomb and Paul M. Hirsch's discussion on how one episode of *Father Knows Best*, a North American sitcom, could be regarded either as an example of a programme framing social questions within a personal, reductive perspective, or strategically introducing important issues surrounding sex role discrimination in a mainstream television text (Newcomb and Hirsch, 1983, pp. 48–49). Understanding semiotic structures involves more than having and applying knowledge of the language in which the contents have been codified; it requires a continuous interaction between what is being apprehended and the web of beliefs together with previous experiences of the subject.

> The text . . . [is not] a self–sufficient entity that bears either the dominant ideology or its own meaning and exerts a similar influence on all its readers. Rather, it is seen as a potential of meaning that can be activated in a number of ways. Of course, this potential is prescribed and thus neither infinite nor free; the text does not determine its meaning so much as delimits the arena of the struggle for that meaning by marking the terrain within which its variety of readings can be negotiated (Fiske, 1992, p. 303).

The process of watching television is based on interchanges between both the content and the structure of the programme with the viewers' experience and understanding of the world. All semiotic systems, television included, are products of human experience, built upon socially constructed webs of belief, and primarily reinforce those methods of constructing reality that they originated from. Dorr illustrates this with a particularly interesting example of how language affects people's perception of physical phenomena:

> Science tells us that visible light contains continuously changing colour determined by the wavelength of the light, that the colour of any object is determined by the wavelengths of light it absorbs and those it reflects, and that the human visual system can register all wavelengths of visible light. Yet, in their everyday lives, people do not treat colour this way.
>
> Every culture divides the spectrum into sections, giving each a colour name, and these sections differ from culture to culture. Our biggest sections are called red, yellow, blue, and green and, of course, white and black. Very small sections are identified by names such as turquoise, eggshell blue, and navy. For us, these are the "real colours" of the world, but not for some other peoples. One culture, for instance, has two major colour categories, colours of living and of dead plants, while another has no yellow or orange as we know them but rather a colour whose wavelength falls between our two. For these peoples, their colours are the real colours of the world. The physical reality is that virtually all colours exist in everyone's world and can be received by everyone's visual system, but the constructed – and socially significant – reality is that different people's worlds are made up of different colours (Dorr, 1986, pp. 21–22).

The movement from ideology to media feeds back as webs of belief are constantly recomposed to include not only the apprehended content but also the decoding process. Beliefs shape media which reinforce or modify beliefs which, in turn, reshape media.

Many factors make television a major contributing element in determining how people understand the world and interpret reality. An important point is the pervasiveness the medium achieved in just six decades since the first public broadcasts in the 1930s. It took just over ten years after the effects of the great depression of the 1930s and the Second World War had dissipated,

for the number of American homes equipped with a television set to grow from a meagre 2% in 1949 to 90% by 1960 (Condry, 1989, p.10). At the beginning of the 1990s, 98% of the population of the USA had at least one television set at home, a higher proportion than the number of American households with telephones (Allen, 1992, p. 2). or even indoor toilets (Dorr, 1986, p. 8). Such rapid penetration was not only a First World phenomenon. Television stations were only set up in Latin America in 1950 (TV Difusora, Brazil, and Telesistema Mexicano, Mexico). Given that Armand Mattelart and Michele Mattelart state that only 25% of the Brazilian households were equipped with television sets in 1970 (Mattelart and Mattelart, 1989, p. 42), it seems at first that the penetration of television in Brazil occurred very slowly. Taking the facts of the Third World situation into account, however, reveals this not to be the case. Two thirds of those Brazilian homes without television in 1970 did not have an electricity supply at that time (Mattelart and Mattelart, 1989, p .42). In areas not fully provided with utility services, watching television is often a very different activity from the home–centred mode characteristic of the wealthier areas of the country, and of the First World. The available television sets are often those acquired by organisations such as churches or City Councils, and watched by groups, sometimes numbering in the hundreds, of people congregated around a single set. Allen is probably considering this communitarian mode of television viewing when he arrives at the conclusion that "[a]t least 90% of families in Venezuela *have access* to television" (Allen, 1992, p.2, emphasis added). It also has to be considered in the evaluation of the data from 1970 that only in 1978 did television

broadcasts become available throughout the whole of the Brazilian territory (Mattelart and Mattelart, 1989, pp. 37–38).

The massive investments in television infrastructure made by the military governments that ruled Brazil from the beginning of the 1960s to the end of the 1970s are themselves the result of the recognition of the importance of television as an instrument for the political and cultural unification of that country (Mattelart and Mattelart, 1989, p. 36). The results of such a policy are apparent in the statistics. By 1985, 22 million Brazilian households had at least one television set. Frequently expressed concerns about ideological side–effects of such national homogenisation also testify to the influence of television in contemporary Brazil. Media depictions of Brazilian *favelas*[10] often stress the presence of the television set and the contrast of the opulence depicted in broadcast material with the poverty of the families. The film *Bye, Bye Brasil* (Cacá Diegues, 1980). emphasised television as a pervasive instrument of the Southern domination and cultural disenfranchisation of the Northern areas of the country.

Other characteristics combine with television's pervasiveness making the medium not only a major influence in the composition of belief systems within most contemporary Western societies, but, as it will be shown, a particularly powerful one. For an ever increasing number of people throughout the world "[t]elevision is an unremarkable part of their daily activities, accepted as the source of believable news, important information and education, useful product information, accurate social knowledge, pleasurable entertainment, and relaxing companionship" (Dorr, 1986, p. 8).

[10] *Favela* is the Brazilian term for the local equivalent to a shanty town.

The television set has come to be an essential home appliance, providing an ubiquitous stream of entertainment and information. It is even difficult to conceive of contemporary life without it. Many people keep it on continuously as a source of 'companionship', and daily routine is often determined by the scheduling of television programmes. In many Brazilian homes, for example, children's 'bed time' is announced by the opening theme of *Jornal Nacional*[11], and dinner set according to when the family's favourite soap opera is shown.

Further factors add to the pervasiveness and familiarity of television making the medium particularly prone to critically unaware usage. Given that this thesis proposes an interactive artefact for experimenting with the role of form in the construction of televisual meaning, and hypothesises that such an exercise can contribute to an increase in critical awareness, it is pertinent to start by evaluating those conditions considered to favour acritical television consumption. The second part of this first chapter concentrates on aspects related to camera mediation and television viewing circumstances. Formal issues will be discussed in Chapter 2.

Television Images

To appreciate how the notion of the objectivity of images produced with cameras originates, as intended for the following section, it is necessary to review some fundamental concepts of semiotics. Charles Sanders Peirce's semiotics is based on the idea of a triadic relation between the object, which is

[11] *Jornal Nacional* is the most popular Brazilian news programme, presented by Rede Globo, Monday to Saturday, at 8 p.m.

the thing in itself; the interpretant, which is the idea of the thing; and the sign, which is the medium by which the interpretant arises from the object (Figure 1).

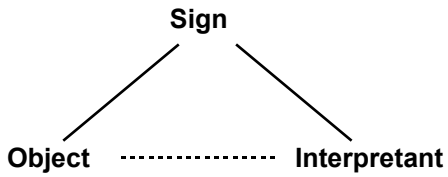

Figure 1 – The interpretant relates to the object solely through the mediation of the sign.

The most widely known, and according to Peirce himself most fundamental division of signs (Peirce, 1931b, paragraph. 275, p. 157), is into icons, indices and symbols.

> One very important triad is this: it has been found that there are three kinds of signs which are all indispensable in all reasoning: the first is the diagrammatic sign or *icon*, which exhibits a similarity or analogy to the subject of discourse; the second is the *index*, which . . . forces the attention to the particular object intended without describing it; the third is the general name or description of ideas or habitual connection between the name and the character signified (Peirce, 1993c, p. 243).

These three types of signs correspond to Peirce's three phenomenological categories: Firstness, Secondness and Thirdness. Firstness is

> the mode of being which consists in its subject's being positively such as it is regardless of aught else. That can only be a possibility. For as long as things do not act upon one another there is no sense or meaning in saying that they have any being, unless it be that they are such in themselves that they may

> perhaps come into relation with others (Peirce, 1931, p. 7 paragraph 25).

Secondness is the mode of being of whatever is actual, of that that bears some relation to some other actual and thus goes beyond mere possibility. As Secondness fulfils the requirement for existence that was missing in Firstness, Thirdness relates to the intervention of the mind that Secondness lacks, and "is basically explained as mental apprehension (in the sense of intelligibility)" (Santaella, 1988, p. 60). Sobchack defines icons, indices and symbols in terms that describe their correspondence to Peirce's categories:

> An *iconic* sign is in *monadic* relation with what it signifies. That is, it claims similarity, resemblance, physical identity to its signified. . . . An *indexical* sign is in *dyadic* relation with what it signifies. It does not claim resemblance or identity, but rather contiguity with what it signifies; that is, an indexical sign has some existential bond or connection with what it represents. . . . Finally, a *symbolic* sign is in *triadic* relation with what it signifies. It does not depend upon resemblance or contiguity, but rather upon its formal connection with the signified and upon its conventional use. In other words, the symbolic sign's power to signify is ruled by *convention*: perceptive and expressive persons coming together in cultural agreement whereby the relation between the signifier and its signified is arbitrarily made to *stand as* a sign (Sobchack, 1992, pp. 74–75).

Figurative images are often understood as examples of icons, not only due to the common usage of the word icon meaning "an image or statue" (Allen, 1990, p. 584), but also due to these signs relating to their objects through similarity.

> In this sense the [television] code is always *figurative* or *iconic*; I perceive certain shapes on the video as images of other already known shapes, if the first ones have structural elements similar to the second ones, and if these are enough to be considered their 'reduced model' (Eco, n. d., p. 110).

Maria Lúcia Santaella proposes a recursive application of Peirce's system of categories according to which "in macrostrutural terms, the musical sign is to Firstness as the visual is to Secondness and the verbal is to Thirdness. This means that each of these systems has its logical axis of dominance in each of these categories" (Santaella, 1988, p. 61). As Peirce's phenomenological categories are essentially dynamic and interdependent, the three semiotic systems; musical, visual, and verbal are taken separately, and the same three categories are recursively applied to them. For the visual system, Santaella identifies three main types of visual signs: non–representational forms, figurative forms and symbolic forms, with the dominant nature of each being respectively iconic, indexical and symbolic. Applying another recurrence of Peirce's categories to the subgroup of figurative images, with which this thesis is concerned, Santella considers that technical images are "the most genuine manifestations of indexicality – that is, the physical registering or recording of existing objects and situations" (Santaella, 1988, p. 74).

This classification goes beyond the immediate understanding of images generated with cameras as icons due to the relation of similarity they bear to their objects, and incorporates the fact that Peirce himself understood photographs as genuine examples of indexical signs.

> Photographs, especially instantaneous photographs, are very instructive, because we know that they are in certain respects exactly like the objects they represent. But this resemblance is due to photographs having been produced under such circumstances that they were physically forced to correspond point by point to nature. In that aspect, then, they belong to the second class of signs, those by physical connection (Peirce, 1931b, paragraph 281, p. 159).

A great part of the 'realism' and objectivity attributed to television originates from the medium's prominent indexicality, that is, the impression of objectivity generated by television is largely based upon the assumption that the image on the screen bears a direct, physical relation to that which it represents.

The generalised belief in what A. Machado calls 'the mirror illusion', "according to which [technically produced] images are accepted as if they were 'reflections' of the things that can be seen and felt in the so–called 'real world'"[12] (Machado, 1988, p. 213) originated prior to the development of, and extends beyond, television. André Bazin traces the origins of such mirror illusion back to the nineteenth century:

> The guiding myth . . . inspiring the invention of cinema, is the accomplishment of that which dominated in a more or less vague fashion all the techniques of the mechanical reproduction of reality in the nineteenth century, from photography to the phonograph, namely an integral realism, a recreation of the world in its own image, an image unburdened by the freedom of interpretation of the artist or the irreversibility of time (Bazin, 1992, p. 36).

[12] The original text, in Portuguese, reads "segundo as quais as imagens anotadas nos suportes de registro são 'reflexos' das coisas sensíveis e visíveis do mundo dito real como acontece nos espelhos".

The reputation of the fidelity of images recorded with cameras extends to all images constructed according to the principle of the *camera obscura*, and can therefore be traced back at least to the Renaissance. The systematisation of central perspective[13] by Leon Baptista Alberti's *Della Pittura* (1435). conferred enough scientific credibility to the system that in the last five centuries it has become inculcated into Western societies to the degree that drawings based on its principles are generally acknowledged as the most realistic and objective representations. Within his considerations about icons, Peirce acknowledges the great degree of illusion realistic paintings can produce.

> So in contemplating a [realistic] painting, there is a moment when we lose the consciousness that it is not the thing, the distinction of the real and the copy disappears, and it is for the moment a pure dream, not any particular existence, and yet not general. At that moment we are contemplating an *icon"* [14] (Peirce, 1993, p. 163).

To understand images produced with cameras as indices is to assume that, beyond the mere resemblance, there is a one–to–one correspondence between parts of the three–dimensional object depicted and its representation in central perspective. This level of equivalence has been postulated not only for technologically mediated pictures, but also for paintings. Alberti's description

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[13] Central perspective is a form of projection of the tridimensional space on a two–dimensional surface based on the convergence of all orthogonal lines to a central point.

[14] The concept of 'icon' is one of the most intricate within Peirce's classification of signs, because "[a] sign by Firstness is an image of its object and, more strictly speaking, can only be an *idea*. For it must produce an Interpretant idea; and an external object excites an idea by reaction upon the brain. But most strictly speaking, even an idea, except in the sense of a possibility, . . . can not be an Icon. . . . But a sign may be *iconic*, that is, may represent its object mainly by its similarity, no matter what its mode of being" (Peirce, 1931, paragraph 276, p. 157).

of the imaginary ‘vision rays’ that connect the eye to what is seen describes the existential relation assumed to exist between ‘realistic’ drawings and paintings and the objects or events they represent.

> Let us investigate the reasons for this, beginning with the maxims of philosophers who affirm that the plane is measured by rays that serve the sight – called by them visual rays – which carry the form of the thing seen to the sense. For these same rays extended between the eye and the plane seen come together. . . . We can imagine those rays to be like the finest hairs of the head, or like a bundle, tightly bound within the eye where the sense of sight has its seat (Alberti, 1966, pp. 45–46).

The use of physical devices apparently decreases the interpretative intervention of the artist on the final picture. For a long time mankind is known to have had knowledge of the *camera obscura*. When light is allowed to penetrate a closed dark room solely through a small point, the image of elements outside the pinhole appears upside down on the wall opposite to it (Figure 2). The device is known to have been used by artists such as Jan Vermeer (Machado, 1984, p. 31), who would point the pinhole of a portable box at the scene to be painted and, inside the box, trace the outlines on a screen located on the opposite side of the box to the pinhole. With the development of the photographic emulsified card in the nineteenth century the procedure was automated, resulting in a very basic photographic camera that that operated on the same fundamental principles as those of today. The closing of the process inside a black box masks the intervention of the artist in the generation of the image. As the light reflected by the object in front of the aperture penetrates the camera and materially affects the film, a direct physical

link is considered to be established between the original object and its photographic image.

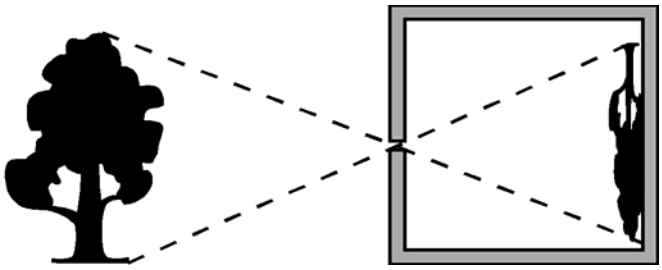

Figure 2 – Conceptual representation of the *Camera Obscura.*

The reputation for fidelity of the central perspective code, which led to the elimination from general use of other forms of two–dimensional representation and its acceptance as the most realistic and approximate of human visual experience is, however, supported mainly by culturally induced factors. Before the systematisation of central perspective in the Renaissance, other systems of spatial representation were more widely known. Angular, inverse, and axonometric projections, characterised respectively by the existence of multiple vanishing points, reduction of the objects in first plane, and absence of vanishing point, were usual during Middle Ages and in Eastern Art (Machado, 1984, p. 66). Santaella's classification of visual signs recognise as symbolic all spatial systems of convention used to reproduce the visible world.

> What becomes predominant here is the fact that it is not possible simply to imitate the outer shape of an object without having first learned how to construct such a shape– that is, without prior acquisition of a conventional vocabulary for the graphic or plastic

> projection of images. . . . The purest example of a regulated principle– that is, one precisely coded for figurative projection– is that of central perspective in its construction of rational, constant, homogeneous space (Santaella, 1988, pp. 74–75).

Even those authors, such as Roland Barthes, who consider the photographic image the perfect *analogon* of reality (Barthes, 1993, p. 196–197). acknowledge the existence of a connotative level that is inherent to the processes of both, the production and the reception of photographic messages.

> The photographic paradox can then be seen as the co–existence of two messages, the one without a code (the photographic analogue), the other with a code (the "art", or the treatment, or the "writing", or the rhetoric, of the photograph); structurally, the paradox is clearly not the collusion of a denoted message and a connoted message (which is the – probably inevitable – status of all the forms of mass communication), it is that here the connoted (or coded) message develops on the basis of a message *without a code.* This structural paradox coincides with an ethical paradox: when one wants to be "neutral", "objective", one strives to copy reality meticulously, as though the analogical were a factor of resistance against the investment of values (such at least is the definition of aesthetic "realism"); how then can the photograph be at once "objective" and "invested", natural and cultural? (Barthes, 1993, pp. 198–199).

Most authors agree that the processes of creating and understanding pictures generated with cameras are highly dependent upon knowledge of a visual code according to which those images are organised (for example Machado, 1984, Hall, 1985, Flusser, 1985, Seiter, 1992). The system of conventions upon which photographic images are based is so common that the ways in which it differs from natural visual experience tend to remain unnoticed.

Acknowledging the existence of cultural conventions in photographic representations allows for technical images to be classified in Peirce's category of symbols instead of indices or icons. The relation between symbols and their objects consists of mental associations, and depends upon habit. They are, for the most part, conventional or arbitrary (Peirce, 1993, p. 162). Central perspective itself, and the compositional processes inherent to the use of cameras such as framing, focus or lighting, are habits in Peirce's sense of "general rules to which the organism has become subjected" (Peirce, 1993b, p. 162). The same sign, such as an image created with a camera, can be therefore understood as icon, index or symbol.

> Phenomenological categories are omnipresent; that is, they are simultaneously present in all phenomena, so that when a phenomenon presents itself as a sign, all three semiotic levels– iconicity, indexicality, symbolicity – are indissolubly connected and intricately interwoven. Assigning a level to a given matrix thus entails identifying one principle of logical dominance which above all characterises this system. It therefore involves a search for a kind of spinal column as a basis for measuring the degrees of variation and modes of articulation of the other signic levels in relation to that which is most prominent in the system of signs in question (Santaella, 1988, p. 64).

It is possibly due to their pronounced indexicality that technically produced images in general, including those of television, tend to be accepted as real. "In the idea of reality, Second is predominant; for the real is that which insists upon forcing its way to recognition as something *other* than the mind's creation" (Peirce, 1931, paragraph 325, p. 163). The nature of perception that culminates in the acceptance of visual sign as objective representation is

reinforced in audio–visual media as what Santaella would call the iconic quality of audio information supplements the indexicality of the image, masking symbolic levels of codification.

Television images, as with those of cinema, appear even more realistic as these kinetic media operate with both, spatial and temporal cues. To introduce his discussion on the realistic interpretations of an animation with abstract figures, V. F. Perkins states:

> The credibility of movies comes, I believe, from our habit of placing more trust in the evidence of our eyes than in any other form of sense data: a film makes us feel like eye–witnesses of the events it portraits. Moreover, our belief extends even to the least realistic forms of movie because movement so strongly connotes life. The source of meaning of the term "animation" indicates that we regard a moving picture, even a cartoon, as a picture *brought to life.* In the early days of movies words like cinematograph and kinetoscope, which meant *moving* picture, were interchangeable with words meaning *living* picture (vitascope, biograph, bioscope, etc.). The powerful combination of picture and movement tempts us to disregard the involvement of our imaginations in what we see (Perkins, 1992, p. 54).

In the specific case of television, the prevailing indexicality of camera–based techniques conjoins with live transmission in generating an even stronger illusion of having the world portrayed 'as it really is'. Television is the first visual technology in which there can be an apparent coincidence between the time in which an event happens and the moment of its exhibition. The resultant sense of immediacy adds to the vicarious ubiquity implied in the multiple locations and positions of television cameras, conferring upon

spectators the power to, in some respects, see better on television than if actually present on the scene (Stam, 1983, p. 24).

The absence of a noticeable time lag between the presence of the object represented in front of the camera and the exhibition of its image to the public implies an uncertainty about the evolution and outcome of the displayed events in some ways related to real–life experience. This impossibility of fully predicting the next scenes to be displayed exists for both the spectators and the broadcasters. From the many examples of unexpected events changing the intended broadcast, the explosion of the North–American shuttle *Challenger* is particularly representative and probably the most known. Arlindo Machado rephrases a description from the Brazilian journalist Paulo Francis that describes the situation created in appropriately vivid terms:

> NBC's live transmission of the event allowed the American public to live some moments of absolute stupefaction with the sudden collapse of the ritual intended to praise one more step in the conquest of space. While the spaceship exploded, the stupid voice of the NASA official narrator continued to explain the efficiency of the flight, generating an unbearable contrast. As everything became evident, the voice stopped and the scene was accompanied by heavy silence. The spaceship was already in pieces when a reverse shot showed the families of the astronauts still clapping at the Kennedy Space Centre, their hands soon vacillating, smiles dying on their lips, a shadow of horror threatening to disfigure their faces[15] (Machado, 1988, p. 77).

[15] The original text reads: "A rede americana NBC transmitia ao vivo o evento e permitiu ao público americano que a acompanhava viver alguns momentos de absoluta estupefação, vendo ruir, de repente, num piscar de olhos, todo o ritual sacralizante montado, pela televisão inclusive, para cantar mais uma etapa na conquista do espaço. Enquanto a nave explodia, a voz estúpida do narrador oficial da NASA continuava ainda a explicar a eficiência do vôo, criando um contraste insustentável. Até que tudo se tornou evidente, calou–se a voz e a cena se fez acompanhar de um silêncio pesadamente significativo. A nave já estava em pedaços quando um contracampo mostrou uma tomada dos familiares dos astronautas, ainda

As the unpredictability that makes live transmission so fascinating for the viewer represents a loss of control over the broadcast, television's full potential for live transmission tends not to be exploited. It has even been totally forbidden for political reasons whenever circumstances are considered particularly stressful. In Brazil, for example, live television was totally banned by the military government as part of its censorship policy (Machado, 1988, p. 76). Apart from the possibility of displaying scenes against the interests of the networks and other institutions, live transmission is considered by some to be potentially dangerous due to what they regard as its inherent power for mobilisation. Simultaneous broadcast implies that the displayed event is not yet completed, its outcomes not irreversibly defined. There is, therefore, room for intervention. Despite the claims of restoration of both democracy and freedom of expression at the time, the Brazilian government, for example, decided to forbid live broadcast of the parliamentary session that decided against the re–establishment of direct presidential elections in 1984. Discussing this incident, Machado suggests that

> in the case of simultaneous transmission the spectator feels as a co–participant of an evolving process and, if the message is understood as particularly relevant, such impression of participation can convert into real mobilisation[16] (Machado, 1988, p. 76).

Television's potential for live transmission has been many times considered to be the prime essence of the medium. Claims that live broadcast is the intrinsic

aplaudindo no mirante do Centro Espacial Kennedy, as palmas das mãos logo vacilando, o sorriso morrendo nos lábios, enquanto uma sombra de terror ameaçava deformar suas faces".

[16] The original text in Portuguese reads : "diante da emissão simultânea o espectador se sente co–participante de um processo em andamento e se a mensagem lhe diz respeito particularmente esta impressão de participação pode se converter numa mobilização real ."

and most appropriate mode of television find theoretical support in the ever–changing nature of the electronic image (Heath and Skirrow, 1977, pp. 53–54), and give rise to an aesthetics of television that feeds back into the fantasy of unmediated presentation. Despite the fact that live transmission represents only a small part of material transmitted by most broadcast channels, "the medium in its own practices seems to insist . . . upon an ideology [and aesthetics] of the live, the immediate, the direct, the spontaneous" (Feuer, 1983, p. 14).

Other features reinforce the impression of immediacy that is characteristic of television. Stephen Heath and Gillian Skirrow call attention to the fact that the continuous succession of programmes (and units of programme in the case of commercially–based broadcasting), commercials and trailers that compose what Raymond Williams calls 'television flow' (Williams, 1974, pp. 86–118). "suggests a permanently alive view on the world" that supports the immediacy effect (Heath and Skirrow, 1977, p. 54). John Ellis notes how the scheduling of broadcast networks demands viewers' availability at very specific times, generating a feeling of present–moment specificity related to that of liveness (Ellis, 1992, p. 345).

The considerations above were not made to imply, however, that audiences should be seen as helpless victims of an infallible deceitfulness inherent to television. The 'realism' established by the prominent indexicality and immediacy of television depends upon the viewer's collaboration and is strongly influenced by the circumstances in which television is watched.

Watching circumstances

Realistic representation in painting, photography, and also in more strictly narrative media, from literature to television, necessarily depends on the addressee's willingness to disregard the mediation and operate with the representation as if it were the object represented. Important considerations about the regime of belief thus established are given in Christian Metz's discussion of the process of 'suspension of disbelief' as practised by spectators of cinematic fiction.

> It is understood that the audience is not duped by the diegetic illusion, it 'knows' that the screen presents no more than a fiction. And yet, it is of vital importance for the correct unfolding of the spectacle that this make–believe be scrupulously respected, . . . that everything is set to work to make the deception effective and to give it an air of truth (this is the problem of verisimilitude). Any spectator will tell you that he 'doesn't believe it', but everything happens as if there were nonetheless someone to be deceived, someone who really would 'believe in it' (I shall say that behind any fiction there is a second fiction: the diegetic events are fictional, that is the first; but everyone pretends to believe that they are true, and that is the second; there is even a third: the general refusal to admit that somewhere in oneself one believes they are genuinely true) (Metz, 1982, p. 72).

Engagement with televisual fiction presented as such, for example soap operas or serials, involves a similar process of 'suspension of disbelief'. The spectator recognises the events presented on screen as fictional and is willing to disavow this knowledge in order to be engrossed in the plot. In so doing, television viewers generate within themselves the credulous spectator Metz refers to, not as a psychotic detachment from reality but in a controlled

process in which denial and acceptance of the fictional reality coexist subordinated to the viewer's acquiescence. This special psychological regime is referred to by Metz as 'fictional capacity', and acknowledged as a necessary pre–condition for the existence of the diegetic cinema itself.

> The diegetic cinema as an institution could not function– and it would not therefore had begun to exist, . . .– if the spectator, already 'prepared' by the older arts of representation (the novel, representational painting, etc.). and by the Aristotelian tradition of Western arts in general, were not capable of systematically adopting, and renewing at will, [this] special regime of perception (Metz, 1982, p. 118–119).

In the case of cinema, a second factor that Metz calls 'filmic state' operates in parallel with the fictional capacity, reinforcing engrossment within the diegesis. Generated by the immobility of the spectator, the darkness of the movie theatre and the sealing–off of ambient noises and everyday pressures, the filmic state produces a kind of dream condition supposed to predispose the spectator for suspending disbelief (Metz, 1982, pp. 117–118). Despite the absence of those environmental conditions that engender the filmic state, however, telespectators effectively suspend disbelief when presented with television narratives. Extreme cases in which television fiction was confused with reality demonstrate how vigorous engagement with television diegesis can be. Muniz Sodré cited the case of an actress attacked on the street due to playing a prostitute on television, and generalises: "[t]elevision has so much influence in Brazil that it is typical for people to confuse real life and *novelas*" (Sodré, interviewed by Lamb, 1996, p.1.18). The theoretical formulation of a credulous spectator who believes the representation does not imply an

hallucinatory state in which the viewer fully believes the diegetic illusion, as in the extreme examples above, but a symmetrical movement in which the fictional world is simultaneously recognised as such and accepted as if it were real.

Given the absence of the isolation and immobility that make it possible for the filmic state to arise, Robert Stam argues that telespectators fictional capacity could be supported by the insubstantial nature of television images. The characteristics that engender the 'filmic state' are shared by both cinema and classical theatre, but it is well–known that engagement with the fictional universe tends to be stronger in cinema than in theatre. Metz attributes the ease with which cinema generates impression of reality to the doubly imaginary nature of the medium. In cinema or theatre fictional narrative involves an imaginary universe being represented through real materials and actors. While the theatrical representation is tangible, in cinema it is a projection, as immaterial as the fictional universe itself. For Metz, this difference in the balance of immateriality of representation and represented implies that

> the theatrical fiction is experienced more . . . as a set of real pieces of behaviour actively directed at the evocation of something unreal, whereas cinematic fiction is experienced rather as the quasi–real presence of that unreal itself; the signifier, already imaginary in its own way, is less palpably so, it plays more into the hands of the diegesis, it tends more to be swallowed up by it (Metz, 1982, pp. 66–67).

Expanding such reasoning to television, Stam assumes the impression of reality generated by a medium is inversely proportional to the materiality of that medium's representation:

> It might even be argued that in some respects identification in a medium varies in *inverse* proportion to its representational accuracy. . . . The impression of reality is stronger in film than in theatre precisely because the phantomlike figures on the screen easily absorb our fantasies and projections. Television, by this same logic, allows a more powerful identification because its signifier entails an even higher degree of imaginariness. It constitutes quintessential illusion, and it is hardly surprising that Marshall McLuhan, from a very different theoretical perspective, insists that its impoverished images, which are ultimately 'not even there', make it a 'cool' medium in which the viewer involvement is all the more 'hot' and intense' (Stam, 1983, pp. 25–26).

McLuhan's argument is based on the assumption that television's low resolution demands a high degree of participation from the viewers, who need to fill in the gaps between the lines and dots that compose the screen mosaic in order to complete the image (McLuhan, 1967, pp. 31–42 and 329–360). Stam understands such demand for a high degree of participation from the spectator to have the effect of heightening the imagination, increasing the potential for engagement with the fictional universe. Machado, on the other hand, considers that the low resolution of the medium makes television viewers less likely to be absorbed by the diegesis.

> The truth is that the video image, small, broken, without depth, barely realistic, and of precarious illusionistic effect, can not fascinate the spectator enough to make him loose awareness of

> his own sensations; on the contrary, the precariety of the media generates critical distance and increases the chance of intervention in the symbolic universe. . . . In the cinema, on the other hand, the hypnotic weight of the mirror illusion is much stronger, enough to cause the spectator to ignore himself and the space he occupies in the auditorium and become completely immersed in the diegetic time–space of the narrative[17] (Machado, 1988, pp. 61–62).

McLuhan specifically states that "[b]ecause the low definition of TV insures a high degree of audience involvement, the most effective programs are those that present situations which consist of some process to be completed" (McLuhan, 1967, pp. 340–341). Whether such completion happens through a deep engagement with the diegetic universe or a critical detachment from it, the circumstance in which television is watched is also bound to influence the process of suspension of disbelief not only in quantitative but also in qualitative ways.

The television equivalent of the filmic state is a condition in which diegesis alternates with viewers' reality in a way cinematic representations can not. Consumption of cinema and theatre depend upon ritual preparation: leaving home, acquiring a ticket, sitting in a dark room amongst strangers, dedicating full attention to the presentation. Television, on the other hand, is turned on casually and exists within the domestic environment, mingled in with many other stimuli. Viewers do not always pay full attention to the television set, as

[17] The original text, in Portuguese, reads: "A verdade é que a imagem do vídeo, pequena, estilhaçada. sem profundidade, pouco 'realista' e de efeito ilusionista extremamente precário, não pode fascinar o espectador a ponto de fazê–lo perder a vigilância sobre suas próprias sensações, pelo contrário, a precariedade dos meios serve–lhe de distanciamento crítico e de estímulo para a intervenção no universo simbólico. . . . Já no cinema, o peso hipnótico do efeito especular é muito mais esmagador, a ponto de fazer muitas vêzes o espectador ignorar–se a si próprio e ao espaço que ocupa na sala de exibição, para mergulhar inteiramente no espaço–tempo diegético da narrativa"

people are often involved in other activities such as having a conversation, eating or reading while the television is on. Research has shown that attention given to television varies according to many factors, including viewers' ability to predict changes in programme material (Krull and Husson, 1979, p. 89). Even when a television programme happens to engage the viewers with an intensity comparable to that of cinema for a while, images and sounds from the environment will sooner or later bring the social world back to their attention. Ellen Wartella recognises as characteristic of "the normal course of watching television, [that] other distractions in the room take children's as well as adults' attention away from the television set" (Wartella, 1980, p. 525). The great fictional capacity of television viewers, that includes in its construction the experience of cinema and continuous self–reinforcing exposure to television itself, allows for such constant comings and goings between reality and representation without compromising the engagement with the latter.

The unifying interchange of different levels of fiction and realism that arises from the apparently accidental sequence of on–screen events that compose the television 'flow' combines with the diffusion of diegetic information through 'real' daily experience established by the television viewing situation. The result is a convergence of fiction and real life, a 'television state', that allows for concessions otherwise unthinkable, in which television characters share viewers' reality and fictional events influence daily behaviour.

For this phenomenon to be possible, however, it is essential that viewers either ignore or are unaware of the narrative strategies used for constructing

television messages. Far from naturalistic, television representations are articulated through a set of conventions that bear, at best, only a tenuous resemblance to everyday experience of temporal and spatial relations in the 'real world'. Chapter 2 will discuss some of these syntagmatic structures, why they tend to remain unnoticed and the nature of their influence on the construction of the meaning of television messages.

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Chapter 2 – Understanding Television

Making sense of television messages is a skill acquired at early age. Dafna Lemish reports children as young as sixteen months old turning on the set for the purpose of actually watching television, not for merely playing with the knobs. During the first half of the second year of life, personal preferences begin to emerge as babies start to notice the presence of television more often and to pay attention to it for increasingly longer periods of time (Lemish, 1987, pp. 47–48). "By 2 ½, they are already regular viewers with clear habits and expectations" (Lemish, 1987, p. 56). Exposed to the idiosyncrasies of such an ever–present medium from very early age, viewers do not recall having started to understand television more than they remember having learned their native languages. Both processes are in fact said to happen at similar age, with television often being used as a source of vocabulary. (Lemish, 1987, pp. 40–41).

Most of the evidence that making sense of television is the result of adopting the conventions according to which messages are organised in the medium is derived from developmental studies of children's understanding of televisual messages. Generally agreeing that "children's abilities to make sense of television change greatly as they grow older" (Wartella, 1980, p. 517), the overwhelming majority of authors tend to base their work on the debatable existence of 'correct' readings of television messages, basically identified as the typical interpretations of older viewers. W. A. Collins, for example, compared the information that adults considered absolutely central to the plot of a television programme with the points children remembered from the same programme, and concluded that comprehension of television narratives

improves notably during middle childhood (Collins *et al.*, 1978, p. 389). This phenomenon is related by the author to a progressive increase in the ability to recall information essential to the plot, in its turn associated to older children's greater capacity to focus on important points while ignoring non–essential content.

As a consequence of their poor identification of relevant content, Collins considered young children less likely to make correct inferences about the interrelationships between discrete scenes of a dramatic plot (Collins, 1983, p. 127). Other authors, such as Leifer *et al.* and Berndt and Berndt, similarly suggest that the ability to make the abstract inferences necessary to understand narratives develops with age (Leifer *et al.*, 1971, p. 1514; Berndt and Berndt, 1975, p. 904). Older children's more complete understanding of television is associated with both, the age–related development of cognitive skills and an increasing experience with television genres and syntax throughout childhood. Analysing patterns of attention, R. Krull verified that children's "vocabulary of television viewing techniques" broadens significantly with age. Older children are said to react to a wider range of program attributes and to do so more consistently, while younger ones are more likely to pay attention to surface qualities of television messages without necessarily dealing with their contents (Krull, 1983, pp. 114–118). Younger children are inclined to concentrate on the highly salient and fragmented units of information without dealing with the overall structure and sequence of stories (Salomon, 1979, pp. 72–73) not only because the concept of narrative structure develops throughout childhood (Applebee, 1978), but also because making sense of the stream of information flowing from television depends more heavily on

learning and experience than do direct responses to the perceptual attributes of television messages (Huston and Wright, 1983, p. 45). Such studies give rise to the hypothesis that the messages young children extract from television may be different than those apprehended by adult viewers (Collins, 1975, p. 37).

It is important to underline that understanding television messages does not necessarily involve being aware of the specific sets of conventions upon which televisual narratives are organised, but rather becoming immersed in their apparent naturality. Televisual narrative structures are ordered by temporal and spatial relations that may not correspond to real–life experience, but that, through habit more than accuracy of representation, come to be apprehended as subtle and transparent. “It is only when the conventions are violated, or when a technical glitch renders them visible, or when we watch another culture’s television operating from a different set of conventions that we became aware of just how constructed and unnatural the world of television really is” (Allen, 1992, p. 7). As many narrative devices used in television were inherited from cinema, their artificiality is likewise and didactically displayed in early films. Some techniques used in the first decades of narrative cinema compose a particularly illustrative testimonial of the struggle to develop the now pervasive grammatical rules of the moving image. A review of some aspects of the history of cinema can not only shed some light on the structure and implications of the otherwise ‘transparent’ television narrative techniques, but will also indicate the appropriate starting points for the development of the Semiotic Toy, which is intended to generate experimentation with these very same techniques via play. The following

sections discuss some examples relevant to three main points used in the construction of narratives with moving images: organisation of space, representation of time, and attribution of causality.

It must be stressed that the use of examples from the history of cinema to illustrate the artificiality of narrative strategies adopted in broadcast television does not imply the identity of both media. Beyond the obvious common ground of their use of moving images, there are many differences between cinema and television that ought not be forgotten. Some of these dissimilarities have already been identified in the previous chapter, and others will emerge throughout the present chapter.

Narrative Strategies – History of Cinema

Initially, cinema's ability to register movement with photographic accuracy was remarkable enough to be itself a form of entertainment. The earliest films produced concentrated, therefore, on demonstrating the fascination of the new technology, with no narrative intentions. One or two minutes long, these films showed trivial events, such as people walking (*Brooklyn Bridge*, Lumière, 1896), trains in movement (*Empire State Express*, Dickson, 1896), and waterfalls (*The Cascade*, Lumière, 1896). As events unfolded in front of the camera, storytelling started to emerge. Lumière's *The Gardener and The Bad Boy*[18] (*L'Arrouser Arrosé*, 1895), for example, showed a boy stepping on the hose used by a gardener just to release the water as the man looks at the nozzle. Scholars disagree whether *The Gardener and The Bad Boy* is the

[18] *The Gardener and The Bad Boy* is also known as *Teasing the Gardener* and *Watering the Gardener*.

recording of a real–life event (as defended by Kracauer, 1992, pp. 11–12, and implied by Musser, 1990, p. 141) or the recording of a pre–arranged scene (Reisz and Millar, 1973, pp. 16). In any case, beyond having been one of the first comic movies ever produced, *The Gardener and The Bad Boy* was one of the earliest films to represent a complete plot; that is, in Aristotelian terms, a story with beginning middle and end.

Figure 1 – *The Gardener and the Bad Boy* (reproduced from Musser, 1990, p. 142).

One of the most important names in the development of the art of telling stories with film, the French director Georges Méliès, is agreed to have discovered cinema's narrative possibilities almost accidentally while recording daily scenes.

> At first, Méliès roamed the streets with his camera 'shooting' people, trains, soldiers– anything that moved– for the mere pleasure of it. One day while he was photographing a Paris street scene his camera jammed; the film had caught inside the aperture gate. Méliès cleared the gate, readjusted the film, and resumed

> shooting. When the film was projected later, he was surprised to see on screen a bus suddenly turn into a hearse. The bus he had been photographing when the camera jammed had gone its way while he was readjusting the camera, and in its place a hearse had appeared. When Méliès started shooting again, the camera had taken a picture of the hearse on the same bit of film and in the same place where the bus had been photographed (Jacobs, 1939, p. 23).

A professional magician, Méliès explored this and other effects as means of producing films in which people disappeared, flew through the air, turned into animals, etc. These films, as their contemporaries, were composed by a single sequence and shot with a still camera. The use of 'special effects' such as stop motion and painted backgrounds made Méliès films increasingly more attractive.

In 1899 Méliès produced *Cinderella*, a remarkable film acknowledged by Lewis Jacobs as the first cinematographic work to have succeeded in recording pre–defined scenes and organise them in order to tell a story (Jacobs, 1939, p. 25). Illustrative is the fact that Méliès called the method he had envisioned for telling a story with cinema 'artificially arranged scenes'. Being composed of scenes that represented only some key points of the fairy tale and not consistently articulated around spatial and temporal continuities, *Cinderella* showed, rather than told, the story. The film succeeded in its narrative intent mainly due to its being ingeniously based on a well–known tale, that allowed for *Cinderella* to be understood without depending upon explanations of the events unfolding on the screen by the exhibitor or the use of explanatory intertitles. In the early years of cinema those two supporting

strategies were commonly used to help the public understand films with intricate narratives– or, better to say, all films but those with extremely basic plots. Figure 2 shows the sequence of scenes that composed *Cinderella*'s original plan.

1. Cinderella in the Kitchen
2. The Fairy
3. The Transformation of the Rat
4. The Pumpkin Changes to a Carriage
5. The Ball at the King's Palace
6. The Hour of Midnight
7. The Bedroom of Cinderella
8. The Dance of the Clocks
9. The Prince and the Slipper
10. The Godmother of Cinderella
11. The Prince and Cinderella
12. Arrival at the Church
13. The Wedding
14. Cinderella's Sisters
15. The King
16. The Nuptial Cortege
17. The Bride's Ballet
18. The Celestial Spheres
19. The Transformation
20. The Triumph of Cinderella

Figure 2 – Méliès' plan for *Cinderella* (transcribed from Jacobs, 1939, p. 25).

Organisation of Space

Films that were mere recording of real life movement or with very simple story lines did not demand intricate spatial representation. Hence, film space was initially constructed according to the most basic mode of arrangement of the theatrical stage. Scenes were typically recorded with a single still camera positioned not less than three meters away from the actors (Bowser, 1990, p.

94). The resultant frame composition, in which part of the ground in front of the actors' feet and some empty space above the heads are included, became known as 'stage space'.

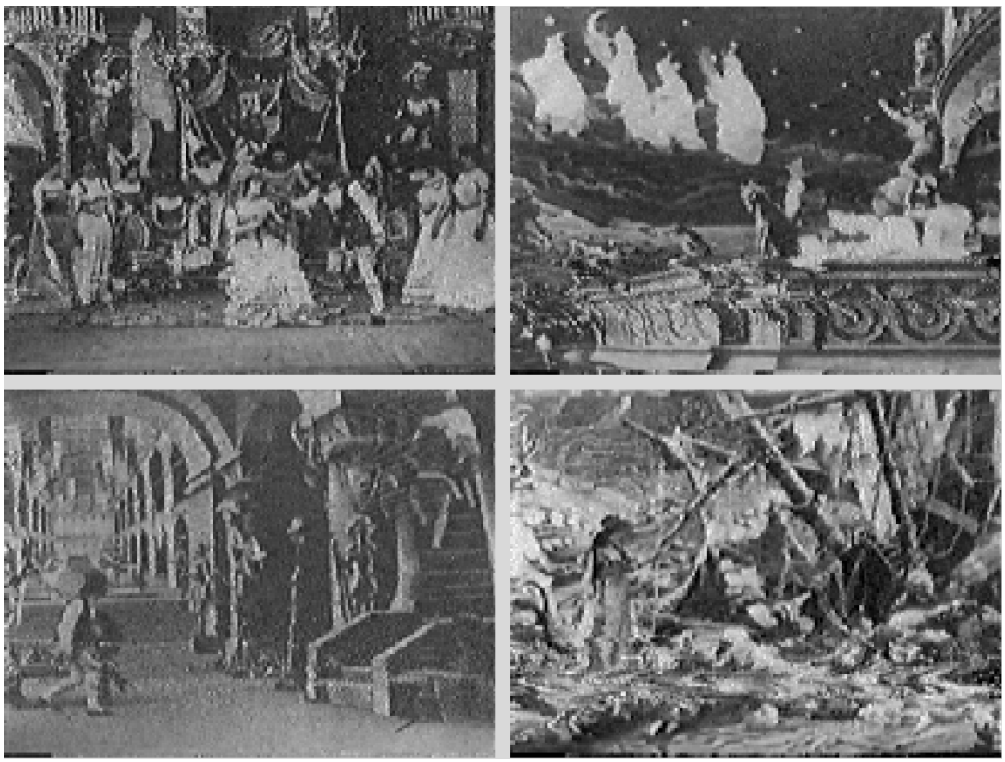
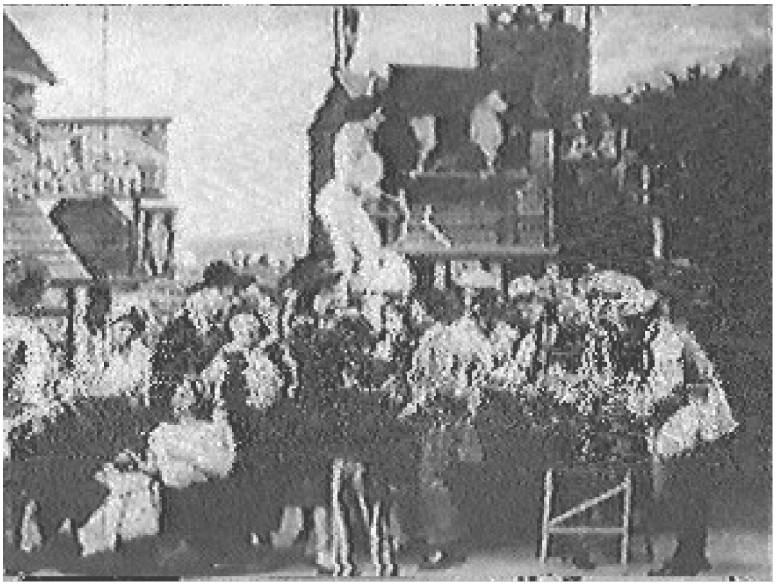


Figure 3 – Scenes from Méliès' *The Kingdom of Fairies* (reproduced from a copy in video by the American Cinematography Association).

Based upon the previous knowledge from theatrical and fine arts experiences, organisation of on–screen space initially tended towards placement of the action in the centre of the frame and the use of the imaginary diagonal lines of the screen. These structural features can be seen, for example, in the scenes of *The Kingdom of Fairies* produced by Méliès in 1903 (Figure 3).

The artificiality of even such very basic and early manifested modes of organisation of on–screen space is highlighted by comparison with the different spatial structure of a scene from Johann Gottlob Wilheim ('Billy') Bitzer's *Tom, Tom, the Piper's Son* (1905). The film, based on a traditional

nursery rhyme[19], opens with a sequence in a street fair where many other events take place and Tom is seen stealing a pig. The principal attractions of the street fair, an acrobat and a juggler, are shown in the centre of the frame. Most important for the film, however, is the pig being stolen by Tom. This event appears in the bottom left corner of the screen (Figure 4). Spectators tend to concentrate on the performances of the acrobat and the juggler, and miss the robbery of the pig.[20]



[19] Tom, Tom, the piper's son/Stole a pig, and away he run./The pig was eat, and Tom was beat,/And Tom went roaring down the street.

