Making your Mark: Digital Inscription, Animation, and a New Visual Semiotic

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Introduction

A hundred and twenty primary school children sit in a cinema, watching a programme of animated films presented by the education officer at the cinema. They are about to embark on the making of their own animation, using computer animation software to animate drawings made in a vector-drawing software package. Our concern in this article is to try to distinguish what the particular characteristics might be of these digital tools, and of the processes of their use by children in the making of a moving image text.

This is part of a wider enterprise, in which we aim to construct a general grammar of the moving image. We owe much to the grammar of the still image proposed by Kress and Van Leeuwen (1996) and we will refer to their categorisations from time to time where appropriate. Their model is a social semiotic one - that is, it works within a general theory of communication which emphasises systematic processes of signification in conjunction with a social theory which attributes to all acts of signmaking a motivation proceeding from the desire of the signmaker to act upon the world, in ways determined by social and cultural processes (contested or assented to). The specific elements of this grammar are partly derived from traditions of visual semiotics, and partly from the grammar of functional linguistics, elaborated in particular by Halliday (especially 1978, 1985). The new dimensions we add are, of course, those related to movement. In particular, we develop the grammar of *diachrony* (how textual sequences develop in time), and its constituent elements of duration, motion, rhythm, sound (see Van Leeuwen 1985 and 1999 for extended discussions of rhythm and sound).

Why is a new grammar of the moving image is needed now? Film grammars are not new, of course, and can be seen as a series of historical developments from early Russian theory and practice, especially Eisenstein's theory of montage (1968), through classical Hollywood continuity editing (see Bordwell et al., 1985), through the structuralist model of film grammar proposed in, for instance, the earlier work of Metz (1974), into the post-structuralist and psychoanalytic studies of signification in film by writers such as Mulvey (1975), Heath (1976), and Metz (1982). Our arguments for a decisive move forward are fourfold.

Firstly, any clear idea of 'film grammar' that might have evolved through this period became, in our view, increasingly obscured by the moves into psychoanalytic and post-structuralist theory, which, though they redressed some of

the mechanistic reductionism of the earlier structuralist models, emphasised the elusiveness of meaning, and proposed unhelpfully ahistorical notions of the ideal viewer. Because of this, no clear consensus about structures of meaning analogous to those which might obtain, despite differences, in the world of linguistics, was able to emerge. As a consequence, while teachers of English can base the teaching of language on the helpful models proposed by, say, systemic-functional grammar, no such clarity emerges from the history of attempts to frame a grammar of the moving image.

Secondly, the theories to which we have referred are narrowly based in attempts to conceive the act of viewing, rather than making; and viewing film, rather than moving image more broadly conceived. They are thus inadequate to deal with the practices of viewing and making moving image texts which are now a reality in schools and in the wider community. The children we describe in this article employ digital technologies to move between acts of spectatorship and authorship, and the models of textual relations proposed throughout the period of so-called *Screen* theory fail to anticipate this historical development.

Thirdly, some of the most useful insights into young people's engagements with the moving image in recent years have come from the Cultural Studies tradition (Willis, 1990; Buckingham, 1996; Bazalgette and Buckingham, 1995). However, though these accounts offer valuable descriptions of the social and cultural uses of the moving image by young people, they do not, by and large, propose a theory of signification to complement these accounts.

Fourthly, we consider that a theory of the visual semiotic which offers explicitly to ally itself with the insights of cultural studies has been successfully laid out by Kress and Van Leeuwen. Furthermore, this model has been enthusiastically received by those concerned to analyse both the cultural contexts and the semiotic processes involved in children's engagements with the still image, whether in the Art curriculum, or in the context of picture books used in primary schools. We consider that part of the reason for the success of this model is that it uses the relative clarity of linguistic approaches to signification, in an effort to provide an account of the visual semiotic that will be as transparent as possible, and thus as useful as possible, to practitioners. To develop their model into a social semiotic grammar of the moving image is an obvious next step. The development of this full model is a book-length project; in this article, we will

concentrate on only one aspect of it: how digital moving image texts are inscribed.

The research model at work here is not an experimental or intervention model: this project was not set up for the purposes of our research. Our research is theoretical, as far as the model of a grammar of the moving image is concerned, but there are two methodologies at work. The first is that of social semiotic analysis, which will look at the work produced by the children as texts available for such analysis. The second is the kind of ethnographic approach typical of the cultural studies tradition, which we employ to try to capture both the processes and the cultural/social contexts which produce the texts and the grammars we are describing, through semi-structured interviews with thirteen pupils.