[20] Based on the view that the composition seems to have been inspired by an eighteenth century print (William Hogart, Southwark Fair), Charles Musser challenges the use of this sequence as an example of early cinema's naïve construction of space. Musser argues that the basis for decodification provided by the intertextual references to the nursery rhyme and the printing that inspired the film "suggests a sophisticated if not totally successful principle of organisation" (Musser, 1990, p. 383). The inspiring picture , in any case, does not hierarchise the depicted events but in relation to their importance for the street fair itself. Even if Musser's argument is to be accepted, it does not invalidate the points herein stressed. Based on a work of art, theatre stage, or real life, the initial sequence of Tom, Tom, the Piper's Son can help in emphasising the artificiality of many of the spatial organisation strategies nowadays widely used by television and cinema.

The author showed this sequence to six groups of around one hundred undergraduate communications students each, in Faculdades Anhembi-Morumbi, São Paulo, in 1992. Not a single student described the scene as depicting the robbery of a pig, as readings varied around the following pattern: "An acrobat performed in a street fair. After she finishes her presentation, a man dressed in white makes some tricks with balls, then everybody runs away for no apparent reason".

Figure 4 – Initial sequence of *Tom, Tom, the Piper's Son* (reproduced from a copy in video by the American Cinematography Association).

The emergence of story films generated a demand for more complex plot lines that implied longer films and better narrative techniques, extending the question of spatial arrangement beyond the boundaries of a single scene. From the variety of strategies proposed at that time notably those attributed to David W. Griffith prevailed, giving rise to many of the narrative devices nowadays predominant in cinema and television. The uniqueness of Griffith's methods derives from his translation to cinema of some narrative strategies developed by literature (Einsenstein, 1992), as opposed to the more widely practised appropriation of elements from other visual media such as theatre or painting. Struggling against cinema's reputation of being an entertainment medium for the uncultured masses, Griffith targeted the literate public. As a consequence, he concentrated on adapting literary works for the screen, and increasingly assumed that viewers would use their knowledge of narrative strategies from literature to decodify cinematographic narration. From literary models, Griffith developed many strategies for the organisation of on–screen space, inaugurating the fully integrated use of close–ups and long shots within the narrative.

Few directors before Griffith dared to record a scene from closer than the three metres of the 'stage space'. Examples of early use of close–ups refer mainly to extra–diegetic depiction of one character from a nearby point of view, such as a remarkable close view of the outlaw shooting towards the camera in Edwin S. Porter's *The Great Train Robbery* (1903). As typical with such 'emblematic shots', exhibitors were instructed to place the close–up

either in the beginning or in the end of the film, to increase representational realism without risking a break in the narrative continuity (Musser, 1990, pp. 353). From the early days in which moving picture shows concentrated on the depiction of actual events, however, storytelling cinema had inherited a reputation for verisimilitude. The exaggerated pantomime of the earliest films did not allow for the voyeuristic illusion that cinema seems to have, since then, been expected to provide. As the audiences "like to believe that the pictures are real photographs of the real scenes, and the public mind seems to resent any jot which awakens them out of the pleasant dream" (Bowser, 1990, p. 55, quoting from a 1909 periodical), the adoption of a more subtle style of acting was essential for the fictional film. But with the camera at 'stage space' distance it is not possible to capture subtle gestures and facial expressions, so a more natural acting demanded, in its turn, that the framing varied in order to provide spectators with visual details.

As a writer can change the point of view of his description without interrupting the narrative flow, Griffith set the camera free from the theatrical shot and consistently used closer views to emphasise the facial expression of actors. Examples of close shots integrated within the narrative can be found in Griffith's work as early as 1908 (in *For Love of Gold,* according to Jacobs, 1939, pp. 101–102) and regularly from 1910.

> At the moment when an actor's emotional reaction became the focal point of the scene, Griffith simply cut from the establishing shot to a closer view; later when the scene again reverted to broader movement, he cut back to the more comprehensive long shot (Reisz and Millar, 1973, p. 25).

Figur 5 – Example of Griffith's use of close shots: scene from *An Unseen Enemy*, 1912 (reproduced from Bowser, 1990, pp. 99).

Griffith also made use of long shots for increasing dramatic impact. One of his most highly acclaimed films, *The Birth of a Nation* (1915), includes panoramic views of the battlefields (Figure 6) that are considered essential in generating the impression of magnitude of the nation–wide disaster that the film aims to represent (Reisz and Millar, 1973, p. 25).

Figure 6 – Example of Griffith's use of long shots: scene from *The Birth of a Nation,* 1915 (reproduced from a video recording from a television broadcast by BBC 1).

If other directors also attempted to cut between different points of view without interrupting the narrative, Griffith's work is differentiated by his recognition of the different shots as part of a single scene. Other filmmakers did not necessarily think of the various shots as continuous in time and space. An example of discontinuous use of close–ups is found in Edwin S. Porter's *The Gay Shoe Clerk* (1903). The film is composed by three shots, the middle one being a close view that, if on the one hand is rather presentational in its treatment of space, could also be seen as an early example of the use of close–up for dramatic intensification.

> [A] shoe clerk helps a young woman try on some shoes, while her chaperone settles in a chair and reads the paper. This is followed by a close view of the woman's leg as she discretely rises her skirt and the shoe clerk's hands slowly move up her calf. In a return to the establishing shot, the two kiss, but osculatory pleasure is interrupted as the chaperone hits the shoe clerk over the head with her umbrella. Presentational elements occur on several levels as the woman displays her ankle to the shoe clerk, and in turn, to the spectator. The close view takes place against a white background rather than the set, further focusing the spectator's attention (Musser, 1990, p.347).

Figure 7 – Scenes from *The Gay Shoe Clerk* (reproduced from Musser, 1990, p. 348).

Varied points–of–view are widely used in the intricate– but apparently naturalistic– composition techniques nowadays common in cinema and television. Integration of independently recorded fragments of scene into a continuous diegetic space would most probably be the solution chosen by contemporary directors to clarify the initial sequence of *Tom, Tom, the Piper's Son*, for example. Alternating closer shots of the boy and the pig would locate them among the crowd and direct the viewer's attention to them before the robbery actually takes place, while allowing the maintenance in the centre of the frame the attractions that would have been the focus of attention in the street fair. If the resultant structure seems obvious now, it is only because of habit: in daily life, things happen very much as in Bitzer's version. The presently prevalent mode of narration would have the camera, or better to say the implied narrator, calling the attention of the viewer to the main elements of the robbery prior to it actually happening. Hierarchically organising the crowd not around the performances of the acrobat and the juggler; but giving priority to the boy and the pig, would imply the narrator was previously aware of what was going to happen in the fair. An inheritance from literature, the use of such omniscient and omnipresent implied narrator would have been expected prior to Griffith. Much earlier the point of view of the character had been used to grant continuity to independently recorded fragments. In *A Search for Evidence* (Weed, 1903), a woman and a detective search a hotel corridor for evidence of her husband's unfaithfulness. "Every time she looks through a keyhole, the scene cuts to a new view with a keyhole mask. . . . Point–of–view motivation is used twice, as the wife and then the detective peer through the keyhole" (Musser, 1990, p. 345). Understanding

the narrative of *A Search for Evidence* depends upon spectators not only alternating between the points of view of a neutral observer and those of the characters, but also accepting diegetic space to extend beyond the limits of the screen; that is, behind the doors on the corridor. Edwin S. Porter's *Jack and the Beanstalk* (1902) contains another example of director's reliance on public's ability to infer off–screen continuity. In that film Jack is shown going up the beanstalk while his mother and friends remain at the bottom of it. Half the way up, Jack is seen looking downward and waving to the bottom of the frame, supposedly to the other characters who are now off–screen.

While many strategies for the representation of space were inherited from other media, the induction of temporal inferences revealed one of the most problematic challenges for the cinema pioneers.

Representation of Time

Representation of time was one of the hardest challenges for the pioneers of visually–based kinetic narration. Primary solutions were useful only to the most straightforward problems. In very early works such as *The Kingdom of Fairies* scenes are arranged in chronological order and the events in each sequence last as long as the related incidents would. The issue became more intricate as the emergence of films with more complex plot lines demanded, for example, the presentation of events whose real time duration would disrupt the rhythm of the narrative. A film showing a man sleeping for six hours, such as Andy Warhol's *Sleep* (1963), can be a work of art but is definitely not popular entertainment.

A particularly interesting problem comes from the requirement, present in many narratives, to represent either simultaneous events or a single event from different points of view. A typical case involves the depiction of telephone conversations. The situation had been dealt with through the use of 'split screen' as early as 1901, with James Williamson's *Are you There?* (Bowser, 1990, p. 65). An ingenious, if not effective, alternative was tried in *The Story the Biograph Told,* a film produced by the Biograph company in 1904. The story includes a sequence in which a man is in his office, with his secretary in his arms, while talking to his wife over the phone. To indicate simultaneity, both footage were superimposed: the image of the wife at home begins to appear when the husband picks up the phone and ends when the phone is placed back on the hook (Figure 8). The result was a blurred, indistinct image.

Figure 8 – Scenes from *The Story the Biograph Told*: left: the husband in the office, with his secretary on his lap; right: double exposure of the two scenes, the office where the husband is and the wife at home (reproduced from Musser, 1990, p. 356).

The Life of an American Fireman (Porter, 1902) is the archetypal example of early cinema's attempts to represent the passage of longer periods in life without actually presenting them on screen. The film also includes efforts to

depict action from different points of view, which generates a problem similar to that of presenting simultaneous events.

Porter's work was inspired by his studies of Méliès pictures, to which many references can be found. Porter not only carefully conceived the scenes in terms of content, but fully described the action, details of location and framing and, above all, concentrated on the transition between scenes. In *The Life of an American Fireman* "[t]he scenes had two functions: to communicate the action and, more important, to relate it to the next action so that a meaning was given to the whole. The scene thus became a unit dependent upon all the other units; to be fully understood, it was inseparable from them" (Jacobs, 1939, p. 38). Porter's understanding of scenes as interrelated components of the narrative whole instead of independent representations of key scenes led the director to be confronted by the problem of temporal continuity. Based on overlapping and repetition, the non–linear model adopted by Porter in *The Life an of American Fireman* "was so unfamiliar to later spectators and scholars that a modernised, re–edited version of the film was long accepted as the original, 'logical' ordering of shots" (Musser, 1990, p. 327). Due to their strangeness to modern audiences, Porter's solutions are powerful reminders of the artificiality of those strategies contemporarily prevalent.

The Life an of American Fireman begins with a fire chief asleep at his office desk. He dreams of a mother putting her baby to bed, and the images of the dream are shown in a circular frame above him. The chief suddenly awakes and nervously walks around the office[21].The picture dissolves first to a close–

[21] A different interpretation, emphasising the fictional qualities of The Life of an American Fireman, accounts for this initial sequence as representing the fire chief premonitorily dreaming of his own wife and child, whom he subsequently rescues. (Musser, p. 327). The

up of the fire alarm being turned on, which in turn dissolves to show the sleeping quarters of the Fire Department. The firemen, initially asleep in their beds, are seen putting their clothes on and leaving the room sliding down a brass pole. After the firemen have been shown going down, the scene dissolves to the ground floor where they arrive, one by one, Porter's script describes the intended effect:

> [t]he first fireman to reach the pole seizes it and, like a flash, disappears through the opening. He is instantly followed by the remainder of the force. . . . As the men come down the pole and land upon the floor in lightning–like rapidity..." (*Edison Catalogue,* 1930, transcribed in Jacobs, 1939, pp. 38–39).

Despite Porter's clearly reported intention of generating a fast paced scene; it seems for the modern viewer that the first fireman arrived at the ground floor just after the last one had left the first pavement: either the longest or the slowest journey down a brass pole ever. Contemporary cinema or television would show, for example, the first men sliding down and the last ones arriving, implying but not specifically caring to show that all firemen had gone down through the pole. Either such solution did not occur to Porter, or he feared that viewers would have the impression that just a few firemen had gone down the pole. Similarly, the horse–drawn fire–engines rushing out of the fire station are shown twice, in interior and exterior views[22].

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versions of the film presently known supply no direct evidence for this interpretation.

[22] Charles Musser calls attention for the apparent connection between the solutions developed by Porter and a sequence in Méliès' A Trip to the Moon (Le Voyage Dans La Lune, 1902). "In one juxtaposition of shots a scene ends with the rocket hitting the man in the moon in the eye, and the next scene begins with the rocket landing on the moon's surface and its travellers disembarking. The landing of the space vehicle is thus shown twice in rapid succession. Porter applied this brief temporal overlap to a problem that the had previously explored: the depiction of simultaneous actions and the representation of an event from multiples points of view" (Musser, 1990, p. 325).

The film continues with the fire engines on their way to the house on fire. Here Porter condenses the real time of the journey in various short scenes depicting the vehicles crossing the screen against numerous different backgrounds. This early attempt to compress on–screen what would have been a longer period in real time was bound to generate a thrilling sense of rush in the 1900's viewers. Familiar with more extreme versions of this type of condensation, the contemporary public tends to understand the distance between both locations as immeasurable, as the vehicles are shown against many more different backgrounds than presently expected.

Another totally viable strategy that now seems strange was developed by Porter for the problem of displaying the events at the house on fire from two different points of view. The rescue sequence is shown twice, first from inside and then from outside the house. Initially, the interior of a bedroom on fire is seen. The occupant opens the window and cries for help until, overcome by smoke, she faints on bed. Breaking the door with a fire axe, a fireman enters the room. He shatters the window frame, outside which a ladder is placed. The fireman carries the unconscious woman down to the ground, and is soon seen coming back up and rescuing the child who had been left on the bed.

The scene then dissolves to outside the house, and the same events are shown once more from the beginning: a person is seen at a first floor window. A ladder is positioned and a fireman comes out carrying a woman. On the ground, the woman cries pointing to the window. The fireman returns to the ladder, climbs up, enters the house, and comes back holding a baby. Woman and baby are shown reunited. Figure 9 shows scenes of these two sequences.

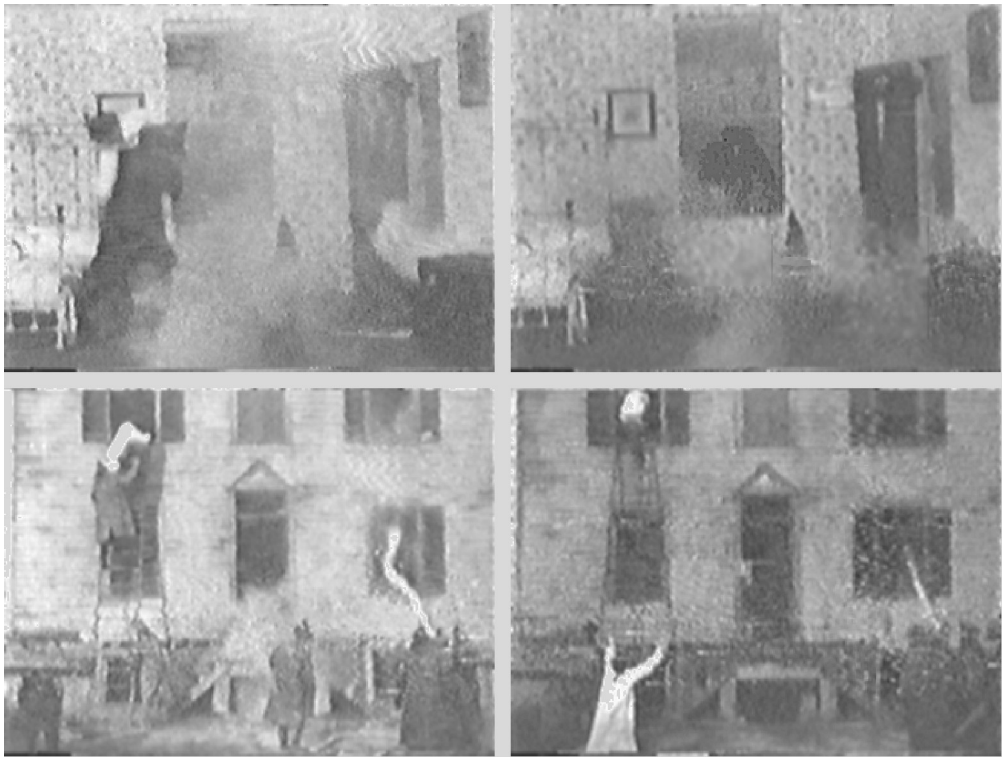

Figure 9 – Rescues scenes from *The Life of an American Fireman,* in order of depiction: top left, fireman rescues the woman who had fainted, inside the house; top right, fireman returns to rescue the baby, seen from inside the house. Bottom left, the rescued woman, outside the house, asks for the firemen to bring her baby; botom right, a fireman brings the baby down the ladder. (reproduced from a copy in video by the American Cinematography Association).

Contemporary directors would typically intercalate scenes inside and outside the building, keeping the impression of time continuous and linear. The four scenes in Figure 9, for example, could be edited in the following order: top right, bottom right, top left and bottom left. A more accurate representation of time could be: the fireman carrying the woman out the window from inside the bedroom, and disappearing down the ladder; the scene is transferred to a different point of view, outside the house, where the man is seen already half way down the steps with the woman in his arms. Fully depicting the whole rescue once more, *The Life an of American Fireman* generates the impression in contemporary viewers of consecutive events, as if after one woman was

rescued another man appeared at the window, another ladder was placed, etc. This impression of two different pairs of rescues is reinforced by the extreme condensation of off–screen time, that causes some actions to take longer in one sequence than in the other. Porter's script does not include the repetition of the sequence from inside the bedroom and outside the house. The verbal description of the sequence is structured very much as it would be edited today; from the woman being rescued from inside the room to her pleading for the child outside the house.

> The woman rushes back and forth in the room endeavouring to escape, and in her desperation throws open the window and appeals to the crowd below. She is finally overcome by smoke and falls upon the bed. At this moment the door is smashed in by an axe in the hands of a powerful fire hero. Rushing into the room, he tears the burning draperies from the window and smashes out the entire window frame, ordering his comrades to run up a ladder. Immediately the ladder appears, he seizes the prostate form of the woman and throws it over his shoulders as if it were an infant and quickly descends to the ground. We now dissolve to the exterior of the burning building. The frantic mother having returned to consciousness, and clad only in her night clothes, is kneeling on the ground imploring the fireman to return for her child" (*Edison Catalogue,* 1930, transcribed in Jacobs, 1939, p. 40).

In *The Kleptomaniac* (1905), Porter shows sequentially two independent events that are supposed to have happened simultaneously. The film tells the story of two women, one poor and one rich, who were both arrested after being caught shoplifting. That the two crimes occurred at the same time is only implied by both women appearing together in the police court in the third

and last shot of the film. Intercutting between shots one and two, as contemporary directors would probably choose to do, would not only emphasise the simultaneity of the two events, but also stress the contrast between the wealth of one woman and the poverty of the other, increasing the dramatic appeal of the final sequence, in which justice is revealed to have different measures applied according to the social background of the people involved.

Intercutting between scenes is one more prevalent narrative strategy attributed to Griffith. In *After Many Years* (1908), Griffith is first reported to have intercalated between two scenes. The image of a woman, who is supposed to be thinking about her husband cast away in a desert island, is followed by an image of the husband.[23]

One year later, in *The Medicine Bottle* and *The Lonely Villa,* Griffith went further in the use of alternating between unfinished scenes, and introduced the now classical method of representing simultaneous events. In *The Medicine Bottle* an unsuspecting child is about to give her grandmother a spoon of poison instead of medicine. As the mother discovers the child had taken the wrong bottle, she tries to telephone the daughter to avoid a tragedy. "The film alternates between the mother, the switchboard operators, and the little girl four times, until in the twelfth shot of the sequence the call goes through" (Bowser. p. 67). *The Lonely Villa* includes a sequence in which a husband hurries home trying to prevent a robbery and save his endangered

[23] This strategy for the representation of simultaneity is another example of Griffith's adoption of the omniscient and omnipresent narrator so common in literature. The implied narrator, whose knowledge Griffith structures through the camera, not only sees the two characters who are in fact apart, but learns what the woman does not know: that her husband is alive and safe (Bowser, p. 64, Jacobs, p. 103).

wife and child. Suspense is added by intercutting from the family house to the rushing husband while continually decreasing the length of time each scenario was shown (Jacobs, 1939, p. 105). This method, now known as 'accelerated montage', breaks proportionality between diegetic time and on–screen time in the name of narrative intensity.

This and other syntactic strategies developed by Griffith prevailed to the point that nowadays they seem to be obviously 'correct' solutions. Contrary to the mainstream intention to use cinema's capability of adding movement to photographic accuracy in order to construct realistic representations, Griffith's solutions were based on literary principles and directed towards increasing dramatic impact. What is now acknowledged as 'narrative realism' is not obtained by denying mediation, but rather by properly using formal structures in order to provide the spectators with the means to fulfil their drive towards plot coherence. Presented with known (or at least understandable) stylistic devices used accordingly to the demands of the plot, properly oriented in time and space, viewers tend to concentrate on the course of the action. The level of engagement generated by the accelerated montage in the chase sequence in *The Lonely Villa*, for example, working together with the comprehension of thematic, spatial and temporal connections between the alternating scenes, compensates for the stylistic artificiality and allows, or even encourages, viewers to focus on their expectations of the outcome of the sequence.

The trick of building believable realities is "not to provide a perfect illusion, that is an integral reproduction of reality, but to offer enough reality to make the spectator disregard what is missing" (Perkins, 1992, p. 56). Beyond

disregarding what is missing, the general public in fact tends to fill any gaps in the narrative by inferring from their experience of the world and of other narratives. Comprehension of cinematic and televisual narratives is highly dependent upon the viewers' willingness to "grasp the filmic continuum as a set of events occurring in defined settings and unified by principles of temporality and causation" (Bordwell, 1995, p. 34). Spatially related inferences have already been mentioned. Attention was drown to the exemplary sequences in *A Search for Evidence* and *Jack and the Beanstalk*, that overtly depend on the public's willingness and ability infer spatial continuity between scenes. Only by allowing for the existence of diegetic space beyond the boundaries of the screen can it be understood that the various scenes displayed inside a keyhole mask correspond to those that the betrayed wife saw when she looked through the hotel doors. The same applies to comprehending that by waving to the bottom of the frame Jack is signalling neither to his own feet, nor to someone standing under the screen in the cinema, but to his friends that he can see but the public can not.

Cases in which understanding the story of the film depends upon making inferences about temporal relations within a scene or between scenes have also been mentioned. In *Life of an American Fireman*, for example, the contemporary impression that two different pairs of rescues have been shown was said to have been intensified by the condensation of off–screen time in both sequences, from inside and outside the house. In the first sequence, for example, an interval no longer than a fraction of a second is placed between the fireman going out of the window with the woman in his arms and reappearing back to rescue the baby. The public understands that the fireman

carried the woman all the way down the ladder despite the fact that, literally taken, the timing would imply that the fireman threw the woman to the ground as soon as he was out of the public's sight. It is not necessary that each event of a film lasts as long as it would in real life, as in the previously mentioned *Sleep*, by Warhol, but only that a gap is placed for the public to fill in with inferred time.

At least since Aristotle, the impossibility of constructing representations equitable to reality in its whole intricacy and detail has been praised as a facilitator, as opposed to an obstacle, for the construction of narratives with the desired high level of clarity. In the *Poetics,* Aristotle identifies as a defining feature of a well structured plot that it concentrates on those elements essential for the development of the action. By demanding that a plot "ought to represent a single action, and a whole one at that; and its parts (the incidents) ought to be so constructed that, when some part is transposed or removed, the whole is disrupted and disturbed" (Aristotle, 51a31–35, p. 12), Aristotle also promoted the practice of clearly defining the causal connections between the various elements that compose the story.

Attribution of Causality

The process through which film narrative became independent from extra–diegetic explanations by the exhibitors consisted of the discovery of the necessary and sufficient information for the public to perform the desired inferences. Following the Aristotelian tradition, and based on the experience of previous media, notably theatre and literature, classical film and television have typically concentrated on those elements relevant to the development of

the plot, and emphasised causal connections between the various events of the story. Contemporary authors have reinforced Aristotle's claims for causality as "the connective tissue of plot" (Laurel, 1993, p.73). Noël Carrol proposes causal connections as the main defining factor for the identification of narratives and for differentiating between those and other literary forms, such as chronologies or descriptions (Carrol, 1997).

Causal inferences are demanded in many and varied levels for the understanding of film and television narratives. Stories as a whole are typically organised around causation: a woman and a detective search a hotel because her husband is unfaithful; Tom is punished because he stole a pig. Required for intelligibility of the successive shots and sequences of a film, causality is the unifying principle in the previous examples of temporal and spatial continuity. The interdependence between causality and spatial continuity can be seen, for example, in the succession of scenes in which the firemen rush after the alarm comes off in *Life of an American Fireman.* The sequence depends on the assumption that the alarm and the men are in the same building, despite the fact that the two successive shots do not contain this information. Those specific fire alarm and quarters could in fact belong to stations that were miles apart.

It was not by coincidence that the possibility of intercutting between shots of supposedly simultaneous events was first explored in situations in which causal connections were clear. For a specific example, it is very unlikely that the sequences of the husband rushing and the family at home that are intercalated in *The Lonely Villa* were recorded at the same time. Simultaneity

is inferred from the causal link between the two situations; that is, it is because the family is in danger at this exact moment that the husband hurries home. As this and other narrative formulae are repeatedly applied, the public assume, by generalisation, that intercutting between scenes implies simultaneity even if the scenes are not clearly connected, and, for example predicts that the characters of apparently unrelated situations will meet later on in the story. Working on the definition of 'plot', Seymour Chatman exemplifies how contemporary readers tend to infer causal relations from succession:

> "The king died and then the queen died" is only a 'story' (in the sense of a 'mere chronicle'); "The kind died and then the queen died of grief" is a 'plot', because it adds causation. *But the interesting thing is that our minds inveterately seek structure, and they will provide it if necessary. Unless otherwise instructed, readers will tend to assume that even "The king died and then the queen died" presents a causal link, that the king's death has something to do with the queen's* (Chatman, 1993, pp. 45–46, emphasis added).

This tendency of juxtaposed shots to be understood as spatio–temporally or causally related is not a secondary effect cinema can try to avoid, but a central feature of the practice of creating content with moving images often recognised as the very definition of montage (for example by Bazin, 1992, p. 156, Reisz and Millar, 1973, p. 30 and Monaco, 1981, p. 323). The same is also true for television. To demonstrate how, by manipulating logical continuity, the editor of a sequence is "uniquely capable of causing the truth to cleave to his interests", Rod Whitaker mentions an experiment in which the same footage of a Civil Rights demonstration was arranged so in one version

violence appeared to have been initiated by the police, while a second version suggested that the demonstrators started the violence (Whitaker, 1970, p. 118). Transforming and generating content is inherent to the practice of editing: as the process of framing the scene defines the specific points of view from which the event will be represented, so selecting and arranging shots into sequences necessarily organises the message according to specific intentions.

Besides direct manipulation of content by induction of continuity inferences, similarities and differences can be sharpened by comparison. The idea of properly assembling impact sequences in order to connotatively induce specific interpretations dates back to at least 1905. In that year, Porter directed *The Ex–Convict.* The film tells the story of an ex–convict to whom a businessman refuses a job. To emphasise the contrast between the poverty of the family of the ex–convict and the wealth of the manufacturer's home, Porter intercalates sequences from both households (Jacobs, 1939, p. 40). This narrative device is now known as 'contrast editing'.

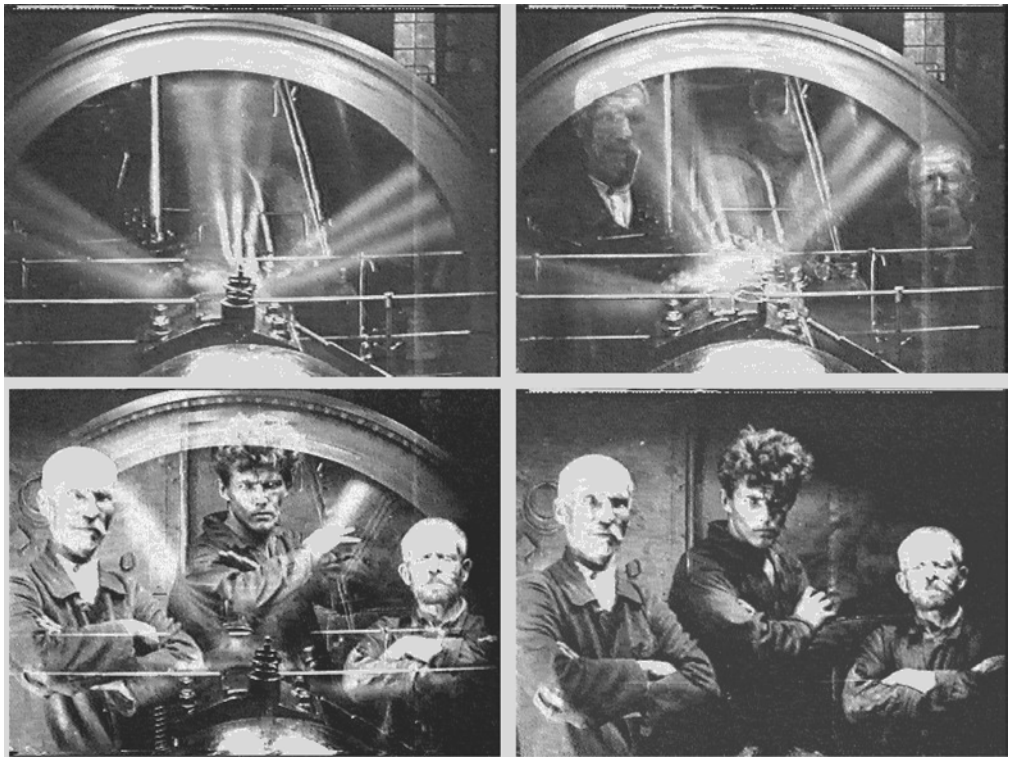

Figure 10: Generation of meaning in *Strike* (reproduced from a video recording from a television broadcast by BBC 2).

The introduction of more abstract concepts by juxtaposition of initially unrelated shots is the basis of Sergey Einsentein's 'montage of attractions'. In a sequence of *Strike* (1925) for example, Einsenstein dissolves from the engine gears stopping to the workers crossing their arms (Figure 10), implying that the strike affected the whole production line. In the final sequence of the same film, the director makes a clearly ideological statement by punctuating the shooting down of workmen with shots of slaughter of a bull in a stockyard.

The many ways in which meaning can be constructed, implied or transformed by choices relating both to the enunciation of each image and to the orchestration of scenes into sequences open fascinating possibilities for fiction. In the field of documentary material, the implications of having the

public accustomed to assuming that all points represented are essentially relevant– and conversely that all relevant points have been presented –and also being used to performing causal or symbolic inferences from juxtaposition can not be overstated. The intermixing of reality–based and fictional programmes that compose the television flow and the medium's peculiar modes of reception, both topics discussed in the previous chapter, combine to produce a particularly interesting instance in the case of television, increasingly the main news provider of the Western world.

Representing real actions and events, news programmes are in the realm of history, not fiction, and as such can hardly be reduced to simplistically established sequences of cause and effect. In essence collages of brief inserts about different events taking place in unrelated parts of the world, the daily television news programme as a whole typically does not compose a thematic unit. Usually restricted to short screen time, the analysis of each news item tends to superficiality. Furthermore, not only is commercial television essentially in the business of "selling consumers to advertisers" (Allen, 1992, p. 19), but the maintenance of public funded broadcast channels is also highly dependent upon audience levels. In his account of the tendency of television to make news programmes more pleasurable to watch by constructing them according to procedures that resemble those of fiction "[f]or stories, as a constitutive element in human life, are pleasurable because they impose the consolation of form on the flux of human experience" (Stam, 1981, p. 31), Robert Stam quotes how the president of NBC News Division describes the ideal structure of television news from the point of view of the broadcaster:

> Every news *story* should, without any sacrifice of probity or responsibility, display the attributes of fiction, of drama. It should have structure and conflict, problem and dénouement, rising action and falling action, a beginning, a middle and an end. These are not only the essentials of drama; they are the essentials of narrative.(Stam, 1981, p. 31, emphasis added)

Narrative Strategies – Television News

Various layers of interpretation separate the facts happening in the world from their enunciation on television. The selection of news itself is inevitably an ideological process, starting with the mechanisms through which the knowledge of some events arrive at the editor's desk while others are ignored. Selection proceeds through decisions not only based on relevance (in itself a very subjective matter), but also on very accidental criteria such as the quality of the films available to illustrate the topic or the amount of time available to each item in a specific edition of the news programme.

Having been introduced to an information programme, as opposed to a fictional one, the public expects the news to adhere to the facts (Machado, 1988, p. 83). Television news programmes, however, sometimes take direct advantage of the impossibility of distinguishing between real and imaginary images and sounds on screen. Stam mentions that "[North American] networks have presented footage of military operations in Viet Nam [sic] 'as if' they were taking place in Cambodia'", and calls attention to more subtle and customary cases when "the footage is authentic but its combination is fictional, as when library material and freshly–shot location footage are

moulded into an illusory continuity. Or a single track can be illusory, as when library sound aurally buttresses the image track" (Stam, 1981, p. 31).

Often placed at the start of prime–time programming, television news stands within the programming flow as a means of building and captivating the audience for the evening (Glasgow University Media Group, 1980, p. 224; Sperry, 1981, p. 297). As a result, television news programmes incorporate the idiosyncrasies of the – mostly fictional – prime–time programming they precede, notably their formal composition and simplified plot structure. The contamination of news by characteristics of other prime–time programmes is very clear on Brazilian television, where main news programmes are presented before the leading *novela* of each channel. During the military dictatorship, *Rede Globo de Televisão* minimised the political content of both its news programmes and its *novelas*. National news was good news, and novelas were about personal, emotional matters. Under the democratic regime, both *Rede Globo'*s novelas and its main news programme, *Jornal Nacional,* simultaneously adopted a more political tone. *Rede Manchete*, a television network created in the early 1980s, specialised in historical and 'truthful' novelas with a smaller number of episodes and more detailed production that their Globo counterparts. Matching this standard its main news programme, *Jornal da Manchete,* is more sober and reflective, including deeper analysis of, and critical commentaries on, the main news items of the evening. *SBT,* proposing an alternative popularistic television programming, offers not only

the most melodramatic *novelas*, but also the most passionate and sensationalist of the Brazilian news programmes, *Aqui e Agora*[24].

Extreme in many senses, *Aqui e Agora* provides the clearest, or least subtle, examples of the extent to which events can be constructed, implied and transformed in television news. Many reports in *Aqui e Agora* are composed by a mix of fiction and reality, as the programme concentrates on the use of narrative structures that engender emotional response. Regardless of the occurrence or otherwise of important events in Brazil and internationally, the informational level of most *Aqui e Agora* stories is irrelevant: they make the news because of their potential for stimulating and appealing presentation. Every edition of *Aqui e Agora* is centred around newscasters denouncing abuse of power against individual members of the working class; gory descriptions of recent crimes; and some kind of police raid. These last reports, for example, are constructed as complete plots, with clearly defined beginning, middle and end. They often start with the TV crew going to the scene with the policemen, normally discussing the dangers of the operation. The chase itself is reported with exaggerated shaking, out–of–focus 'camera in hand' effects, combined with inefficient and meaningless framing. Apparently breathless and scared, as if constantly escaping from gunfire, reporters speak of the great danger they are involved in and revere the work of the police. Even if the transmission is not said to be live, reality effects[25] converge to construct an *Aqui e Agora* (literally 'Here and Now') connotation,

[24] Jornal Nacional is broadcast by Rede Globo de Televisão at 8,00 p.m., Mondays to Saturdays. Jornal da Manchete is broadcast by Rede Manchete at 8,35 p.m., Mondays to Saturdays. Aqui e Agora is broadcast at 18,00 p.m. 7,30 p.m. Mondays to Saturdays.

[25] The expression 'reality effects' is from Roland Barthes, and denominates "strategic details designed to elicit a feeling of verisimilitude" (Stam, 1983, p. 32).

generating a greater level of suspense as if something really unexpected, such as the death of the reporter, could be displayed at any moment.

Sometimes the programme directly claims to be transmitting live despite obviously not doing so. In 1993, for example, a sequence covering the popular manifestations for the impeachment of president Fernando Collor de Mello, was announced as 'live' in São Paulo. The fact that it was night time in the city when the news was broadcast directly contradicted the scenes, recorded in daylight. Some regular viewers of that programme were questioned at the time by this author, who obtained replies that illustrate to which level 'suspension of disbelief' is a necessary condition to 'properly' watching *Aqui e Agora:* 'But that was *Aqui e Agora*, you know how it is'. Sharon L. Sperry optimistically identifies an acknowledgement by the receptor that the non–fictional events presented in the news are filtered and transformed in order to compose an appealing narrative in such willingness to suspend disbelief:

> The non–fiction narrative form demands these compromises of the Truth – a point of view and a shaping and simplification. And, by both tradition and necessity, the listener assents to these narrative necessities. There is a 'willing suspension of disbelief' by the listener, and an agreement by the narrator to approximate reality as he has seen or heard it. This agreement by the two is based on an understanding that the narrator has struck the right compromise between Truth (the chaos of reality) and the listener's expectation of a coherent and effective (or affective) form. The credibility of the narrator is the key to this understanding, and for this the teller must possess authority. (Sperry, 1981, p. 298)

The degree of authority granted to media as sources of information is an important point to consider when dealing with the influence of television on the composition of the web of beliefs of its viewers. Many British viewers recall the occasion in which the team in charge of the programme *Panorama*[26] decided to take the opportunity of a broadcast on April Fool's Day to play with the idea of 'spaghetti trees' in Italian farms. Many people reacted to the simulated reportage by calling the programme with the serious intention of acquiring some cuttings.

Most television news programmes construct the authority of their newscasters by the use of assertiveness and emotional distance. Commentaries, normally either autocued or memorised texts, are presented as spontaneous pieces of communication whose fluency places the newscaster as a particularly cultured figure. The looks and manners of the newscasters of *Jornal Nacional* and *Jornal da Manchete*, for example, place the news team within the highly educated upper middle–class, connotatively associating the social authority of that group with the content of the broadcast. Following a different model, *Aqui e Agora* attempts to generate a direct and affective identification between its target audience and reporters. This is clear in the mode of verbal communication chosen for its daily police chase, for example. The reporter on site, usually female, screams and punctuate descriptions of events with interjections, often religious in tone. The newscaster clearly plays the role of the endangered female in a plot in which heroic policemen triumph over criminals.

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[26] Panorama is a long–running programme produced by the BBC.

Not only by *Aqui e Agora* and not necessarily with such lack of subtlety are news items built on a hero plot. Detailed analyses, graphs, and data are informative but not entertaining. The ability to visually display motion, captivating viewers by generating a desire to know what happens next is one of the main strengths of television. As a result, many television news programmes tend to concentrate on action, leaving no time for conjectures if the fast pace – and the attention of the target audience – are to be maintained. Consequently, not only do the characters tend to be simplified by television news, but the events themselves are generally presented as a well–defined battle between good and evil forces. The model clearly adapts to most of the prime–time programming scheduled to follow the news programmes each day.

Figure 11 – Studio, symbol and newsreaders of Jornal Nacional (top, left); Aqui e Agora (top, right); and Jornal da Manchete (bottom) (reproduced from a video recording from broadcasts in 15 September 1997. The original colours could not be copied due to incompatibilities between the Brazilian television system (PAL–M) and the equipment available in Britain. Shades of blue are predominant in both the presentations of Jornal Nacional and Jornal da Manchete, and Aqui e Agora uses red and white).

An example from Brazilian news can help elucidate the implications of such simplifications of history. After more than 20 years of military dictatorship, the democratic re–estruturing of the country that had been initiated in the late 1970s culminated in an enthusiastic campaign for direct elections for President. Despite the great mobilisation of the people, the campaign was not successful, and in 1984 Tancredo Neves was elected president by the Brazilian parliament. Nominated as a neutral candidate, able to conciliate the most powerful political parties, Tancredo Neves was depicted by television news as a last minute saviour of the democratic process, supposedly endangered by extremists. Not surprisingly, people reacted to his death of natural causes before assuming the presidential role with a grief of strong religious tone. At the time, many news programmes included street interviews that revealed a generalised fear for the near future of the nation, without objective identification of any imminent threat. Few days after the burial, the late elected president's grave was visited by faithful people asking for miracles of a private nature. Often uncultured, sometimes barely literate, people praying for Tancredo Neves knew nothing about his political career prior to the Presidential election: a career that dated from the 1950s and included many executive and parliamentary positions inclusively during the military dictatorship. The coherence of the plot of the 'last minute saviour of the democracy' depended upon overlooking the nuances of his almost forty years of political activity. In–depth considerations about Tancredo Neves, particularly about his political history, were confined to the newspapers. Television news programmes transformed the election of Tancredo Neves by the parliament into the tale of the sudden appearance of a leader ready to lead

the nation towards a better future. It is not surprising that the unsophisticated public, for many reasons restricted to television as a means of obtaining information, reacted to the death of such last minute hero by going a step further in the mythification of Tancredo Neves.

> The narrative plot of action for television programming taps the roots of man's simplest and most pervasive myth: Men muddle through life as best as they can, but when tragedy strikes, they require and seek a leader, a single individual of superior worth and superior skill, who will meet the problem and conquer the evil (Sperry, 1981, p. 300).

"If illusionistic fictions disguise their discourse as history, TV news, in certain respects, wraps up its history with discourse" (Stam, 1981, p. 38). In transforming a very intricate moment of Brazilian politics in the tale of the appearances and tragic loss of a hero, television news converted history into a drama to which it was hard to resist reacting emotionally.

> But news stories can never share the opening stasis and closing return to stasis of the heroic plot structure. The story (and the protagonist) is never able to achieve completion and never returns the world to a state of safe stability. . . . . Not that the newsman should or could present a resolution where none exists. But in introducing action and simplifying conflict in order to dramatise the news and attract an audience, the television newsman can hardly escape the public frustration that surfaces when he fails to close his drama in some way more satisfactory than "That is the way it is". . . . perhaps, on a rational level, television audiences realise that the news is, by nature, fragmentary –a cyclical, unending series of events. In a sense, there is a kind of agreement between the networks and newsmen who present the news and the audience who views it: The newsmen recognise the need to structure the news so as to make

> it entertaining, while the audience recognises that this entertaining narrative structure does not actually reflect the real world (Sperry, 1981, pp. 307–309).

Under the democratic system, Brazilian television news maintains the same narrative structure that was used throughout the twenty years of authoritarian government. Political censorship, however, necessarily facilitates making victorious the heroes and defeating the enemies of the national tales. Presently, the narrative structure of the news stories remains, but the constant changes in the equilibrium of the political groups brought by democracy does not always allow for the production of such hegemonic completion and triumphant ends. As "the narrative structure of the news program still leads us to *emotionally* expect the congruence to be found in traditional narratives" (Sperry, 1981, p. 300), an audience used to encountering such a congruence under dictatorship easily develops negative feelings about the democratic regime. Less critically aware sectors of the Brazilian populace often regret the intricacy of political and economical affairs recalling how 'there weren't so many problems in the 1970s' and 'things were easier under the military'[27].

The simple depiction of complex matters in terms of simple conflict and stereotypical characters does not make the narrative of real life events as fictional stories semiotically equivalent to fictional narrative. It demands, for example, much less in the way of illusionistic effects to convince the viewer of the news than of a self–declared fictional entertainment programme of the verisimilitude of the events represented. As a consequence, news aesthetics

[27] The author has often heard observations such as these, sometimes surprisingly from formerly enthusiastic defenders of democracy.

can be less illusionist than that of the fiction programmes. Strategies such as the 'camera in hand' style that generates the feeling of liveness in *Aqui e Agora* are condemned by classical film narration because, by attracting attention to the mediation, they supposedly send the viewer away from the diegetic universe and negate any emotional engagement. In television news coverage, however, the camera is not an intruder interfering with the diegetic illusion; it is rather the instrument that 'transports' viewers to where the supposedly most relevant facts are taking place. Rather than calling attention to the artificiality of representation as in fiction, in television news programmes the use of prominent camera mediation reinforces the impression that viewers are having their sense of vision extended by the medium, and being transformed into witnesses of events otherwise inaccessible.

It is important to stress that none of the observations above were made to condemn broadcasters for making news programmes, or television as a whole, partial and motivated. "Framing a discussion with these terms [bias and objectivity] obscures the fact that there is no totally unbiased way in which television or any other system of representation can show us the world" (Allen, 1992, pp. 10). As there is no such a thing as impartial means of communication, it is definitely more productive to enlarge the understanding about how television constructs its representations of the world than to try to determine which forms and contents should or should not be broadcast.

At the time of their emergence, interactive media were announced as able to provide the television public not only with a wider choice of programmes due to an exponential increase in the number of channels available, but also with

scripting and editing decision power. Individual choices about the outcome of fictional stories and options regarding the points of view from which to follow football matches seemed to be only the beginning of a revolution that would empower the formerly ‘passive’ television public. The next chapter reviews the origins and current state–of–the–art of various technologies aggregated under the label ‘interactive media’, and attempts to identify to directions in which is interactivity being driven.

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Chapter 3 – Interactive Media

The use of new media has often started with the appropriation of specific attributes and techniques from previously existing ones. In their early days, printed books were designed on manuscript standards; films were conceived as technologically–mediated theatre presentations and television programs were based on radio broadcasting patterns. Similarly, the first proposals for digital media concern their impact on the existing structure of analogue communications, for example by increasing the number of television channels available, or providing choices of points of view for watching sport broadcasts. Such a pattern of development implies a need to investigate both, the real potential of interactivity and the future possibilities for currently analogue media, such as film and television, under the effect of digitisation.

Many of the quantitative promises of digitisation have already started to materialise. A simplified version of video–on–demand, in which films start in half hour intervals on different digital channels for example, was advertised as being available within the United Kingdom by 1998. The provider, Cable & Wireless, suggestively calls the service 'near video–on–demand' (*The Sunday Times*, 5 October 1997, p. 11.6). Beyond '500–channel television', digitisation of communications systems offers the opportunity to handle different types of media in binary form. The reception of text, sound and images with a single device and through the same network stimulates the overlap within communications fields reflected in the acceleration of the emergence of Media Conglomerates such as the Brazilian Rede Globo, previously refered in the first and second chapters.

One of the most exciting prospects of digital communications derives from the potential redefinition of the roles of information receiver and sender by interactivity. One of the first applications of interactivity to be successful television are the so–called 'shopping channels', in which advertisements stopped sponsoring programmes in commercial television sponsorship and became themselves television programmes. This and other initial promises of interactive television, such as on–line participation in television quiz shows and choices of outcome for fictional programmes, are supposed to be solely the first steps towards the provision of greater levels of participation and decision. To access possibilities of the application of interactivity to audio–visual media require a review of both the origins of and current state–of–the–art in various related technologies.

Interactive Media on Discs

One of the first technologies to bring interactive possibilities to video was the analogue system LaserVision, launched by Philips in late 1970s. The manufacturer's hopes of a commercial success were transformed into the necessity of facing a market failure. Without disregarding the unpredictability inherent in the mass market, some jeopardising peculiarities of LaserVision technology at the time of its launch can be pointed out. Two of the most important features reputed to give LaserVision supremacy over the then recently launched Videocassette Recorders (VCRs) were not immediately attainable by the target public. First, free–order retrieval of the material encoded on the disc (i.e., random access) was not provided by simply connecting the LaserVision player to a television set, but required the parallel

attachment of the player to a computer. Second, the proclaimed high quality image offered by LaserVision was irrelevant, as the final output depended on a low resolution device (the television set). The fact that, unlike VCRs, analogue videodiscs did not offer the possibility of recording was a clear disadvantage, and so was the absence of titles to stimulate the demand for hardware. A wider range of titles would not perhaps be sufficient without the existence of a 'killer application': one that is perceived as being essential, leading to the purchase of players.

In 1988 Philips re–launched LaserVision. Digital audio was added to the original features, and the system renamed Laserdisc. Despite being reputedly a reliable high performance audio and video playback medium[28], Laserdisc also failed to penetrate the home market. Tables I and II illustrate the number of households with Laserdisc players and VCRs in the first years of the 1990s. While the highest numbers for Laserdisc players are of the order of magnitude of 10^5, reaching 10^6 in Japan only, videocassette recorders households oscillate around 10^7, reaching 10^8 in Europe.

As a result of their low penetration into the consumer market, the use of analogue interactive video systems became increasingly restricted to large organisations and companies. Analogue videodisc technology has consequently become linked with the niche market of corporate training. One of the British companies still using analogue interactive video for training in the 1990s, the Halifax Building Society as it was then considered the system a

[28] Mr. Robert Lowe, Philips PDO Systems Quality Engineer, in personal interview on 18 April 1994 in Blackburn, England..

worthwhile instrument for the uniform training of their staff within the United Kingdom. The Televisual Services of the Halifax Building Society considered the advantages of interactive video to be that it allows flexible training hours, reduces the number of instructors required and minimises the necessity for training conferences and related expenses[29].

	1991 (000s)	**1992** (000s)	**1993** (000s)	**1994** (000s)
U. Kingdom	5	10	16	24
Europe	196	287	397	512
U. States	674	898	1,185	1,490
Japan	3,600	4,450	4,980	5,580

Table I – Households with Laserdisc players (adapted from *Screen Digest*, August 1994, p. 182).

	1991 (000s)	**1992** (000s)	**1993** (000s)	**1994** (000s)
U. Kingdom	15,113	15,815	16,321	16,771
Europe	83,155	93,401	103,481	113,805
U. States	63,036	68,481	73,565	78,125
Japan	28,587	29,828	31,028	32,224

Table II – Households with videocassette recorders (adapted from *Screen Digest*, August 1994, pp. 183-184).

Analogue interactive video was less successfully applied to general education. Several educational projects based on analogue videodisc technology were developed within the United Kingdom during the 1980s. At the 900th anniversary of the *Doomsday Book*, the *BBC's Doomsday Project* distributed

[29] Mr. Kevin Thornburn, Manager of Televisual Services of the Halifax Building Society, in personal interview on 22 March 1994 in Halifax, England.

analogue interactive video players linked to BBC microcomputers among British schools. Today, it is hard to locate a school in which those non–standard electronic Doomsday Systems still operate[30]. Other projects based on analogue videodisc from the 1980s are, for example, the *Interactive Video in Schools* (IVIS) Project; the National Curriculum Council's project of five analogue interactive discs supporting mathematics teaching in primary and secondary schools; the *National Council for Educational Technology Project* consisting of two videodiscs on career's education and career's guidance; and the *Interactive Learning Project* at Newcastle University. Data from the National Council for Educational Technology indicate that less than 30 per cent of about 2,000 analogue interactive video workstations installed in British schools are actually in current use (Feldman, 1994, p. 82).

Major broadcasting organisations such as the BBC, with a traditional commitment to innovation and technical excellence, investigated this first analogue stage of the supposed interactive revolution. Interactive applications were initially produced by units formed in a number of programme departments, from which emerged a free standing company, the Multimedia Corporation. Interesting training applications were produced both for in house use and for educational establishments. At the time of writing, with the emergence of the digital video disc, the BBC has re–entered the multimedia business.

Digital media started to reach the consumer market in the years between the advent of LaserVision and Laserdisc. Audio Compact Discs, hereafter referred to as CD–As, were made commercially available in 1983 and soon

[30] Not a single operating Doomsday System was found by the author in Yorkshire in 1994.

became one of the biggest successes in electronic products for the home market. Beyond its reputation for high accuracy reproduction, the triumph of CD–As certainly relates to the existence of full standards for recording and for players, as well as the availability of a reasonable range of titles from their launch. The smaller size and higher resilience of CD–As in comparison to vinyl recording units are both factors that are likely to have influenced the success of Audio–CD technology.

With a storage capacity of 650 MBytes[31] of data, compact discs were one answer for the requirement of larger storage capabilities that the computer industry constantly faces. Compact Discs–Read Only Memory, or CD–ROMs, have been commercialised since 1985. Standardisation was quickly recognised as an essential point to assist the success of CD–ROMs. Not only a physical pattern, but a logical standard defining the format for structuring data and files, had to guarantee the compatibility of CD–ROM players produced by different manufacturers.

In 1991 (U.S.A.) and 1992 (Europe and Japan) Philips launched another interactive video technology targeting specifically the home market, this time on digital CDs. Using television sets for display, the international marketability of the CD–I System depended upon compatibility with all of the three most important television systems: NTSC, PAL and SECAM. At the time of its launch, a comprehensive standard was already defined for all CD–I–related products. The CD–I standard not only states how data should be structured on the disc, but also sets up specifications for the players, allowing

[31] A Byte is equivalent to 8 bits of information. A Kbyte (Kilo Byte) corresponds to 1,024 (2^{10}) Bytes, and a MByte (Mega Byte) to 2^{20} Bytes. A GByte (Giga-Byte) represents 2^{30} Bytes.

a wide range of manufacturers to produce compatible hardware hence increasing software demand. By the end of 1993, the number of CD–I players world-wide was estimated at 300,000 (Bowen, 1994, p.24). The number of CD–ROM drives installed on personal desktop computers by this same time was around 8,8 million (Dataquest, 1994, n. p.). In 1997, CD–I seems to have failed to penetrate the home market to any significant extent, and has become yet another 'game machine'.

One of the main drawbacks of first generation CD–I was its inability to provide full–screen full–motion video (FMV), a characteristic shared with the non–dedicated CD–ROM–based systems. Providing FMV has proven to one of the biggest challenges for the multimedia industry. Borko Furht presents a table with the storage requirements for various data types, reproduced below (Table III). Projected on those data, the 650 MBytes of a CD are shown to support more than 300,000 A4 pages of ASCII[32] text, more than one hour of audio or more than 85 high–resolution colour still pictures. Video sequences can take the storage requirements to a much larger scale.

> For example, a single frame of colour video, with 620 x 560 pixel frames at 24 bits per pixel, would take up about 1 MByte. At a real–time rate of 30 frames per second, that equals 30 MBytes for one second of video. A typical multimedia application might store more than 30 minutes of video, 2,000 images, and 40 minutes of stereo sound on each side of a laser disc. That application would require about 50 GBytes of storage for video, 15 GBytes for images, and 0.4 GBytes for audio. That means a total of 65.4 GBytes of storage on the whole disc (Furht, 1994, p. 48).

[32] ASCII is the acronym for the American Standard Code for Information Exchange, in which each character is represented by a two bit number.

	Text	Image	Audio	Animation	Video
Object type	ASCII	Bitmapped graphics Still photos Faxes	Noncoded stream of digitised audio or voice	Synched image and stream at 15–19 fr/sec	TV analogue or digital image with synched streams at 24–30 fr/se.
Size and bandwidth	2 KBytes per page	Sample: 64 KBytes per image Detailed (colour) 7.5 MBytes per image	Voice/phone 8 KHz/8 bits (mono) 6–44 KBytes/sec Audio CD DA 44.1 KHz/16 bit 176 KB/sec	2.5 MBytes/sec for 320x640x16 pixels/frame (16 bit colour) 16 frames/sec	27.7 MBytes/sec for 640x480x24 pixels per frame (24 bit colour) 30 frames/sec

Table III – Storage requirements for various types of data (reproduced from Furht, 1994, p. 48).

Data compression was the solution developed for digital video and multimedia. Compression techniques work by removing redundant data without significantly reducing the informational content. Visual data redundancy takes two basic forms: 'statistical redundancy', that arises from the correlation between values at one pixel and its adjuncts (for video temporal adjacency can also be considered); and 'psycho–visual redundancy', based on the tolerance to distortion of the human visual system (adapted from Hawker, 1992, p. 25). Inevitable losses of accuracy are compensated for by the high compression rates achieved with the most commonly used compression algorithms. These are based on three compression standards established respectively by the Joint Photographic Expert Group (JPEG), Moving Pictures Expert Group (MPEG) and Specialist Group on Coding for Visual Telephony. The JPEG compression standard was developed for full colour continuous tone still images, achieving an average compression rate of

15:1. The MPEG standards target full–motion video, storing only the difference between successive frames at compression ratios of up to 200:1. The H.261 standard, commonly called px64, developed by the Specialist Group on Coding for Visual Telephony, targets on–line video communications. By applying pre–emptive redundancy estimation strategies, both within each frame and between frames, it achieves compression ratios of up to 2,000:1 (Furht, 1994, pp. 49–50).

Compression techniques also meet moving images demand for high speed retrieval. FMV requires the retrieval of 30 MBytes of data every second. The first CD–ROM drives, nowadays referred as single–speed, sustained a data transfer rate of 150 KBytes per second. In 1997 eight–speed drives, operating at 1,200 KBytes per second, are considered standard, and twelve–speed drives are increasingly common (*Personal Computing World*, July 1997, p. 328).

The advent of the Digital Versatile Disc (DVD) in 1997 set a new scale for the discussion of the storage capacity of discrete units, challenging the stability of CD–ROMs as standard storage devices for personal computers. A single–layer, single–sided DVD supports 4.5 GBytes, while double–sided, double–layered discs can hold up to 17 GBytes of data (*Personal Computer World*, July 1997, p. 132). Rewritable DVDs, or DVD–RAMs, compensate for the flexibility inherent in rewritable CDs. Initially, DVD–RAMs support only 2.6 GB, but it is predicted that 4.7 GBytes capacity will be reached as the related technologies continue to improve (*Personal Computer World*, July 1997, pp. 37 and 53).

Interactive Media On–Line

The initial conception of interactive audio–visual systems, based on discs, established one delivery model for interactive media. A second delivery model started to emerge during the late 1980s with the first feasible projects for interactive media broadcasting.

Early proposals for interactive media broadcasting were based on analogue format mainly owing to the data retrieval speed required by full–motion video. An example of such a strategy for incorporating interactivity in analogue broadcast television is the system proposed by the BBC and the Multimedia Corporation in 1987, Transmitted Interactive Television (TRANSIT). TRANSIT was based upon the idea of

> [decoupling] the act of transmission from the act of viewing by introducing a form of intermediate recording. This introduces a timeshift of variable length . . . which is under the control of my personal microcomputer, taking instructions from me and from data within the broadcast (Armstrong, 1987, p.31).

Several conditions were lacking for the successful implementation of such early and intricate strategies. Above all, the flexibility inherent in the digital format was missing. On–line media became viable through the developments of both, compression algorithms and digital networking.

It is interesting how the epidemic structure of the international digital network Internet was generated owing to paradoxes of the prevalent irradiative model of communications technologies[33]. The development of communications

[33] The expressions ‘epidemic’ and ‘irradiative’ are applied to communications systems according to the following definitions adapted from Marc Guillaume by Arthur Mattuck: irradiative communications systems are based on a single delivering point and spreading information homogeneously. In epidemic systems messages circulate horizontally among all individuals (Mattuck, 1992, p. 17).

technologies had initially been driven by a centralised delivery model, as centralisation of emission facilitates controlling the content of delivered messages. Technologies of communications initially created as epidemic systems have later been transformed for irradiative use. The classical example is radio, which was initially developed as a two–directional tool for military and navigational use, and transformed into a mass medium after the First World War. Substantial government investments were made from the 1920s in order to assure the spread of radio receivers, providing the means for the establishment of that communications technology on an irradiative basis. This is not said ignoring the importance of the necessity to create a market to absorb the excessive production capability of the hardware industries, over–estimulated by the wartime demand. It was the awareness of radio's political importance, however, that determined that receivers were to be made artificially cheaper than transmitters and caused the delivery of information through radio waves to be considered a matter for government control. Both uses of radio, irradiative and epidemic, had their value confirmed during World War II.

The counterpart of the ease of control created by centralisation is that it also makes it simple to take over the power. The events in the Philippine during the fall of Ferdinando Marcos government in 1986 demonstrate how much contemporary *coups d'etat* recognise the importance of controlling communications systems.

> In the uncertainty that followed the launching of the rebellion against the tyranny of Marcos, the take-over of the government's TV-radio broadcast facilities two days later proved to be the most

> vital initial strategic victory for the rebel forces (*Business Day*, 21 March 1986).

Two decades before the events in the Philippine, the Brazilian authoritarian governments of the 1960s demonstrated their awareness of both the advantages and dangers of centralised communications. Shortly after the military assumed the government in 1964 the network supporting the single opposition newspaper evenly distributed throughout the country (*Última Hora*) was dismantled (Mattelart and Mattelart, 1989, p. 36). Massive investments were made, on the other hand, on the establishment of new nation-wide irradiative communications systems, mostly television networks, linked to the government with different degrees of subtlety (Mattelart and Mattelart, 1989, pp. 35-56).

By the late 1960s missile technology had already reputedly achieved high levels of accuracy over extremely long distances. Traditional defense methods became no longer effective protection for obvious war targets such as focal points of government and communications structures. North–American military control was then re–directed to an epidemic basis. As a perfectly epidemic network has no central or preferable emitting point, communication among authorities and remote control of weapons would be assured in the event of the destruction of sections of the original mesh. The Advanced Research Projects Agency (ARPA) of the U.S. Department of Defence initiated the development of the first network of computers at dispersed sites in 1969. Linking the University of Utah, Stanford Research Institute, and two campi of the University of California, the ARPANET was initiated. By 1972, thirty seven universities and government research institutions were linked together. As the

network grew, participant civil institutions started to demand autonomy from the military. In 1983, ARPANET was split up in two networks: MILNET for military use and ARPANET for research. Other nations adopted networking technology, and national networks were linked through satellite, generating the international network that became known as the Internet.

Data traffic was soon far too heavy for ARPANET's structure. In 1987, ARPANET failed due to overloading, and the Internet backbone started to be transferred to the NSFNET, created in 1986 by U.S. National Science Foundation (Reid, 1994, n. p.).

One of the drawbacks of the complete decentralisation of the Internet is the difficulty to obtain reliable statistical data about the network. Estimates of the number of machines with Internet connections are based either on counting the total number of hostnames and IP addresses listed on each name server[34], or restricting the calculation to those machines not only listed on a name server but actually on and connected to the network when the survey takes place. In the first case, machines that do not actually exist but have been mentioned in a name server are counted. In the second case, computers that are behind restrictive firewalls[35] or not on at the time of the survey are not included in the results The actual number of computers connected to the Internet is probably between the results obtained by those two modes of calculation.

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[34] IP addresses are sets of four numbers associated to network interfaces. There is usually, but not necessarily, one IP address for each computer. Hostnames are sets of letters associated to IP addresses to facilitate human usage. More than one hostname is often associated to the same IP address. Name servers resolve hostnames into IP addresses (adapted and expanded from Gray, 1996, n. p.).

[35] A firewall is a network security device that hides information on the use of machines within a name server from external enquiries.

	1993 (000,000s)	**1994** (000,000s)	**1995** (000,000s)	**1996** (000,000s)
N° of hostnames and IP addresses	1,3	2,2	4,9	9,5
Annual Growth (%)	?	69	123	94
N° of machines on at survey time	0,4	0,6	1,0	1,7
Annual Growth (%)	?	50	67	70

Table IV– Estimate of the number of computers connected to the Internet (in millions) and proportional growth from former year (%) (based on results by Network Wizards, listed in Gray, 1996, n. p.).

The combination of high speed data transmission with data compression techniques made on–line multimedia possible. Interactive television, a basic application of the interactive potential of digital on–line audio–visual media, has been frequently connected with giving audiences power over the outcomes of television programmes. Based on a book from 1953 by Ray Bradbury, François Truffaut's *Fahrenheit 451* (1966) contains one of the first depictions of a (fake) interactive television programme whose evolution was decided (or, more exactly, pretended to be influenced) by viewers. The engrossment and sense of empowerment of the viewer who believes to be influencing the programme makes one of the highest points of Truffaut's film.

One of the earliest works known to have been actually realised on this line of public participation was an interactive movie shown at the Czech Pavilion at the 1967 *World Expo* in Montreal, Canada. The audience "was allowed to influence the course of the action by selecting from among several alternatives at a few key points in the film" (Laurel, 1993, p. 53). Some experimental two–

way television systems, in which the viewer is supposed to both receive and transmit information, operated also in the mid–1970s. The most famous examples are the communitary communication system Hi–Ovis, in Higashi–Ikoma, Japan, and QUBE, Columbus, Ohio, U.S.A. (Toffler, n. d., pp. 168-169, Mattuck, 1992 , pp. 211-217 and Laurel, 1993, p. 53).

The Brazilian network Rede Globo has always explored the appeal of attributing decision power to the viewer. Despite the defined authorship characteristic of Brazilian *novelas*, many storylines have been reputedly altered by Rede Globo in order to concur with Ibope results revealing public desires that differed from the original plans of the playwright[36]. In 1992, Rede Globo launched the programme *Você Decide*. In the weekly editions of *Você Decide* plots are developed up to their climaxes, when two radically different possibilities of action are proposed. The audience then uses the telephone to vote for their preferred course of action. The majority of phone calls defines which final sequence will be displayed. The program is a natural extension of both, the practice of filming multiple ends to show to test–audiences and the concept of 'Direct Response Television Advertising', in which a telephone number for viewers response is displayed on screen during the commercial.

Beyond the presentation of few options at scant key points of a story, the paradigm of 'interactive film' stumbles on basic mathematics. The number of sequences to be produced, recorded and stored increases in up to exponential proportion to the number of decision points and choices available. Figure 1

[36] As previously seen in this thesis, Ibope is an acronym for *Instituto Brasileiro de Opinião Pública e Estatísticas*, the 'Brazilian Institute of Public Opinion and Statistics'. The assertion is based on personal memory of several claims on this line both by Rede Globo itself and the specialised media during the 1970s and 1980s.

shows how an interactive story with only five decision points, each one leading to three different sequences, can develop into eighty one different outcomes. A ten minute version of such hypothetical interactive story, for example, could be composed of one hundred and twenty one two minute paths. Despite requiring video production equivalent to a four hours film, for the viewer the final story would be rather short and presenting a restricted number of choices. Not surprisingly, most interactive videos are composed of converging paths, giving rise to a general impression that "all roads led to Rome – that is, all paths through the movie led to the same end" as Brenda Laurel straightforwardly stated about the 1967 Czech interactive film (Laurel, 1993, p. 53).

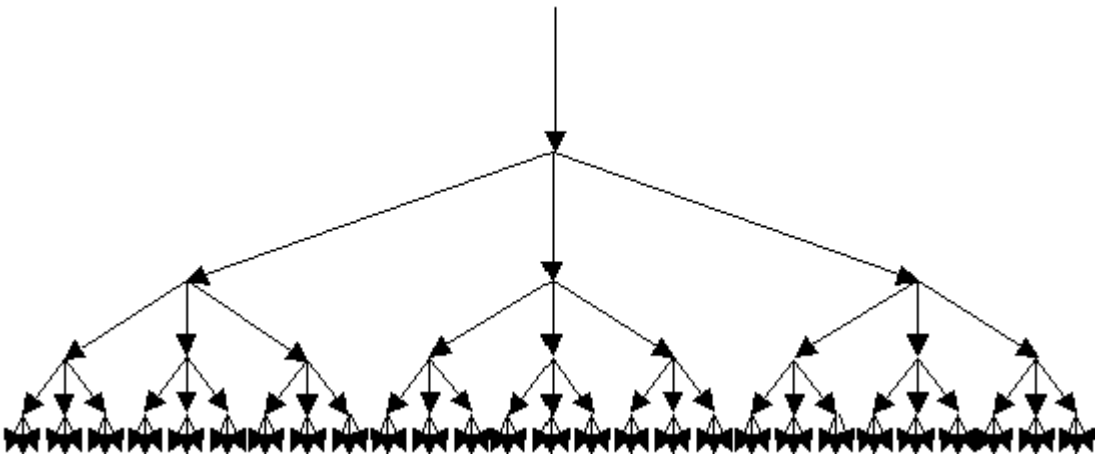

Figure 1 – The number of paths that compose interactive narrations can increase in up to exponential proportion to the number of decision points and choices available.

The possibility of deciding the ending of programmes, actively participating in quiz shows or voting for winners of contests is, however, only a small part of the overall possibilities of interactive television. For some authors, the long term attractiveness of digital television actually resides in "tailored

programming which is selected by genre and delivered upon request with a tiered price level" (Jenkinson, 1994, p.21). Once more following a pre–digitisation model of 'democratic interactivity', Rede Globo offers its public the opportunity to vote by telephone and decide which one of the three films selected for daily editions of the programme *Intercine* will actually be broadcast. On Tuesday, 25 March 1997, for example, viewers could choose among *Night Eyes Three* (Stevens), *Dinner at Eight* (Lagomarsino) and *The Goodfellas* (Scorcese, 1990) (according to 'Telejornal', *O Estado de São Paulo*, 23 March 1997, p. T. 22).

In 1997, multimedia content already circulates through fibre–optic, coaxial cable and wireless networks in various countries. The turnover of networked home–delivered interactive services in the United States in 1993 was reported to have been around twelve million dollars. This includes the delivery of games, multimedia reference material, video–on–demand and applications such as home–banking and on–line shopping. (*Screen Digest*, August 1994, p. 173).

Almost one in three households in Western Europe already received television programmes via satellite or multi–channel cable networks by 1994, and the number of serviced houses has been increasing by around 4.6 million per year (*Screen Digest*, August 1994, p. 177). In July 1995 the millionth household was connected to United Kingdom's broadband cable television (*Screen Digest*, August 1995, p.173). Between 4,4 and 7,1 million home subscriptions are predicted for the year 2,000 (*Screen Digest*, January 1997, p. 24). The number of European households with digital satellite television receivers has

also increased significantly, from 320,000 at the end of 1996 to over 1,2 million in October 1997 (*Screen Digest*, October 1997, p. 225).

Home Hardware

As a direct result of media digitisation, several authors predicted the transformation of the average home television set into centralised 'Home Communicational Sets' (Wicklein, quoted in Wegner, 1985, p.52). Such "powerful digital information centre[s], accessing linear and interactive information and services from advanced cable and telecommunications networks, satellite and terrestrial broadcasts and hybrids of networked information and off–line CD products" (Feldman, 1994, p.29), would be "used at home to watch films, read the news, play games, consult personal advisors such as lawyers and accountants, make theatre reservations, etc." (Bowen, 1994, p. 119).

An important challenge for the success of those centralised digital stations can come from the need to hide the computer technology they rely upon inside a 'black box gadget'. To be fully accepted as home appliances, it is generally considered that interactive products need to be easy to install and simple to use. Despite any illusions generated by the adoption of the concept of 'user friendly' computing in the design of many personal platforms since the advent of the Apple Macintosh (1984), devices that are explicitly computers are usually believed to appeal solely to a niche market.

Digital processing has already spread into our homes in a variety of different devices. From the microwave to the answering–machine and the telephone

itself, households of the 1990s can be said to confirm 1970s' predictions of "computers living at the centre of our homes running the central heating, setting the burglar alarm, logging phone calls, etc.". The difference between today's reality and earlier visions is that there is not just one powerful computer centralising all home activities, but a dedicated computer inside every appliance (MacGregor, 1994, p. 120).

Centralisation of all different types of data from distinct on–line and off–line sources can be crucial for some professional applications. At home, however, it seems economically inappropriate to concentrate many activities in a single powerful and therefore expensive, station. Beyond the choice between acquiring more than one costly 'Home Communicational Set' for simultaneous use by different members of a family or having to wait for a relative to finish watching a film to access the electronic dictionary, customers would almost certainly prefer if several cheaper dedicated platforms were to perform different tasks. Home computing equipment will therefore most likely develop towards the 'ubiquitous computing' model, proposed as "an enhancement of computer use by making many computers available throughout the physical environment, while making them effectively invisible to the user" (Weiser, 1993, n. p.). Descriptions of a high–technology home in 1997 actually list twelve independent computerised devices intended for the living room alone, some of them to be interconnected[37] (Murphy, 1997).

[37] The equipment listed by David Murphy includes a 'gas–plasma television', a 'two–way television', 'NetStation', 'PlayStation', digital home cinema, speaker system, noise–reduction headphones, digital to analogue converter, automation control system, 'DVD System', 'MiniDisc recorder' and a 'virtual aquarium' (Murphy, 1997).

Within a fully ‘ubiquitous computing’ environment as proposed by ? Weiser, different devices communicate among themselves and with a central processing station through radio signals. The same principle underlines the ‘Things that Think’ MIT Programme, described by Tony Smith with colourful examples:

> The Media Lab’s Things That Think programme was founded on the idea that IT [information technology] will only become truly useful when it provides you with the information you need, wherever you are, precisely when you ask for it and with the minimum of hassle. To do that, systems need to be connected to an all–pervasive and powerful network, capable of talking to each other, able to understand what kind of information you have asked for and therefore what they will need to deliver it. They also need to do so invisibly. . . . Media Lab folks like to talk about shoes that can pick up data from the carpet when you walk into a room and transmit it to a display on your watch. That may be an extreme example, but it’s not so daft. . . . A mug might need to check whether the coffee it contains has gone cold or has been drunk. It might tell the coffee maker to warm a fresh pot, signalling it by sending a current through your body (your Personal Area Network) which is detected by your shoes and routed to the coffee maker via the mesh of wiring in the carpet (Smith, 1997, p. 209).

The general tendency towards the adoption of multiple independent platforms, networked or not, makes standardisation an even more crucial for digital technologies aimed at the home market. Amongst the various storage units presently available, CD–As and CD–ROMs are undoubtedly the most commonly found. CD–ROM platforms are more versatile than Audio–CD players, inclusively supporting CD–As themselves. Their prevalence and potential

adoption as the ultimate discrete interactive media vehicle has recently been threatened by the advent of DVDs. Presently, most interactive software still reaches the home market in the form of CD–ROMs.

Home Software

There is no such a thing as a successful technology without demand. Even the most efficient demand–induction strategies need some starting points from which to be applied. Gutenberg's printing press could have been a failure few people knew about without "meeting and feeding demand for reading matter from the emerging and increasingly better–educated, secular middle classes" (Arundale, 1994, p. 1). Despite all the enthusiasm about their potential, interactive media can remain confined to specific portions of the consumer market if ‘killer applications’ fail to appear.

Mainly supported by educational institutions and computer users, CD–ROM reference books are one of the most successful applications of digital interactivity. Owing to its large storage capability and the random access it provides, CD–ROM is an ideal vehicle for reference material. CD–ROM–based dictionaries appeared before the 1990s. The natural development was to incorporate images and sound, creating the so–called ‘Multimedia Encyclopaedia’.

The concept of large retrieval devices storing information in diverse media dates back to as early as 1945, when Vannevar Bush proposed ‘Memex’, a ‘memory–extender’ system. At that time computer technology was just taking its first steps, and so Bush's proposal was based on microfilming. Apart from

that, Memex does not have any essential difference from today's multimedia encyclopaedias or the Internet when used as a database. Bush himself pointed out that, as a consequence of the implementation of Memex, "[w]holly new forms of encyclopaedias will appear, ready–made with a mesh of associative trails running them, ready to be dropped into the Memex and there amplified" (Bush, 1945, p.108).

As previously seen in this thesis, hypertext is the denomination given to text files with persistent connections (called 'links') between selections (called 'anchors'). The user may navigate through the information by selecting and following these links. Hypermedia is an extension of the concept of hypertext to information that is not limited to text, such as various forms of graphic images, animation and motion–video. Both terms, hypermedia and hypertext, were invented by Ted Nelson in 1965 to describe the system he conceived and named 'Xanadu', in which anything ever written, drawn, photographed or filmed would be electronically stored in a form that branches and allows choices to the reader (Landow, 1992, p. 4). As collection of all knowledge and information ever produced, the concept of Xanadu is still dreamt of by some as a possible future for the Internet.

As they require an active user, hypermedia applications tend to be identified as either being games or demanding too much hard work and thought. In order to justify the demand for activity and at the same time avoid extreme identification between interactive products and game–playing, most manufacturers have chosen to stress the educational potential of interactive

products. An extremely similar situation drove microcomputer's advertisements towards education some years ago:

> too strong a games identity threatened the status of the micro as a more general purpose machine, and indeed pushed the micro towards being a child's toy. Hence, early advertisements for micros never overtly emphasised games as their central function; if anything, the key stress was on the educational potential of the machine. While games were always mentioned in advertisements and fostered by the software support that manufacturers offered, games–playing was depicted as being only one option within a range of applications (Haddon 1993, p. 130).

As occured in the early years of personal computing, public investment has been directed towards providing British schools with multimedia equipment. More than four million pounds were spent on multimedia systems and discs to be distributed amongst 2,300 primary schools within the United Kingdom only in 1994 alone (*The Times Education Supplement*, 20 January 1995, p. 24).

Despite some serious efforts towards the development of serious interactive learning systems, early pseudo–educative applications already super–populated the market. Among the titles one can find under education–related headings in dedicated magazines are *Creepy Crawlies* ("some of the most interesting facts that you will ever know about the ugliest and most horrible bugs"); *Cookbook Heaven* ("an incredible 2,000 recipes on one CD, including a stress management program"); *Digital Love* ("various therapy sections including colour, breath control and mantra chanting"). Exclusively quantitative approaches include for example: *20th Century Almanac*

("discover what happened "on this day" in history with the dynamic timeline of video history"); *Grolier Guinness Records* ("the G.B. of Records has amazed millions with the world's facts and figures and will again on CD"); *1,000 Beautiful Landscapes; 1,000 Butterflies* ('Buyers Guide', *MPC & CD–ROM User*, October 1994, pp. 104–113).

Most educational interactive artefacts presently available share what Roger C. Shank calls a 'page–turning' architecture, which

> typically present students with a screen of text [or photographs, drawings, video] and allow them to 'press the button for the next page'. This is a very passive experience for the student and, in spite of some well–intentioned programming, not very educational (Schank, 1994, p. 69).

Shank also calls attention to the fact that most educational software seem to be largely influenced by a behaviourist conception of learning. Behaviourism, a branch of Psychology which proposes the use of reinforcement as a way of conditioning individuals to produce the response considered correct when presented with a given stimulus. Burrhus F. Skinner, a well known figure in this field, actually designed 'teaching machines' in accordance with this theory:

> These machines present students with a long series of short–answer questions to be answered one at a time. . . . When a student answers correctly, he moves on to the next question. . . . The machine never explains the reasons why an answer is incorrect, and it makes no effort to discover the source of the student's error. . . . The many educational software programs featuring 'drill and practice' are not much more than a computerised version of Skinner's machines. Both kinds of

> machine operate under the assumption that learning consists of behaviour modification through conditioning (Schank, 1994, p. 70).

By reducing the 'active role' of the user to turning the virtual pages of electronic books and memorising contents, much educational interactive software hardly reaches the frontiers that are supposed to be trespassed by interactivity. The experience of learning through interactive devices designed within such paradigm combines with the large quantity of information stored in electronic reference artefacts to reinforce passive acceptance instead of stimulating speculation and creativity. Users are driven towards the presumption of interactive databases as the realised Xanadu, representing the whole of existent knowledge instead of an enormous amount of distinctively selected information. The illusion is intensified by the general lack of understanding concerning hyperlinked structures. Computers are still seen as all–powerful machines, and remain surrounded by an aura of technological wonder. Interactive databases are often accepted as providing neutral and accurate representations of reality.

Reputedly operating on the border line between education and entertainment, some interactive artefacts are supposed to have participated in a new field, 'edutainment'. Most edutainment software has so far concentrated on a very narrow concept of education. Titles such as *Mario Teaches Words* (Mindscape, 1993), *Hooray for Spelling* (Lander Software, 1995) and *Your Child Can Be a Genius* (Europress, 1996) speak for themselves.

> There is really nothing wrong with educational toys if the emphasis is entirely on the enjoyment of play and not on the

> intent of educating. Such toys become problematic, however, when parents emphasise what using the toy supposedly teaches the child over how the child desires to use it. Educational toys become absolutely deadly when the child is expected to learn what they are designed to teach rather than what he wants to learn. A child must be permitted to use a toy the way he wishes to . . . not as the parent, teacher, or manufacturer thinks it ought to be used (Bettelheim, 1987, p.42).

Other artefacts, fully dedicated to entertainment, do not necessarily operate with representations of reality but have as much cultural and ideological impact and signification. Games have been introducing users to computers for years, and entertainment is often recognised as crucial to an effective penetration of multimedia, interactive, and even virtual reality systems into the home market. One of the wealthiest sectors of the interactive software production, computer games already support a ten billion dollars per year industry in the United States. While creating traditional games with cartoon–like characters usually costs between fifty thousand and one hundred and fifty thousand American dollars, new generation artefacts based on digitised video sequences have a minimum cost of at least two hundred and fifty thousand dollars (Jenkinson, 1994, p.21). The production of Sierra's *Phantasmagoria* (1995), a seven CD–ROM artefact, is said to have cost around six million dollars (*CD–ROM Today* 15, July 1995, p.21). During the first year of a multimedia–on–demand trial in Kyoto, Japan, users requested over ten times more games than movies per month (*Screen Digest*, August 1995, p. 185). The total spending of European consumers on interactive entertainment software is reported to have reached nearly 3,500 million dollars in 1996, a growth of 58% from 1995 (*Screen Digest*, February 1997, p. 33). The rise in

popularity of non–entertainment CD–ROM titles between 1996 and 1997 did not meaningfully affect games' leadership amongst other multimedia applications for the consumer market (Table V).

	Games	Education	Utilities	Reference	Home Office
1996	78,8	6,8	5,3	8,1	1,0
March 1997	69,0	8,6	8,6	7,6	6,1

Table V – Proportion of sales of various types of CD–ROMs for personal computers in the United Kingdom over twelve months (adapted from *CD–ROM Today* 39, June 1997, p. 13).

Entertainment is not only the economic leader of multimedia industry, but also launches a massive amount of new artefacts each year and often introduces new features in human–computer interaction. Given its general significance and particular relevance for the design of the Semiotic Toy as proposed by this thesis, entertainment software in the game paradigm will be analysed in detail in the next chapter.

A different approach to the issue of interactive entertainment involves artefacts usually referred to as interactive literature, interactive narration or interactive fiction. Unlike traditional linear fiction, in which a story is narrated by the author to the reader, truly interactive literature is intended as a dialogue by which author and reader compose together. The reader is invited to make choices on the development of the story or even to add his own contributions to the original material.

Recognising playfulness as a main characteristic of interactive literature, Jay D. Bolter differentiates electronic games from electronic fiction on the basis of the relationship between author (or programmer) and reader (or player).

The programmer of electronic games defines a series of goals and obstacles to be surpassed by the player. The author of electronic fiction does not challenge the reader, but offers partnership in the composition of the story (Bolter, 1991, p. 130).

Most interactive narration in both, verbal and audio–visual formats, is based on networks of choices leading to ramifications of outcomes. In its basic form, interactive literature offers choices between different outcomes at the end of each narrated incident. Each option leads to a different sequence within the narrative, and the incidents are structured to form different stories for every pathway of choices. This is the underlying principle of electronic artefacts such as *The Doomsday Brunette* (Zakour, 1994). The branching structure is identical to that of the hypothetical interactive story represented Figure 1 (page 118), previously discussed as an interactive video. In the case of verbal modes of narration, however, production costs and storage demands are much reduced if compared to audio–visual media.

A further level of elaboration leads to interweaving paths as encountered in interactive books in printed format such as *Mountain of Mirrors* (Estes, 1982). *Caught Out and other Works* (Larsen, 1994) is an example of electronic interactive fiction following this model.

Interactive literature conceived as work–of–art tends to take better advantage of the possibilitites of hypertext and, breaking the linearity implicit in the drive–towards–the–end, operate further from the Aristotelian concept of a ‘well constructed plot’ than its commercial counterparts.

> A whole is that which has a beginning, a middle and a conclusion. A beginning is that which itself does not of necessity follow something else, but after which there naturally is, or comes into being, something else. A conclusion, conversely, is that which itself naturally follows something else, either of necessity or for the most part, but has nothing else after it. A middle is that which itself naturally follows something else, and has something else after it. Well–constructed plots, then, should neither begin from a random point nor conclude at a random point, but should use the elements we have mentioned [i.e. beginning, middle and conclusion] (Aristotle, *Poetics*, 3.2.1, additions in square brackets by the translator Richard Janko, 1987, p. 10).

The dynamic nature of hypertext invites experimentation with non–stactic arrangements of discrete textual units as narrative components, with the concepts of beginning and end, and with the roles of reader and author. Important studies of the possibilities inherent to hyperliterature have been undertaken for example by Bolter (1991) and George P. Landow (1992), who stress the potential of hyperliterature for the realisation of possibilities contemplated by theoreticians such as Jacques Derrida and Roland Barthes. Both these scholars discussed the possibilities of narratives composed of blocks of text linked by multiple paths in an open–ended structure. Some modern icons of printed literature had undoubtedly started to explore those possibilities before the advent of hypertext. Well–known examples are Julio Cortazar's *Hopscotch* (1975) and Marc Saporta's *Composition Nº 1* (1962, described in Bolter, 1991, p. 140), clearly structured on narrative units to be arranged by the reader. Jorge Luis Borges' *Pierre Menard, Author of Quixote*

(1970) is a fictional essay on the inherently active role even of the reader of linearly constructed literature[38].

One of electronic interactive literature's most discussed icons is Michael Joyce's *Afternoon* (1994). The reader navigates through *Afternoon* by selecting keywords from the episode currently on the screen or typing replies to questions formulated at the end of a section. The first 'page' of *Afternoon* reads:

> I try to recall winter. 'As if it were yesterday?' she says, but I do not signify one way or another.
>
> By five the sun sets and the afternoon melt freezes again across the blacktop into crystal octopi and palms of ice–rivers and continents beset by fear, and we walk out to the car, the snow moaning beneath our boots and the oaks exploding in series along the fenceline on the horizon, the sharpnel settling like relics, the echoing thundering off far ice.
>
> This was the essence of wood, these fragments say. And this darkness is air. 'Poetry' she says, without emotion, one way or another.
>
> Do you want to hear about it?"

Figure 2 – *Afternoon* (Joyce, 1994) (reproduced from Bolter, 1991. p. 123).

Answering 'yes' causes the narrative to continue in similar fashion, while 'no' sends the story off a new tangent. The first sentences of the screen resulting from a 'yes' reply are:

> She has been a client of Wert's wife for some time. Nothing serious, nothing awful, merely general unhappiness and the need of a woman so strong to have friends...

Figure 3 – *Afternoon* (Joyce, 1994) (reproduced from Bolter, 1991. p. 124).

[38] Further considerations of the implications of hyperliterature were considered to be beyond the scope of this thesis, and can be found in Bolter (1991) and Landow (1992) for example.

If the reader answers ‘no’ to the question in the first ‘page’, the sequence will begin:

> I understand how you feel. Nothing is more empty than heat. Seen so starkly the world holds wonder only in the expanses of clover where the bees work...

Figure 4 – *Afternoon* (Joyce, 1994) (reproduced from Bolter, 1991. p. 124).

Other examples of computer–based exploration of the possibilities of non–linear narration are for example Rob Swigart’s *Downtime* (unpublished[39]) and Kathryn Cramer’s *In Small & Large Pieces* (1994). *Downtime* is a collection of stories that can be read independently and linearly. Each story is composed by narrative units the author calls ‘nits’. If the ‘reader’ types a word in the appropriate window of the interface (specially designed by Swigart for *Downtime*), the system sets together all ‘nits’ containing that word, composing new stories.

In Small & Large Pieces is designed around links between words in different sections of the whole text. As the reader selects a word, the correspondent selection of text appears on the screen. On different occasions, the same keyword may link to different paragraphs. Different words may also link to the same selection, generating a labyrinth of diverse possible readings in multiple orders.

In 1994, the North–American publisher Eastgate Systems considered the production of electronic interactive books financially interesting despite its

[39] A version of *Downtime* with added sound capabilities is expected to be published by Eastgate in 1998.

likely restriction to a niche market[40]. In 1997, the *Eastgate Catalogue of Serious Hypertext* lists fifteen fictional hypertext stories and ten non–fiction hypertext titles published.

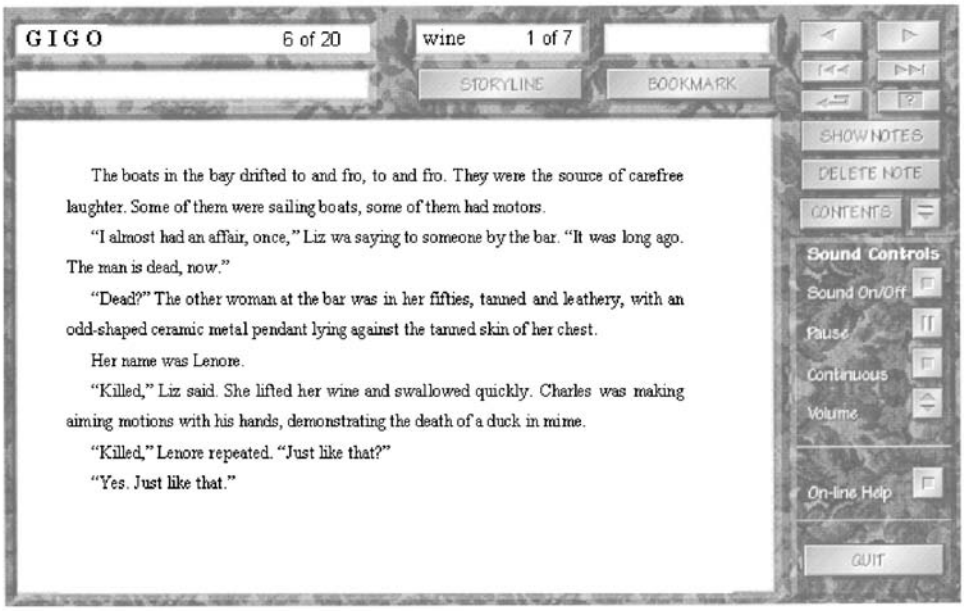

Figure 5 – *Downtime*'s interactive interface (Swigart, unpublished), showing one 'nit' of a story composed from the selection of the word wine (reproduced from original obtained from the author).

Without relying on hypertext links, other interactive stories concentrate on inviting the 'reader' to join the creative process of writing. *Clara: the cybernovel* is one example of experiment with the possibilities of redefining the roles of both, writer and reader. *Clara: the cybernovel* was initiated by Christopher Duhamel in 1996 with a sequence of around three hundred words publicised in the World Wide Web in two versions, English and French. Readers were invited to write the next sections and submit to the original author, who selected which of the suggested additions would be put on–line as part of the story. In October 1997, Duhamel reported to have received around

[40] According to Mark Bernstein, editor of *Eastgate Systems Inc.,* in private conversation during the European Conference on Hypermedia Technology, Edinburgh, 1994.

500 contributions to the English version of *Clara: the cybernovel* (Duhamel, 1997). More than twenty different contributors had their texts incorporated to the story by then.

Further in the paradigm of computer–mediated literature, story–generating programs have been proposed as a way of fully transferring the activity of authoring to the computer itself, away from the human user. One early example is TALE–SPIN (Meehan, 1976, discussed in Meehan, 1980). TALE–SPIN tries to establish causal relations by generating stories through problem–solving techniques. Ideally, the reader would be able to choose not only characters and events, but also the style of storytelling (Meehan, 1980, Preface, n. p.). Focusing on what is supposed to be "a model of the physical world and the world of human behaviour" (Meehan, 1980, p.1), the system concentrates on the events of the story and eventually understresses the way these events are told.

ONCE UPON A TIME GEORGE ANT LIVED NEAR A PATCH OF GROUND. THERE WAS A NEST IN AN ASH TREE. WILMA BIRD LIVED IN THE NEST. THERE WAS SOME WATER IN A RIVER. WILMA KNEW THAT THE WATER WAS IN THE RIVER. GEORGE KNEW THAT THE WATER WAS IN THE RIVER. ONE DAY WILMA WAS VERY THIRSTY. WILMA WANTED TO GET NEAR SOME WATER. WILMA FLEW FROM HER NEST ACROSS A MEADOW THROUGH A VALLEY TO THE RIVER. WILMA DRANK THE WATER. WILMA WAS NOT THIRSTY.

GEORGE WAS VERY THIRSTY. GEORGE WANTED TO GET NEAR SOME WATER. GEORGE WALKED FROM HIS PATCH OF GROUND ACROSS THE MEADOW THROUGH TO A RIVER BANK. GEORGE FELL INTO THE WATER. GEORGE WANTED TO GET NEAR THE VALLEY. GEORGE WANTED TO GET NEAR THE MEADOW. GEORGE COULDN'T GET NEAR THE MEADOW. WILMA WANTED GEORGE TO GET NEAR THE MEADOW. WILMA WANTED TO GET NEAR GEORGE. WILMA GRABBED GEORGE WITH HER CLAW. WILMA TOOK GEORGE FROM THE RIVER THROUGH THE VALLEY TO THE

MEADOW. GEORGE WAS DEVOTED TO WILMA. GEORGE OWED EVERYTHING TO WILMA. WILMA LET GO OF GEORGE. GEORGE FELL TO THE MEADOW. THE END.

Figure 6: Story generated with TALE–SPIN (reproduced from Meehan, 1980, pp. 164-165).

While hyperliterature proposes a re–arrangement of the relation between author and reader of a story, computer–generated stories depend on the unlikely advent of creative computers with an accurate aesthetic sense. On the one hand a techno–utopian dream, on the other hand a humanistic nightmare, the issue of computers able to generate stories directly calls into question the inability of many human beings to produce or understand narrations themselves.

Besides the two existent paradigms of application of interactivity to narratives discussed in this chapter, interactive video and interactive literature, it is also necessary to discuss the prolific universe of computer games. The following chapter is totally dedicated to analysing existent electronic entertainment artefacts not just due to the economic importance of computer games within the digital media industry, the easy acceptance of electronic games by the consumer market or the demand for novelty inherent to the field. Above all, it seems highly appropriate that if most narratives with moving images are accepted by viewers as entertainment, experimenting with and learning about those same narratives should be equally a playful activity.