The school project we use as an example, then, was a four-week sequence of events in which one secondary school, Parkside Community College (a specialist media college under the specialist school scheme of the UK Department for Education and Skills), worked with four primary schools. After the viewing of animated films at a partner cinema, the Year 6 (11 year-old) pupils from each of the schools planned animations of *Little Red Riding Hood* at their own schools - divided up the story, made storyboards, drew backgrounds which were scanned into the secondary school's computer network. The pupils then visited the secondary school for two days and made animations of the story, drawing the characters in a vector-drawing program (the Acorn *!Draw* program), and animating them in an animation 'edutainment' package: the *Complete Animator*. (see Parker & Sefton-Green, 2000, for other accounts of the use of this software). As well as their teachers, the children worked with the Director of Media Arts at the secondary school (one of the authors), with a Film Education Officer from the partner cinema, the Arts Picturehouse in Cambridge, and with a professional animator from the bfi (the British Film Institute). In a third day, a small group of six came from each primary school to edit their animations together; and in some cases to edit the soundtrack with the animation on a professional digital video editing package, *Media 100*. Finally, all the schools attended a screening of their films at the cinema, as part of a screening programme presented by the secondary school during its summer festival week. In this article, we will look in detail at two of the animations: one by Year 6 pupils at St Matthews' Primary School Fig. [1*] and one by Year 6 pupils at Park Street Primary School. Fig. [2*]
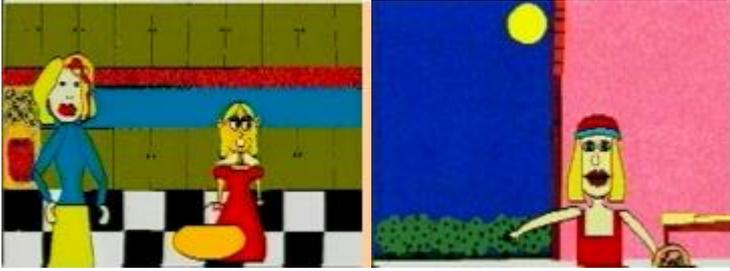
These three computer packages, each with their specialised function, were the tools which allowed the children to design, assemble, animate, edit, exhibit their short films. These tools, and the material forms and surfaces they operate with, are the inscriptional resources from which this ancient narrative is remade by the children. We will look briefly at what grammatical structures are employed by them to make a moving image text; and how technologies of inscription relate to these structures.

Systems of incription and the new communicative landscape

The grammar of the moving image we propose falls into two main categories. The first is a descriptive model of the *spatiotemporal* grammatical system of the moving image: how space is designed, for instance, in a single *frame* of an animated film; and how time is designed, by creating representations of movement, structures of duration, and so on.

The second category, which we have called *spectatorial grammar*, aims to describe how the spectator's response to, understanding of, engagement with the film is grammatically constructed, as a counterpart to the grammar of the text, sometimes assenting to the implied positions it offers, sometimes dissenting.

These two elements: the spatiotemporal structures of the moving image, and the spectatorial grammar, will be developed in further publications. These will also follow Kress and Van Leeuwen in seeing the moving image as a multimodal form, which subsumes other modes of communication – speech, music, and gesture, for instance. This article, however, will focus only on that aspect of the production of texts which Kress and Van Leeuwen describe as *inscription*. The relation of inscription to the whole grammatical system we propose is perhaps best imagined through an analogy with language. Language consists of a lexicon (the word-stock) and a grammar (the system for combining those words). Since these two are in practice inseparable, linguists will talk of a lexicogrammar. In order for this system of communication to be put into practice, however, practices of physical production are indispensable. In speech these are the physical processes of voice production. In writing, they consist of various kinds of inscription. These practices, whether of pen and ink, typewriter, or wordprocessor; on watermarked letter paper, exercise book, billboard poster or computer screen, are often

forgotten, or assumed to be incidental to the making of meaning. Kress and Van Leeuwen's point is that they are by no means incidental. They will always carry a semiotic burden, always contribute to the meaning of the text. Furthermore, the move from analogue to digital forms of inscription, where text might be a free-floating digital code unfixed from physical print, and capable of realisation in a vast range of physical forms, is a change in how meaning is realised in written language through its inscriptional form as great as that made by the printing press. The effects of this are described by Kress and Van Leeuwen; and extensively explored in the first issue of this journal by Richard Lanham (Lanham, 2001).