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Chapter 4 – Electronic Entertainment

The proposal of adopting the entertainment paradigm for the development of the Semiotic Toy makes it necessary to consider some of the implications of playfulness before proceeding to the analysis of existing digital artefacts within the field. No material benefit or utility is directly generated by entertainment activities, and, as a consequence, play and seriousness have often been considered opposites in industrial societies. Entertainment is usually defined through negative statements (it is *not* important/useful/real). Even Johan Huizinga, who as early as 1938 rejected the opposition between play and seriousness, attributed the major role of play within and for civilisation exactly to its gratuitousness. "It [play] adorns life, amplifies it, and is *to that extent* a necessity" (Huizinga, 1970, p. 27, added emphasis). Both games and toys, however, simultaneously reflect and shape the socio–cultural context they are inscribed in. In the words of Marshall McLuhan,

> [g]ames are popular art, collective, social reactions to the main drive or action of any culture. Games, like institutions, are extensions of social man and of the body politic, as technologies are extensions of the animal organism. Both games and technologies are counter–irritants or ways of adjusting to the stress of the specialised actions that occur in any social group. As extensions of the popular response to the workaday stress, games become faithful models of a culture. They incorporate both the action and the reaction of whole populations in a single dynamic image (McLuhan, 1967, p. 250).

The elements that define and regulate play within the play itself and the goals pursued are not necessarily consciously admired by any particular cultural group, but, as the "faithful models of a culture" advocated by McLuhan,

certainly reflect social values and beliefs. Games and toys not only present ideas about society, but also allow experimentation with different forms of social interaction, moral identities and behaviour. As players invest feelings of self–esteem and competence in achieving the goal of a game, playing becomes more than a mere distraction. Even those games that do not provide a forum for conflict resolution by means of creativity or resourcefulness can represent a chance to operate symbolically with the eventual problems and pressures of life.

A review of existing electronic entertainment artefacts, as proposed in this chapter, calls for a differentiation between 'games', 'puzzles' and 'toys'. Games are contrived goal–oriented activities. They can depend entirely on luck, or involve physical or mental skills and knowledge. Puzzles are a particular type of game in which the object is to arrive at the right answer to a proposed problem. Rules are either replaced by instructions or do not exist. Puzzles are games to be solved instead of won. Playing with toys, on the other hand, is an essentially autotelic activity. There are no set objectives nor can winners exist. Playing with toys has no pre–determined rules and requires the application of imagination[41]. These definitions do not imply that all entertainment artefacts can be played with in a single way only. Some flexible 'play tools', such as cards or dice, can be used for both games and puzzles, or as toys.

The majority of the interactive entertainment artefacts presently commercialised are specifically designed as either games or puzzles. They

[41] The definitions of game, toy and puzzle herein adopted are expansions of considerations made by Bob Dixon, 1992, pp. 9–10.

usually have goals (and consequently concepts of winning and loosing), limiting rules or a very restricted set of possible ways to be played with. As a consequence most discussions about digital entertainment artefacts refer exclusively to games. Furthermore, such discussions predominantly concentrate on the contents of specific categories of computer games. Defined by the ease of their delimitation, such subgroups are often restricted to dedicated platforms and are rarely representative of the world of electronic entertainment in general. To avoid extrapolative generalisations, it is essential to look for a consistent way of differentiating amongst the various groups of electronic games.

Defined as an interactive artefact to promote experimentation with aspects of television narratives an appropriate design for the Semiotic Toy will require that there is a recognition of the similarities and differences between the experiences of interactive entertainment and television.

The universe depicted by electronic entertainment artefacts can be free of the limitations of physics, but is certainly as subject to ideological constraints as other symbolic structures. The symbolic scope of play is defined, moreover, not only by its final objective but also by its rules. Players of interactive entertainment artefacts are as much subject to uncritical absorption of the contents displayed on screen as the reputedly more ‘passive’ television viewers. Perhaps even more so, as the actions of the player directly cause or modify what appears next on the screen. Whilst discussing issues related to censorship of both games and videos, James Ferman stresses the need to

recognise differences resulting from the more direct modes of participation inherent to games–playing:

> [t]he experience of the games player is significantly different from that of the peruser of . . . video images on the screen, where an act of imagination is required to experience the illusion of participation (Ferman, interviewed for an article by Green, 1995, p. 42).

Even those authors such as Ted Friedman, who argues that "games reveal their own constructedness to a much greater extent than more traditional texts" (Friedman, 1995, p. 82) consider the experience of being fully involved in playing a computer game to be typically one of unlimited acceptance rather than critical awareness.

> It is very hard to describe what it feels like being "lost" inside a computer game precisely because at that moment one's sense of self has been fundamentally transformed. Flowing through a continuous series of decisions made almost automatically, hardly aware of the passage of time, the player forms a symbiotic circuit with the computer . . . . The computer comes to feel like an organic extension of one's consciousness, and the player may feel like an extension of the computer itself (Friedman, 1995, p.83).

This description echoes criticisms about the alienating power of cinema and television, augmented by the two–direcional flow of information. As television viewers are often considered to be unaware of the ideological contents of the messages received from the medium, so playing with electronic interactive artefacts is frequently said to propitiate active engagement in the construction of meaning without allowing for critical attention.

Most debates about electronic entertainment greatly resemble discussions about the depiction of violence and pornography in cinema and television. The legislation regulating screen violence and pornography in the United Kingdom is the *Video Recordings Act*, according to which all videos and games need to be given a rating by the British Board of Film Classification, BBFC. They are classified according to their suitability for distinct age groups (U, PG, 12, 15, 18). A crucial difference for the early electronic games was a clause in the Video Recordings Act that differentiates violence presented in the form of cartoon from realistic representations, as a way to avoid high age ratings being assigned to 'violent' cartoons such as *Tom and Jerry*. Cartoon characters are neither human nor animal, and so violence among them was considered harmless. As the level of realism of electronic games increased, censorship of computer games became a more controversial issue. To the annoyance of many, blood started to run out the victims of violence in games, as occurs in *Mortal Kombat*[42] (Akklaim, 1992) and *Doom* (id Software, 1993), whilst these games still qualified for exemption. Producers of computer games based on digitised video sequences are required to present a tape containing the motion video sequences, a printout of all text in the game, a flow chart showing the plot pathways, the soundtrack and the packaging. Changes in the nature of viewing offered by the rewind and slow–motion facilities available to video have already caused the BBFC to demand more cuts for videotape copies than cinema presentations (Green, 1995, p. 42). The question of whether interactivity makes pornography and violence in games even more problematic than in cinema or video remains controversial. The European

[42] When not within the text, a description of games herein referred to can be found in the Appendix at the end of this thesis.

Leisure Software Publishers Associations, ELSPA, introduced in September 1994 a voluntary ratings system. Game publishers use guidelines defined by the Video Standards Council, VSC, to set ratings according to the suitability of the software to different age groups (0–10; 11–14; 15–17; 18+).

Electronic games that incorporate nakedness and sex are generally considered to target the interests of stereotypical 'young male' game players. Beyond the usual concerns with the depiction of naked women in electronic calendars and jigsaws, interactivity adds the possibility of actually 'performing' sexual activities. The degree of realism of the representations is usually considered irrelevant, as it is evidenced by the practice of 'text–based sex' in on–line games. Adding to the general polemic about pornography on the Internet, on–line virtual reality sites such as *FurryMuck* (<138.74.0.10 8888> in 1994) acquired a reputation for the ease with which their participants were willing to engage in 'virtual sex' with other players. Computer games distributed in discrete units have also gone beyond the mere display of sexual–related images. *Cover Girls Strip Poker* (On–Line, n. d.), for example, requires dealing with 'virtual money' to disrobe women wearing stockings and other similar garments.

Discussions about pornography and sexual discrimination are not restricted to games with explicit sexual references. Most electronic games are said to represent women in discriminatory ways. There are very few female characters, and even those are predominantly depicted as passive victims in need of a male character's help. Eugene F. Provenzo mentions the extreme case of a computer game from the early eighties, *Custer's Revenge*, in which

"[p]layers who were able to get through thorny cactus and a hail of arrows got to watch an officer sexually assault a helpless but smiling Indian woman tied to a stake" (Provenzo, 1991, p.52).

The issue of aggression in electronic games is approached in two basic ways. For those who consider violence to be instinctive, that is, who assume that violent behaviour arises occasionally even without any stimuli, playing aggressive games can work as an escape valve draining off inborn belligerence. This cathartic hypothesis is opposed by those who believe that human violence is induced by external factors. From this behaviouristic point of view, increasing the amount of violence children are exposed to can stimulate aggressive behaviour.

Gregory Bateson raises some important considerations about play that takes on both these approaches. Bateson points out that the statement 'this is play' implies a mutual agreement in which it is implicit that all actions performed do not aim at what would be meant outside the scope of play. "[T]he messages or signals exchanged in play are in a certain sense untrue or not meant . . . [as] the playful nip denotes the bite, but does not denote that which would be denoted by the bite" (Bateson, 1954, p 41). The emotions experienced in such 'as if' representations appear to be directly related to those emotions that would be generated by reality. It is this relationship that opens the possibility of play being treated as the creation of a controlled environment that provides a chance for individuals to experiment with daily life demands. This symbolic experimentation provided by play has been used to explain why the

overwhelming majority of games, electronic or not, are designed over a compensatory framework.

> Firstly, [games] supply the spur of competition and the intellectual challenge which so many of us find stimulating. Then there is the escape they offer from the pressures of an often oppressive reality and, less obviously, the chance to assume the responsibilities of a Roman proconsul, a banker or a Head of State, if only for a few hours. Role playing and decision taking are powerful psychological palliatives in a society where the individual so often feels helpless to influence events (Pritchard 1975, p. 6).

Decision–making situations that arise without the opportunity for negotiation and co–operation, as is often the case in computer games, can easily distort the exercise of control into practising tyranny. In the typical electronic game situation, the single way a player can improve his outcome is at someone else's expense, and switching from one strategy to another very often leads to the worst possible outcome instead of a 'second best' option. Called 'zero–sum games' in Game Theory [43], such extreme conflicts are unlikely to happen in real life.

The structure of electronic games is often one in which the player is presented with the need to fight in order to rectify damage previously inflicted by some evil force. Beyond the self–defensive impression such a scenario induces,

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[43]Game Theory is a branch of mathematics developed to deal with conflict of interest situations such as political elections, war and other forms of dispute, usually the subject of the social sciences. Not specifically concerned with games in the sense of contrived contests played for pleasure, Game Theory can be said to embrace playful games by its own definition of game as "any social situation involving two or more actors (players) in which the interests of the players are interconnected or interdependent" (Hamburger, 1979, pp. 1–2; Zagare, 1984, p. 7). The typical 'player versus system' structure of electronic games is a two–player situation, as actions performed by the system affect the interests of the human player and vice–versa.

actively performing violence is usually essential to obtaining high scores or achieving the final goal of the game. This performance of violence is facilitated by the anonymity provided by the weak characterisation of both the player's character and the villain. The responsibility for violence carried out against stereotypically evil creatures or machines by impersonal heroes can be easily diffused throughout the context of the game.

> Whenever social conditions lead people to believe that they will not be observed or evaluated as individuals (by being anonymous or submerged unrecognisably into a larger group), the result is often a loss of self–awareness, a narrowed focus of attention, and a tendency to engage in behaviours that are not normally considered appropriate. This "deindividuated" state is most likely to appear in situations where an individual can diffuse responsibility for her actions through an anonymous state similar to that provided by video games (Toles, 1985, p.217).

In addition to the activities necessary to achieve the goals of the game, the totality of possible actions within the universe of each electronic game is pre–defined by the design of the game. Violence performed in such a situation is essentially an act of obedience and not of rebellion as many players seem to believe. Terry Toles points to the use of game arcades as a field to select soldiers from:

> One setting where obedience often leading to aggression is demanded of individuals is, of course, the military. Individuals in the armed forces can easily slip into a deindividuated state in the course of the performance of their duties (Toles, 1985, p. 218).

The adequacy of electronics for defence purposes is hardly surprising. The genesis of computers themselves is connected with the defence requirements of the Second World War (Bowen, 1994, p. 17). As discussed in the last

chapter, much of the development of on–line computing appeared as a counter–response to the accuracy that intercontinental ballistic missiles achieved during the Cold War. Many developments in hardware and software, particularly in computer graphics, which were created for military flight simulators had important effects on the electronic games industry. In an era of technological weapons, automatic obedience combined with fast hand–eye co–ordination as developed by electronic games is an extremely useful skill for military purposes. Wars are now fought without real sight of the enemy, "by planes dropping bombs on anonymous populations, or by missiles being launched across the globe. Video games provide an almost perfect simulation for the actual conditions of warfare (Provenzo, 1991, p.132).

Technological mediation enables the denial of personal responsibility in the violence of war. Beyond individuals immediately involved in the military, the anonymity and impersonalisation that characterised the Gulf War coverage demonstrate the power of electronic games in developing a new paradigm for violence. Referred sometimes as the 'Video Game War', the conflict of 1991 was represented on television as a spectacle of bright lights accompanied by verbal explanations of missile and anti–missile performances. The revealing impact of television coverage of the war in the Vietnamese jungle in the 1970s was turned inside out by the pyrotechnic portrait of a 'clean war' in the desert in 1991.

Neither presenting war as a game nor playing war are novelties created by electronic games. The majority of all games have been based on competition, usually on the form of either a war or race, amongst individual players or teams of players. The typical 'player against the machine' situation of electronic games, however, excludes the explicit presence of a human opponent as the existence of the designer behind the software is often forgotten.

Mainly designed for solitary play, electronic games have also been criticised as being based on individualist patterns. From an analysis of games produced by Nintendo, Provenzo suggests that

> the theme of individualism . . . is the operand principle underlying the organisation and structure of the majority of the games – and . . . the emphasis on violence and aggression found in these games is crucial to maintaining the model of the individual as an autonomous and self–directed being (Provenzo Jr, 1991, p.121).

It should be said that reinforcement of individualism by play is not a novelty created by electronic games. There are more playground toys designed for individual play than based on collaborative enjoyment, the seesaw being a remarkable exception.

In arcades, electronic games can lead to group identification among players sharing the same room, watching other players and waiting for their turn. Even in the isolated home environment, computer games designed for solitary play generate some level of social exchange based upon knowledge of the clues, passwords, and general tips. More sociable versions of home entertainment such as networked multi–user computer games are increasingly successful. Elisabeth Reid discusses examples of strong friendships and solid romances developed solely through computer–mediated interaction within on–line text–based game environments, and stresses the importance of those relationships. Reid reports on the existence of players who consider their on–line mates to be their "best and closest friends" despite eventual physical distances, and even includes an example of romance initiated within a virtual text–based environment that developed into 'real life' marriage (Reid, 1994, n. p.).

History of Electronic Games

The universe of electronic games started to become significant with the appearance of dedicated machines in game arcades. Through (also dedicated) console devices that became known as 'videogame platforms', they found their way into the home market. Home videogames appeared in 1972, with the *Odyssey* machine. Proposed as an alternative use for television sets, the Odyssey required a plastic overlay to be placed on the screen to provide the background setting for the game (Haddon, 1993, p. 128). As the number of users with microcomputers at home increased, these started to be more specifically targeted by the games software industry. Although many games developed for computers were based on simpler arcade or console versions, some made the transition the other way. *Spacewar* (Steve Russel, MIT, 1962), frequently considered the first computer game ever, had its arcade coin–op[44] version launched in 1971.

Many new approaches to the issue of computer–based entertainment have appeared since the early days of *Spacewar*. Over the three decades of their existence, several different computer–based game styles and genres have been created, generating a variety of structures difficult to manage without further categorisation.

Classification of Electronic Entertainment Artefacts

As this chapter proposes to review the characteristics of existing electronic entertainment artefacts as a background for the proposal of the Semiotic Toy, it is necessary to differentiate amongst the various categories of electronic games. Beyond the generic differentiation amongst games, puzzles and toys previously presented in page 142, the need to group similar items into genera in order to make sense of the vast array of different semiotic structures called 'computer games' has already produced various classifications. Mostly

[44] Coin–op stands for coin–operated, an allusion to the pay–per–play scheme of the arcades.

developed by computer gaming magazines, the majority of the existing classifications are based on the jargon used amongst players. Despite the unquestionable value of the players' experience that these schemes are based upon, the high level of informality makes the resulting categories difficult to operate with.

One example is the classification proposed by the magazine *CD–ROM Today* for the booklet enclosed in its 18th issue (October 1995). In this booklet, games and toys are, without discrimination between themselves, divided into six categories: Adventures; Strategy Games; Arcade Games; Flight Sims; Sports Games and Role–Playing Games. *CD–ROM Today*'s classification undoubtedly allows for further development. The category Adventure, for example, is acknowledged by the magazine to be problematic given "that the term can cover so many different sub–styles of game" ('Showcase', *CD–ROM Today* 18, 1995, p. 3). The category Strategy games is also recognised to incorporate many sub–categories: "puzzle games, wargames, resource management games, board games" ('Showcase', *CD–ROM Today* 18, 1995, p. 9).

David Myers attempted to clarify the defining characteristics of the 1989 genre classification established by the magazine *Computer Gaming World.* This classification included the following eight categories and definitions: Strategy (games that emphasise strategical planning and problem–solving); Simulation (games based on first–person perspectives of real world environments); Adventure (games that allow you to take your alter ego through a storyline or series of events); Role–Playing Adventures (adventure games that are based on character development, usually involving attributes); Wargames (simulations of historical or futuristic warfare from a command perspective); Action/Arcade (computer games that emphasise hand–eye co–ordination and reflexes) (*Computer Gaming World,* 1989, reproduced from

Myers, 1990, p. 293). Acknowledging that "[t]hese genres are not defined according to any isolated game characteristic but rather according to the overall feel or flow of a game" (Myers, 1990, p. 294), Myers attempts to map the classification according to the "particular type of symbolic interaction between player and game". As a result, a definition by 'mode of interaction' is given to each genre: Strategy, environmentally interactive (wherein player actions and choices are guided and tested by the game environment); Simulation, mechanically interactive (wherein player actions and choices are learned and selected through the assimilation of algorithmic models of mechanical activity), Adventure, logically interactive (wherein player actions and choices are timed mental responses to logical puzzles), Role–Playing Adventure, culturally interactive (wherein player actions and choices are learned and selected through the assimilation of environmental and cultural assumptions), Wargames, competitively interactive (wherein player actions and choices are guided and tested by opposition of competing player actions and choices); and Action/Arcade, physically interactive (wherein player actions and choices are timed physical responses to objective stimuli). (Myers, 1990, p.294). Despite being more detailed than *CD–ROM Today*'s, the classification proposed by *Computer Gaming World* is also relatively vague. Myer's digressions on the type of symbolic interaction can help understanding of the origins of some spontaneous classifications of computer games, but does not eliminate the imprecision of the original categorisation by *Computer Gaming World.*

To assure both specificity and ease of application, a classification is here proposed targeting entertainment artefacts for home personal computers; that is, it does not include artefacts specific to dedicated platforms and games exclusive to arcades. This classification is based on the main characteristics of desktop computer games, and takes into consideration denominations broadly accepted within the gamers communities. By adopting as much as possible the

previously existing and generally accepted spontaneous genre classifications, the present proposition attempts to systematise well–known categories without denying that "coherence is provided in the process of construction, and a genre is ultimately an abstract conception rather than something that exists empirically in the world" (Feuer, 1993, p. 144).

Games for the multi–purpose home computer have been developed mainly around two aptitude requirements: physical reaction (based on hand–eye co–ordination) and strategical planning. From this first level of categorisation, a sub–division of the games based on physical reaction leads to six sub–categories, as shown in Figure 1. All six denominations for these sub–categories derive from expressions already crystallised within the field.

Shoot–'em–Ups is a self–explanatory denomination generally adopted by gamers to define one of the most straightforward format of hand–eye co–ordination games. A prototypical and well–known example is *Doom*.

Other direct applications of the basic principle of trying to establish or avoid contact between the shapes displayed on the screen with self–explanatory denominations already established among users are One–on–One Combat games, for example *Mortal Kombat*, and Run Away games such as *Pac Man* (originally designed for dedicated platforms by Williams, 1980, home version from Atari, 1981).

Platform games are a special type of Run Away in which the player has to navigate a character through mazes of multi–storey buildings, scaffoldings and ladders (hence the term platform) avoiding dangers and collecting tokens. This is the structure most often used for games adapted from other visual media such as *Aladdin* (Virgin, 1994) and *The Lion King* (Virgin, 1994), both based on Disney films.

Sport Sims attempt to reproduce on the screen, with variable levels of detail and accuracy, many different real–life sports. The paradigm was inaugurated

by *Pong* (Atari, 1972), a simulation of table tennis developed for dedicated machines, and developed towards intricate games such as *Brett Hull Hockey 95* (Warner Interactive, 1995).

Racing games are a special kind of Sport Sims that refer to the depiction of races. These vary mainly from avoiding crashing in realistic or hazardous tracks, as in *Indycar Racing II* (Papyrus, 1995) and *Fatal Racing* (Gremlins Interactive, 1995) respectively. Free from the responsibilities implied by reality, electronic sport simulations can easily degenerate into violence. Bob Dixon cites the paradigmatic example of *Death Race* (Exidy, 1976), in which the objective is to run over as many pedestrians as possible (Dixon, 1992, p. 201).

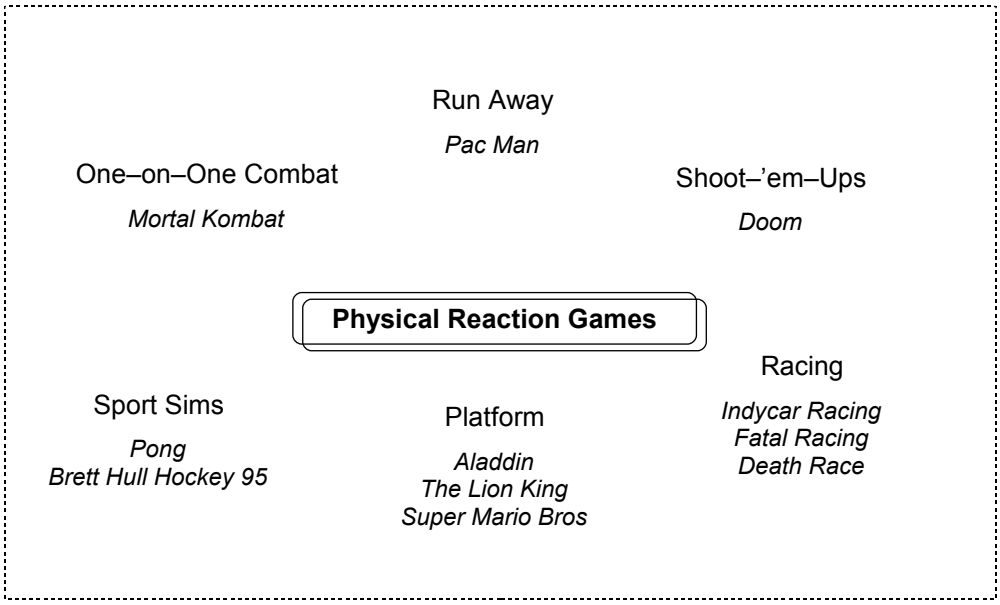


Figure 1 – Physical Reaction games and examples: the six categories

Short play times and no requirement for saving the game in evolution are characteristic of Physical Reaction games. Strategical Planning games require thinking time and the possibility of saving achievements both, in order to go back to the previous situation after trying the next strategical movement and due to the extended playing times. From the early Text Adventures, a sub–

category of strategy games developed around a plot, while others maintained a more abstract use of logical thought. Figure 2 presents the two sub–categories so defined, Plot–Based and Abstract Logic, and further genre sub–classifications within them.

Abstract Logic Strategical Planning games include straightforward Puzzles such as *Klotski* (ZH Computer, 1991) and *SuperTetris* (Sphere, 1991), electronic versions of Card Games, for example *Solitaire* (Microsoft, 1985) and Board Games such as *Virtua Chess* (Titus, 1995) and *Monopoly* (Leisuresoft, 1996).

The name God Games define those games in which the player acts as a demiurge ubiquitously present, who is able to choose and modify the destiny of whole populations. The denomination was created referring to the game *Populous* (Bullfrog, 1989). Another well–known example of this kind of game is *Civilisation* (Microprose, 1991). As their game play is not based upon a plot, God Games are here classified as Abstract Logic.

Text Adventures were the first Plot–Based Strategical Planning games. The game world is described in words only. The player, referred to as 'you', navigates and interacts with the Adventure universe through commands such as 'go north', 'look building' and 'get weapon'. Playing consists in fighting off enemies, overcoming obstacles, and discovering treasure. *Advent,* written by Donald Woods in the MIT in the early 1970s, is cited by Reid (1994, n. p.) as the earliest example. This lineage evolved towards both, networked text–based 'Multi–User Dungeons' (MUDs) and visual electronic adventures.

MUD, standing for Multi–User Dungeon, is the general name given to networked multi–user games which allow users to communicate with one

another, to co–operate on adventures together, or to fight against each other. Most MUDs presently available on the Internet are fully text–based, but efforts have been made to provide audio–visual multi–user environments. The first MUD was designed by Roy Trubshaw in 1978.

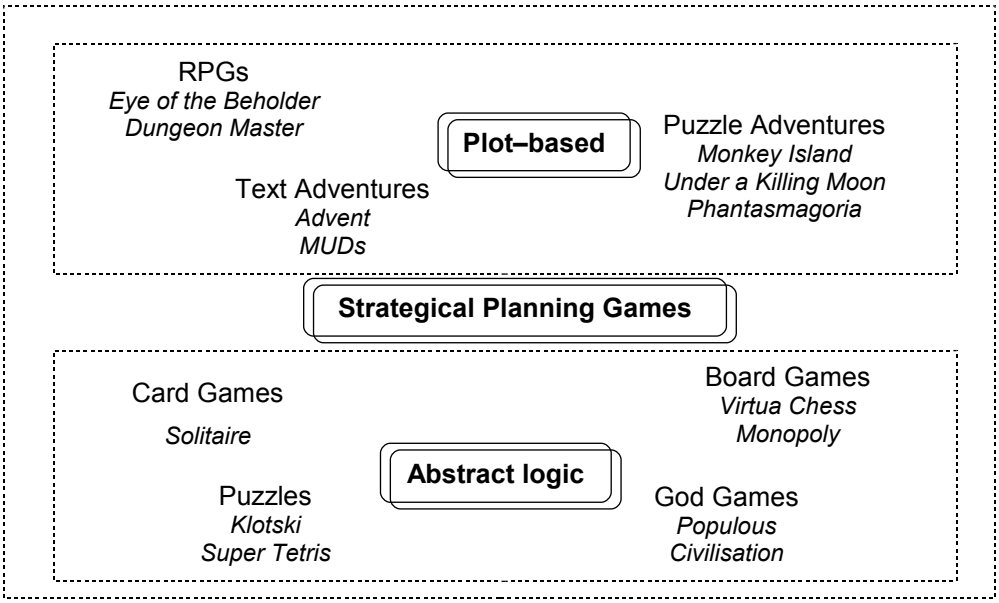


Figure 2 – Strategical Planning games, sub–categories Plot–Based and Abstract Logic, genre classifications and examples.

Visual electronic adventures are here differentiated by the special qualification Role Playing Games (RPGs). This is not to say that Text Adventures are not role–playing, but to establish the two separate categories taking gamers nomenclature into consideration. The universe of RPGs is usually presented from a first–person point–of–view and game play is based on fighting enemies and collecting tokens. *Eye of the Beholder* (Strategic Simulations, 1990) and *Dungeon Master* (Psygnosis, 1992) are examples of electronic RPGs.

Puzzle Adventures are Plot–Based puzzles such as *The Secret of Monkey Island* (LucasArts, 1990). The play of Puzzle Adventures concentrates on finding hidden clues for solving the proposed puzzles. Heavily dependent upon visual representation, Puzzle Adventures naturally evolved towards the incorporation of videoclips, exemplified by the so–called 'Interactive Videos' *Under a Killing Moon* (US Gold, 1994) and *Phantasmagoria* (Sierra, 1995).

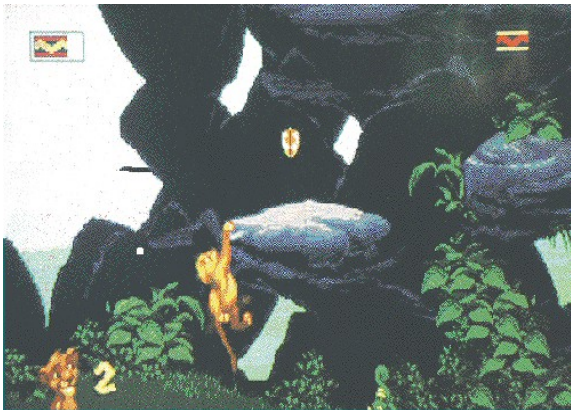
Many games require both, fast physical reaction and strategical planning. This is the case in some of the games that have so far been included in one or the other category, according to main features of their game play. *Doom*, a game that is extremely dependant upon hand–eye co–ordination, evolved from the RPG line, as its first–person point–of–view and 'collecting tokens' strategy testify. Combat in the Shoot–'em–Up style is part of playing most RPGs. Some Puzzles involve fast physical reaction, *SuperTetris* being an example. Other Puzzles such as *Lemmings* (Psygnosis, 1991) are structured specifically as Platform games.

Hybrid games are neither predominantly Physical Reaction nor primarily Strategical Planning games, and are here presented in the intersection of those main sets. The combination of physical co–ordination and strategical

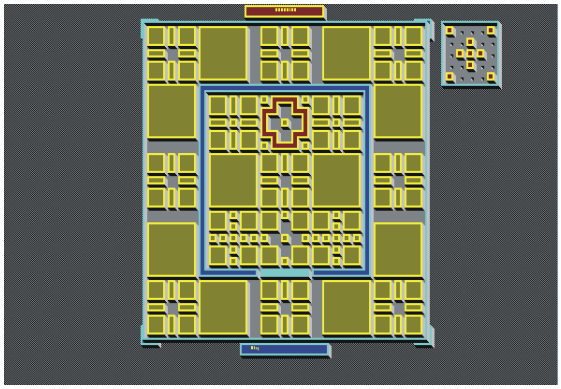
Colour Plate I - Doom (id software) (screen captured from a demo version included in PC Format Gold Collection '95, CD-ROM Volume 2).

Colour Plate II - Mortal Kombat 2 (Akklaim) (screen captured from a demo version included in PC Format Gold Collection '95, CD-ROM Volume 2).

Colour Plate III - Fatal Racing (Gremlin Interactive) (screen captured from a demo version included in CD-ROM Today 20).

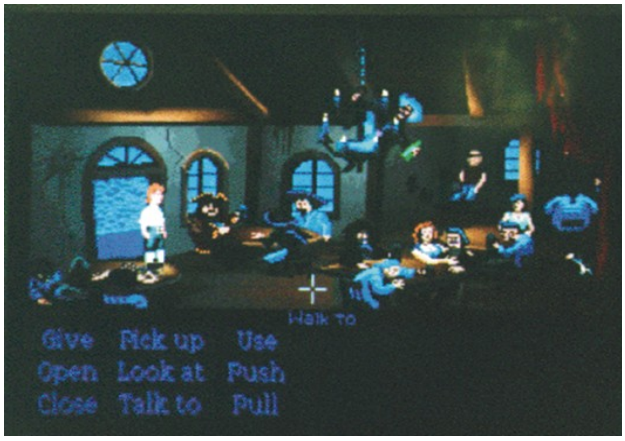


Colour Plate IV - The Lion King (Virgin) (screen captured from a demo version included in CD-ROM Today 29).



Colour Plate V - Klotsky (ZH Computer).

Colour Plate VI - Civilisation II (MicroProse).



Colour Plate VII - The Secret of Monkey Island (LucasArts).

Colour Plate VIII - Phantasmagoria (Sierra On-Line).

reasoning requirements is balanced in games as *Warcraft: Orcs & Humans* (Interplay, 1994) and *Frontier Elite II* (GameTek, 1993).

Sport Management games use strategical and physical skills one at a time, for administrating the team and playing the simulated games. *Player Manager II* (Anco, 1995) is an example of a Sport Management game.

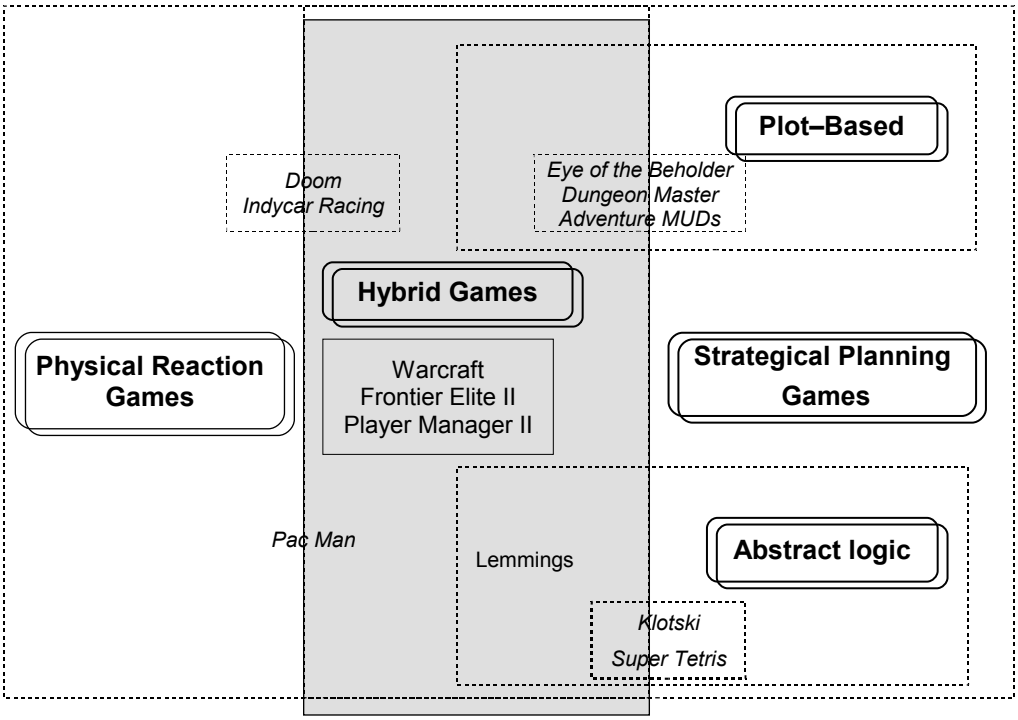


Figure 3 – Hybrid games in the intersection of the sets of Physical Reaction and Strategical Planning games.

Figure 3 shows the sets of Physical Reaction and Strategical Planning games arranged so as to emphasise their intersections, and shows Hybrid games in relation to the whole domain of desktop computer games.

Additionally to the presented classification according to aptitude requirements, other criteria such as algorithmic structure or degree of interactivity can be used to categorise games. One straightforward criterion is

how time is represented in the game, generally either continuous or turn–based. The overwhelming majority of games require fast physical reaction to some degree, and so tend to occur in continuous real time. Both *Doom* and *Dungeon Master* are examples of this tendency. Turn–based games have no timing at all, i.e., the game is frozen until the player (or the system) performs the next action. When the game action spreads over considerable lengths of time, as in *Civilisation*, playing time obviously needs to be accelerated. A pause option with the effect of freezing time is generally present in home platform versions, but not in coin–op situations.

Response to the actions of the player can be originated in one of three basic ways: randomly; according to a database; or through the application of the user's input to a computational function. It is relevant to underline that, as player activity, time can also trigger evolution of the game. Most games utilise all three methods, each coming into operation at different points. The predominance of certain algorithmic structures over others allows the categorisation of some exemplifying games as depicted in Figure 4.

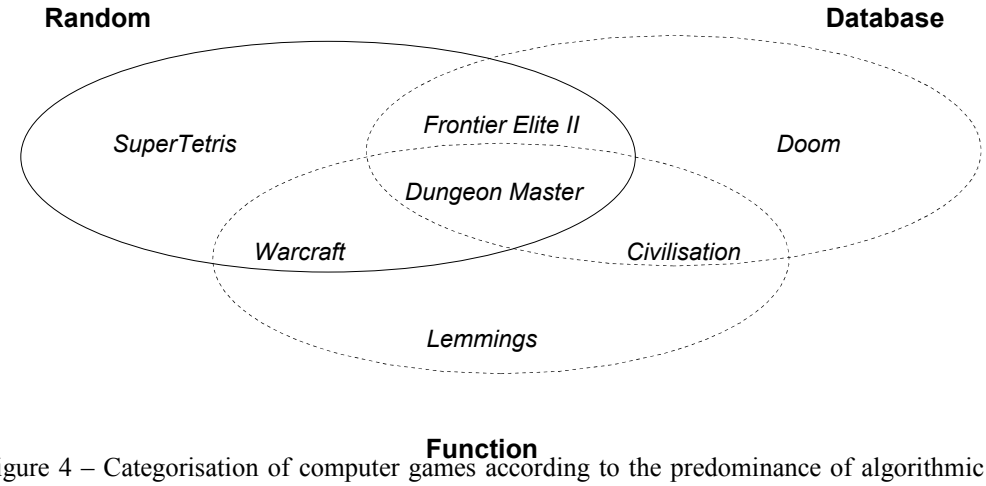


Figure 4 – Categorisation of computer games according to the predominance of algorithmic structure, with examples.

Most games have variable levels of difficulty which can either be chosen by the user before play starts (as in *Civilisation*) or which effectively compose

part of playing. In the last case, a game evolves from the easiest to the hardest mode once each level is completed, as is typical in Platform games. A combination of both strategies can be found, for example, in *Doom*.

Difficulty of play is usually defined by three factors: the speed of required reactions; the power available to the characters; and/or the complexity of decisions to be made. Figure 5 shows examples of games whose difficulty levels are predominantly structured according to each factor or combinations of them. As with most aspects of recent electronic games, there is a tendency for factors to overlap.

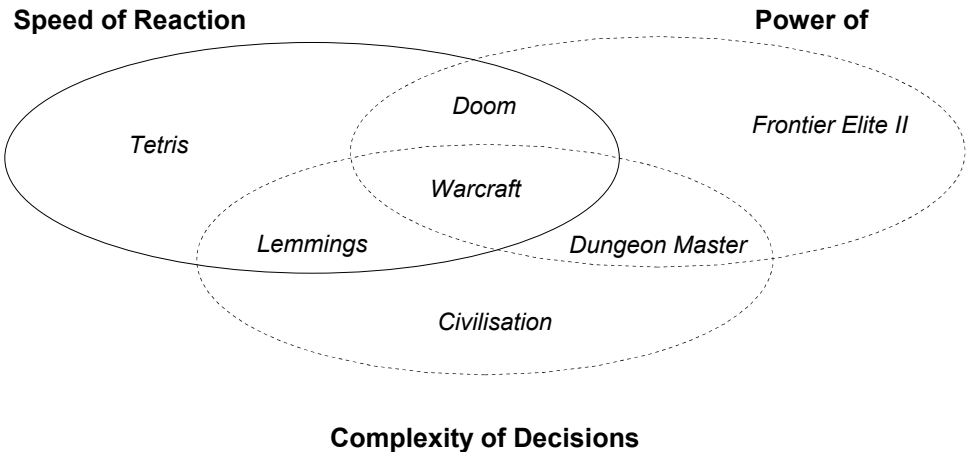


Figure 5 – Classification of computer games according to the factors that define the various difficulty levels, with examples.

Different approaches have been adopted to access computer games according to their interactivity. Myers' attempt to map a genre classification according to the type of symbolic interaction between player and game has already been discussed in page 154. Brenda Laurel suggests three more objective variables to be used for measuring levels of interactivity: frequency (how often input is enabled); significance (the impact of the user's action upon the whole of the events); and range (how many choices are available to the user at a given

moment) (Laurel, 1986, pp. 94–100 and Laurel 1993, p. 20). While the range of interaction varies considerably from one electronic game to another, frequency and significance gravitate toward the same level in the overwhelming majority of games.

Frequency tends to continuous in most non turn–based games as some kind of action (usually moving) is always possible. When play is structured around alternating turns, frequency depends on the speed of the adversaries (nearly always fast when playing against the system). Some games include animation sequences during which interaction is not possible, *The Secret of Monkey Island* being an example. The tendency to include many sequences with no interactivity has motivated strong criticism of Interactive Videos in general, as switching between viewing and acting mode can jeopardise the involvement of the player with the game.

The degree of interactivity significance in electronic games can be approached in different ways. On the one hand, several games are based on a pre–defined scenario that is only locally affected by the actions of the user. For example in Shoot–'em–Ups, significance is low as defeating the present opponent does not define characteristics of the next challenge to be faced. Generally, games structured on mathematical functions of the user input have higher interactivity significance than those structured on random generation or databases. For example, significance is higher in *Virtua Chess* (as the moves performed by the system predominantly depend on the moves of the human player) than in *SuperTetris* (as shape of the next piece to appear is randomly defined).

On the other hand, it can also be said that the actions of the user are fully determinant in most games, as at each moment they define if play continues or comes to an end. From this point of view exceptions to this high significance pattern would come mostly from Interactive Videos. The current

impracticality of mathematically generating sequences of an analogue nature leads to the need for pre–defining and recording response videoclips for every effective input empowered. Thus, enabling only a few significant inputs is essential to maintain viable production time and costs. An extreme example, as implied by its title, is *Voyeur* (Interplay, 1994). Being part of the story universe solely as a peeping tom, the user can not alter any of the events taking place. Only the final sequences depend on the choices of the 'spectator'.

The range of interactivity within each game can vary at different moments of play. The minimum levels tend to single binary choices (shooting or not, moving the only possible direction or not) in most games, while maximal levels vary considerably from one game to another. Maximal range of interactivity remains around modest 2^4 possibilities in some games, for example *Indycar Racing II* (left and right, accelerating and decelerating), and reaches extremely high levels in games structured on very many different inter–associated factors, such as *Civilisation*. The so–called 'natural language' mode of interaction of Text Adventures creates an extremely large interactivity range, but the limited significance of many possible inputs[45] can be surprising (and very frustrating) for the player.

Interactivity range can be implicitly or explicitly restricted by constraints present prior to play (for example, through the background story or in the game manual) and via the interface (i.e., the representation on the screen of the game universe, the actions taking place in it, the user's character and performance and the choices presented). Implicit constraints are normally imposed as a logical part of the game universe, and therefore the restrictions they impose on the range of interactivity are less intrusive (Laurel, 1993, pp. 103–105). For example, it is not possible to use the machine gun in *Doom*

[45] An input composed of words not recognised by the system generates a reply such as "I don't understand that".

prior to finding it, or build a Temple in one of *Civilisation*'s cities before the advent of mysticism. Explicit constraints are non–mimetic elements such as the menu–based dialogues of *The Secret of Monkey Island* or the toolbar in *Lemmings*.

Different input devices are more or less suitable for each game, depending on the complexity of interaction. Thus, joysticks are appropriate for moving and shooting, while mice work more effectively for grabbing and selecting. Keyboards are necessary for more intricate modes of interaction, such as the 'natural language' parsing of Text Adventures. Sophisticated mimetic controls for emulating action very realistically, such as wheels or guns, are generally found in arcades.

Cooper and Benjamin classify the way the virtual universe is presented to the user as: first–person interaction ("the uniting of interaction and interface, where, whatever the mechanism, the user is experiencing as 'I'"); second–person interaction (where the user experiences being a "you", removed from the interaction by the need to manipulate iconic or text representations"); and third–person interaction ("where the user experiences without any interaction, watching a video or as an audience in a cinema or theatre") (Cooper and Benjamin, 1994, p. 255). Many contradictions make this classification hardly operative. The 'I' experience does not exclude the manipulation of icons or the mediation by text in any known game (including *Doom,* used by those authors to exemplify first–person interaction). Players tend to refer more often to the character as 'I' when given a first–person point of view, but otherwise the character is generally understood as a third–person ('he' or 'she'), not 'you'. The definition of third–person interaction as no interaction at all is clearly paradoxical.

It has herein been considered more appropriate to classify the type of interaction established by the mode of presentation of the game universe in

terms of the player as first–person or observer. First–person mode implies the depiction of the game universe from the subjective point–of–view of the player's character in what Cooper and Benjamin call "the 'I' experience" and Laurel calls 'first–personess' (Laurel, 1986, p. 65). Game examples are *Indycar Racing II, Dungeon Master, The Eye of the Beholder* and many others, including the already cited *Doom*. In the observer mode the user is either attached to a character whose representation can be seen, as in *Mortal Kombat II or The Secret of Monkey Island*, or to an ubiquitous point–of–view such as in *Civilisation*. Abstract Logic games such as *Virtua Chess* or *SuperTetris* could also be included in the ubiquitous presentation category.

In many Plot–Based games, the mode of presentation of the game universe reflects a main conceptual difference: Puzzle Adventures have so far concentrated on discovering and revealing a pre–defined plot, while RPGs include (even if just to a small degree) the creation of a story by play. The user is given a first–person point–of–view in Text Adventures and RPGs, adequate for role–playing. Much of the success of this formula is based on the continuous frequency of interaction, even if eventually only inputs of very low significance are available. In such Plot–Based Strategical Planning games puzzle–solving does not trigger a whole sequence to be displayed, but rather opens up the way for the next stage of the game, to be explored at the user's pace and accordingly to his own playing style. Puzzle Adventures usually give the player the perspective of an observer somehow 'attached' to a character, whose story is being revealed. Regardless of their importance as protagonists, third–person characters are often presented as "little more than a cursor that mediates the player's relationship to the story world" (Fuller and Jenkins, 1995, p. 61) [46].

[46] Fuller and Jenkin's comment refers specifically to Platform games from Nintendo, and has been extrapolated here to all computer games.

Desire for stronger characterisation was manifested in the answers 8– to 9–year–old players gave to Provenzo when asked what would they like most to have in a game:

> In response, they talked about wanting to be able to define the characters in their game, to shape the power that they had and to design the settings in which the games took place. (Provenzo, 1991, p.48).

There is a point in the players' request above concerning the weakness of characterisation in electronic games that diminishes the possibility of symbolic identification with the character played. Not only is the character often represented as 'little more than a cursor', but the spatial structure of the narrative (as observed by Fuller and Jenkins, 1995, for Nintendo games) can be conceptually related to the Graphical User Interface, GUI, paradigm. GUIs project the multi–layered virtual space onto the surface of the computer screen, representing the place of interaction as a generic two–dimensional desktop. Computer games focus narrative onto the space where it happens, representing plot as "a generic atmosphere – a haunted house, a subterranean cavern, a futuristic cityscape– that the player can explore" (Fuller and Jenkins, 1995, p.61). The advent of various new computer game genres extended the plot structures of the medium beyond the basic 'kidnapping and rescuing' identified by various authors as typical of videogames (for example Gillian Skirrow, 1986, and Ben Arnette, n. d.), but did not prevent the repetition of the new formulae on different scenarios. Successful narrative strategies have always been repetitively used in all media, and the high pace of development of computer graphic techniques reinforces this tendency. The development of new computer games often emphasises visual quality over plot and characterisation.

The narrative potential of computer entertainment software has been further explored by artefacts that do not belong to the general category of games as

specified here. This is hardly surprising, considering the ease with which toys in general tend to give rise to 'playing stories'.

Computer Toys

Most entertainment programs are commercially labelled as 'computer games', but the absence of final goals to be achieved places some of these as toys under the criteria adopted in this thesis. The most widely spread group of such electronic toys are the paint–systems[47]. *Kid Pix* (Brøderbund, n. d.) is a well–known example of entertainment paint–system. Developed specially for children, it includes playful features such as the sound effects associated with each painting tool. Considered under the same non–genre criteria previously applied to computer games, paint–systems do not generally include different levels of difficulty and are totally function–based. Their levels of interactivity are high according to all three variables suggested by Laurel (frequency, significance and range).

Other well–known groups of computer–based toys are non–combat Flight Simulators such as *Flight Unlimited* (Virgin Interactive, 1994), and the *SimCity* family (for instance *SimCity 2000* and *SimIsle*, Maxis, respectively from 1993 and 1995). Both these groups of electronic toys operate from database–defined set–ups followed by function–generated responses to the user's inputs. High interactivity is assured by both constant availability of input and function–based response. Since it is mostly implicitly constrained, the interactivity range tends to be understood as total in the flight simulator model. Not immersive, the ubiquitous observer typical of the God game format of *Sim* toys necessarily calls for non–mimetical interface. The number of combinations available via toolbar and menu options in *Sim*'s software tends, however, to be highly satisfactory within the logic of playing.

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[47] According to an oral legend that circulates within the expert community, the first paint–system was developed by a computer programmer trying to entertain his children.

The *Sim* family of toys explores the realm of creation with what is called in the catalogue of their children software *SimTown* the 'building blocks approach' (Maxis, 1995, p. 57). They provide sets of elements that can be arranged in practically infinite permutations, giving rise to unique situations. The model can be paralleled to paint–systems, which usually include galleries of pictures that can be combined not only with each other but can also be modified with the drawing tools provided. *SimTown,* for example*,* provides elements to be combined in order to build a town.

A different concept of computer toy comes from the *Living Books* series (Bronderbund, first book *Just Grandma and Me*, 1993). *Living Books* are electronic interactive books in which a story is presented on illustrated pages of a virtual book on the screen. A narrator reads the text while the words are highlighted. Clicking on pre–determined parts of the illustration ('hot spots') reveals animated sequences. Analysed under the three variables suggested by Laurel for measuring levels of interactivity, *Living Books* can appear rather disappointing. While input is enabled at any time, the impact of the user's actions upon the whole of the events is minimal. The number of choices available to the user at each moment is restricted to the number of 'hot spots' available in each specific page of the book. Such low interactive possibilities are compensated for by the unpretentious presentation: *Living Books* do not intend to be more than books with some animation. A friendly interface and funny moving sequences can easily motivate children to care about the highlighting of written words and try the versions available in foreign languages.

Many variations were created following the *Living Book* series. *Winnie the Witch* (Oxford University Press, 1995) allows the user to explore the house and 'play' with the magic wand of the main character of the story. Don Bluth's *Thumbelina* (Time Warner, 1994), combines reading a story with

pages to colour and mazes to solve, creating what could be called an 'electronic colouring book'.

Electronic colouring books represent the first step towards merging the ideas of interactive books and paint–systems. Other computer toys explore further the possibilities of mixing both narrative and the 'building blocks' approach. Pictures drawn with the paint–system in *Orly's draw–a–story* (Brøderbund, 1997) are incorporated into the default stories narrated by the main character. The system also allows the user to write and illustrate new narratives.

Sierra's *Playtoons* series (first book *Uncle Archibald*, 1995) also combines creative possibilities with storytelling through the addition of a 'construction game' to an animated book. Based on the electronic book presented in each volume, the 'construction game' gives the user choices of backgrounds, characters, props, sound and text with which to create new stories. Besides the default animations associated with some characters and objects, elements can be moved through landscapes as specified by the user. The construction game is common to all titles of the series, allowing backgrounds, characters and props from different titles of the *Playtoon* series to be combined in a single story.

There are also some computer toys totally dedicated to the creation of new narratives. Theses are usually based on models inherited from wordprocessors, paint–systems, modelling or desktop video systems.

Microsoft's *Creative Writer* (1993), designed for creating cards, banners, newsletters, and other written material, is the prototypical storytelling toy in the wordprocessor model. In 1994, Microsoft launched the paint–system *Fine Artist,* with which pictures could be created or selected from libraries and added to the written work produced with *Creative Writer*. The upgrade version *Creative Writer 2* (1996) incorporates the paint–system, adds email and Web Page creation facilities, and eliminates some presentation features of

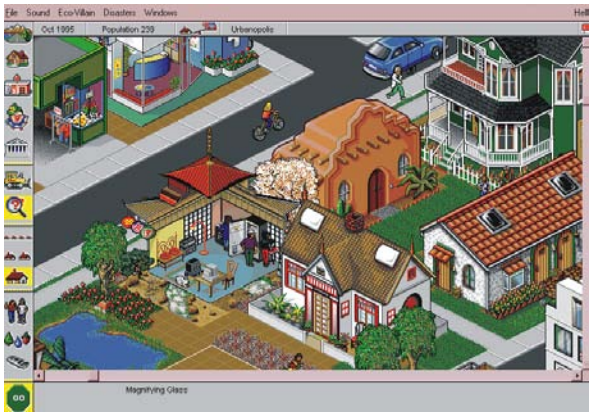
the first version, such as the distribution of the software tools around a virtual building or the guide character. In *Creative Writer 2*, tools are organised in four fields, each one giving access to different sets of functions. The option 'Writing' allows the user to set and modify background and font type, size, style, colour. The 'Page' option gives access to page layout, while 'Pictures' allows you to include and modify both clip art pictures and words. 'Ideas' gives access a library of background music, sound control, and tools to send emails and create Web links. It also includes the 'Splot Machine', that combines parts of sentences at random generating supposedly inspiring sentences such as "The tender spy drank lots of black coffee in the tree of Mystery", and a 'Story Strater', that shows inspirational pictures from thematic libraries.

Despite its rich visual interface and the animated sequences linked to some proposed characters and objects, *Wiggins in Storyland* (Music Pen Inc, 1994) is another example of wordprocessor–like toy. The user chooses a book shape from a library, and then types the text directly on the pages. Font characteristics can be modified and, according to themes available (space, fairy tale, dinosaurs, etc.), further libraries can be accessed. From those, background pictures (that once selected occupy the entire left page of the book opening), characters and objects can be added to the book. Nouns, verbs and adjectives related to selected elements can be displayed and pronounced by the system, and function as writing suggestions. Background music, also available from thematic libraries, can also be set to play as the user 'flips through the pages' of the illustrated book produced.

Magic Theatre (Instinct, 1994) is a paint–system with animation features that allow for storytelling. Thematic libraries give access to background elements and scenes, characters and props, visual effects and sounds. The elements appear in the final animation according to the order in which they were placed on the background, and their movements can be determined by dragging the figures within the working space. Characters can also perform some basic

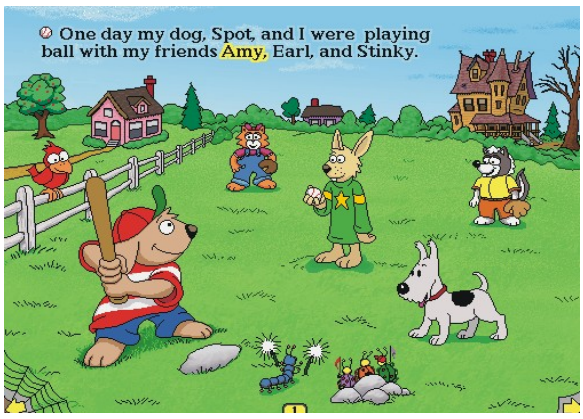
actions with which they are associated by default, such as flapping wings or moving legs.

Colour Plate IX - SimCity2000 (Maxis)



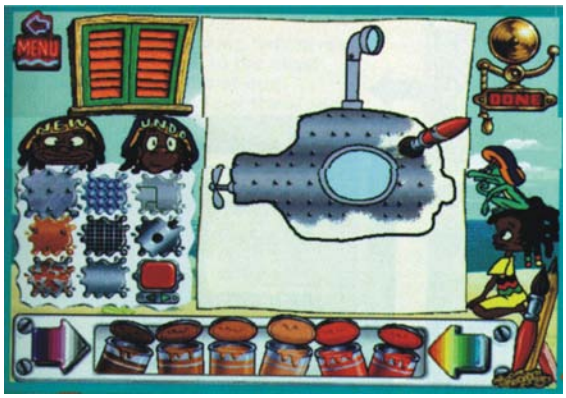
Colour Plate X - SimTown (Maxis)

Colour Plate XI - Living Books: Harry and the Haunted House (Broderbund), (screen captured from a demo version included in CD-ROM Today 29).

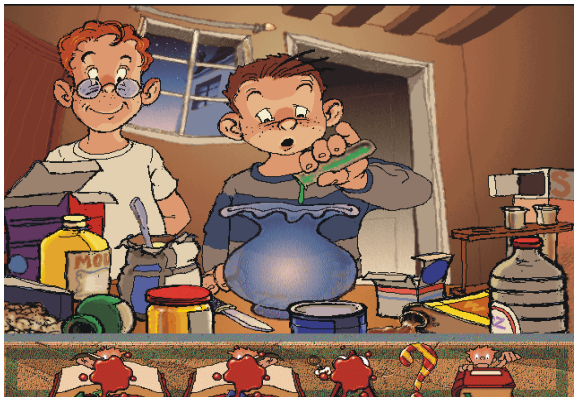


Colour Plate XI - Living Books: Harry and the Haunted House (Broderbund), (screen captured from a demo version included in CD-ROM Today 29).

Colour Plate XIII - Thumbelina (Time Warner), (screen captured from a demo version included in CD-ROM Today 12).



Colour Plate XIV - Orly's Draw-a-story, Drawing Screen (Broderbund), (screen captured from a demo version included in CD-ROM Today 39).



Colour Plate XV- Playtoons: Uncle Archibald (Sierra).

Colour Plate XVI - Playtoons' Construction Game (Sierra).

Colour Plate XVII - Creative Writer 2, Options (Microsoft), (screen captured from a demo version included in CD-ROM Today 33).

Colour Plate XVIII - Creative Writer 2, Story Starter (Microsoft), (screen captured from a demo version included in CD-ROM Today 33).

Colour Plate XIX- Wiggins in Storyland (Music Pen Inc.). (screen captured from a demo version included in PC Format Gold Collection '95, CD-ROM Volume 2).

Colour Plate XX - Magic Theatre (Instinct).(screen captured from a demo version included in CD-ROM Today 32).

The children's paint–system *Kid Pix* has been extended into a suite that includes five additional applications, and could support storytelling. The animation options of *Kid Pix Studio* (Brøderbund, 1994) are: 'Slide Show', that displays sequences of previously saved and selected pictures; 'Moopies', that gives access to special brushes associated to libraries of shapes and movements; 'Stampimator' that places moving cartoon figures on selected backgrounds; 'Digital Puppets', that gives access to libraries of on–screen marionettes that move according to keyboard commands; and the 'Wacky TV', that shows animations selected from its library or previously saved by the user, allowing additional use of special effects and transitions.

Other storytelling computer toys resemble systems for the creation of film or video. Amongst these, Microsoft's *3D Movie Maker* (1995) and Viacom's *Director's Lab* (1995) relate most directly to the concerns of this thesis. *3D Movie Maker* is a children's three–dimensional modelling system for the creation of animated films. Various background scenes are available from libraries, and each background can be seen from different points of view. Characters, props and three–dimensional words can be placed over the scenery, rotated, re–sized or modified with a 'Costume Changer' device. Movements of characters or props can be selected from galleries of actions specific to each or element. Speech, sound effects and background music can be added from galleries. The system also allows for titles and credits in various colours, fonts and sizes.

Colour Plate XXI - Kid Pix Studio, Options (Broderbund), (screen captured from a demo version included in CD-ROM Today 29).

Colour Plate XXII - Kid Pix Studio, Kid Pix (Broderbund), (screen captured from a demo version included in CD-ROM Today 29).

Colour Plate XXIII - Kid Pix Studio, Wacky TV (Broderbund), (screen captured from a demo version included in CD-ROM Today 29).

Colour Plate XXIV - 3D Movie Maker (Microsoft). (screen captured from a demo version included in CD-ROM Today 22).

The narrative possibilities of *3D Movie Maker* are thematically restricted by the software's heavy reliance upon libraries of backgrounds, characters, props and movements. A second version of *3D Movie Maker,* with different libraries and slightly different presentation, was launched by Nickelodeon in 1996. Sharing the same interface, both Microsoft and Nickelodeon's *3D Movie Maker* include very flexible tools that are, however, rather difficult to use. Placing props or characters against specific spots on the background and dragging the elements to direct their movement depends upon precise control of the mouse.

Director's Lab (Viacom, 1995) is a children's desktop video system in which various activities related to video production are organised across six rooms. The 'Title Editor' (Graphics) room is a basic paint–system with which to create graphics. The 'Video Suite' gives access to libraries of video clips that can be set to play forwards, backwards or in loop, and chosen to be displayed in the centre of the available area, moving across it or repeated in four different sections filling the 'virtual video screen'. Each video clip can also be modified by adding stickers with pictures such as flags, colourful blobs or text balloons (for example containing the expressions 'cool' or 'aarrgh').

The 'Music Studio' offers a selection of nine instruments used to perform pieces from the music library. Each piece can be modified by recombining the instruments, altering elements in the score, changing pace, playing backwards or in loops.

'Sound FX' leads to libraries of sound effects and lines of dialogue that can be combined amongst themselves. It is also possible to add echo or

reverberation, adjust tone and volume or play the sound files backwards and as loops.

'Director's Lab' contains the desktop video suite itself. It gives access to all libraries and has shortcuts to the other rooms, including the Title Editor feature that is not accessible from the main hall. To compose the final video sequence, elements need to be placed along one of five horizontal timelines: 'Graphs', 'Titles', 'Video', 'Music' or 'Sound FX'. A sixth timeline allows users to apply wipes to graphics and video sequences. The final video production can be watched and copied to floppy discs in the 'Screening Room'.

Director's Lab includes specific tools for handling video sequences that are clearly based on simplifications of existing desktop video suites such as *Adobe Premiere* (Adobe, version 4.0, 1996) or *Lumiere Studio* (Corel, 1997). Initially developed for professional non–linear editing, desktop video liberated handling video footage, sound and images from the restrictions inherent in analogue material. Digitise, these elements can be arranged on editing timelines resembling frame–by–frame displays, adding visual control to tasks such as cut, paste, defining transitions and superimpositions. The visualising features also provide desktop video suites with a degree of intuitiveness impossible for analogue video editing equipment.

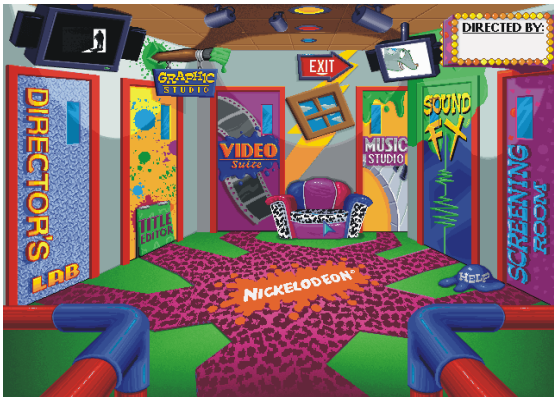
Features as simple as the horizontal timelines across which to arrange the elements inherited by *Director's Lab* from desktop video suites are of great didactic value. Following the production of the final video step by step throughout the rooms and the gradual addition of each medium to compose the final video can help users to understand how graphics, video footage,

background music and sound effects interdependently generate meaning. *Director's Lab* is strongly influenced by the aesthetics of its producer, children's television channel Nickelodeon, and therefore concentrates on possibilities related to the use of rich visual imagery and fast pace. It is not only difficult to develop a plot with *Director's Lab,* but the software encourages the user to create non–narrative video clips.

One characteristic common to all storytelling toys presently available is the assumption of previous knowledge of narrative strategies. This is probably due to the fact that the target public for which those storytelling toys are designed has certainly been exposed to a significant number of stories, both in written and audio–visual format, prior to acquiring the toy. As discussed in the second chapter of this thesis, however, making sense of narratives does not imply being aware of the subtleties involved in their creation.

Storytelling construction toys based on the word–processor model do not add much to what can in fact be done without computers. Based on metaphors derived from physical devices, the overwhelming majority of the tools available in those electronic toys go no further than pen, paper, coloured pencils and some stickers can do. Despite how much emphasis is given to the visual aspects of the final product, the narrative itself is contained in the written text. The electronic mediation provides the means to create material very similar to 'real' books.

Colour Plate XXV - Nickeolodeon 3D Movie Maker (Microsoft).(screen captured from a demo version included in CD-ROM Today 33).



Colour Plate XXVI - Director's Lab, Entrance Hall (Viacom).

Colour Plate XXVII - Director's Lab, Title Editor, Graphics (Viacom).

Colour Plate XXVIII - Director's Lab, Video Suite (Viacom).

Colour Plate XXIX - Director's Lab, Music Studio (Viacom).

Colour Plate XXX - Director's Lab, Sound FX Room (Viacom).

Colour Plate XXXI - Director's Lab, Title Editor (Viacom).

Colour Plate XXXII - Director's Lab, Director's Lab (Viacom).

With visual and audio–visual storytelling toys, on the other hand, it can be difficult to achieve satisfactory results. Lacking information about the usual strategies for dealing with basic narrative situations, and not having been presented with any other possibilities, visual storytelling electronic toys trigger experiments such as moving elements selected from libraries across one or other choices of background, but do not invite the construction of stories. The results are most often like the films Frank Eadie's research group observed as the typical production of the youngest children engaged in the Young Filmmakers Foundation of New York. Seven to ten–year–olds are reported by those authors to have made films with simple, non–elaborated narratives which consisted mostly in scenes of people walking, running, going in and out of doors, and the like[48] (Eadie *et al*., 1983, p. 69). Visually–based electronic toys in principle dedicated to the construction of narratives similarly privilege movement of elements over plot development. Even for those users motivated to construct narratives, the lack of information on how to combine images and sounds in order to construct a story can limit the possibilities of the visual storytelling toys presently available.

None of the visual storytelling toys, computer games, interactive videos or interactive literary works investigated in this or the previous chapters can be said to approach all the questions proposed to be targeted by the Semiotic Toy. The next chapter investigates some design possibilities for an artefact to enable experimentation with variations of narrative strategies commonly used

[48] The authors attributed such action–oriented approach to filmmaking to young children's greater concern with playing with one another and conducting what has been called 'look at me' performances to the camera than with developing original and well–structured plots (Eadie et al., 1983, p. 69).

in film and television, attempting to make effective use of the interactive power of digital media as an instrument for extending observational skills and critical awareness of television viewers.

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Chapter 5 – Towards a Semiotic Toy

The development of an artefact to enhance understanding of the ways in which meaning is constructed in television, as proposed by this thesis and herein referred to as the 'Semiotic Toy', should, to be satisfactory if not necessarily ideal, meet two requirements. These are that it facilitates experimentation with both the paradigmatic and syntagmatic aspects of visual narration, for example through the use of a variation of the semiotic 'commutational test', reinforcing its inherent playfulness and extending its principles to the realm of syntagmatic analysis[49]. It demands, therefore, not only the provision of some method for choosing and altering both independent images and pre–assembled sequences of images, but also that it gives incentive and support to experimentation with the ways in which elements can be combined to create narratives. If the Semiotic Toy is to address the question of the attribution of realism to television representation it is also necessary that it uses photorealistic moving images. The apparent indexicality of technically mediated images has been previously discussed in the section on Peircean Semiotics (Chapter 1, pp. 34-47).

The recent proliferation of computer toys dedicated to visual storytelling is indicative of the increasing interest of the computer entertainment industry in the storytelling impulse and visual creativity of the public. The fact that the vast majority of the new software is targeted at the juvenile market reflects the

[49] According to Daniel Chandler, the 'commutational test' is used by semioticians in order to identify distinctive paradigms and to define their significance. It is based on considering the implications of substituting signs within the text by alternatives suitable for each specific structural position, for example "imagining the use of a close–up rather than a mid–shot, a substitution in age, sex, class or ethnicity, substituting objects, a different caption for a photography, etc." (Chandler, 1997, n. p.). The method can be extended to allow for syntagmatic experimentation by providing the means for the user of the Semiotic Toy to exchange the position of elements within the syntagmatic structure of a narrative.

industry's belief that this visual creativity impulse is strongest in children. The significant enhancements of the visual capabilities of more recent toys, for example *3D Movie Maker*, when compared to older toys, such as *Magic Theatre,* reflect manufacturers' confidence in, and utilisation of, the growing storage and processing power in the home market computing equipment. The effective narrative possibilities of visual storytelling toys, however, have not developed along with their visual refinement. Many state–of–the–art computer games and applications testify to the increasing capability of home computers to deal with digitised moving image sequences. Motivated by the availability of camcorders and video capture cards at affordable prices, and acknowledging the increasing memory and processing power of personal computers, fully featured desktop video editing applications such as *Corel Lumiere Studio* (Corel, 1997) were by 1997 targeting the consumer market. These electronic video editing suites follow the same design principles as their professional counterparts, thus providing the tools but not the theoretical support for digital video production. It is likely that amateur users of these applications will mostly be limited to adding wipes, visual effects and similar features to the typically unrefined birthday, wedding and holiday productions of camcorder hobbyists.

The design of the Semiotic Toy ought to acknowledge and incorporate the positive features of the existing artefacts dedicated to the construction of narratives with moving images, whilst eliminating, as far as possible, the weaknesses identified in those artefacts. The high concentration of visually–based narrative artefacts targeting the home entertainment market is not a

coincidence. As has been shown in the third chapter of this thesis, the computer games industry is not only the wealthiest, but also the most prolific and innovative software developer. The great penetration of electronic entertainment artefacts into the home market speaks for the widespread influential power of artefacts belonging to that paradigm. The decision to present the Semiotic Toy as an entertainment artefact rather than as an education artefact generates the further benefit of creating an alternative approach for the promotion of 'video literacy'. By proposing that the acquisition of some aspects of 'video literacy' can be an essentially pleasurable activity, the Semiotic Toy aims to transfer the question of enhancing public understanding of television from the introduction of the subject into school curricula to the realm in which television itself is strongest. People watch television because it is entertaining, and this very characteristic of the medium is undoubtedly one of the bases of its massive penetration and influence.

Within the paradigm of entertainment, the games industry choice of aiming visual storytelling toys at the juvenile market seems also the most appropriate strategy for the Semiotic Toy. The reduced role of play in adult Western life, as discussed at the start of Chapter 4, makes children generally more likely to enrol in playful experimentation than adults, who tend to be concerned with efficiency even when partaking in leisure activities. This pre–disposition towards playful activity combined with children's apparent interest for, and ease with, computer–based devices can help reduce the avoidance of viable

but unusual strategies for generating meaning with moving images – such as repetition.

With the exception of the series *Playtoons,* each volume of which is composed of an animated book and a 'construction game', the existing electronic storytelling toys do not include anything like the variable levels of difficulty commonly found in computer games. It has been seen in Chapter 4 that such different difficulty levels can either be selected by the user before play starts or shift automatically from an easier to a harder mode as sets of pre–requisite tasks are completed. It has also been observed that, in computer games, difficulty of play is basically defined by three factors: the speed of required reactions; the power available to the user; and the complexity of decisions to be made. While most computer games concentrate on speed and hand–eye co–ordination, the Semiotic Toy will offer different levels of power and complexity, allowing users to work with more intricate tasks according to their age, their degree of cognitive development and their experience with various media. The provision of different levels of difficulty is not intended to confer upon the Semiotic Toy a competitive tone. The concepts of winner and loser implied in competition require the existence of correct answers to specific tasks, and therefore favour the imposition of specific narrative models as opposed to the incentive to creative experimentation desired for the Semiotic Toy. Hierarchisation of the various levels or conditioning the availability of features to accomplish pre–requisites will therefore be avoided. In short, each difficulty level of the Semiotic Toy will be conceived as an independent activity, ideally aiming at different tasks of increasing intricacy that are available at any given time but will be likely to succeed each other in

the users' preferences as their age, cognitive ability and visual literacy develop.

The existence of possible variations in the way in which storytelling in general, and more specifically the telling of stories with moving images and sounds, is approached throughout childhood also needs to be incorporated in the design of the Semiotic Toy. Arthur Applebee (1978) suggests that there are age–related changes in the levels of complexity with which children are able to combine the constitutive elements of the stories they create. Applebee identifies two main processes of organisation of children's stories, chaining and centring, giving rise to six different types of structure that illustrate the development of children's narratives from random to causal and temporal organisation. The resultant classification will be adopted as a background hypothesis against which to verify the adequacy of the proposed Semiotic Toy in respect of those variations in children's concept of story.

Applebee considers that the simplest method of organising the elements of a story is to aggregate them purely by chance. In this basic approach, named 'heaps', the child constructs successions of elements as they happen to come to mind, without caring for logical connections. A step further in complexity the stories are organised into 'sequences', in which the various elements are linked together on the basis of an attribute shared with a common central feature of the story. Applebee stresses that "[i]n a sequence, the associations between the incidents and their centre are limited to bonds of *similarity* rather than causality or complementarity" (Applebee, 1978, p. 60). Advancing towards forms of organisation considered more complex, children start to

aggregate elements based on their complementarity to the central core of their tales, thus assembling stories of the kind Applebee classifies as ‘primitive narratives’.

Abandoning the centring process to adopt a type of organisation based on constructing chains of elements, children start to compose ‘unfocused chains’. “Here each element shares a clear concrete attribute with the next, but the defining attribute is constantly shifting. . . . The result is a story which, taking its incidents in pairs, has much of the structure of a narrative, but which as a whole loses its point and direction” (Applebee, 1978, pp. 63–64). Stories organised into ‘focused chains’ combine the processes of centring and chaining: these narratives are centred around a core feature, usually a character, that is kept constant throughout a succession of events. This kind of organisation is characteristic of some adult genres, including television serials such as *Star Trek*. In the last stage of childhood development of narration skills, the central character or situation around which the story is built is allowed to develop over the course of the narrative. In these stories, that Applebee calls ‘narratives’, “[e]ach incident not only develops out of the previous one, but at the same time elaborates a new aspect of the theme or situation. Such stories seem to have a consistent forward movement and often, though not necessarily, a climax at the end” (Applebee, 1978, pp. 65–66).

Attempting to classify twenty two stories created by children between two and fourteen years of age according to Applebee’s scheme, Michelle A. Wolf (1987) found no evidence of story organised purely as heaps, sequence or primitive narrative. Only one story was considered by Wolf to have been an

unfocused chain and three were classified as focused chains. The overwhelming majority of the stories analysed, eighteen, were considered to be fully developed narratives (Wolf, 1987, p. 77). It is important, however, to keep in mind Applebee's own warning that "many stories use more than one method of organisation in the course of their narrative" (Applebee, 1978, p. 59), which suggests that to properly apply Applebee's classification requires a more flexible approach than Wolf's rigid labelling of whole stories in one or another category. It also ought to be taken into consideration that the stories analysed by Wolf were generated with the expressed intention of future video production by a peer group, and were publicly presented to such group. This suggests that the children could have attempted to match standards of adequacy developed from the narratives usually seen on television. Brian Sutton–Smith, for example, verified that after having demonstrated their capability of composing fully developed narratives, under informal circumstances children sometimes revert to storytelling modes that would be considered less sophisticated under Applebee's scheme (Sutton–Smith, 1986, p. 76).

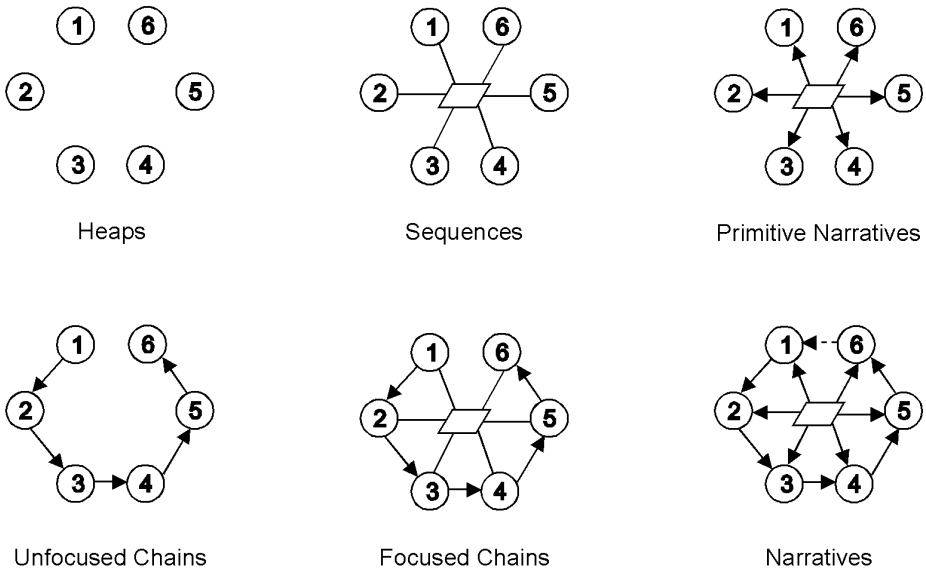

Figure 1 – Graphic representation of Arthur N. Applebee's six categories of children's stories according to their structural organisation (reproduced from Applebee, 1978, p. 58).

Sutton–Smith's analysis of children's storytelling led to general conclusions that mostly parallel Applebee's classification. Attempting to identify the formal aspects of the organisation of young children's stories, Sutton–Smith provides additional insights into the methodology children adopt for organising the various elements of the stories they create. While Applebee observes that "[i]n children's stories, the linking elements usually involve time sequence and causality", but carefully reserves that "in other spectator–role forms we might expect to find other sorts of chains – of images, say, or ideas or even sounds" (Applebee, 1978, p. 70), Sutton–Smith verified that those stories that appear less sophisticated when considered in terms of the causal and temporal connections established by the teller follow, in fact, a highly prosodic mode of organisation (Sutton–Smith, 1986, pp. 75–76 and 88). Considered together, the studies by Applebee and Sutton–Smith suggest that verbal narratives structured as 'heaps' may obey patterns based on

phonetic similarity, and that theme and variation structure of stories constructed as unfocused or focused chains produce a pulsating aural effect.

In order for the Semiotic Toy to give incentive to creative experimentation, and to avoid imposing specific models of plot construction, it should adapt to different concepts of story. Furthermore, by providing the opportunity for stories with moving images to be constructed according to the highly poetic modes of organisation indicated by Sutton–Smith, the Semiotic Toy would allow for experimentation with different methods of constructing meaning through a diverse range of musical, visual and verbal combinatory patterns.

Age–related variations in the degrees of consideration given to different aspects of the making of a narrative with moving images, as verified by Frank Eadie, Brain Sutton–Smith and Michael Griffin (1983) in an empirical study of the methods and procedures adopted in the film making workshops of the Young Filmmakers Foundation of New York, also need to be taken into account. The youngest children studied by those authors, between seven and ten years of age, tended to concentrate their attention on the recording of movement and showed little concern with plot content or camera and editing techniques. The authors suggest that some characteristics of the first films produced by young children can be understood as a consequence of their lack of expertise, and tended to disappear after the relatively rigorous training offered by the Young Filmmakers Foundation. The action–oriented approach and heavy dependence upon off–screen narration, however, remained constant from the earliest to the latest films produced by this age group. These youngest children were apparently more concerned with recording their own

playing experiences and conducting ‘look at me’ performances for the camera than with creating a narrative (Eadie *et al.*, 1983, p. 69). It is interesting to note that, by emphasising movement and not offering the user any support for dealing with basic narrative situations, most existing visual storytelling toys in fact suggest similar action–oriented approaches to creating narratives with moving images and sound.

In contrast to the youngest children’s spontaneity and playful use of the equipment available, the intermediate age group of the students of the Young Filmmakers Foundation, comprising of children between eleven and thirteen, were observed to adhere rigidly to the filmmaking rules as enunciated by the teachers. These children produced films that concentrated on trickery and camera and editing effects, showing their great concern with mastering the techniques of the medium. The eldest group analysed by Eadie *et al.* was composed of individuals between fourteen and sixteen years of age. The films produced by this age group are said to testify to the balanced attention given to both, content and formal aspects of film making. Eadie *et al.* consider such ‘more balanced’ results to be the consequence of the eldest group studied having mastered the lessons on techniques of filmmaking more easily than their younger counterparts, thus allowing them to explore the medium with more flexibility.

Describing the production of six– to seventeen–year–olds in workshops in film animation held from 1965 to 1969, Yvonne Andersen similarly stresses a significant enhancement of sophistication, both in thematic and technical terms, in the films produced by children from the age of thirteen (Andersen,

1970, p. 23). The age–related differences encountered by Eadie *et al.* also correspond in general to the findings of Howard Gardner, whose studies of the developmental stages of children's graphic expression propose that the freedom of expression characteristic of younger children tends to be replaced in middle childhood by the preocupation with mastering the nature of the medium and rendering accurate representations to eventually remerge in adolescence (Gardner, 1980, pp. 143-163 and 235-269). It is important that the Semiotic Toy allows for related variations of emphasis on different aspects of the construction of narration with moving images and sound.

Other insights that can help in the design of the Semiotic Toy come from the work of Wolf (1987), previously referred to in this chapter concerning her evaluation of children's storytelling according to Applebee's classification. Attempting to develop a new research methodology for evaluating how and to what extent children make sense of television, Wolf studied one hundred and seven children over a period of ten months. The field work was structured in three phases: becoming acquainted with the children, helping the children to create their own programmes, and examining children's perception of television programming. Despite not providing specific information or discussing in detail the videos created by the children in the second phase of research, Wolf's warning about the possibility that most specialised literature underestimates children's understanding of television's narrative and production conventions should be taken into account. The children studied by Wolf showed awareness of many of the strategies for constructing meaning commonly used in television programmes. Speculating about 'how things are done on television', the subjects of Wolf's study sometimes demonstrated

surprising levels of technical accuracy, mostly when the production device under consideration had previously been explained by some third party (Wolf, 1987, p. 87). In general,

> [c]onsidering camera shots/operation, picturization[50], and special effects, the children's remarks were often surprisingly sophisticated. Time and again, they expressed their awareness of the use of multiple cameras and angles, editing, lighting, slow and fast motion, superimposition, process shots, and numerous other production devices. They also referred to audio effects used on television shows, recognising that voices they heard were not often delivered by 'invisible' persons, and that words could be slurred by manipulating the sound track. They also made distinctions between such elements as 'sad' versus 'happy' music, and were quick to recognise the implications of what one boy called 'danger music' (Wolf, 1987, p. 93).

It is important that the Semiotic Toy recognises its role as a source of information about television narrative techniques without underestimating children's abilities. If "youthful creativity is of a different kind to that of 'adult ordering' of responses", it is important not to "close any doors by the superimposition of arbitrary standards which might prevent the learner benefiting from both worlds" (Lowndes, 1968, p. 127).

General Design Specifications

The Semiotic Toy should be conceived as home computer entertainment software. Intended to promote experimentation with paradigmatic and syntagmatic combinations of elements in order to create narratives, it seems

[50] The expression 'picturisation' is used by Wolf signifying "the process of structuring shot sequences by way of using transitions or editing" (Wolf, 1987, p. 62).

appropriate that the Semiotic Toy should offer a default version of a story around which all the features converge. The most basic use of the Semiotic Toy will simply be to display the basic linear video narrative on the computer screen. A first and most straightforward level of experimentation, based on choices between pre–established variations of the basic story, would allow for identifying the restrictions implied by the branching pattern of the 'interactive video' model which, as noted in Chapter 3, is frequently reputed to empower audiences by allowing choices relating to the outcomes of movies or television programmes. Technically, this implies the construction of the basic story from narrative units corresponding to the alternative paths desired. It is important to recall from the previous discussion of the interactive video model in Chapter 3 that the quantity of narrative paths may increase in an exponential proportion to the number of nodes and choices created depending upon the narrative.

By offering more localised choices within each available narrative unit, the Semiotic Toy can provide the means for experimenting with the role of each medium in the construction of a video narrative. Choices on the verbal level will refer directly to dialogue options, while the visual aspects of meaning construction could be demonstrated by offering, for example, alternative settings for each scene. Sound effects and music would be the most basic requirements for understanding how meaning can be modified by different aural information, but the Semiotic Toy should allow also for experimenting with the musical aspects of human speech. Technical and didactic requirements converge to suggest the organisation of those options within

independent paradigmatic libraries, from which elements can be applied to the narrative units.

The majority of entertainment programs dedicated to the generation of narratives with moving images presently available tend to rely on the libraries of sound and image supplied with the package. The increasing number of capture devices at prices compatible with the purchasing power of the home market, however, justifies the inclusion in the Semiotic Toy of tools that depend upon sequences produced or digitised by the user in order to create personal libraries of images and sound.

On the syntagmatic level, the Semiotic Toy should provide the possibility not only of recombining the narrative units, but also of dismantling each of them into shorter sequences that can be reassembled as the user desires. To this end, it is advisable to provide information on how typical narrative circumstances, such as the construction of dialogue situations or condensations of time, are usually dealt with. For the Semiotic Toy to be a useful instrument in the development of critical awareness, rather than mere acceptance of television narrative techniques, it ought to guide the user through the most common structures used to construct meaning in television without imposing them as best or unique solutions. Rigorous teaching of techniques without an incentive for free experimentation as the means to discover alternative strategies is also unlikely to give rise to engrossing play. Confronted with a course modelled on "what many directors do in filmmaking and [that] sought to teach apprentices the necessary steps", most students of the Young Filmmakers Foundation of New York between 1974 and 1976 are said to have "found the teachers

difficult and demanding and much of the work tedious in the extreme" (Eadie et al, 1983, p. 66). Not only did most students give up the course before making their first film, but those youngsters who dropped out are believed to have been amongst the most creative who initially engaged in the film making workshops. Less rigorous approaches are said to result in lower drop out levels and be of greater educational usefulness (Eadie *et al.*, 1983, pp. 66 and 72).

The impossibility of incorporating information on all syntagmatic aspects of the construction of narratives with moving images, combined with the thematic restrictions implied by centring the many features of the Semiotic Toy around a default story, led to the development of a collection of independent, but interconnecting, volumes. Each volume of the Semiotic Toy Series would be based on a different story and present different narrative and production devices. The content of the narrative units and their related paradigmatic libraries will vary according to the basic story. Ideally, it would be possible to combine narrative units and library elements from different discs in order to create stories, as occurs with the elements of the 'construction games' of the series *Playtoons,* also structured in volumes[51].

It is also important that variations of the default story and the new narratives created with the Semiotic Toy remain available for future display, allowing

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[51] The technical solution adopted by the manufacturer Sierra, however, is based on the repetition of data files from older discs in each new volume of *Playtoons*. While this strategy avoids the need for exchanging CD-ROMs in order to access files linked to different stories, it does not support the size of the files containing photorealistic images or the more numerous and more demanding possibilities of the tools of the Semiotic Toy when compared to those of the 'construction game' of *Playtoons*. To combine narrative units from different discs without compromising other specifications desired for the Semiotic Toy, it is advisable that the units selected to integrate a story will be copied to the users' hard disc, as occurs, for example, with *Director's Lab.*

for re–evaluation, discussion and the exchange of productions and ideas amongst users.

In order to avoid early obsolescence, it is required that the design of the Semiotic Toy takes into consideration advances in storage capability, processing speed and the availability of peripherals expected to penetrate the home market redefining the specifications of personal computers in the near future. On the other hand, it is not appropriate to tie the feasibility of the Semiotic Toy to developments that are inherently uncertain. Ideally, the Semiotic Toy will be designed with enough versatility to allow for it to evolve in parallel with the development of the technical possibilities of home computers. The following specifications of the Semiotic Toy are based upon the current situation of home computing. Consideration will be given to the feasibility of specific features whenever storage requirements and essential peripherals do not comply with the profile of top–of–the–range home platforms available at the time of writing.

Description of the Semiotic Toy

The Semiotic Toy is designed as a collectable series, each volume of which is centred around a different video narrative, and containing all the tools that characterise the Semiotic Toy Series. Play is structured in five different levels of difficulty: Play It Again, Forking Paths, Building Blocks, Mix & Match, Nuts & Bolts and All Yours. The intricacy of the various functions increases from one level to the next. It is also possible to progress from simpler to more complicated uses within each level, as not all functions need to be played with in any given session and most features can be partially used if desired.

1. Play It Again

In the Play It Again Level, the video sequences that compose the default story are displayed linearly within a frame designed to resemble a television set (Colour Plate I). This frame, hereafter refered to as TV Set, will be used not only in this Level, but also in all other Play Modes of the Semiotic Toy, and is intended to emphasise the parallels between the experience of television and the Semiotic Toy.

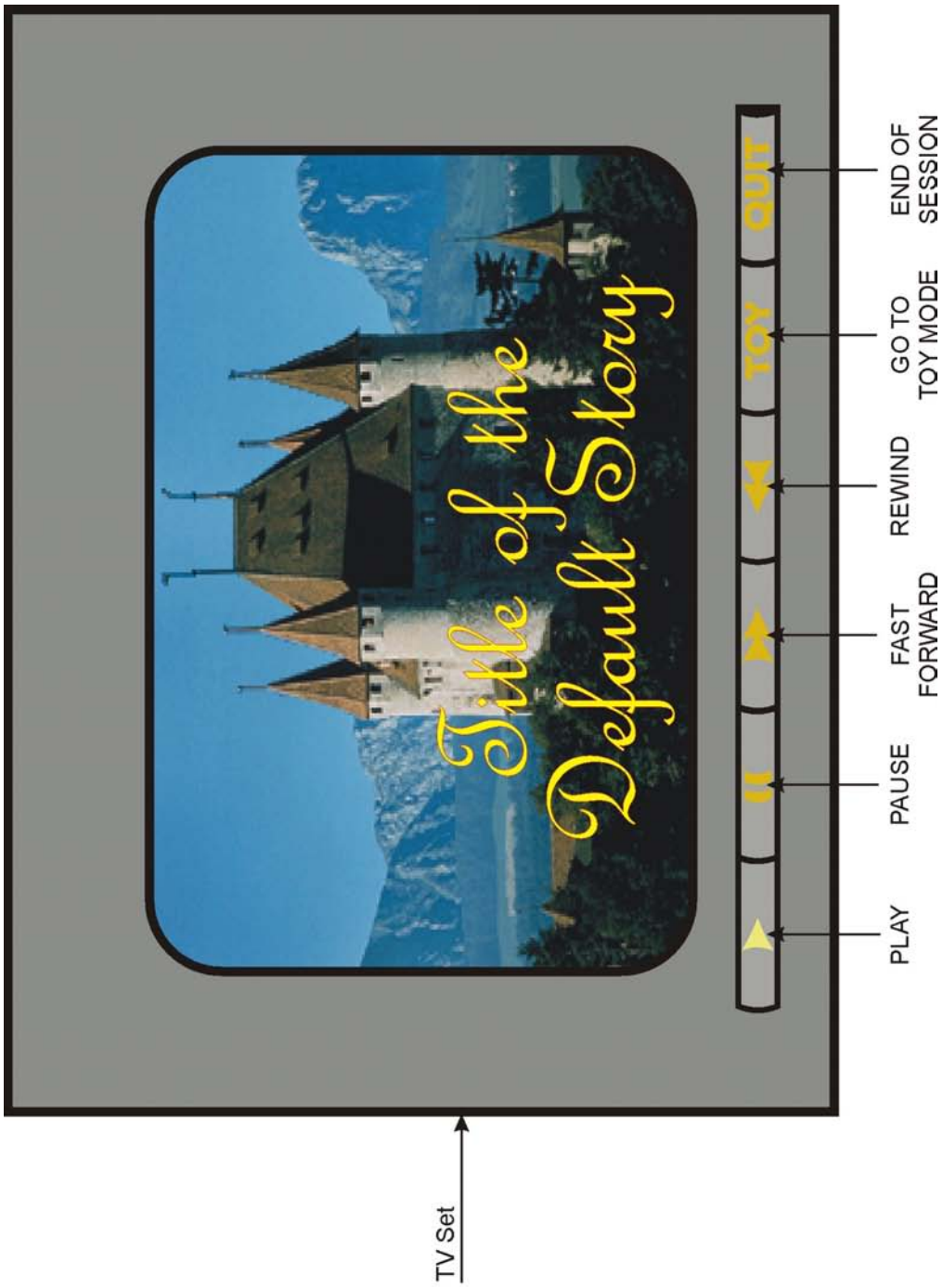
At the bottom of the TV Set, six Function Buttons offer the user the following options: Play, Pause, Fast Forward, Rewind, Toy and Quit. The first four options correspond to functions usually available on Video Cassette Recorders, Compact Disc equipment, etc., and are represented by the icons traditionally used in those appliances. The operations performed by these buttons do not require explanation. Selecting Quit or, in any level of the Semiotic Toy, pressing the Escape key, loads a Quit Pop Up asking the user to confirm the intention to stop playing. Selecting Toy presents the user with the Difficulty Levels Menu (Colour Plate II). Any operation can be selected at any moment, interrupting the display of the default story. Without input from the user the Semiotic Toy proceeds to the end of the default video sequences, before displaying the Difficulty Levels Menu.

The TV Set frame and the Function Buttons are dark grey. Button icons and text are dark yellow, and become highlighted (bright yellow) to indicate which function is currently in operation. The text font is Graphite Light. The TV Set, Function Buttons, and all other features that should remain unchanged

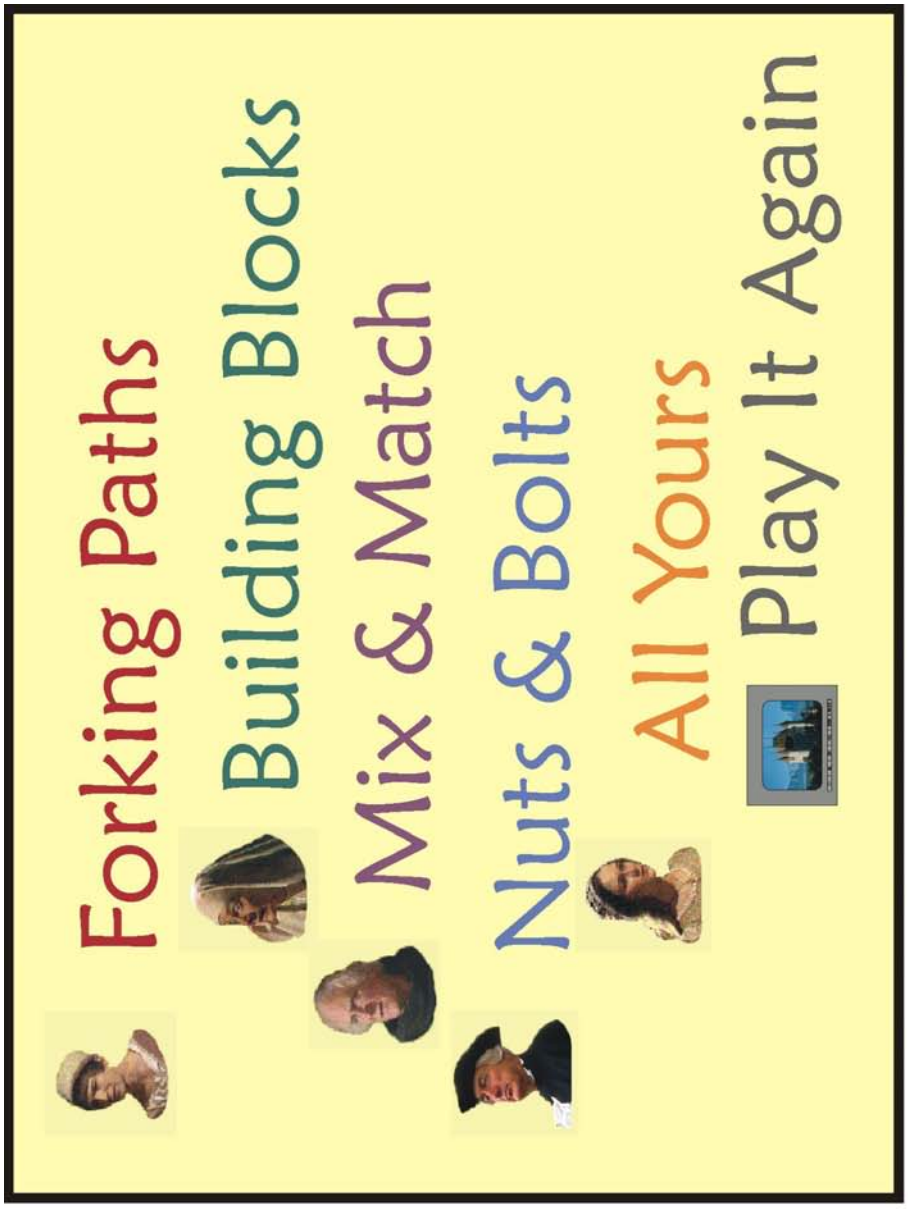
throughout the volumes of the Semiotic Toy Series, will retain the same appearance in all Difficulty Levels.