In a similar way, then, we argue that the moving image has its lexicon of images; and its grammatical systems of combination in space and time. There is no word for this as yet – we propose the term *kineikonic* – a combination of the Greek words for *move* and *image*. As in the analogy with print, any text produced in the kineikonic mode can only be realised through physical forms of inscription. For film, this is partly to do with the material of the text (16 mm film; videotape; quicktime file); and partly to do with the projection surface (TV screen; cinema screen; Palm handheld computer; video projector screen, and so on). Before exploring how this notion of inscription applies to the work of the schoolchildren we use here as an example, we will summarise Kress and Van Leeuwen's ideas in a little more detail.

The production of any kind of text is physically grounded in the materials which inscribe it, and sometimes re-inscribe it on other surfaces for exhibition to an audience, or for secondary forms of production. As technology develops the visual semiotic also produces new ways to read and make images. Kress and Van Leeuwen describe three classes of inscription technologies that have developed over time: (1) technologies of the hand - where the inscription process is in all aspects crafted by the human hand and tools associated with such practices such as chisels, brushes and pencils; (2) technologies of the eye and ear which allow for the analogical representation of facets of the world - examples would include audio tape, photography and film; (3) synthesising technologies which allow digitally synthesised representations to be created using principles associated with technologies of the eye and ear, but which also reintroduce the artisan elements of hand technologies via 'interfaces' of various sorts (keyboard, mouse, etc). In recent years, digital culture has transformed the creative practices of many artists, and of

some creative work in the home and in the school (Sefton-Green, 1999). We will explore this idea a little here, as we describe how a digital drawing package was used by children to design the spatial grammar of the story: the characters of the Red Riding Hood tale, and its places, the forest, the granny's house; and how they used a digital animation package to design its temporal grammar: the gentle walk through the forest, the rapid attack of the wolf by the woodcutter. Before looking in detail at the children's work, however, we wish to develop the model sketched out by Kress and Van Leeuwen, for two reasons: firstly because, in their brief sketch of the idea of visual inscription, they are not able to develop an account of the *processes* of inscription; secondly, because our model will need to refer specifically to the inscription of the moving image.

Kress and Van Leeuwen, in their account of inscription and inscription technologies, focus strongly on the materiality of this aspect of representational practices, summarizing their account of inscription as comprising 'the interrelated semiotic resources of surface, substance and tools of inscription'. (Kress & Van Leeuwen, 1996: 241). While retaining this system of the nouns of inscription, as it were, we wish to flesh out the verbs - the processes of inscription as they appear to us in the making of digital animation. We want to emphasize the dynamic, mobile qualities of these acts of inscription. While retaining the materials of inscription – the computer tools, the screen on which the animations are displayed – we want to categorise and describe the actions which deploy these materials. A technology, we argue, is about tools and materials – but also about the social actions which use them.

We will identify three distinct categories of the processes of inscription that we can observe in this making of animated films by primary school children. We do not wish to suggest that these categories are generally applicable to all acts of digital inscription, but hope that they may be widely useful as descriptions of inscribing processes in the making of digital moving image texts, especially those which animate drawn graphics rather than so-called live action footage. In digital moving image production, we will suggest that all three of these stages are governed by a quality of *provisionality*, both cultural and material (of course, we follow many other writers in suggesting this: see, for instance, Buckingham *et al*, 1999: p.15; Burn, 1999b, p.12).

The three categories we propose are:
inscriptions of the synchronic (creating individual images which will be combined to make the moving image sequence)

inscriptions of the diachronic (creating the temporal aspects of the moving image by combining individual images: making duration, speed, movement)
inscriptions of display (realizing the finished text on different surfaces: eg, monitor, television screen, cinema screen)

Within these broad categories, we will need to name a number of subordinate processes, which we will explain in the context of the three stages. These are: *transformation; (re)combination; (un)fixing; interactivity.*

Inscriptions of the Synchronic

Here we will look at how the drawings for the animation were made: in particular, what tools and substances were employed in what processes. The still image and the moving image have, since the inception of film, had a close but contradictory relationship: they are opposites in one sense, and impossible without each other in another sense. In animation, unlike so-called live action film, the moving image is built of still image designs. We might expect these to be differently composed than ordinary still images, however; and the question here is how the tools and materials of digital inscription permit, or are moulded to, this compositional intention by the pupils. We use the term synchronic to refer to elements of the moving image which, of themselves, have no time value, but are perceived as if instantaneously. We will also use the term *synchronic syntagm* (see Hodge and Tripp, 1986; Hodge and Kress, 1988) to refer to how each frame of the film has its own visual grammar. It is made up of interrelated signs (*syntagm* meaning the combination of signs), like a visual 'sentence'; but again, apparently outside time. This produces meanings distinct from, though related to, the *diachronic syntagm*, or sequence of meaning produced by the temporal flow of images one after another.

It is worth remarking, to begin with, that a heterogeneous use of representational resources was in play from the start in this project: the background designs were drawn, as mentioned above, in traditional materials, and some of the character designs were also drawn in advance of the computer animation, such as the Red Riding Hood design shown in Fig.[3*]

One way to view these original designs is to suggest that the digital future is not, as sometimes seems to be implied, a uniformly bright, unscathed surface of neo-technology, like more naïve utopian future landscapes in sci-fi movies. It may be more like Ridley Scott`s *Bladerunner*, where the images of future technologies co-exist with older urban images, locations, styles: a future 'already old', as Rutger Hauer, who plays the ambivalent replicant in the film, remarked of Scott's vision (Channel 4: 2000). Children in our schools will continue to produce images, music, drama with the 'old' technologies of paint, acoustic instruments and the body alongside their digital successors, digital image manipulation, virtual sound studios, and non-linear video editing. Sinker (2000: p.188) makes the point that digital media often subsume more traditional media, rather than simply replacing them; she coins a term to describe this: *metamedia*, as opposed to multimedia. Also, the computers we use (in this case, 15-year old Acorn Archimedes) to advance cautiously into the digital era may be already old, worn, semi-redundant.

We will concentrate here, however, on the processes of digital inscription. What can we say about the act of vector drawing, particularly how it produces drawings for animation, and how its nature as a form of digital inscription makes a difference? We wish to argue the case for the processes we have mentioned above: *transformation;(re)combination; (un)fixing; interactivity*.

Transformation

Why transformation? The drawings made by the pupils followed a model suggested to them by the teachers directing the project. In a vector drawing package, it is more effective to begin by using predetermined squares and circles, then tugged into shape by the vector points, than to attempt freehand drawing with the line tools (Fig.**4*** shows the toolkit of the *!Draw* package).

The face, eyes, pupils, blue eyelids of Red Riding Hood all began life as circles. The hatchet-jawed face of the Woodcutter emerged from a square. (Fig.**5*** shows Red Riding

Hood and the Woodcutter).

The choice of soft or hard lines by the children are obvious semiotic choices, implying the softness of the girl and the toughness of the man. The colour-fill of the blue eyelids suggest the makeup of an older teenager, and the pop-cultural images which reiterate this blend of innocence and knowingness, by no means irrelevant, of course, to the central symbols and narrative of the folktale of Red Riding Hood, in its various versions (see Carter, 1991; Zipes, 1982). The contemporary references are also clear. The eye lashes are exaggeratedly long, the eyes themselves are huge and child-like, the smile is wide, white and transmits the kind of wholesome kitsch Americana current amongst pop cultural icons such as Britney Spears or Christina Aguilera. This is an example, then, of how semiotic policing is less stringent in visual modes, allowing pop culture to butt up against a children's fable without demur, leaving more room for individualistic expression. The codes and conventions for digital animation are too new to have set boundaries of acceptability.

There is a similar case to be made for the woodcutter. On the one hand this is identifiably the man who rescues Red Riding Hood at the end of the story, but the sunglasses, the lantern jaw, the intimidating hat borrow from the iconography associated with leading men in action movies - Arnold Schwarzenegger for example. Our point is that these cultural references are implicit in the children's early choices of circle and square, and in the series of transformations that succeeds this choice, as freehand drawing is replaced by the gradual, delicate tugging into place of vector points along the shifting outline of the drawing.