2. Difficulty Levels Menu

The Difficulty Levels Menu is composed of icons and text arranged on a light yellow background, and does not use the TV Set frame. There are five icons, each with photorealistic portraits of characters of the story, each associated with one Difficulty Level: Forking Paths, Building Blocks, Mix & Match, Nuts & Bolts and All Yours. The names of the Difficulty Levels are displayed beside the respective icons, in font Graphite Light and in the colour associated with each Level (respectively red, green, purple, blue and orange).The association between colour and Difficulty Level will remain unchanged throughout all volumes of the Semiotic Toy Series. At the top right of the screen an icon representing the TV Set displaying the first frame of the default story and the title Play It Again sends the user back to the Play It Again Level.



Colour Plate I - Play It Again (original photographic image from *World PhotoPack*, Aztech, n. d.).



Colour Plate II - Difficulty Levels Menu (Forking Paths', Building Blocks', Mix & Match's and Nuts & Bolts' icons from *Shakespeare on CD-ROM,* BBC Education, 1995; All Yours' icon from *World PhotoPack*, Aztech, n. d.).

After a few seconds, a video sequence of a character not associated with any specific difficulty level or of a person appears superimposed on the Difficulty Levels Menu screen. The video sequence contains brief explanations of the various levels and, while suggesting that the user starts from the easiest level (Forking Paths), progressing to the most complex one (All Yours), emphasises that the user is free to play with the various levels in any order.

Clicking the mouse interrupts the presentation sequence leaving the system on the Difficulty Levels Menu, as if the explanation had arrived at the end. Selecting one of the icons or titles sends the user to the corresponding level.

3. Forking Paths

When the Forking Paths Level is selected the TV Set reappears, initially displaying the point at which the first node of the branching, 'interactive video' version of the story occurs. After a short pause, smaller screen areas displaying the various choices for the next frame appear throughout the screen of the TV Set. The small screens appear one at a time, accompanied by a sound (plop). When all the options are displayed (Colour Plate III), a video sequence of the character–presenter for the level is shown superimposed at the centre of the TV Set screen, and explains how to play with the Semiotic Toy in the Forking Paths Level Clicking on the character–presenter interrupts the explanatory sequence and initiates the level as if the explanation had arrived at the end. The explanatory sequence will not be displayed at all if any keystroke or mouse input is given before the help video starts. In this case, the system proceeds directly to the beginning of the story.

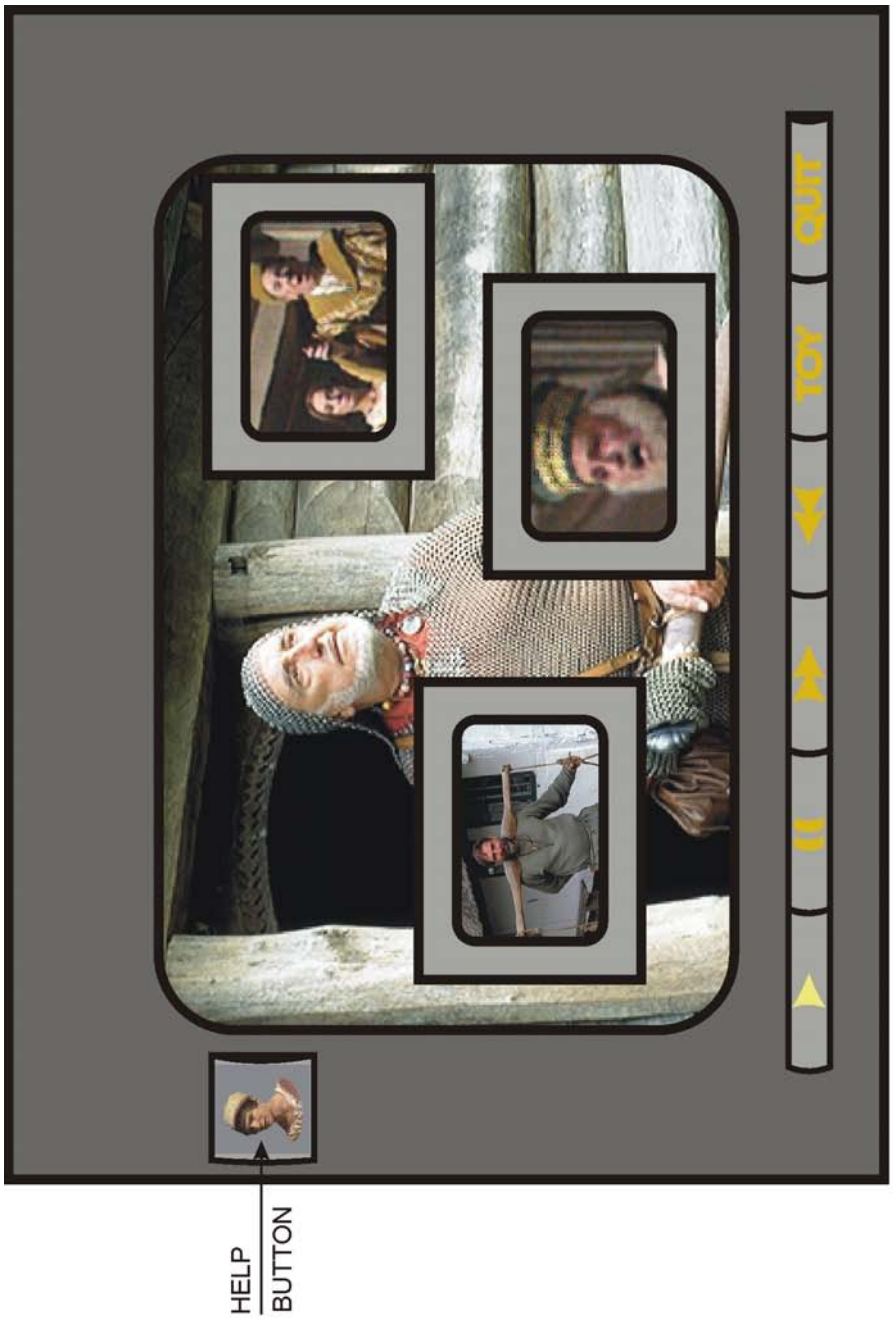
The story starts exactly as in Play It Again. At pre–defined moments the narrative will be interrupted by a short pause, after which choices for the next frame appear as described above. When all options are displayed, the Semiotic Toy pauses until the user clicks on one of the smaller screens, selecting the path along which the story will continue (Colour Plate III). The image corresponding to the option selected enlarges until it occupies the whole screen of the TV Set. A sound is heard throughout the enlargement process. The story follows from that point until a new node is reached.

All six buttons at the bottom of the TV Set, described in the section dedicated to the Play It Again Mode, are fully functional in the Forking Paths Level. An additional red button, containing the face of the character–presenter for the Level, is displayed in the left side of the frame. Selecting this icon starts a video–based help file, suspending the display of the story if necessary. The help sequence appears superimposed on the image that was displayed on the TV Set screen when the red button was selected. Clicking on the help video or once more on the help button reinitiates the story from the point in which it was interrupted.

The Rewind button resets the choices (undo) whenever a node is crossed.

This function enables the user to experiment with different paths without having to watch the whole story for each combination tried.

Fast Forward advances the video until the next node, and then is temporarily disabled until a choice is made.



Colour Plate III - Choice Node in the Forking Paths Level (photographic images from *Shakespeare on CD-ROM*, BBC Education, 1995 and *World PhotoPack*, Aztech, n. d.).

Once the end of the story is displayed and if the user has selected paths that compose a sequence different from the original narrative as presented in Play It Again, the Save Story Pop Up appears superimposed on the final screen (Colour Plate IV).

Once a new version of the story has been saved, a Select Story Screen (Colour Plate V) is displayed before entering any level of the Semiotic Toy. The background colour of this screen corresponds to a light shade of the colour of the selected difficulty level. The title of the default story of the volume of the Semiotic Toy presently in use appears in same font and colour as in other references to it throughout the package, and the names given to other stories previously saved in different fonts and colours randomly selected by the system.

4. Building Blocks

Selecting the Building Blocks Level from the Difficulty Levels Menu loads the Building Blocks Toy Screen (Colour Plate VI). As with all other levels, unless an input is immediately given a video sequence of the character–presenter for the level appears on the screen, and introduces the main concepts necessary to play with the Semiotic Toy using the Building Blocks Level. The explanatory sequence can be interrupted at any time by clicking on the character–presenter, whose portrait will remain in the middle of the Toy Screen, giving permanent access to a series of help files. Selecting the portrait of the character–presenter transforms the mouse pointer into an question mark. Clicking this question mark on top of any feature of the Toy Screen leads to a video–based help file specific to that feature.

Most features that compose the Building Blocks Toy Screen will also be part of the Toy Screens for levels Mix & Match, Nuts & Bolts and All Yours. On the top of the screen, a randomly selected narrative unit (NUT[52]) is displayed 'frame–by–frame'[53] in an area that will be hereafter refereed as the Display Line. Arrows located at both sides allow the user to forward or rewind NUTs in the Display Line. Underneath the arrows two Frame Counters indicate the number of the first and last frame displayed at any given time.

Under the Display Line and Frame Counters is a Title Editor, consisting of five small rectangles containing from left to right: a choice of fonts, a typing area, three options for text size (small, medium or large), six options for text colour (yellow, red, blue, green, white and black) and three choices for paragraph alignment (left, centre and right). Selecting a font enables the title editor. Words entered via the keyboard are displayed in black inside the white Typing Area. Text appears in the selected alignment, font size and colour within a small icon representing the TV Set frame located at the left side of the centre of the Toy Screen. Titles created with the Title Editor can be superimposed over any frames chosen by the user, by dragging them from the

[52] The content and structure of each NUT will not be defined by a general top–to–bottom rule of narrative sub–division, but rather by and for each volume of the Semiotic Toy according to its particular characteristics. This aims at maximising the combinatory possibilities of syntagmatic and paradigmatic arrangements considering each volume independently and as part of the Semiotic Toy Series. The idea of naming the narrative units 'NUTs' was suggested by Rob Swigart, during the *ACM European Conference on Hypermedia Technology*, ECHT'94, Edinburgh, September 1994.

[53] In fact, one frame is displayed for each half a second of video.

Colour Plate IV - Save Story Pop-Up against Forking Paths screen (photographic images captured from *Shakespeare on CD-ROM,* BBC Education, 1995, and *World PhotoPack*, Aztech, n. d.).

Colour Plate V - Select Story Screen.

Typing Area or TV Set Icon to a frame on the Display Line[54].

[54] Text–related features of the Semiotic Toy have been limited to a bare minimum in order to counterpose a current tendency of visual storytelling toys to privilege the use of titling as a

At the bottom of the Building Blocks Toy Screen the first two frames of six randomly selected NUTs, one of which is the one shown in the Display Line, will be displayed in Choice Boxes. Playing with level Building Blocks consists of assembling the narrative units in different orders, thus creating new narratives. NUTs can be added by clicking on a Choice Box and dragging to the Display Line, and removed by dragging from the Display Line to the Choice Boxes Area. If a NUT happens to be dragged to the top of another, previously positioned in the Display Line, it will be placed immediately after the formerly selected one. The outline of the Choice Box containing a NUT selected in the Display Line appears highlighted and remains so until another NUT is selected. Scrolling with the arrows at the side of the Choice Boxes Area rotates the narrative units displayed giving access to all available NUTs. Arrows at the right side of the Choice Boxes forward the NUTs 'frame–by–frame'. Frame Counters indicate the number of the first frame displayed in each Choice Box at any given time. Double clicking on the Choice Box resets the NUT to the beginning.

Six Control Buttons on the left side of the middle of the screen offer the options GET, UNDO, SAVE, PLAY, TEXT SAVE and SMALL PLAY.

GET allows the user to access the default narrative or other previously saved stories created or modified with the Semiotic Toy. It also gives independent access to original or modified and previously saved story elements, according to selections from a Pop Up Directory Menu (Colour Plate VII). The story selected with the GET function appears 'frame–by–frame' in the Display Line.

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means of promoting syntagmatic organisation.

The NUTs that compose the selected version will also be displayed individually in the Choice Boxes.

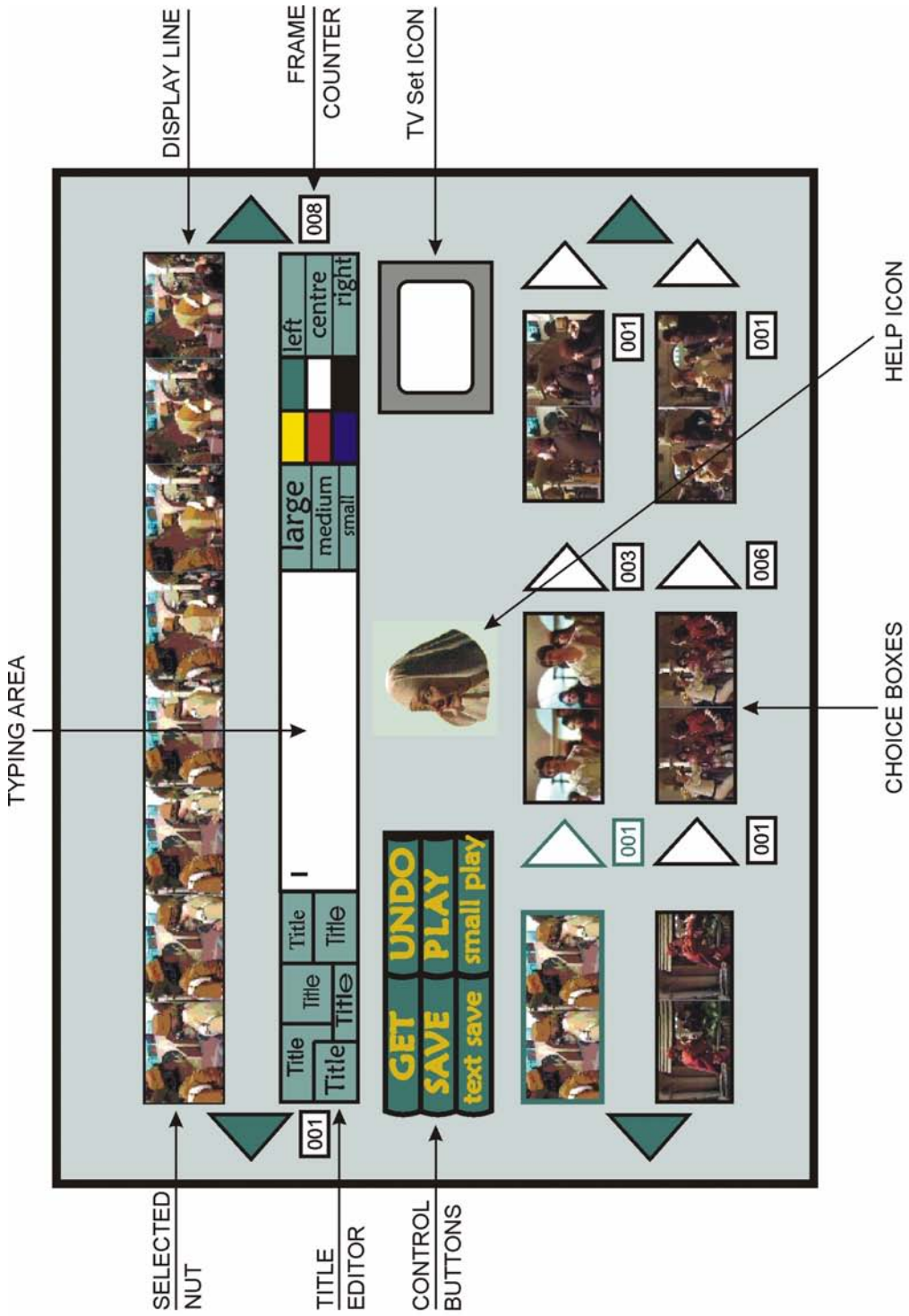
UNDO resets the last action performed.

SAVE gives access to the Save Story Pop–Up, that appears superimposed on the Toy Screen allowing the user to save stories created within level Building Blocks.

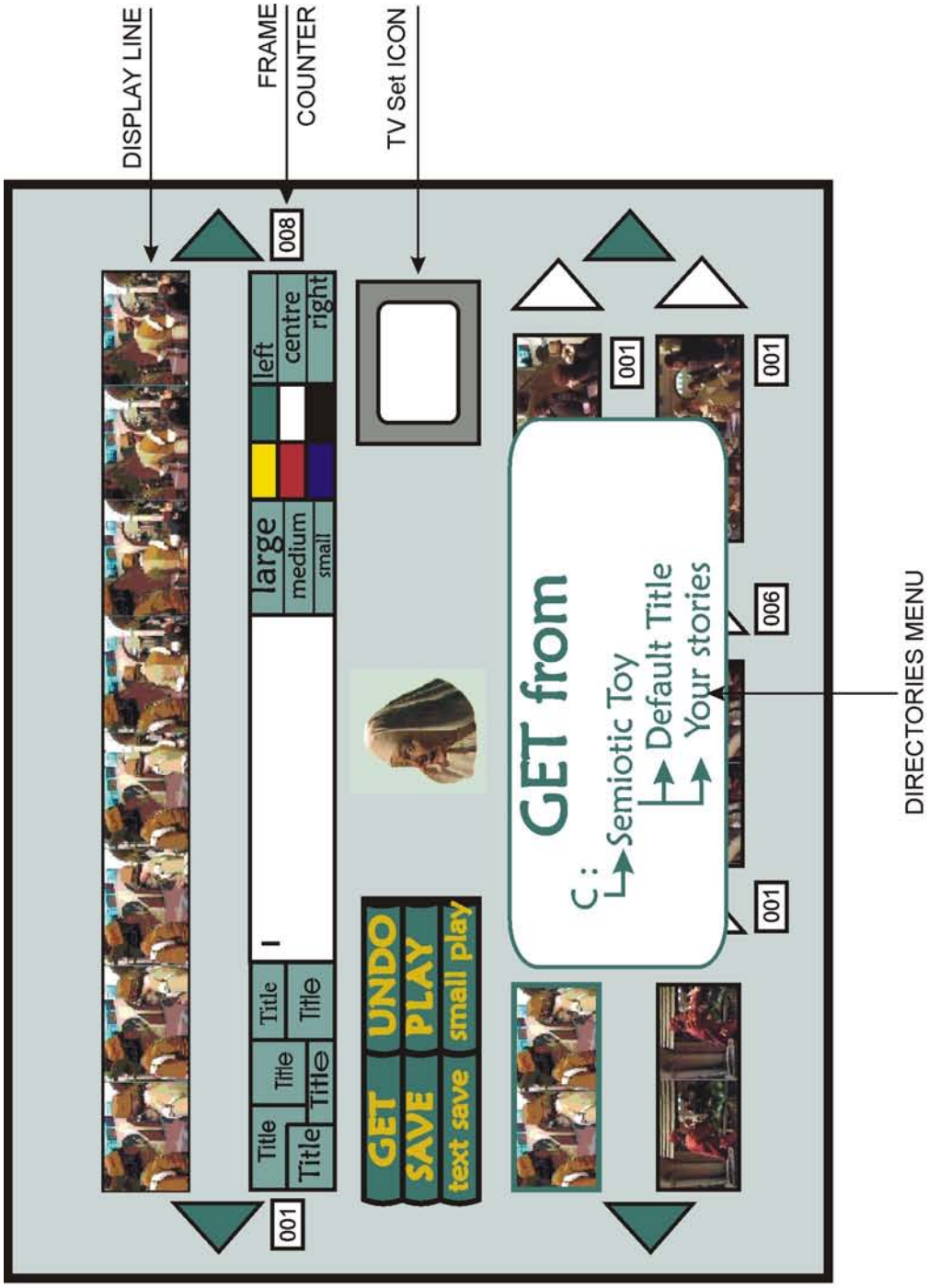
PLAY sends the system to Building Blocks Play Mode, after confirming if any unsaved alterations require saving. In the Building Blocks Play Mode, either the default story or the last version saved is automatically loaded and played. The character–presenter for the level appears in the left side of the TV Set (Colour Plate VIII).

TEXT SAVE calls the Small Save Pop Up (Colour Plate IX), allowing text created with the Title Editor to be saved as an independent file or in association with a video sequence hence creating a new NUT. NUTs created by the user become accessible for the Choice Boxes in the levels Building Blocks, Mix & Match and All Yours as they will be stored in the same format and directory as the NUTs that initially compose the Semiotic Toy.

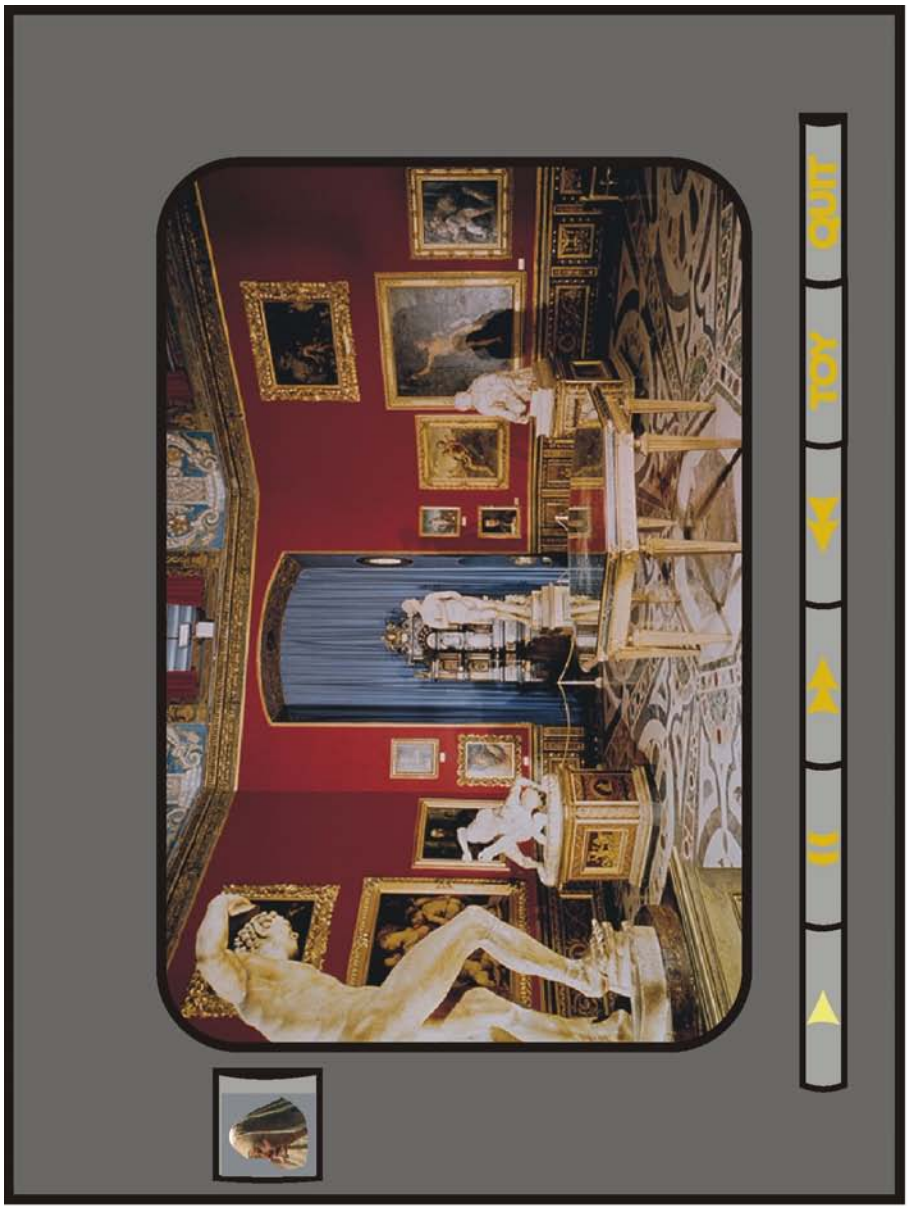
SMALL PLAY plays the NUT inside the selected Choice Box. Clicking either on the playing Choice Box or once more on SMALL PLAY interrupts the video and restores the original display of the Choice Box.



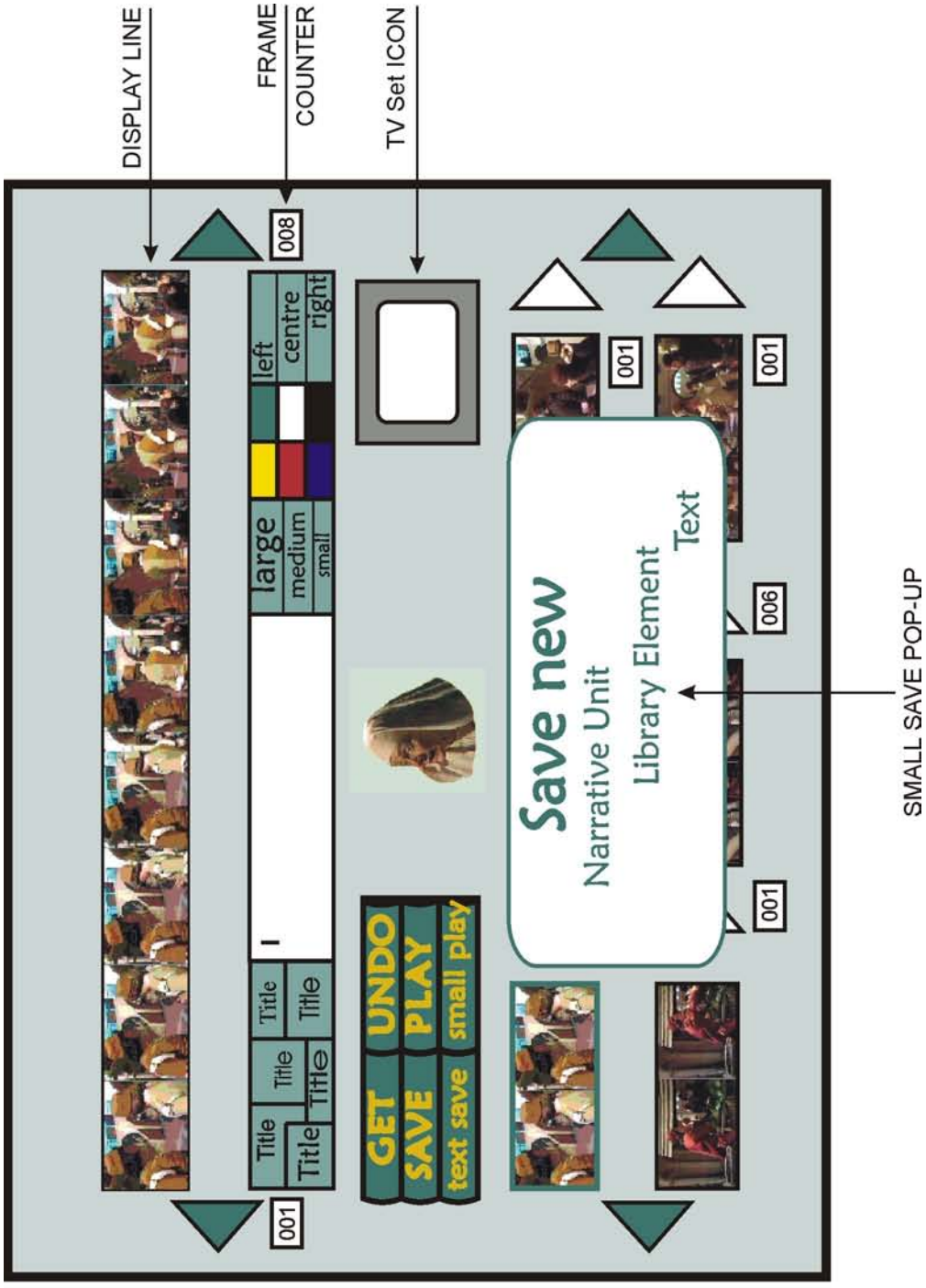
Colour Plate VI - Building Blocks Toy Screen (video sequences and help icon captured from *Shakespeare on CD-ROM*, BBC Education, 1995).



Colour Plate VII - Directories Menu Pop-Up, accessed from GET and displayed against Building Blocks Toy Screen.



Colour Plate VIII - Building Blocks, Play Mode (help icon from *Shakespeare on CD-ROM*, BBC Education, 1995, on-screen image from *World PhotoPack*, Aztech, n. d.).



Colour Plate IX - Small Save Pop-Up displayed against Building Blocks Toy Screen.

5. Mix & Match Level

The Mix & Match Level introduces the Paradigmatic Libraries of the Semiotic Toy. The initial screen of Mix & Match is lilac. Unless an input is immediately given, a video sequence of the character–presenter for the Mix & Match Level appears superimposed over this Introductory Screen, and explain the main concepts necessary to play with Mix & Match. The explanatory sequence can be interrupted at any moment by clicking on the character–presenter.

The user selects the default or any other previously saved version of the story by double–clicking on the corresponding title. The system loads the story within the TV Set, that now includes six Library Buttons at the top (Colour Plate X), giving access to the Paradigmatic Libraries (Music, Sound Effects, Dialogues, Voices, Settings and Actors). Libraries are represented by yellow icons, that appear highlighted whenever the corresponding options become available. The original six buttons at the bottom of the frame (Play, Pause, Forward, Rewind, Toy and Quit) remain fully operative. A help video can be accessed by selecting the portrait of the character–presenter for the Level that appears in the left side of the frame. The help sequence appears superimposed on the image that is being displayed on the screen of the TV Set when the button is selected. Clicking on the help video or once more on the help button reinitiates the story from the point at which it was interrupted.

Colour Plate X - Mix & Match, Play Mode (help icon from *Shakespeare on CD-ROM,* BBC Education, 1995; on-screen image from Animals DownUnder, volume Mammals, R. Strahan, 1995).

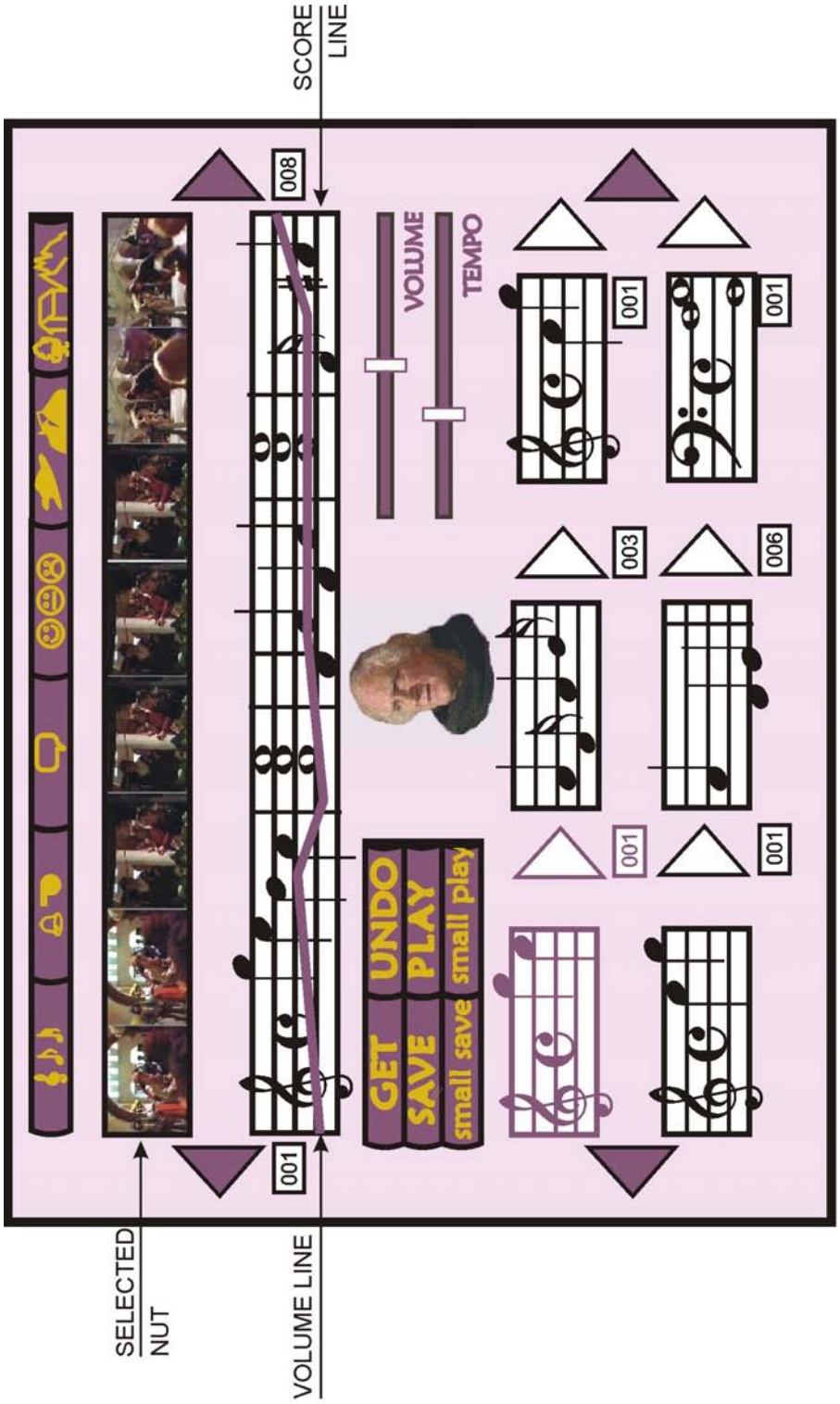
As each NUT that composes the current version of the story is displayed, the buttons corresponding to the Paradigmatic Libraries available for altering that specific sequence appear highlighted. Clicking on a highlighted button interrupts the video sequence and sends the user to the selected Library. The NUT that was being displayed when the selection of the Library was made will appear 'frame–by–frame' in the Display Line of Mix & Match Toy Screens.

Mix & Match Toy Screens: Music Library

There are six different Mix & Match Toy Screens, one for each Paradigmatic Library. They are composed of the same main elements, of which the Display Line, Frame Counters, Forward and Rewind arrows, help icon and Choice Boxes have already been described in the previous description of the Building Blocks Toy Screen. In the Mix & Match Toy Screens, the six Library Buttons are shown above the Display Line, properly highlighted to indicate which Libraries are available for the displayed NUT. Selecting a highlighted button sends the user directly to the corresponding Mix & Match Toy Screen.

In the Music Library Screen (Colour Plate XI) a score containing the main melodic line of the music associated by default with the selected NUT appears under the Display Line, in an area hereafter referred to as the Score Line. The lateral arrows forward or rewind simultaneously the frames in both the Display Line and the Score Line.

At the left side at the centre of the screen, there are six Control Buttons, three of which have already been explained in Building Blocks Toy Screen: GET, UNDO and SAVE.



Colour Plate XI - Mix & Match Toy Screen: Music Library (video sequence and help icon extracted from *Shakespeare on CD-ROM*, BBC Education, 1995).

Selecting PLAY from a Mix & Match Toy Screen sends the system back to the Mix & Match Play Mode, and the story re–initiates from the beginning of the altered NUT, including any saved alterations.

SMALL SAVE leads to the Small Save Pop Up, allowing the user choices to save the alterations as music only, or combined with video as a new NUT.

SMALL PLAY plays the selected choice of music and scrolls the Choice Box displaying the score of the main melodic line of the music as it is played.

In the centre of the Mix & Match Toy Screens is the icon of the character–presenter that gives access to explanatory files for each Paradigmatic Library and help files for specific functions. The explanatory video introduction of the Mix & Match Level, in the Play Mode, recommends the user to access the explanatory file for each Paradigmatic Library by double clicking on the help icon in the centre of each Mix & Match Toy Screen. A single click on the help icon transforms the pointer into a question mark leading to help files for specific functions.

The volume and tempo of the music displayed in the Score Line can be adjusted using the slide controls in the right side of the middle area of the Music Library screen. Defaults are at the middle of the sliding bar, and can be reset by double clicking the pointer. The volume can also be modified in specific parts of the music in the Score Line by dragging parts of the purple line that appears superimposed on the melody.

At the bottom of the screen, the first bars of the main melodic line of the default and other available choices of music are displayed inside Choice Boxes. Selecting one of the Choice Boxes causes it to be highlighted (initially

the first Choice Box, containing the default music, is highlighted). The score in a Choice Box can be advanced using the arrows at the right of the display lines. Double clicking the Choice Box resets the music back to the beginning. Music in Choice Boxes can be played using the SMALL PLAY Control Button. The bars in the Choice Box are updated as the music plays, and resets to the beginning at the end of the piece. Dragging from a Choice Box to the Score Line changes the music associated with the displayed NUT. Conversely, dragging from the Score Line to the Choice Boxes Area cancels that association between music and images. If the selection is directed to a point other than the beginning of the Score Line, the previous music remains until the point where the selection was placed, and the new music follows from there onwards. After a Choice Box has been selected and appears highlighted, clicking once more on any point of it inserts a mark in relation to which the user can select parts of the music. All subsequent bars will automatically replace the default (or formerly selected) music when dragged to the Score Line. Music from Choice Boxes can be used more than once for a single NUT. The last Choice Box contains the option of silence, represented by a white area.

Mix & Match Toy Screens: Sound Effects Library

The Sound Effects Library (Colour Plate XII) allows for variations in non–musical, non–dialogue sound elements such as background noise or bells ringing. Its operation is very similar to that of the Music Library. Sound effects that are by default part of the selected NUT are displayed in a dark lilac Sound Effects Line located below the Display Line. Sound Effects are

represented by yellow icons inside a purple area positioned immediately under the frames associated to each specific Sound Effect. Control Buttons, help icon, Volume Line, VOLUME and TEMPO operate as in the Music Library. Duration of a Sound Effect positioned in the Sound Effects Line can be altered by extending or shortening the purple area around the Sound Effect icon.

The Choices Boxes contain icons and names for the options available. Placing and replacing Sound Effects on the NUT is done by dragging from a Choice Box to the Sound Effects Line. Inversely, dragging from the Sound Effects Line to the Choice Boxes Area eliminates that association between Sound Effect and images. Sound Effects can be used more than once in a same NUT.

Mix & Match Toy Screens: Dialogues Library

In the Dialogues Library (Colour Plate XIII) a dark lilac area under the Display Line, hereafter called the Dialogues Line, contains written words corresponding to speech that eventually takes place in the selected NUT. Different fonts are associated to different characters. Framed dialogue parts can be replaced by clicking and dragging options from the Choice Boxes, thus allowing for altering the dialogues inclusively of completely disregarding lip–synchronisation and repeating words or phrases. A dark lilac area within a framed part of a speech indicates the existence of options with similar aural characteristics in the Choice Boxes, allowing for interchange without generating significant loss of lip movement synchronisation.

All Control Buttons operate in the same fashion as in the Music and Sound Effects Libraries, as do the functions VOLUME and TEMPO. Lip

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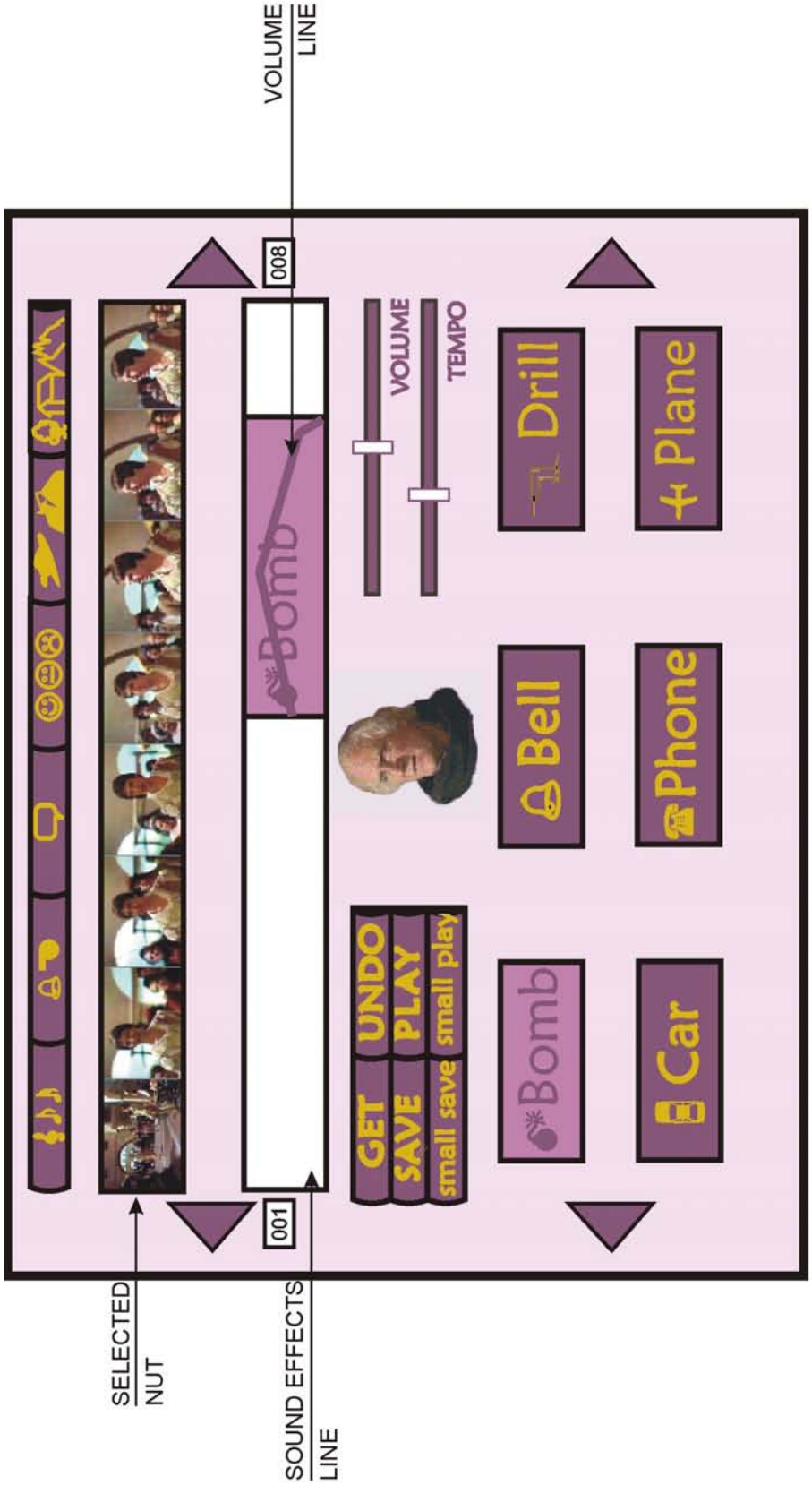
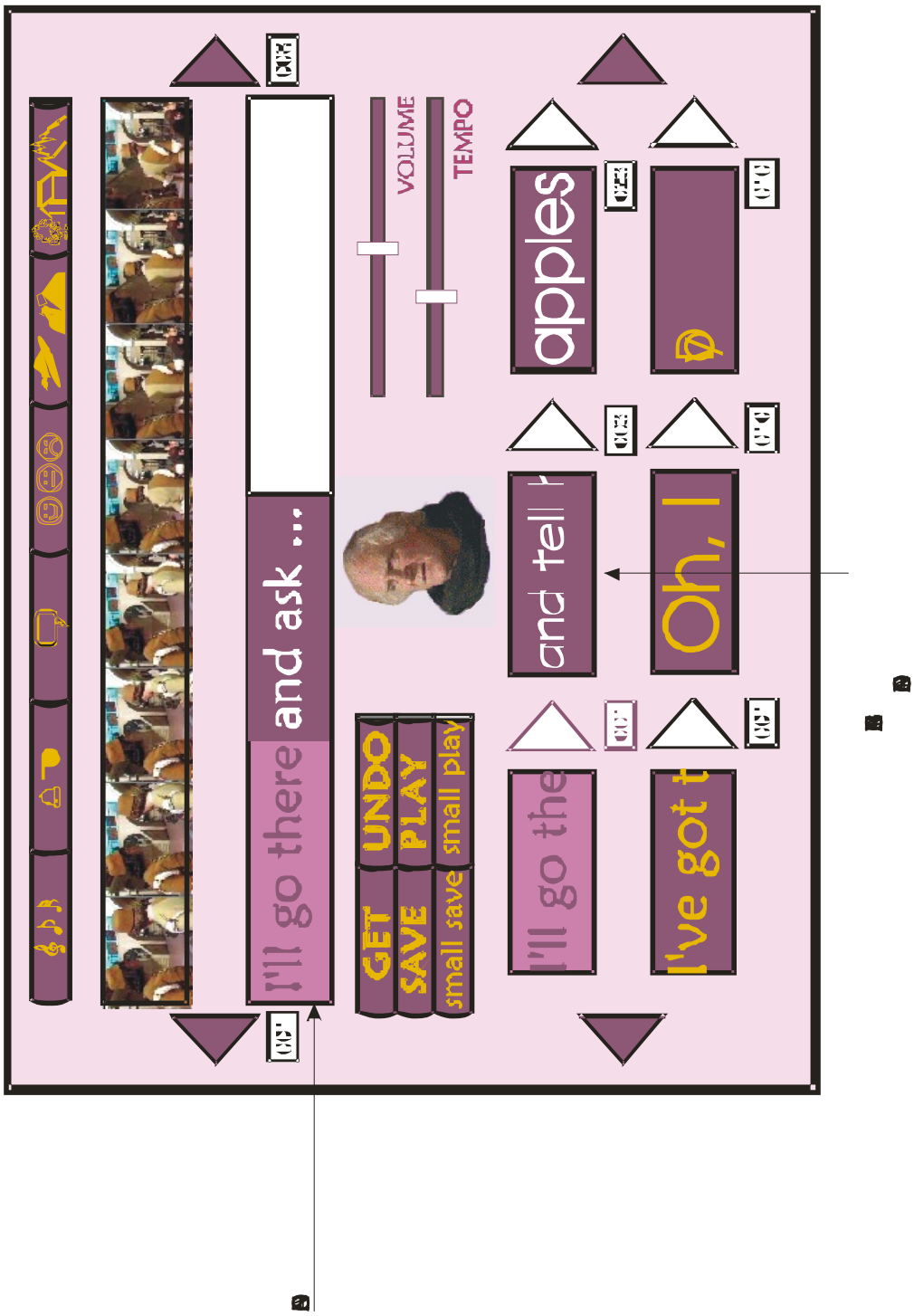


Colour Plate XII - Mix & Match Toy Screen: Sound Effects Library (video sequence and help icon extracted from *Shakespeare on CD-ROM*, BBC Education, 1995).



Colour Plate XIII - Mix & Match Toy Screen: Dialogues Library (video sequence and help icon extracted from *Shakespeare on CD-ROM,* BBC Education, 1995).

synchronisation is lost if the tempo of a dialogue is altered, but the default tempo can be reset by double clicking the pointer.

The default dialogue option is highlighted when the Dialogues Library is first loaded. Forwarding or rewinding the Display Line or the Dialogues Line does not alter the words displayed in the Choice Boxes, that can be forwarded or rewound with the arrows at their right sides.

Mix & Match Toy Screens: Voices Library

The Voices Library offers at least one option of voice or intonation for each choice encountered in the Dialogues Library. Maintaining the representation of different voices by different fonts, the Voices Library adds the possibility of choosing amongst variations of mood, for example sad, angry, or happy. Different intonations are depicted in different colours (Colour Plate XIV).

As in the Dialogues Library, options that can be applied to at least one point without significant damage to lip synchronisation are contained inside dark lilac areas. The user is free to disregard synchrony and use any options at any point of the Voices Line.

Mix & Match Toy Screens: Settings Library

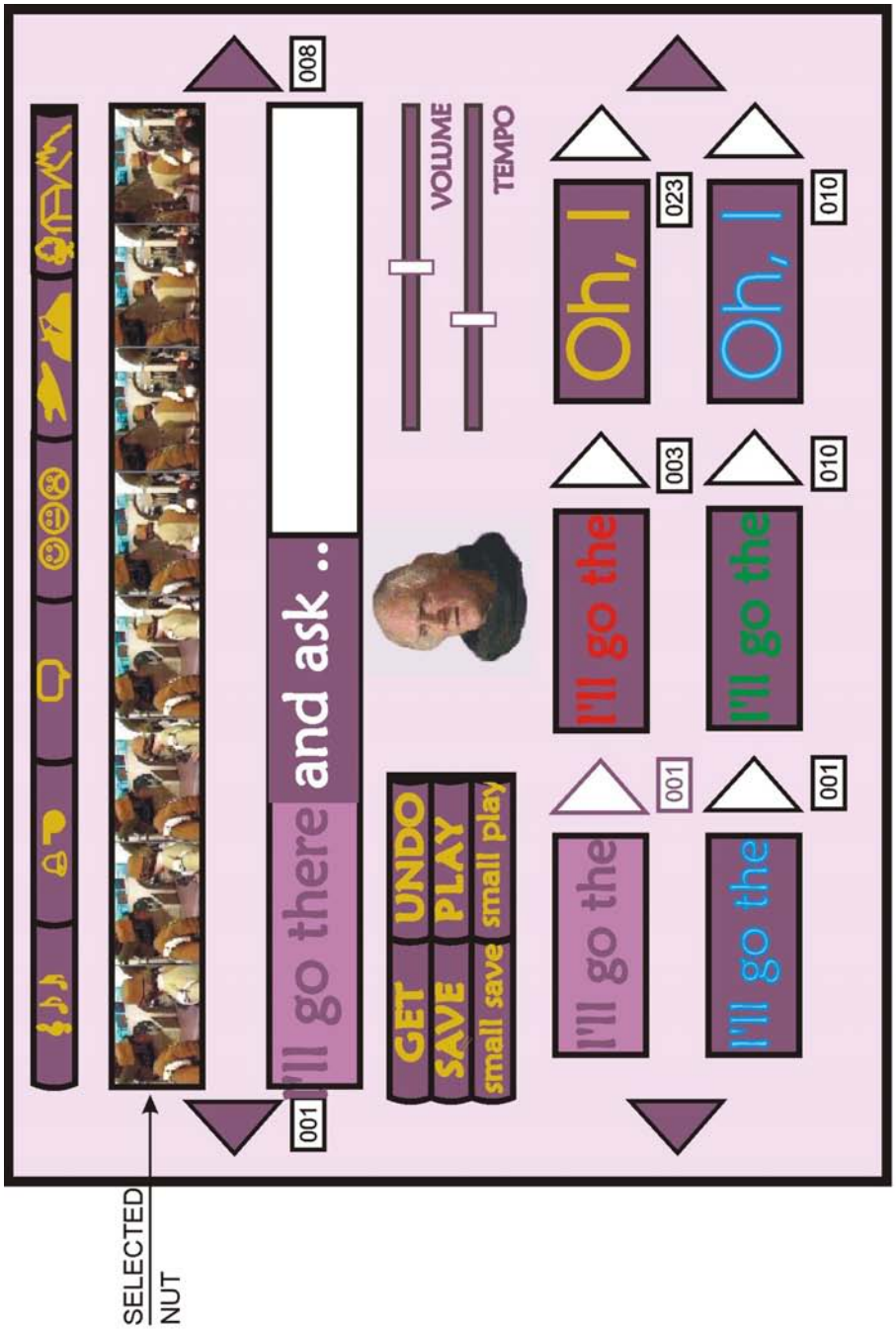
The Settings Library allows for variations of the scenery where actions take place. Underneath the Display Line, the Settings Library Screen (Colour Plate XV) contains another ‘frame–by–frame’ representation of the selected NUT. In this Settings Line only the characters of the video sequence are visible, displayed against white background.

The six Control Buttons in the central area remain unmodified. The slide options VOLUME and TEMPO have been substituted by controls for CONTRAST and BRIGHTNESS whose actions are self–explanatory.

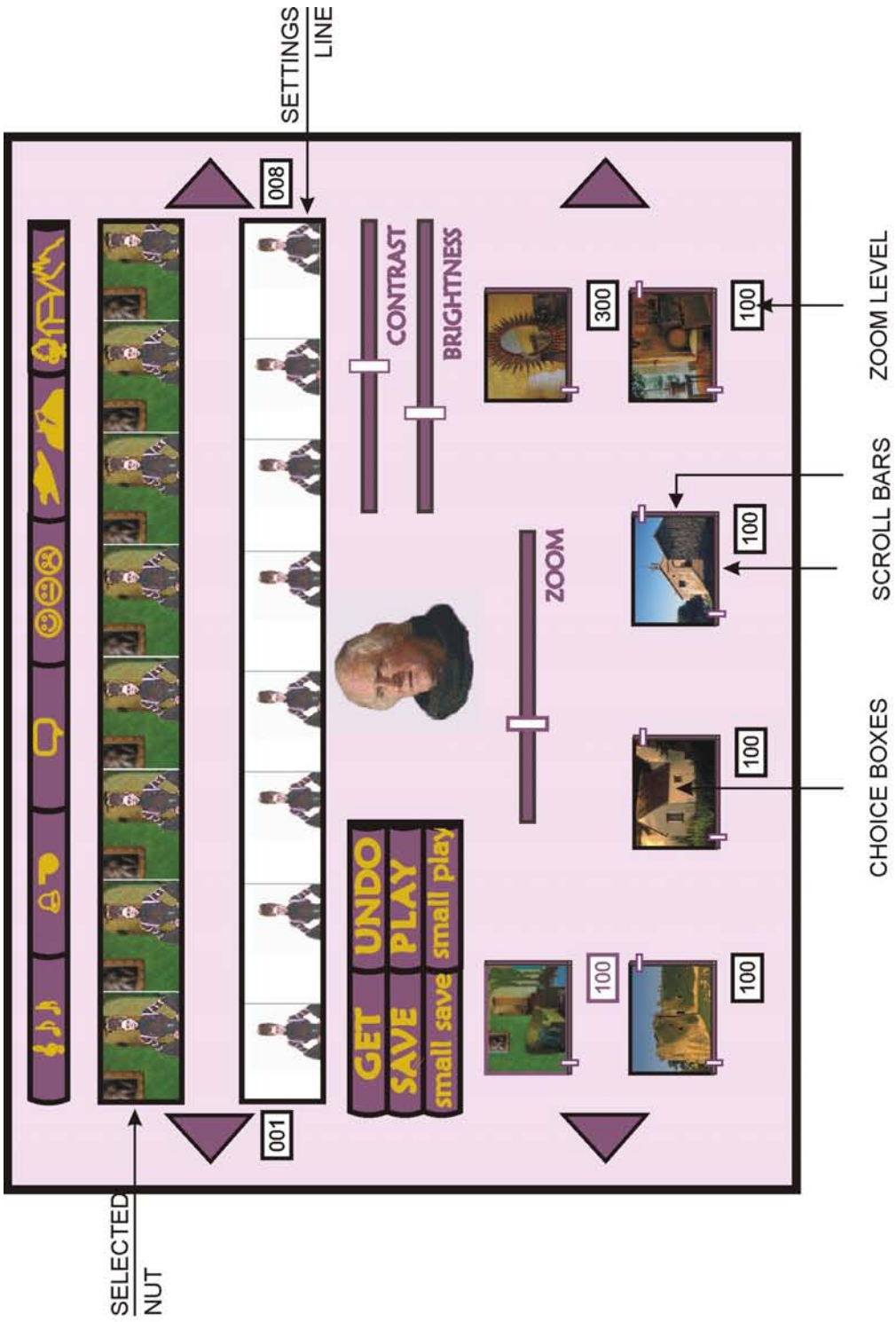
The options of background available are shown inside single frame Choice Boxes. Dragging from a Choice box to the Settings Line changes from the default to the selected background from the frame over which the selection was dropped. Settings in the Bottom Display Line can be replaced by further

choices positioned over the relevant frames, allowing for trial and error and alternating between scenarios.

After clicking on a background in order to select it and before dragging to the Settings Line, the user can enlarge the picture displayed with the help of the ZOOM slide control that appears at the centre of the Choice Boxes area. The current zoom level of each option is displayed under the correspondent Choice Box. The default zoom is 100%. Different areas of enlarged backgrounds can be displayed by scrolling the bars at the bottom and the right side of the Choice Box. Only the area visible inside the Choice Box will be incorporated to the Settings Line. The ZOOM tool allows the user to adjust the proximity of the background to camera movements as eventually required by variations of camera position.



Colour Plate XIV - Mix & Match Toy Screen: Voices Library (video sequence and help icon extracted from *Shakespeare on CD-ROM*, BBC Education, 1995).



Colour Plate XV - Mix & Match Toy Screen: Settings Library ('frame-by-frame' representation built from photographs from *The Sunday Times Style*, 26 October 1997, p. 20. Settings in Choice Boxes modified from *The Sunday Times Style*, 20 July 1997, p.19 and *World PhotoPack*, Aztech, n. d.).

Mix & Match Toy Screens: Actors Library

The Actors Library (Colour Plate XVI) is composed of digitised sequences in which actors and props have been recorded against a neutral background, allowing for superimposition against the various backgrounds available from the Settings Library. The Actors Library Screen also includes a second 'frame–by–frame' representation of the selected NUT that appears under the Display Line. In this Actors Line only the background associated with the selected narrative unit is displayed.

Control Buttons, CONTRAST and BRIGHTNESS operate as before.

The Choice Boxes show the first frames of the scenes in the Display Line, with actors and props standing against a white background and differing in appearance from one Choice Box to another. Variations can refer to the choice of clothes, make up, actors, colour or shape of props, props themselves, etc. Partially altering the NUT is possible by locating the selection in a frame other than the first one available in any Choice Box. The appearance of the scene elements will be changed from the selected frame onwards. It is not possible to alter the order of the frames that compose the NUT in the Mix & Match Level.

All new NUTs created by combining elements from the paradigmatic Libraries in level Mix & Match can be saved to disc and become accessible in levels Building Blocks, Mix & Match, Nuts & Bolts and All Yours.

6. Nuts & Bolts

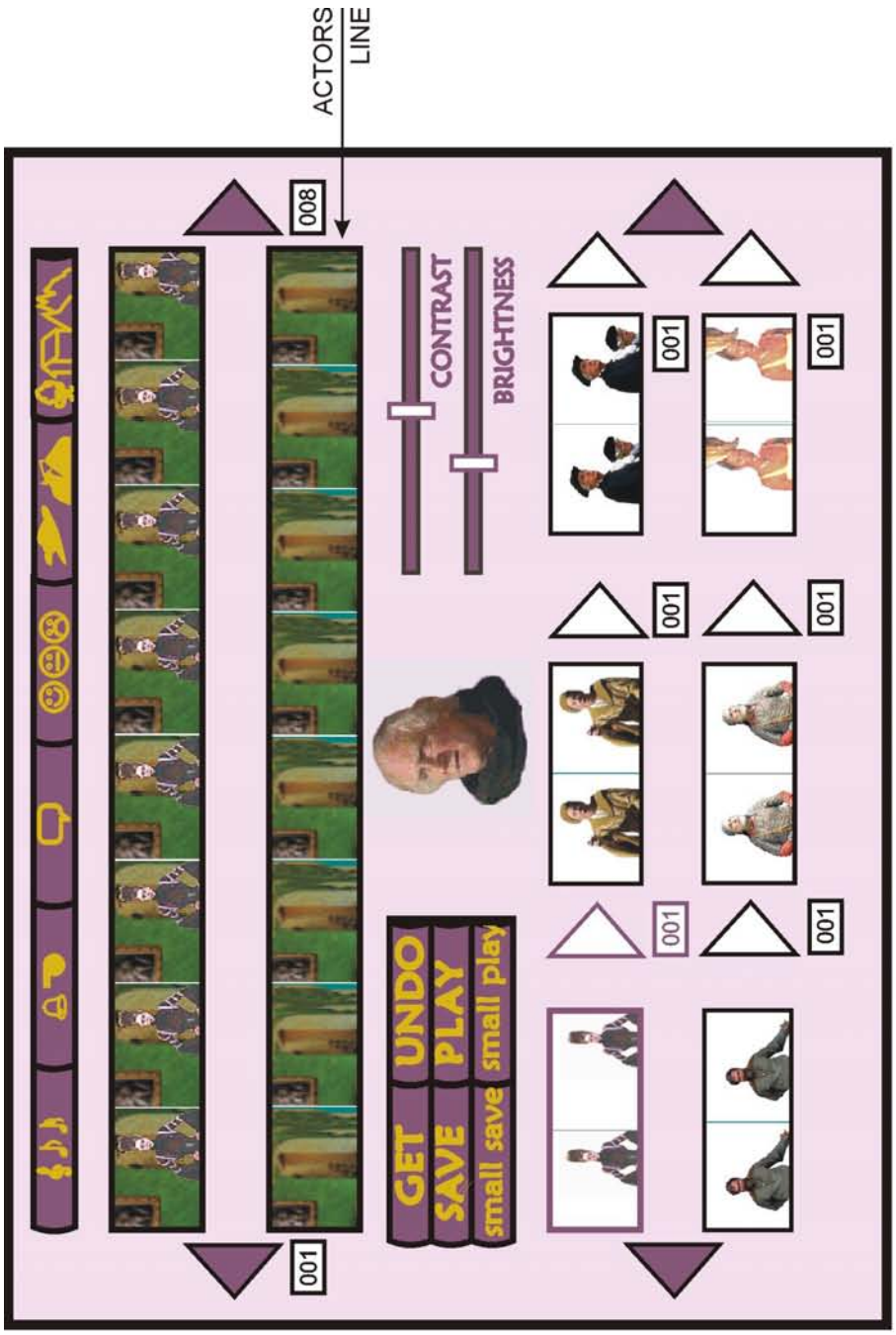
The Nuts & Bolts Level introduces the syntagmatic operations. As the other levels, it begins with the Select Story Screen if different versions are

identified by the system to exist. The background of this introductory screen is light blue, the title of the default story of the volume of the Semiotic Toy is displayed in the same font and colour as in other references to it throughout the package, and the titles of other available stories are displayed in the fonts and colours randomly selected by the system. The explanatory video sequence of the character–presenter for the Nuts & Bolts Level will not be displayed if any input is given before it starts, and can be interrupted at any point by clicking on the picture.

The selected version of the story will be shown inside the TV Set frame, that includes a portrait of the character–presenter for Nuts & Bolts as a help button (Colour Plate XVII). Clicking on this button interrupts the video and leads to a help file. Clicking and dragging from the help button to the screen interrupts the story and sends the user to the Toy Screen of The Nuts & Bolts Level.

Nuts & Bolts Toy Screen

All NUTs that compose the selected story are arranged in sequence and displayed 'frame–by–frame' in the Display Line. A second line for representation of the narrative units 'frame–by–frame' appears under the Display Line, as in the Settings and Actors Library Screens of Level Mix & Match (Colour Plate XVIII). Clicking on any NUT in either the top or bottom Display Line outlines all of the frames that compose that narrative unit. NUTs can be moved vertically from one to another Display Line, and horizontally along a single line creating blank spaces that will be represented in white. Between the two Display Lines is a darker Transition Effects Area. If the



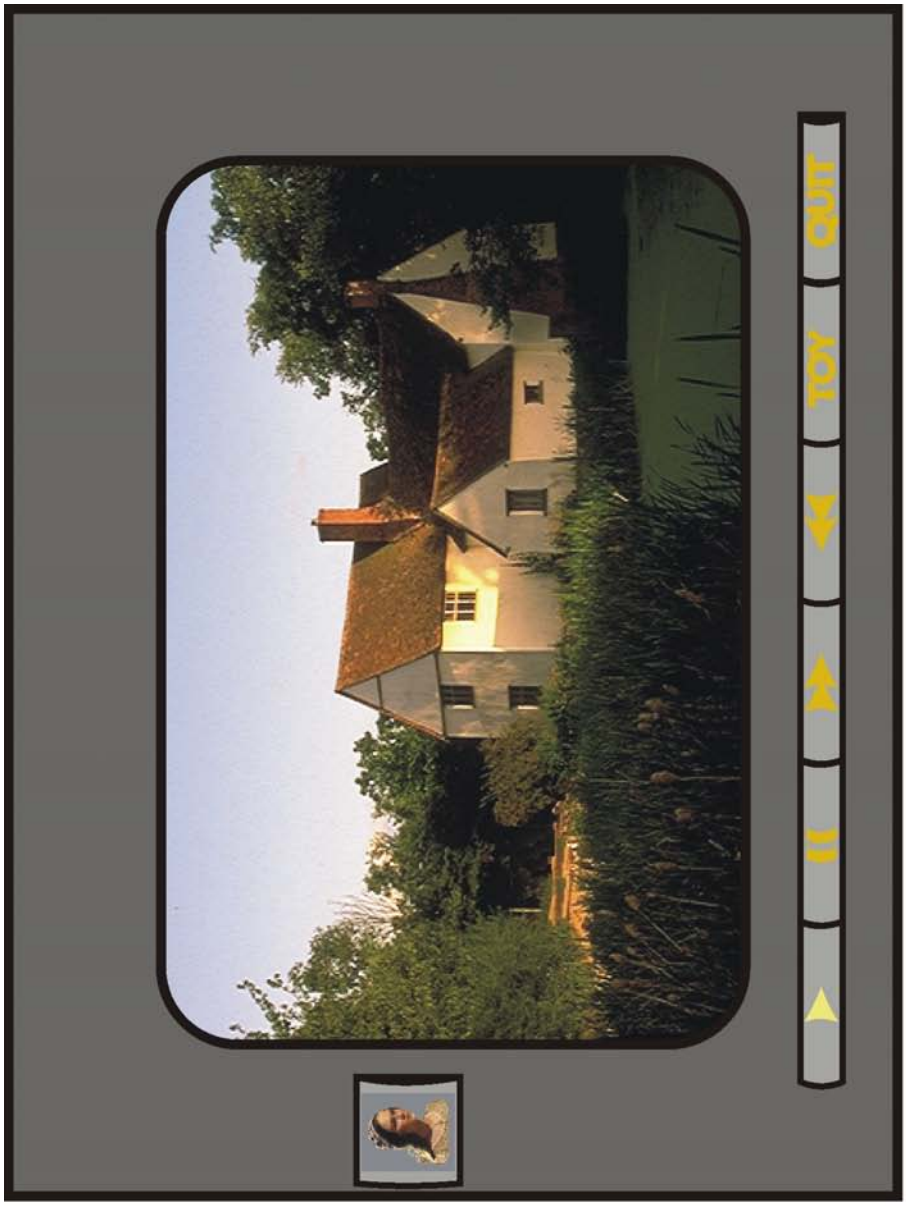
Colour Plate XV - Mix & Match Toy Screen: Actors Library ('frame-by-frame' representation built from photographs obtained from *The Sunday Times Style,* 26 October 1997, p. 20. Actors' options from *The Sunday Times Style,* 20 July 1997, p.19, *The Sunday Times Magazine* 11 May 1997, p. 37, *World PhotoPack,* Aztech, n. d., and *Shakespeare on CD-ROM,* BBC Education, 1995).

default story has been selected when the Nuts & Bolts Toy Screen is first accessed, the NUTs will be distributed in both Display Lines allowing for proper representation of the transitions in the darker area. Versions previously produced with the Nuts & Bolts Level also appear in both Display Lines and Transitions Area as required.

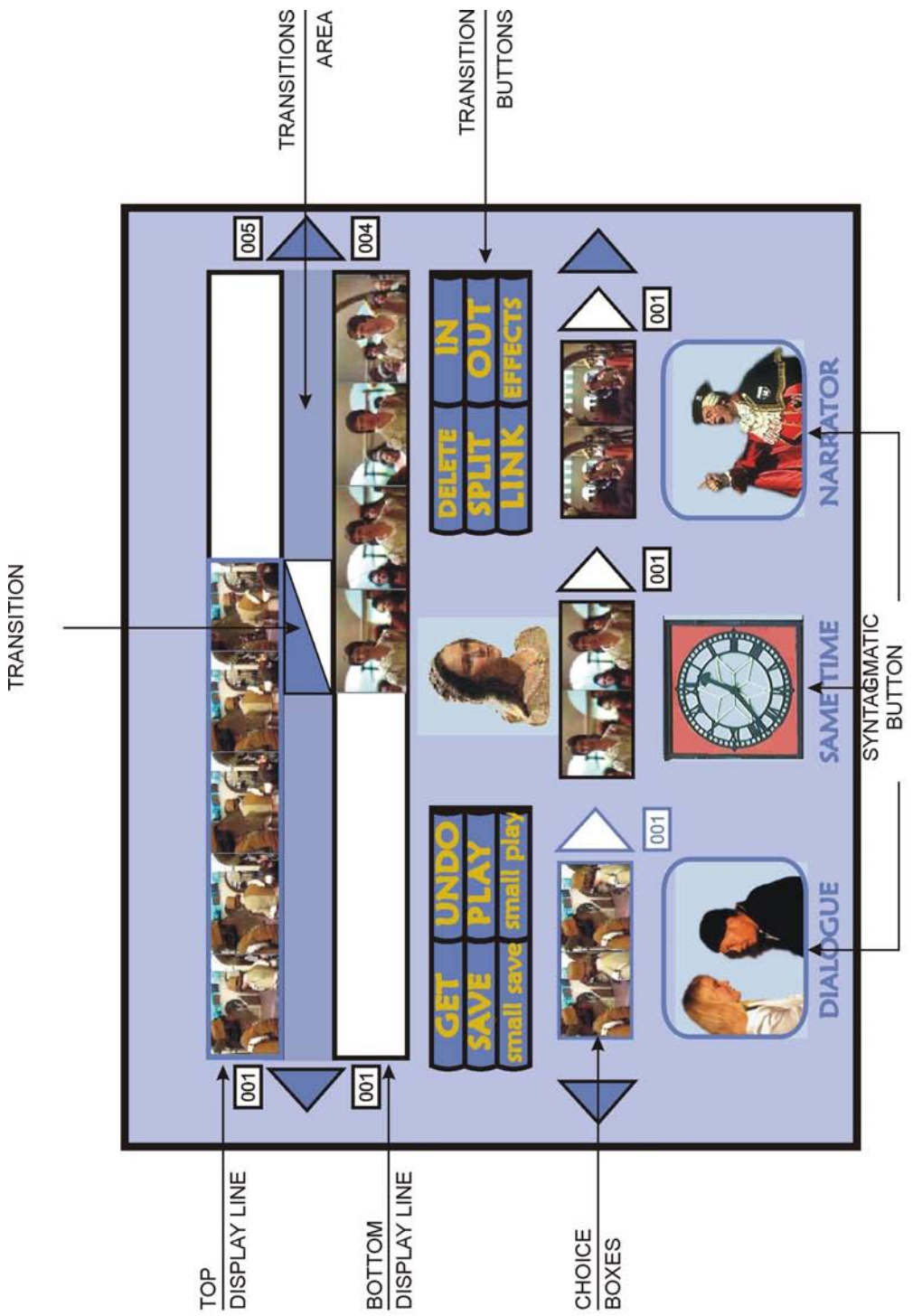
The Control Buttons present the same commands as in the Toy Screens of the former level: GET, UNDO, SAVE, PLAY, SMALL SAVE and SMALL PLAY. The centre of the screen is occupied by the help icon of the character–presenter for the Nuts & Bolts Level, as first determined in the Difficulty Levels Menu. At

the right side of the central area of the screen, six new buttons appear, offering transition choices. Transition Buttons offer the functions DELETE, SPLIT, LINK, IN, OUT and EFFECTS.

Clicking on the button SPLIT transforms the cursor into a pair of scissors. Placing the scissors on any point of a NUT and clicking divides the NUT in two parts at the indicated spot. Whole NUTs or parts obtained with the function SPLIT will be deleted from the story whenever the DELETE Transition Button is selected after the section is highlighted. LINK joins previously split sections into new NUTs.



Colour Plate XVII - Nuts & Bolts, Play Mode (help icon from *Shakespeare on CD-ROM,* BBC Education, 1995; on-screen image from *World PhotoPack,* Aztech, n. d.).



Colour Plate XVIII - Nuts & Bolts Toy Screen (Video sequences and help icon from *Shakespeare on CD-ROM*, BBC Education, 1995; pictures inside Syntagmatic Buttons from *World PhotoPack*, Aztech, n. d.).

IN and OUT transform the cursor into diagonal lines respectively ascending to right or left. Placing the diagonal line cursor on the Transitions Area and dragging horizontally adds a fade in or a fade out in the selected area. Fades operate according to the frames located on the Display Lines above and underneath the area where the Transition is positioned, fading in from the bottom line to the top one and out from the top line to the bottom one. Whenever the relevant area of one of the lines is not occupied, the system performs a fade to or from black. The two functions can be superimposed, generating a dissolve. EFFECTS calls a Transition Effects Pop Up (Colour Plate XIX) from which the user can select a type of wipe. The cursor transforms into a representation of the chosen wipe, that will be applied whenever the cursor is dragged on the Transitions Area as with functions IN and OUT.

Apart from occupying only the top half of the area dedicated to them in the Libraries Toy Screens, the Choice Boxes remain unchanged. All NUTs included in the original package and created with any level of the Semiotic Toy, even those that are not used in the selected version of the story, are available in the Choice Boxes of the NUTs & Bolts Level. Clicking and dragging to either Display Line adds the selected NUT to the story sequence. New narrative units are included in the nearest division between two previously saved NUTs. Divisions performed with the tool SPLIT are considered only if the parts have been saved with the SMALL SAVE function.

At the bottom of the Toy Screen of the Nuts & Bolts Level the Syntagmatic Information Buttons are located. They bring up information and suggestions

about some possible strategies to combine elements to generate different narratives. All explanations are given through video sequences with the help character for the Nuts & Bolts Level against the Nuts & Bolts Level Toy Screen. Descriptions by the help character are always generic, but are accompanied by visual demonstration of the operations on the screen[55].. These video sequences can be paused at any point by clicking anywhere on the screen, and restart when another input is given. Clicking on the Nuts & Bolts button on the right side of the Syntagmatic Screen sends the user back to the Nuts & Bolts Toy Screen.

Three examples of Syntagmatic Buttons are shown in Colour Plate XVIII. DIALOGUE, SAME TIME and NARRATOR. DIALOGUE describes various ways to assemble shots in order to compose dialogue scenes, especially how to create conversations between characters that do not appear talking to each other in any of the supplied NUTs. The help character suggests, for example, that the user selects a shot presenting the actors supposed to engage in conversation and uses it as an 'establishing shot', and then intercalates close–up shots of the characters as they speak or react with facial expressions. Carefully matching the background sceneries for each character involved is important, but other possibilities such as keeping the alternating close–ups against neutral background should be suggested as well. The help character can also introduce the question of how the internal logic of the story pre–disposes the

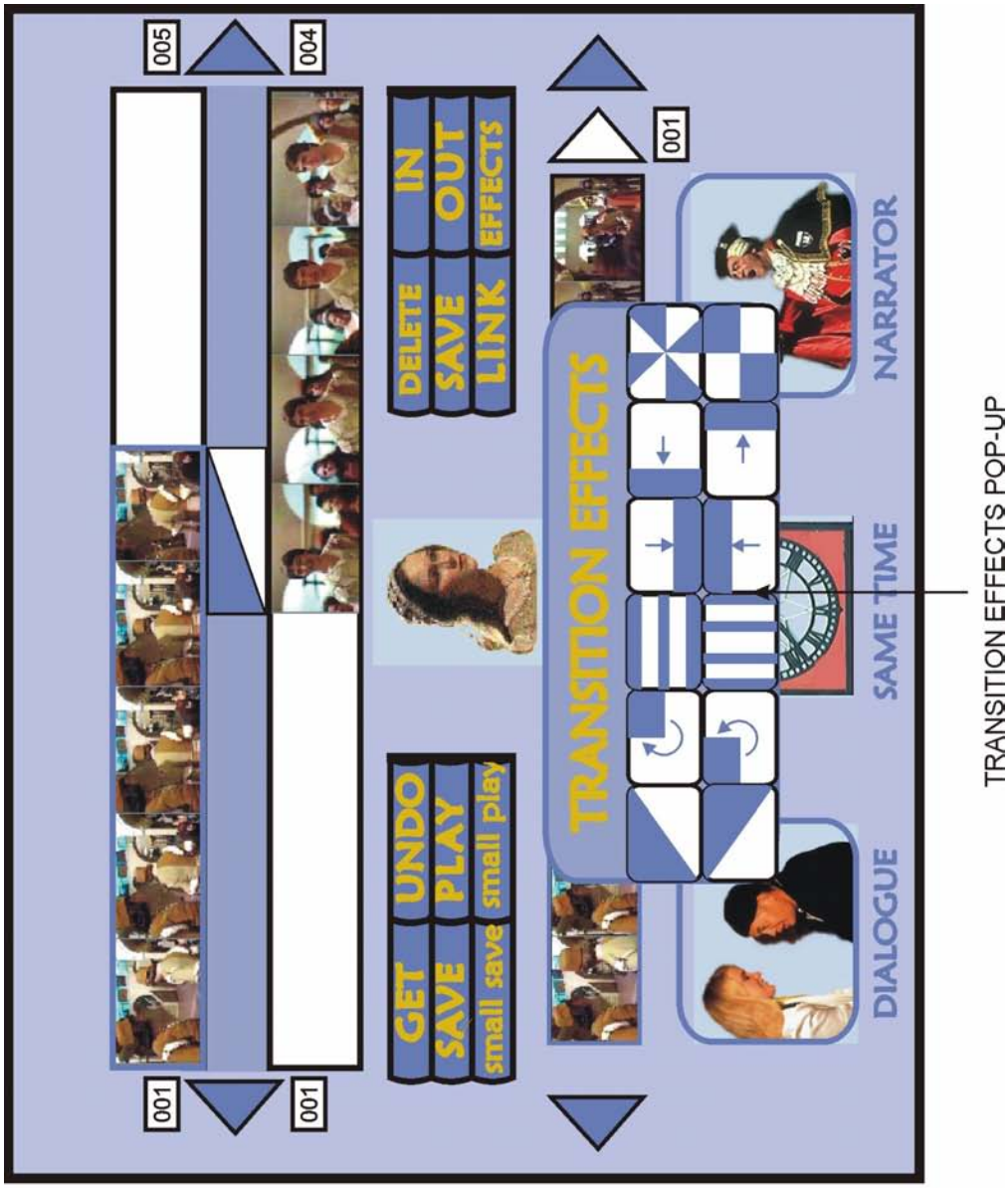
[55] For example, the help character says "See if you can find a scene in which the actor you want to show is speaking, and in which only the head is seen". The Choice Boxes on the Nuts & Bolts Toys Screen behind appear scrolling, until a NUT is selected and positioned in the Display Line. "Now split that to create a new NUT only with the head of that character speaking". The mouse pointer is shown selecting the splitting points. "And save it". The procedures to save the new Nut are shown, and so on.

viewer to accept certain constructions disregarding eventual audio–visual mismatches.

The second syntagmatic button in the example, SAME TIME, leads to an explanatory sequence showing how scenes can be arranged in order to represent simultaneous events taking place in different locations. The help character suggests not only the usual technique of alternating betweeen shots from each event, but also alternatives such as presenting the whole sequences one after another – adding extradiegetic elements such as clocks showing the same time for each event or titles directly specifying simultaneity ('meanwhile', 'at the same time').

The third Syntagmatic Button in the example, NARRATOR, calls a description of various possibilities related to the addition of one or more 'tellers' as a means of co–ordinating story events. Verbal narration can be a viable strategy for dealing with especially problematic actions or circumstances: for example scenes that are essential for the development of the plot but cannot be assembled from the elements available in the Libraries[56]. Examples can relate to the use of a voice–over summary of events that took place before the story starts and which is heard while showing the introductory titles; systematically interrupting the narrative flow with explanatory voice–overs or titles, and more subtle variations such as representing the 'thoughts' of characters as a means of describing or explaining circumstances. It is important to call the

[56] The previously suggested use of titles stating simultaneity can be seen as a manifestation of an extra–diegetic narrator.



Colour Plate XIX - Wipes Pop-Up (Video sequences and help icon from *Shakespeare on CD-ROM*, BBC Education, 1995; pictures inside Syntagmatic Buttons from *World PhotoPack*, Aztech, n. d.).

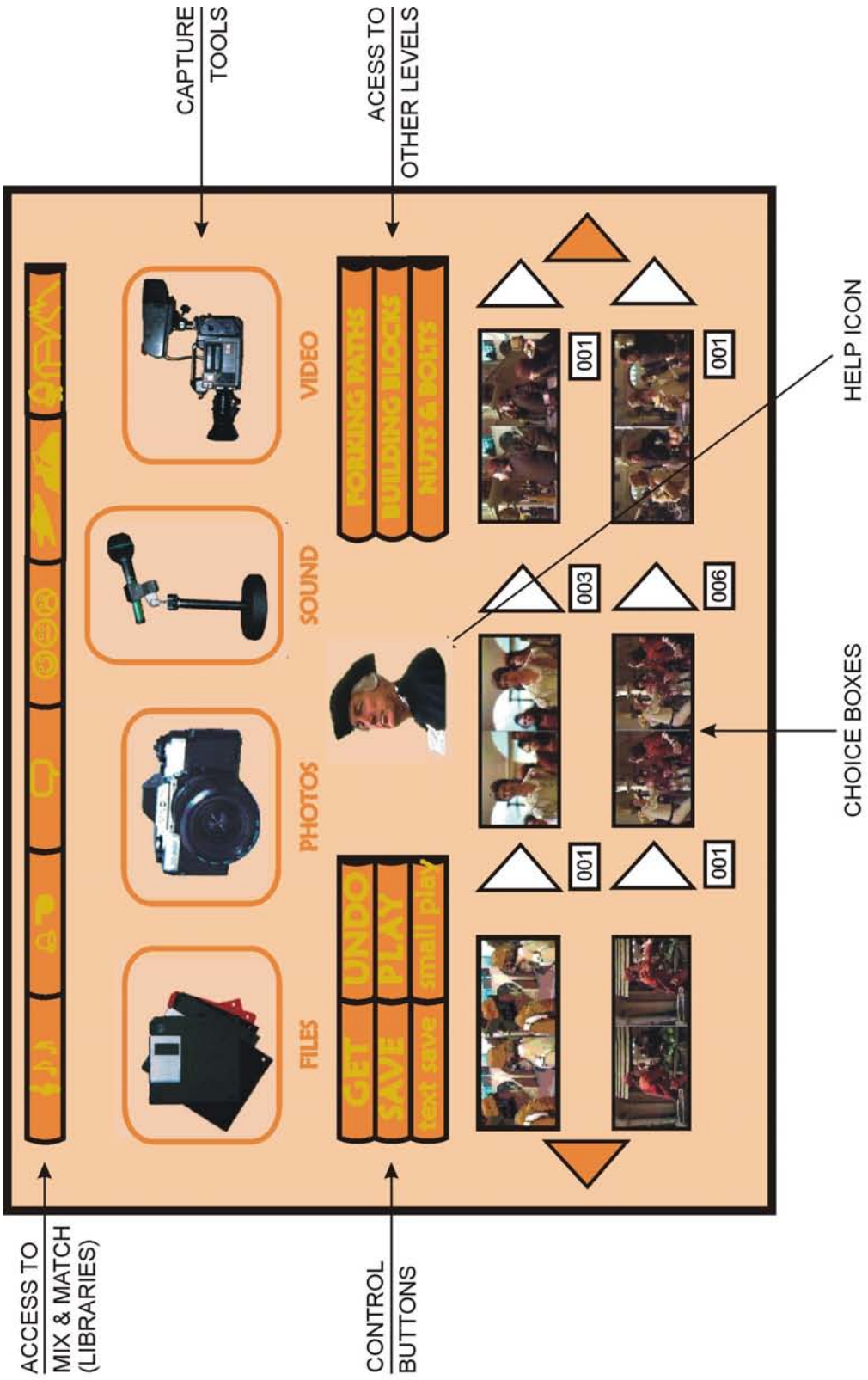
users' attention to the intrusiveness inherent not only in overt narration, but more generally in the excessive use of verbal descriptions instead of visual representation.

These explanatory video sequences need to be carefully conceived to guarantee that they promote experimentation instead of imposing solutions. Furtehrmore, they should give incentive for users to try and develop their own approaches not only for dealing with the specific situations discussed in the Syntagmatic Buttons available in each volume of the Semiotic Toy, but with narrative strategies in general. It is also appropriate to suggest that users attempt to notice how various narrative circumnstances are usually dealt with by media in general.

7. All Yours

The All Yours Level invites users to create new NUTs by incorporating their own video and sound files in the Semiotic Toy directories. Convertions which may be eventually required are automatically performed by the system. NUTs can be created by recording sound with a microphone and images with a digital video camera or video capture card whenever these input devices are available as part of the users' equipment, or with other software.

All existing NUTs are available in the Choice Boxes of the All Yours Level Toy Screen (Colour Plate XX). New NUTs are added after the pre–existing ones, and become available in all levels immediately after saving.



Colour Plate XX - All Yours Level (video sequences obtained from *Shakespeare on CD-ROM*, BBC Education, 1995; help icon from *World PhotoPack*, Aztech, n. d.).

Control Buttons SMALL SAVE and DELETE operate for any file and refer to a directory created by the Semiotic Toy in the user's hard disc. LINK gives the options for linking video and sound files into a single NUT, while BREAK allows the users to break NUTs composed of images and sound into two independent files. SMALL PLAY scrolls a selected NUT inside the Choice Box. At the left side of the central area of the All Yours Toy Screen, three buttons give direct access to the Toy Screens of Forking Paths, Building Blocks, and Nuts & Bolts. Access to the Mix & Match Toy Screens is guaranteed by the Library Buttons.

Discussion

Each volume of the Semiotic Toy Series is centred around a different default story, includes different NUTs, and introduces new Syntagmatic Buttons. NUTs and Library elements from any volume of the Semiotic Toy Series can be combined amongst themselves. This does not justify, however, the adoption of a single thematic or aesthetic approach to stories presented in different volumes. On the contrary, variations are interesting for the general purpose of the Toy.

All default stories, and more generally all provided NUTs, ought to be carefully scripted in order to maximise the possibilities of each volume of the Semiotic Toy, and of the Series as a whole. Adequate scripting will allow not only for more flexibility to re–arrange the NUTs in the Building Blocks Level,

but also for a wider range of possibilities for the Mix & Match and Nuts & Bolts Levels. The Building Blocks Level specifically requires that the NUTs are either composed of a fully closed course of action, or that their last scenes facilitate different modes of continuity. The last case can be exemplified by a NUT that finishes with a character looking at the camera in surprise, thus openning up the possibility for another scene to be used as counter–shot. Amongst the various strategies for increasing the combinatory possibilities in the Mix & Match and Nuts & Bolts Levels are, for example: selection of plots in which two or more characters have a similar appearance; allowing for interchanging between long shots due to the inherent loss of detail; and the provision of a wide range of individual medium close–ups and big close–ups showing different facial expressions for each character.

The restrictions inherent in the branching structure of the Forking Paths Level, in which the story varies according to pre–established possibilities, can be minimised by different paths converging as the story develops.

It is important to remember that a volume of the Semiotic Toy Series does not have to be composed solely by the NUTs necessary for the versions of the default story offered by the Forking Paths Level. Nor do all Paradigmatic Libraries have to be available for every NUT.

The need to record each optional sequence separately makes the Actors Library a demanding feature of the Semiotic Toy both in terms of production costs and of storage. It is important to notice, however, that the Paradigmatic Libraries are composed of choices relating to each of the diverse constitutive elements of the video sequences in isolation: music, sound effects, dialogues,

settings and actors. The various files to which each Library gives access are therefore smaller than a full video sequence lasting for the same length of time. As previously discussed in Chapter 3, sound files are relatively small, and therefore the most significant demand for memory is placed by the two visual Paradigmatic Libraries: Settings and Actors. Composed of still pictures to be repeatedly used against each video frame, the demands of the background options are relatively small if compared to that of video files. The ZOOM tool, however, may place a bigger requirement for memory as only certain types of compression retain full detail.

The need to record the actions against neutral background, to provide the functionality of both Settings and Actors Libraries, implies that higher compression rates can be achieved. Actors' options can therefore be predicted to demand significatively less memory than the branching paths of traditional interactive videos. A similar strategy has been commonly used by game manufacturers working with video sequences of actors superimposed on rendered scenarios: for example in *Under a Killing Moon* and *Phantasmagoria*, both games having been described in Chapter 4.

The possibilities of modifying parts of the original sequence with each Library and accumulating alterations from different Libraries makes the number of combinations possible much bigger with the Mix & Match Level than with the branching structures of 'interactive videos' with similar storage requirements. The possibility of splitting any NUTs into smaller independent narrative units in the Nuts & Bolts Level increases the combinatory potential of the Semiotic Toy even further.

In principle the All Yours Level totally eliminates creative restrictions by allowing the users to add their own files to the Semiotic Toy. Whenever the necessary hardware for digitising images and sound is not available, the All Yours Level can be used to access and incorporate previously digitised material. In practice, however, it has to be acknowledged that the freedom provided by the All Yours Level is limited by the difficulties inherent in the production of video and eventual copyright issues involved in the usage of material from other sources.

The various Save Options throughout the Toy, the All Yours Level, and particularly the possibility of combining NUTs from different volumes of the Semiotic Toy Series, introduce the necessity to copy files to the users' hard disc. It is not reasonable to propose that all files are copied to the system as the software is installed, as it would generate unrealistic storage requirements. A possible solution is to copy the default NUTs to the users' computer solely for the saved versions, or as demanded by the creation of stories composed of material from different discs.

These design specifications are considered to fulfil the desired roles of the Semiotic Toy; that is, to promote experimentation with both the paradigmatic and the syntagmatic conventions and possibilities of constructing narratives with sound and moving images. The Conclusion addresses the adequacy of the proposed features, commencing with a review of the origins of the features described in the theoretical parts of this study.

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Conclusion

The interdisciplinary nature of this work and its culmination in the description of the Semiotic Toy Series make it necessary to conclude by reviewing the findings of each section and relating them to the proposed design specifications.

The design guidelines of the Semiotic Toy emerged from the necessary verification of various assumptions intrinsic to the proposal of using the interactive power of digital media as an instrument for extending the observational skills and critical awareness of television viewers. The first premise to be examined was the existence of a need for improving the observation skills and critical awareness of the general television public. A review of several approaches to the question of television's influence on its public demonstrated the imperative of recognising the process of watching television as an active interchange between the desires and beliefs of viewers and the content and structure of the programmes. Acknowledging the active role of the viewer in the process of constructing meaning from media messages implies abandoning the traditional body of work concerning the hypothetical existence of direct and predictable effects of television on its public. By addressing the issue of critical awareness both qualitatively and quantitatively, this thesis surpasses the traditional opposition between 'active' and 'passive' viewer theories. It intends to draw attention to the patronising tone of efforts to regulate what contents should be broadcast and watched, and proposes an artefact for promoting further development and optimisation of the critical skills of the television public. Initiatives in the development of

'video literacy' have developed into authoritative lectures on television contents and economics, in which the active role and discerning capability of television viewers is often underestimated.

Both the ideological understandings of the public and the messages of the media in general are necessarily modified during their continuous course of interaction, and therefore all media, including television, are likely to influence the construction of the web of beliefs of the public. The various factors that make television particularly influential amongst other irradiative communication systems were organised by this thesis into four categories: the persuasiveness of the medium; its mode of integration into the daily reality of the viewer; the objectivity generally attributed to camera mediation and live transmission; and the reputed naturality of the syntactical organisation of television representations. The first three of these elements were discussed in the first Chapter, Watching television. The artificiality of the narrative conventions commonly adopted in television was the subject of Chapter 2.

The reputation of verisimilitude and the impression of immediacy usually associated with television mediation were shown to combine with the circumstances in which people usually watch television, making the medium especially prone to critically unaware consumption. Analysed in the light of Christian Metz's reflections on the 'suspension of disbelief' and the 'filmic state' in regard to cinema, the circumstances of television reception were revealed to propitiate a peculiar condition herein called a 'television state'. This arises from the diffusion of diegetic information through the viewers' 'real' daily experience as established by the television viewing situation, and

it is amplified by the unifying interchange of different levels of fiction and realism that compose the television flow. The result is a convergence of fiction and real life that give rise to a peculiar incorporation of the contents presented by television into the life of its viewers. This television state is only possible, however, if viewers disregard the intrusive narrative strategies used in the construction of television's diegetic universe. Far from being naturalistic, television representations are articulated through a set of conventions that bear, at best, only a tenuous resemblance to everyday experience of temporal and spatial relations in the 'real world'. It is through habit and familiarity rather than accurate correspondence to real life experience that the temporal, causal and spatial relations according to which television narratives are organised are understood as subtle and transparent. The Semiotic Toy is intended to interfere in the set of circumstances that favour acritical consumption of television by objectifying the artificiality of those narrative strategies. In order to avoid the recurring authoritative tendency of many previous efforts to promote a better use of television, it is essential that the Semiotic Toy does not impose conclusions but rather promotes experimentation with syntagmatic and paradigmatic variations of the narrative strategies commonly adopted in television. To this end, it should provide some method for choosing and altering both independent images and pre–assembled sequences of images, and give support to exploration of the different ways in which elements can be combined in order to create narratives.

In order to identify some narrative devices commonly used in television and indicate some possibilities for their incorporation to the design of the Semiotic Toy, this thesis proceeded to a historical review and discussion of the development of the syntax of the moving image. Examples referred to the early years of cinema, a medium from which television inherited many of its narrative conventions. More specifically within the realm of television, and targeting one of the major roles of the medium, the work proceeded with a discussion of representation strategies adopted by television news programmes. Many features later incorporated to the Semiotic Toy were derived from these observations, mainly the issues approached by the Syntagmatic Buttons of the Nuts & Bolts Level. The impossibility of incorporating all relevant syntagmatic structures in a single artefact was the first indicator that the Semiotic Toy should be developed as a series of collectable volumes, each one developing different narrative devices.

Having defined these general specifications of the Semiotic Toy, it was essential to verify whether such an artefact already existed and, if not, to investigate its technical feasibility. With this intent a review was undertaken of the origins and state–of–the–art of various technologies aggregated under the labels ‘digital media’ and ‘interactive media’. Special attention was given to the identification of existing artefacts within that paradigm that could potentially perform the roles proposed for the Semiotic Toy.

Three main lines of technological development seem to support the viability of the proposal of an interactive artefact incorporating the use of video compression algorithms, digital storage devices and digital networking. These

defined the digital format of the Semiotic Toy. Amongst the various storage units presently available, CD–As and CD–ROMs are undoubtedly the most widely incorporated by the consumer market. CD–ROM platforms are versatile enough to support the design specifications of the Semiotic Toy. If the recent advent of the DVDs threatens the prevalence of CD–ROMs as the ultimate discrete interactive media vehicle, DVDs only affect a Semiotic Toy designed for CD–ROMs by adding storage capacity.

So far, it has been argued that the application of digital networking to television and other media seems to be based on a few formulae, such as on–demand provision of tailored programming, shopping channels, on–line participation in television quiz shows, and the opportunity to choose amongst previously defined sets of outcomes for fictional programmes in the so–called 'interactive video' model. The latter can at first be understood as an empowerment of the 'passive' television viewer, to whom it confers a certain degree of scripting and editing decision power beyond the minimal levels provided by the possibilities of switching the set off and changing channels inherent in analogue broadcast reception. In order to stress the limitations inherent in branching narrative structures, it was considered necessary to incorporate some form of 'interactive video'[57] in the Semiotic Toy.

The majority of interactive artefacts do not necessarily make use of video sequences, for example electronic reference books, education and edutainment software, and do not share the principles that guide the design of the Semiotic Toy. One exception is interactive literature, mostly those works based on

[57] The concept and limitations of 'interactive videos' have been discussed in Chapter 3, pp. – .

hyperlinkage of chunks of text. These attempt to explore the power of interactivity by redefining the roles of author and reader, leading to interesting experimentation with non–Aristotelian modes of plot development. As a result, however, they tend to assume formats that restrict their consumption to a rather specific public. One of the works analysed, *Clara: the cybernovel*, triggered considerations about the possibilities inherent in on–line versions of the Semiotic Toy, for example with several authors contributing to create a video narrative.

Amongst the various types of interactive media already available for home users, computer games are the ones with greatest penetration in the consumer market. The games industry is also the most receptive to innovations, and digitised video sequences have already been included in several computer games. These verifications reinforced the choice of designing the Semiotic Toy as an entertainment artefact, originally due to the fact that most narratives with moving images are accepted by viewers as entertainment, which makes it rather appropriate to propose that experimenting with and learning about those same narratives should be equally a playful activity. A discussion of the implications of adopting the paradigm of playfulness revealed the existence of a commitment to efficiency in adult Western life. As a consequence, children were considered more likely to engage in the kind of playful experimentation desired for users of the Semiotic Toy, leading to the conception of that artefact primarily targeting the juvenile public.

The investigation of whether an artefact that could perform the roles desired for the Semiotic Toy already existed amongst the vast array of existing 'computer games', demanded the imposition of some operational organisation to that vast collection of different semiotic structures. Existing classifications of computer games were considered either incomplete or inappropriately informal, and a structured classification of computer games was proposed. The first level of that classification sub–divided entertainment artefacts into three major categories: games, puzzles and toys. The majority of digital entertainment artefacts presently available for the consumer market are specifically designed as either games or puzzles. They usually have goals (and consequently concepts of winning and losing), limiting rules or a very restricted set of possible ways to be played with. It was unlikely that the features desired for the Semiotic Toy would have been realised by a game or puzzle, but the analysis of those artefacts revealed important features that came to be incorporated into the Semiotic Toy.

Computer games were organised into three main groups according to their main aptitude requirements: fast physical reaction, strategical planning or a combination of both (Hybrid Games). Physical Reaction Games easily develop towards aggressive models, and tend to include little, if anything, in terms of plot. The physical reaction model was therefore considered inappropriate for the Semiotic Toy.

The structure of Strategical Planning Games was verified to develop either around a plot or making use of abstract logical thought. Amongst these games, the most relevant for the proposal of the Semiotic Toy are those that are Plot–Based. This category includes Text Adventures; Visual Electronic Role–Playing Games (RPGs) and Puzzle Adventures. Text Adventures and RPGs present the player with a first–person point–of–view of the game universe, and include, even if to a small degree, the creation of a story by play. The development of a video–based RPG is not impossible and could be rather fascinating, but the role–playing structure does not allow for experimentation with the syntagmatic and paradigmatic possibilities of constructing audio–visual narratives, as intended for the Semiotic Toy. The group of games herein called Puzzle Adventures includes most computer games advertised as 'interactive videos'. Video–based Puzzle Adventures are different from the artefacts herein as interactive videos as they do not directly offer alternatives for the development of the plot, but give the player a third–person perspective linked to a specific character whose pre–defined story is revealed as the user succeeds in finding hidden clues and solving puzzles. This format is also not adequate for the roles proposed for the Semiotic Toy.

The discussion of computer games under non–genre criteria revealed a range of possibilities for the Semiotic Toy. The main possibilities included: the adoption of a model for measuring degrees of interactivity; verification of both the adequacy of graduating the difficulty of play and the existing strategies to that end; and discussion of the possibilities for imposing interactivity constraints.

Various features of the Semiotic Toy originated from the analyses of the existing interactive entertainment artefacts herein called ‘computer toys’. These were differentiated from computer games by the absence of final goals and competitiveness, and explored further the narrative possibilities of interactive entertainment.

Several computer toys developed from the so–called ‘building blocks approach’, based on the provision of sets of elements that can be arranged in practically infinite permutations, giving rise to unique situations. Paint–systems are a particularly interesting extension of that concept, as they not only include galleries of pictures that can be combined amongst themselves, but also provide tools with which those pictures can be modified and new ones created. The model was considered totally adequate for the Semiotic Toy, and was fully adopted in the Paradigmatic Libraries and the All Yours Level.

A different concept of computer toys are the ‘electronic books’. These originate from the *Living Books* Series, in which the reader is presented with an electronic version of an illustrated book. Clicking on specific parts of the illustrations reveals animated sequences. The model was developed towards the incorporation of some ‘building blocks’ features by Sierra in the *Playtoons*, which provide libraries of elements and basic tools with which to create animated stories. The development of the Semiotic Toy as a collection of independent, but interconnecting, volumes, each one based on a different story, was inspired by the *Playtoons* Series.

A third group of computer toys consists of artefacts directly dedicated to the creation of narratives. These are mainly based on models inherited from word–processors, paint–systems, modelling or desktop video suites. Storytelling construction toys based on the word–processor model cannot perform the roles desired for the Semiotic Toy as their narrative possibilities concentrate on the production of written text. Visual and audio–visual storytelling toys, in their turn, remarkably do not provide information about the usual strategies for dealing with basic narrative situations. Furthermore, the extent to which the visual storytelling artefacts analysed privilege either movement of elements or visual effects over plot development makes it difficult even for highly motivated and experienced users to construct narratives with them without resorting to the addition of significant amounts of written text. Whilst the titling tools included in the Semiotic Toy add interest, it is essential not to prioritise narrative devices based on written information over more visual approaches.

Apart from *Director's Lab*, all of the audio–visual artefacts analysed are based on cartoon–like animations, and therefore can not address questions related to the apparent realism of the images enunciated with cameras. Besides the incorporation of video, other interesting features of *Director's Lab* include its organisation in dedicated rooms and the horizontal timelines across which the various elements that compose a video clip are arranged. The Semiotic Toy contains more elaborate versions of both those features.

The concept of various 'rooms' of *Director's Lab* was translated to the Paradigmatic Libraries of the Semiotic Toy. These are organised according to

the roles of each medium in the composition of a video sequence, while Director's Lab concentrates on technical aspects of video production.

The parallel horizontal timelines, that are characteristic of desktop video systems in general, have been distributed across various screens in the Semiotic Toy, taking advantage of the multi–dimensional possibilities inherent in the design of digital communication interfaces. The specific role of the elements of each Paradigmatic Library in the construction of the final video is emphasised by the comparison between a complete version of the video sequence in question and the parallel depiction of the library elements on another timeline.

The fact that all storytelling entertainment artefacts analysed were targeted at children seems to indicate the commercial viability of a Semiotic Toy designed primarily for the juvenile market. Aiming the Series at young users made it necessary to investigate the existence of variations in the way in which storytelling in general, and more specifically the telling of stories with moving images and sounds, is approached throughout childhood. The bibliography in this field indicated that the Semiotic Toy should allow for constructing stories that do not necessarily follow from a clearly defined beginning to the end. A whole level of the Semiotic Toy, Building Blocks, was dedicated to experimentation with different arrangements of the narrative units. It is interesting to notice the parallel between the childhood construction of non–Aristotelian stories and narrations obtained with artefacts belonging to the previously discussed realm of interactive literature, notably hypertexts conceived as works of art.

Submitting the proposed artefact to Brenda Laurel's criteria for measuring degrees of interactivity confirmed the desired correspondence between the various levels of difficulty and increasing freedom of use of the Semiotic Toy.

	Play It Again	Forking Paths	Building Blocks	Mix & Match	Nuts & Bolts	All Yours
Frequency	Nil	Small to Medium	High	Continuous	Continuous	Continuous
Significance	Nil	Medium to High	Medium to High	High	High to Total	Total
Range	Nil	Small to Medium	High	Very High	Very High	Total

Table I – Degree of interactivity of the various levels of difficulty of the Semiotic Toy, according to the variables proposed by Laurel (1986 and 1993) and previously applied to existing entertainment artefacts.

Apart from the basic 'reactive' functions of the TV Set Buttons, the Play It Again Level offers no possibility of interacting with the default story.

In the Forking Paths Level, as in artefacts based on the interactive video model in general, frequency of input is relatively small, depending on the availability of a choice node, and the range of interactivity is a function of the number of options available for each node. Significance is directly dependent upon the scripting of the story and is reduced if the paths converge.

The Toy Screen of the Building Blocks Level allows for input at any time. The significance of the users' actions depends upon the scripting of the narrative units. NUTs composed by full courses of action or finishing in scenes that facilitate different continuities increase the significance of selections. The range of choices within the Building Blocks Level is equivalent to the possible combinations of the number of NUTs available, increasing as more volumes of the Series are available.

Input can be continuously possible in the Play Screen of the Mix & Match Level if at least one Paradigmatic Library is available for each narrative unit. Frequency of interaction is continuous in the Toy Screen of this Level. The significance of input in the Toy Screen of Mix & Match is constrained by the impact of combinations of the elements available from the Libraries on the contents of each video sequence. It can be amplified by properly scripting both NUTs and Library elements. The range of choices for each NUT is equivalent to the number of Library elements available.

In the Nuts & Bolts Level, input is always possible as any NUT can be altered at any given moment. The significance of users' actions can be optimised by properly selecting the subjects and constructing the explanations available from the Syntagmatic Buttons. The Nuts & Bolts Level offers a very high range of options for interaction, as existing and created NUTs can be combined in any way.

The All Yours Level gives the user total freedom for interactivity by allowing the addition of information from various different digital and analogue sources. It also gives direct access to all Toy Screens and to the Forking Paths Level. It is important to consider the All Yours Level as part of the Semiotic Toy rather than an independent video and sound capture software and file converter. It aims at allowing users to add new pieces of information they particularly desire to combine with other elements of the Semiotic Toy.

The version of the Semiotic Toy described above far from exhausts the potential of the concept. The model allows for upgrading to versions that add new features, including those derived from technological developments. One

straightforward possibility is to provide the user with facilities for setting preferences such as the availability of more than one level of 'undo', having the help displayed solely as written text, and the like.

Developing more tools specifically dedicated to further exploration of the possibilities of sound would also be relatively straightforward. Various artefacts dedicated to promote experimentation with digital sound are already available for the home market. *Cool!Edit* (Syntrillium, 1995) and *Music Machine* (Music Sales, 1996) are examples of sound editing softwares suitable for non–specialist users. Sound editing is also one of the best developed features of the previously discussed *Director's Lab*.

Whatever new features upgrading versions come to offer, it is necessary to keep in mind that the Semiotic Toy is not intended as a mere children's version of a desktop video system, and therefore it has not been designed aiming at the production of perfectly constructed stories in flawless finished videos. To assure the possibility of experimenting with narrative structures other than those most commonly accepted as 'correct', it is necessary that the Semiotic Toy does not impose the rejection of strategies usually considered unsuitable. To maintain the coherence of the Semiotic Toy Series, eventual developments ought to concentrate on providing users with pleasurable ways of investigating possible strategies for constructing meaning with sound and moving images. The avoidance of pre–defined concepts about the contents and structures usually adopted in television is a key concept in the design of the Semiotic Toy Series. To this end it harnesses the potential of digital

technology to tranform the aqcquisition of critical skills regarding television messages into an enjoyable and creative experience.

Appendix to Chapter 4 – Descriptions of Computer Games and Toys

Advent (Donald Woods, MIT, early 1970s)

In this text-based adventure, the player assumes the role of a traveller in a Tolkienesque setting. Navigation and interaction with the Adventure universe are made through commands such as 'go north', 'look building' and 'get sword'.

Each new location is described with texts like

> You are standing at the end of a road before a small building. Around you is a forest. A small stream flows out of the building and down a gully. There is a sword beneath a tree next to the stream.

Playing consists in fighting off enemies, overcoming obstacles, and discovering treasure (adapted from Reid, 1994, n. p.)

Aladdin (Virgin, 1994)

Run and jump Aladdin through the street-market, collecting apples and avoiding the big swords of his enemies. As with other games originated from Disney cartoons, the graphics are extremely beautiful and the sound agreeable.

Brett Hull Hockey 95 (Warner Interactive, 1995)

Fast game play and hard-hitting action. Certain rules of the original hockey can be turned on and off to make the game more accurate or easier to play. There is a play-by-play voice commentary (described from a demo version in *PC Gamer* 2(7), June 1995).

Civilisation (MicroProse, 1991)

Civilisation is a key factor in Sid Meyer's reputation as a game designer. The aim of this empire-building game is to take a colony of settlers from the bronze age through to the era of space exploration. Playing involves expanding the original empire, acquiring knowledge and technology and beating off or trading with rival civilisations.

Cover Girl Strip Poker (On-Line, n.d.)

Electronic card game that can be played by one to three persons at a time. Eight women are the available opponents, and will be disrobed or demand the human player to undress according to the evolution of the game. A video sequence of fifteen minutes is included (described from the promotional text provided in the software package).

Death Race (Exidy, 1976)

The objective of this Racing game originally designed for Arcades is to run over as many pedestrians as possible. Pedestrians keep trying to escape from the car, and each time one is hit a squeal can be heard and a grave appears on the spot. In the earlier version of the same game, *Pedestrians*, the figures looked more human and the squeal was clearly a human scream. (adapted from Dixon, 1992, p. 201)

Doom (id Software,1993)

Doom is an extremely popular game, having gained many awards. The user is given the subjective view of the character, with a strong feeling of first-personess, and navigates through a labyrinthic structure of menacing atmosphere, full of monsters and gore. The idea is to find the way out each

level avoiding traps, collecting equipment and bonuses and killing enemies before they kill the character.

Dungeon Master (Psygnosis, 1992)

The player assumes the role of Theron, an apprentice wizard whose master's dungeon was taken by an evil force, spreading chaos around the world. In order to restore peace and harmony, Theron searches for the Firestaff with which his master can re–enter the dungeon and recover his former powers.

Four characters are to be chosen from amongst twenty-four 'champions' imprisoned in magic mirrors inside the dungeon. Various objects, weapons, magic spells, food and water are to be found. Enemies appear to fight the champions, trying to prevent them from finding the Firestaff.

Eye of the Beholder (Strategic Simulations, 1990)

The background story is told before playing effectively starts. Basically, the Lords of Waterdeep want to save the land from an ancient evil of unknown nature. They ask the land's champions to present themselves. Four will be chosen to search from the evil force and destroy it. After the champions walk in the dungeon below the city, the entrance is closed by an avalanche.

Profile and appearance of the four main characters are selected from specific libraries. Inside the dungeon, the player leads the champions handling weapons and casting magic spells in order to overcome many enemies.

Fatal Racing (Gremlin Interactive, 1995)

Hazardous racing game in which circuits include ramps, jumps, loops, corkscrews and bridges. Multi–player option for up to 16 human opponents,

provide editing controls for replay the inevitable crashes (described from a demo version in *CD–ROM Today* 20, December, 1995).

Flight Unlimited (Virgin Interactive, 1994)

Flight Unlimited offers a choice of five different airplanes to be flown over a texture mapped scenery digitised from actual photographs. Flying instructions are available on a board at the Flying Club. The game follows realistic aerodinamics models. Landing and taking off are possible anywhere in the virtual world, not only in hot spots (adapted from *CD-ROM Today 12*, April 1995, pp. 14 and 40).

Frontier Elite II (GameTek, 1993)

In *Frontier Elite* II the player starts with a small spaceship and a little money. The idea is to progress from one of the 'small fry' of the universe to an 'elite' pilot whose reputation ensures lucrative work. This can be achieved by careful planning of journeys, good selection of items to buy and sell, the ability to defend your ship from attack by pirates, avoiding being caught performing anything illegal, and slow development of your ship's capability and capacity. The game is played in real time, but things can be speeded up when nothing is happening.

Indycar Racing II (Papyrus, 1995)

Realistic racing game, featuring fifteen options of Formula Indy circuits. Players can set how many opponents will be raced against, and their individual levels of skill. Charcteristics of the racing cars can also be set up by the player (adapted from *CD–ROM Today* 22, February 1996, p. 86).

Klotsky (ZH Computer, 1991)

The player is presented with a box containing a red shape and a collection of yellow shapes. The object is to place the red shape on a target outside the box in as few moves as possible. The box has an exit that can only be opened when the red shape has contacted it. The shapes are always constructed of square units so there are no curves to consider. It is the computer equivalent of the Chinese Cube puzzles.

Lemmings (Psygnosis, 1991)

Lemmings are small creatures who drop through a trapdoor and walk straight to death on the next dangerous point of the scenery. Play consists in choosing one from a series of available skills (floating, climbing, building bridges, etc.) to be performed by a specific Lemming, creating a way for the others to reach the exit.

The Lion King (Virgin, 1994)

The user plays Simba, learning how to survive and progressing from cub to full-grown lion. As in the original cartoon, the final shoot down is with Simba's evil uncle, Scar. Once more the fascinating graphics are the strongest point of this cartoon-adaptation.

Monopoly (Leisuresoft, 1996)

Electronic version of the well–known Board Game, with added on–line capabilities for the multi–player options.

Mortal Kombat (Akklaim, 1992)

Punching, kicking and jumping, the user is engaged in one-on-one fights to death. The enemy can be controlled by the system or by another player. Much of the success of the game comes from its quick and short cyclic structure.

Blood runs from the hurt ones, mainly if a fatal attack cuts the character in two at the waist or takes his head off.

MUDs (*Dungen*, Roy Trubshaw, 1978)

Adventure MUDs are multi–player versions of text–based adventures such as *Advent,* previously described in page 268. They are basically networked multi-user games which allow users to communicate with one another, to cooperate on adventures together, or to fight against each other.

Dungen, designed by Roy Trubshaw in 1978, is known as the first MUD *Dungen*'s players were encouraged to compete with each other for points. Killing monsters or other players was a source of points, but more were to be gained by finding treasure and bringing it back to a shifting point in the game universe. The more points collected, the more power a character could gain. Although this first MUD game never gained a high level of popularity, it nevertheless has had a great influence on those who were to develop later games (Reid, 1994, n. p.).

Adventure MUDs evolved towards a team mode, becoming more and more collaborative. Non-game MUDs stressing co-operation and interaction rather than competition and mastery appeared from this evolution. The first social MUD was *TinyMUD* (Jim Aspnes, 1989). There are presently several such virtual environments solely dedicated to social interaction in academic use, mainly in their object–oriented format MOO (standing for MUD, Object Oriented). The first academic MOO was *MediaMOO* (co-ordinated by Amy Bruckman, MIT, located at <telnet 18.85.2.46 8888> in 1996).

Pac Man (Atari, 1981)

Extremely successful on the console platforms, *Pac Man* consists in driving a round character, Mr. Pac Man, through a maze, collecting bonuses and running away from destructive enemies.

Phantasmagoria (Sierra On-Line, 1995)

The main character of *Phantasmagoria*, Adrienne, has just moved into an old New England mansion with her husband Don. Exploring the tridimensional rendered scenario of the house, she finds a spellbook hidden behind a wall. Once the book is opened, strange things start happening in the house. Adrienne's husband becomes unusually violent, supposedly under the influence of some supernatural force. The objective is to free Don from his possession.

The action spreads in seven chapters, each one on a different CD-ROM. Characters were digitised and then set in the rendered scenery. The game comes with a 'gore button' to allow the user to turn off and password protect bloodbath scenes.

***Player Manager* II** (Anco, 1995)

The player assumes the role of an athlete called to be player manager of a Second Division football team. His own playing skills are enough to get the team into Premier Division, but a good performance as a manager is essential to keep the classification and challenge for European Honours. Decisions have to be made about buying, selling and loan players, dealing with the press, designing tactics and training the team. (described from the promotional text provided in the software package).

Pong (Atari, 1972)

This simulation of table tennis presents the table in plan. As in the original game, the ball has to be sent to the other half of the table, bouncing once on each side. The adversary can be controlled by the system or by another player.

Populous *(Bullfrog, 1989)*

The player is cast in the role of a god. Under the player's protection is a selected tribe of inhabitants of a world, who are to be nurtured and their population increased. This is achieved by controlling the environment of their world favourably for them whilst simultaneously hindering other tribes. The player is also competing to overcome either random events or another god player favouring another tribe. One of the first God Games.

The Secret of Monkey Island (LucasArts, 1990)

The user plays Guy Threepwood, a youth whose life ambition is to become a pirate. The game takes place in the Island of Melee, where Guy's initial three quests will lead to a fight with ferocious Captain Le Chuck. Playing consists in meandering around the island in the search of clues, hints and instruments to overcome various puzzles. Conversations are held by selecting from sentences that appear on the menu according to the circumstances.

SimCity 2000 (Maxis, 1993)

The player plans the development of a city, and administrate it over a number of years. From a small village to a megalopolis, the challenge is to balance the budget maintaining the infrastructure without sacrifice to the quality of citizens' lives.

Primarily a constructive toy, *SimCity 2000* also includes opportunities to destroy with bulldozers, earthquakes, floods and even a (not very convincing) monster.

SimIsle (Maxis, 1995)

With the same strucutre of *Sim City*, Maxis developed artefacts emphasising other aspects of planning other than the financial constraints of urban planning. One of these alternatives is *SimIsle*. The challenge is to develop a tropical island without over–polluting. Rare animal breedings and natural beauty can attract tourists (thus generating income), but overall it is very important to take note of the threats to endangered species and ecological equilibrium (described from a demo version in *CD–ROM Today* 18, October, 1995).

Solitaire (Microsoft, 1985)

The system shuffles the cards for the user to organise in sequences from Ace to King, according to the suit. At the end of the game, a successful user is awarded with a cascade of cards.

Spacewar (Steve Russel, MIT, 1962)

Spacewar was developed as a visually impressive instrument to demonstrate the potential of interactive computing (Laurel, 1993, p. 1). Action is the key ingredient of this game, in which two spaceships fight in real time.

SuperTetris (Sphere, 1991)

Each level of the game starts with a number of already assembled lines of units laying on the bottom of the screen. The objective is to put the pieces (of various shapes) that fall from the top of the screen together, filling the existing gaps and avoiding the creation of others. Every successfully filled line disappears, and the user is given a bomb with which to explode badly located units of already fallen shapes. A level is completed when all its original lines are eliminated.

Under a Killing Moon (US Gold, 1994)

The main character is the American detective Tex Murphy. Despite Murphy's 50s–style, the game happens in 2045, in a world devastated by a nuclear

holocaust and inhabited by both, normal humans and mutants. The multiple tasks evolve from solving a burglary and finding a missing statuette to saving the Earth.

All characters are digitised from video sequences, and the scenarios are tridimensional computer models. Playing consists essentially in examining the scenes, collecting items and offering them to other characters. Conversation is structured by a method of multiple choice, not of the sentences themselves, but of the style of the approach (humorous, threatening, etc.). (adapted from *PC Zone* 19, October 1994, pp. 88-90)

Virtua Chess (Titus, 1995)

The board is shown in plan and as a rotatable tridimensional view. A menu provides relevant data, such as a list of performed moves. The user can select amongst several levels of difficulty, from basic to expert. The package also includes a database of historic moves and games.

Voyeur (Interplay, 1994)

Inspired by Alfred Hitchcock's classic *Rear Window*, Voyeur places the player as a peeping tom. Play consists in (virtually) recording the events taking place in Reed Hawke's house, until getting enough video evidence to convict him as a murderer or a potential murderer. Portrayed almost entirely by video sequences, *Voyeur* is more about watching various members of the Hawke family doing rude things to each other than solving a puzzle. Sequences of sex, corruption and drug abuse made the reputation of this Interactive video as a detective adventure for adults (adapted from *PC Review*, February 1995, p. 72).

Warcraft: Orcs& Humans (Interplay, 1994)

Warcraft is structured in 24 levels of difficulty, or campaigns. Before the start of each scenario in the campaign, a briefing of the tasks that must be completed is given. There is a choice between playing the Orcs or the Humans, but it does not change the actual play. Tasks vary between buildings and fortifications to be constructed and enemy forces to be fought, very often being a combination of both.

Most scenarios start with the very basic: a town hall, farms, a small amount of gold and some workers and soldiers. More workers can be trained in the town hall or soldiers in the barracks. Exploring the neighbourhood allows the player to find useful trees and gold mines, but can also lead to a fight with the enemy force. Other scenarios are pure search and rescue games with no opportunity for training more soldiers or building anything.

Careful co-ordination of management of resources, construction work, training, repulsion of attacks from enemies and attacking enemy cities; fast reaction and some luck are necessary to win.

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Appendix to Chapter 5 – Outline Procedural Chart of the Semiotic Toy

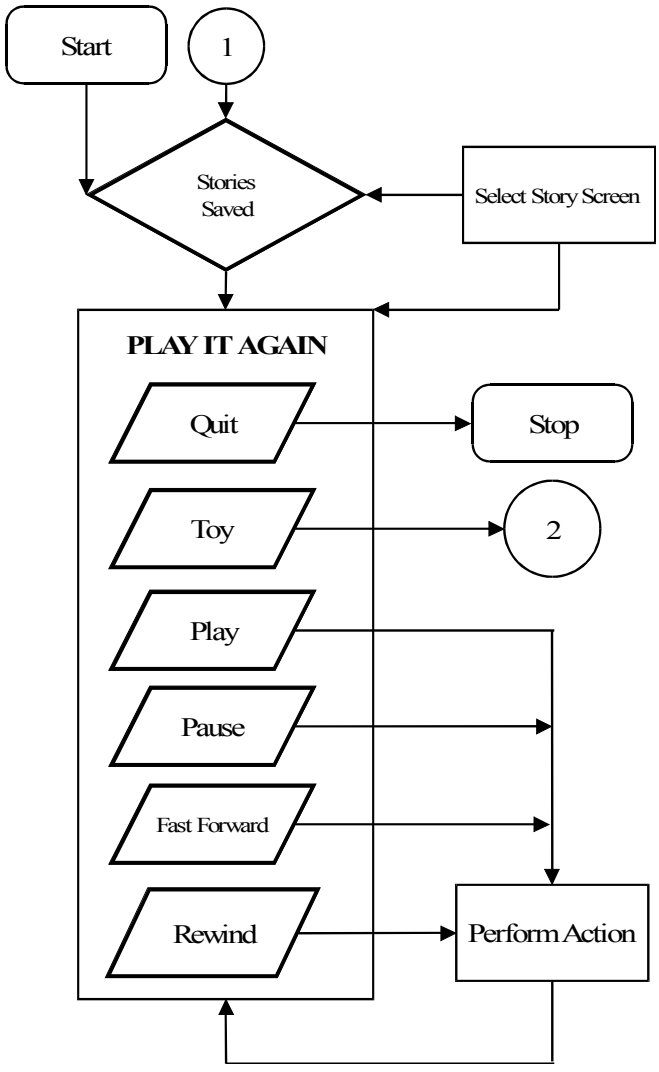

Chart 1 – Play It Again Level

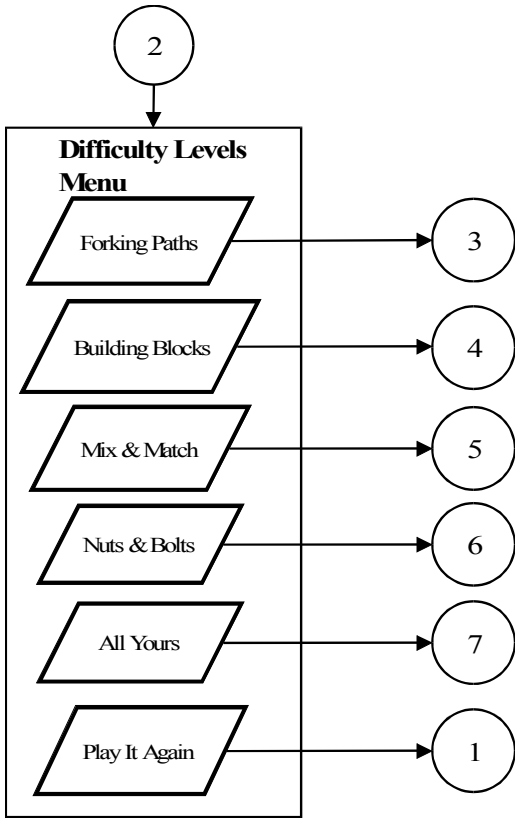

Chart 2 – Difficulty Levels Menu

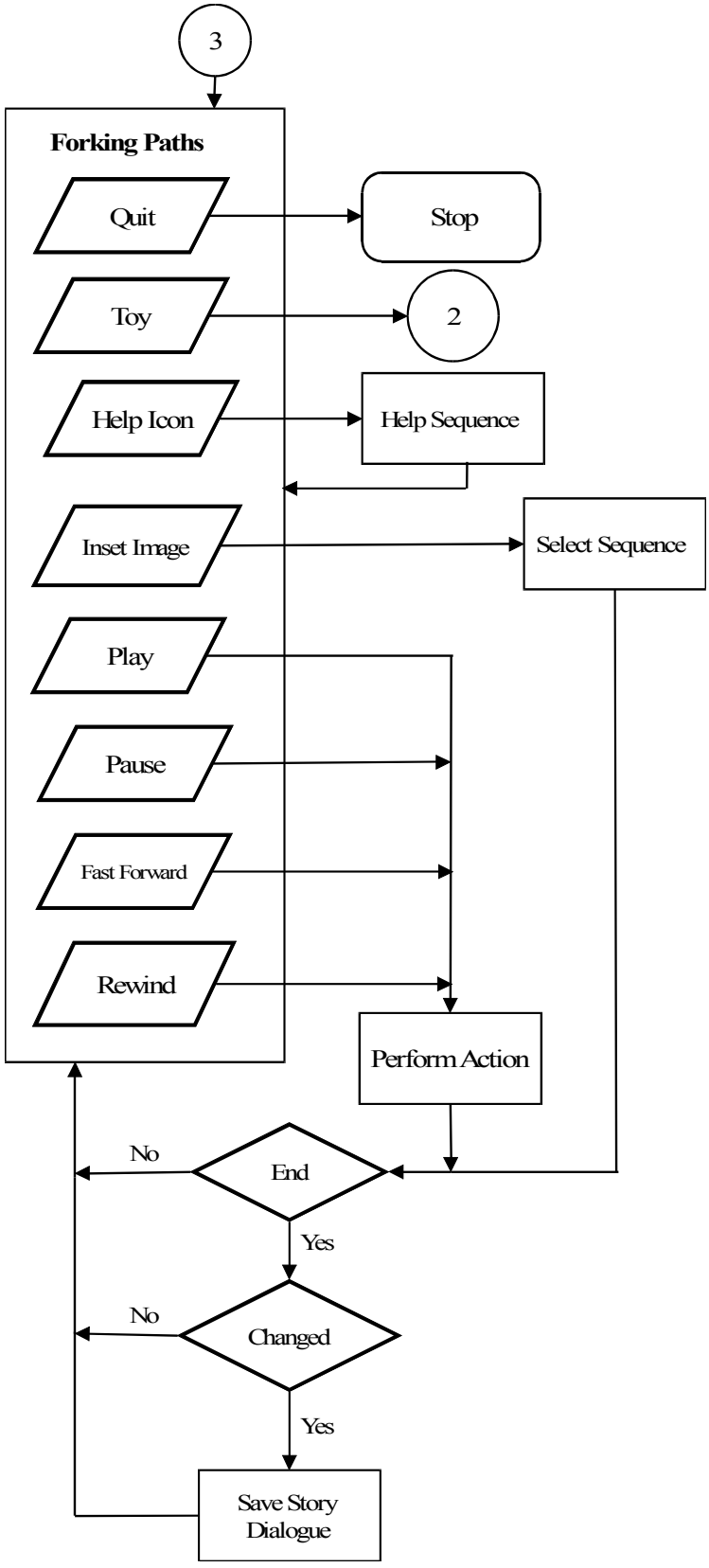

Chart 3 – Forking Paths Level

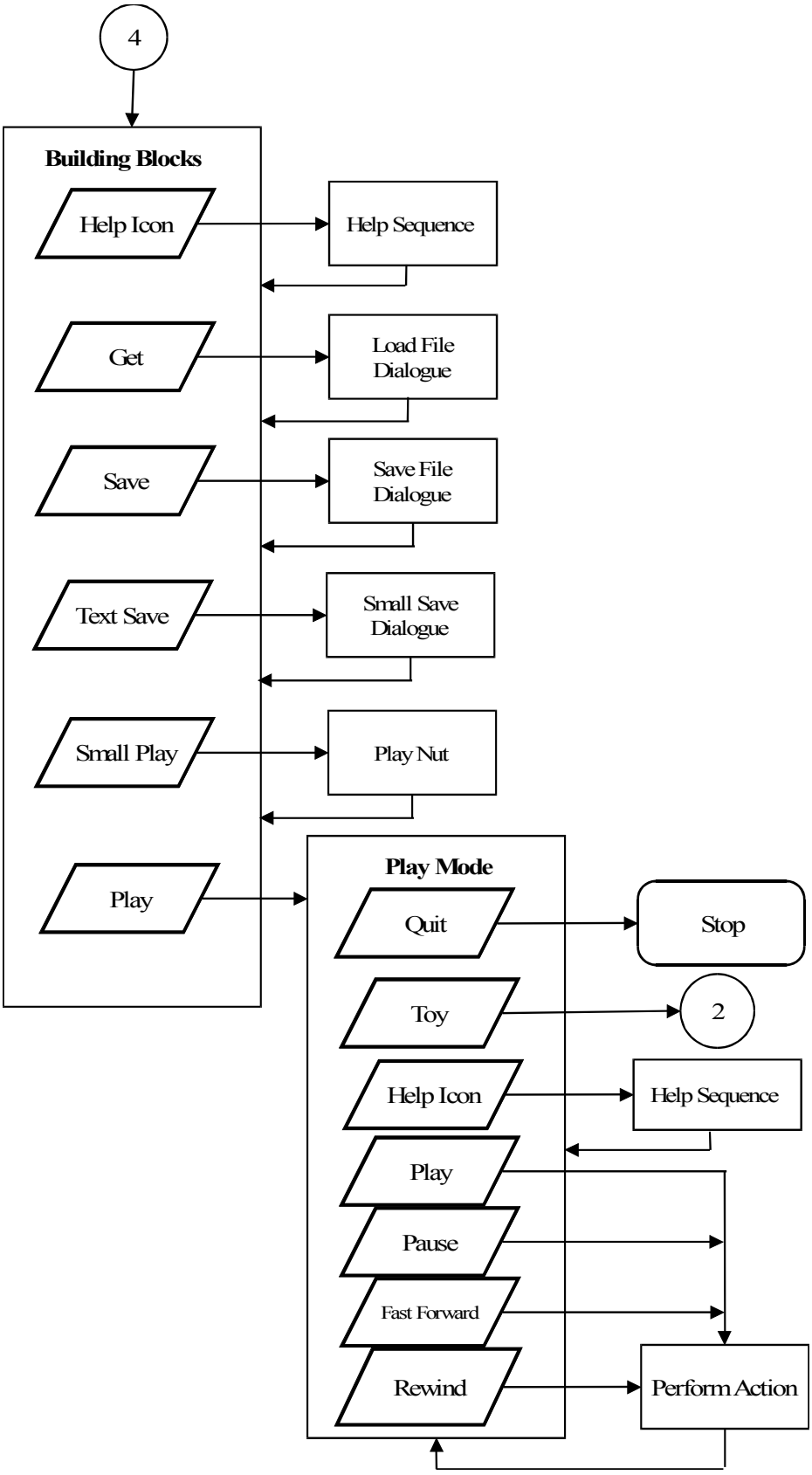

Chart 4 – Building Blocks Level

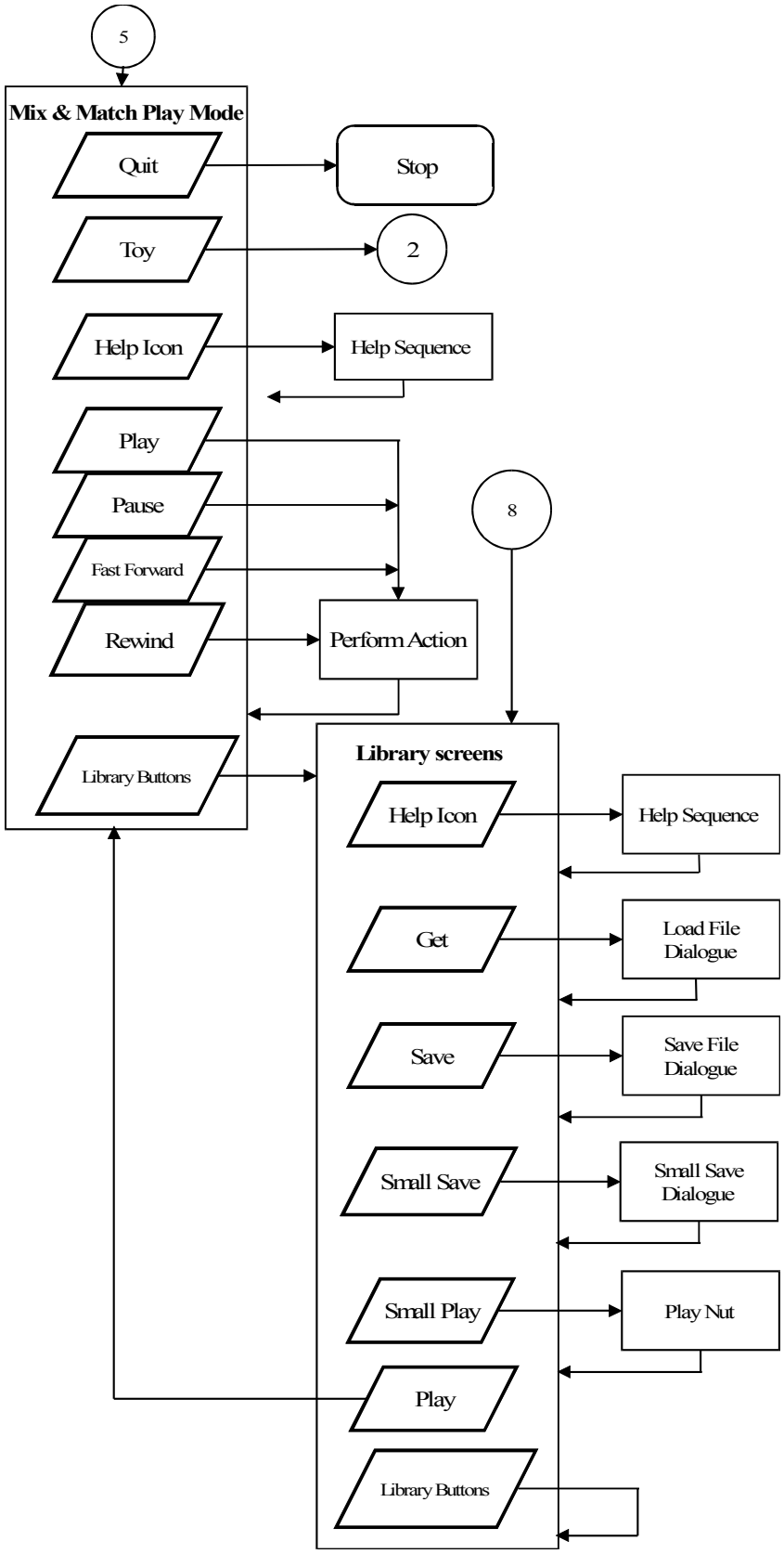

Chart 5 – Mix & Match Level

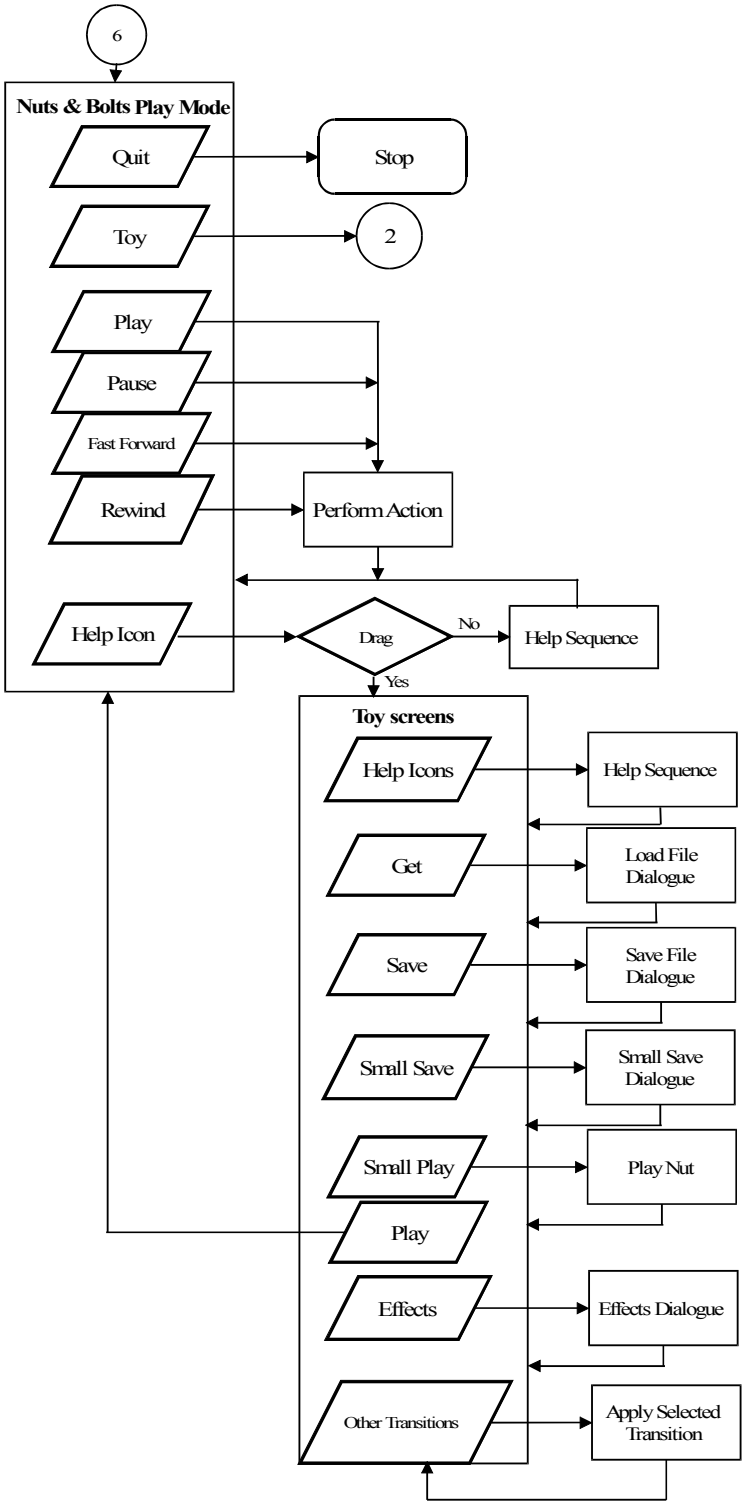

Chart 6 – Nuts & Bolts Level

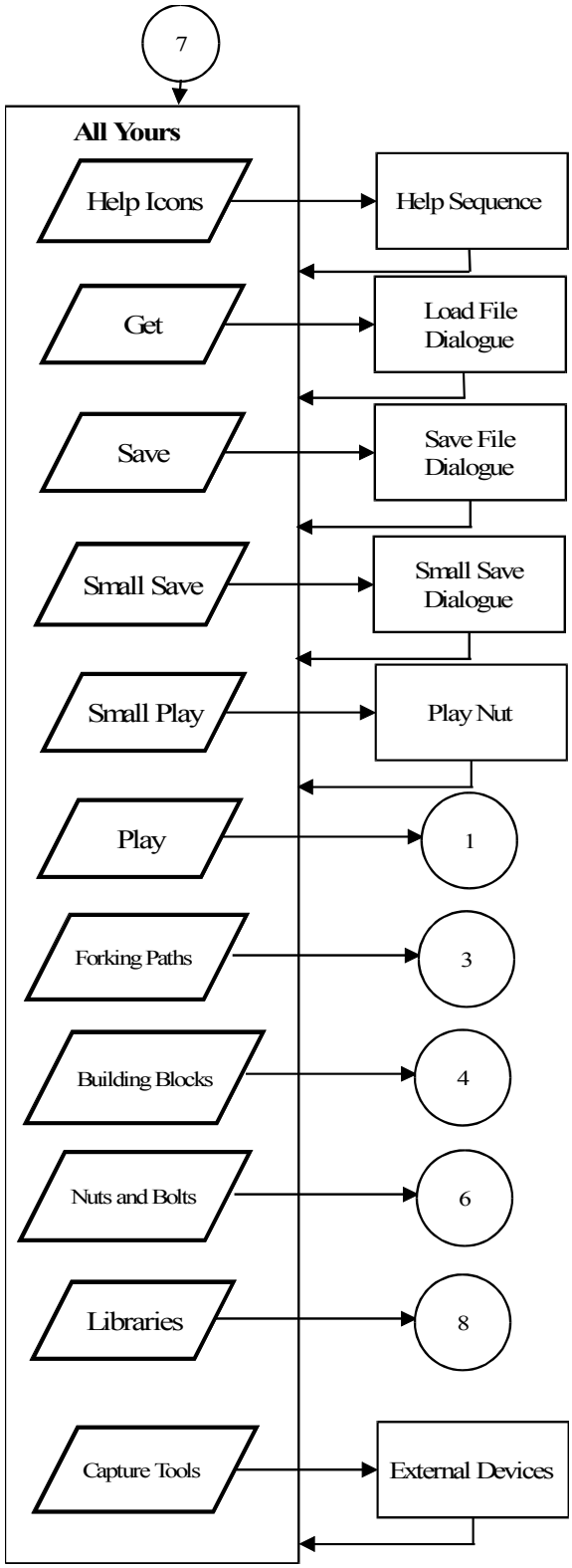

Chart 7 – All Yours Level

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