The basic semiotic resources are to hand, then - circle and square, already pregnant with possible meanings, available for transformation. This act involves seeing the image, seeing the transformational potential of the shape, and handling the vector drawing tools with enough sensitivity to get images adequate to those already in the maker's mind. That this was a difficult process is clear from the comments of the pupils interviewed. One girl found that drawing with a computer was something you had to learn: 'you have to learn how to use all those tools and things'; whereas she saw drawing with pen or brush as something 'that you just do'. However, she was inclined to see the computer as a powerful and liberating device: 'You're more in control'; while her friend, asked if animating on computer was like writing in any way, said: 'It's like, um, writing a story, because you can, like, change your mind, and go back …". This underlines the provisionality of

digital media we have already noted: inscriptional substances which are never materially fixed, but always a set of instructions, effectively, waiting to be rewritten.

(Re)combination

As we have suggested, an important difference between an ordinary still image and the digital vector drawings for animation was that the characters were built out of aggregations of parts - a kind of reverse anatomical process. Romantic perceptions of art imply an organic unity in the represented object, which flows from the pen, brush or chisel of the artist. This organic unity is opposed, in the Romantic ideology, to a scientific view of the body as an assemblage of parts, susceptible, especially as the Enlightenment progressed, to anatomical disaggregation. The collaborative construction of an image by the combination of vector-drawn elements, we suggest, contradicts the Romantic ideology of artistic unity and individual authorship, suggesting an aesthetic exercise which is simultaneously a (digital) technology; the creation of a unity through combinations of elements (a grammar); and a social enterprise, rather than the product of individual artistic genius. A number of interesting features of this technology of inscription arose. Firstly, the parts were seen by all involved as a technology for animation - how they would move in the final film was always a consideration, not only for the children, but for the adults: the teachers, who had undergone a short training process in the use of this software; and a professional animator from the BFI, who specifically asked the children to save parts of their character as separate files. An example of this is the arm of the wolf, used by two girls as part of a sequence they animated in which the wolf knocks on the door of the granny's house Fig.6*
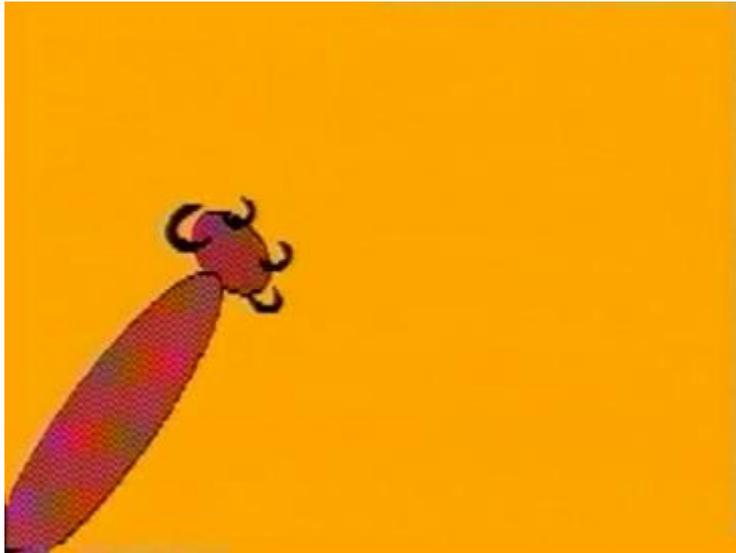
They only used the arm and paw of the wolf, as they had planned from the start to do this shot in close-up. One girl was very clear when interviewed about why they used a close-up for this sequence:

Um - because - it seemed - it doesn't seem that important if you see the whole person just knocking - but it was quite an important bit because he knocks on the door and then goes and eats her … and so we had it looking as if he was quite powerful - he was bigger than most of the other characters, except for the woodcutter, which - as you know, the woodcutter kills him.

Secondly, these disaggregated elements become more freely available for inscription, as floating items – not only in the network space used by the children, but also in their minds. An example was the woodcutter's implement for killing the wolf. The boys responsible for this design drew two implements - an axe, and a chainsaw. In the final animation, the axe is the implement attached to his hand, so some kind of decision, either aesthetic or to do with teacher censorship, has eliminated the chainsaw Fig.7*

Interestingly, however, it is the chainsaw that the girl cited above remembers, as if it had, uncannily, re-inserted itself in the film. She remembers the woodcutter like this:

Um - he was also very modern - he had a - he looked a bit like Popeye with huge muscles and things, and he had a skull tattoo and a chainsaw - so - instead of an axe, he had a chainsaw.

She attributes this image to the influence of horror movies on the boys who designed it, describing how boys in her class boast about scary films they've seen. She associates herself with the appeal of horror, however, claiming to have seen *Childsplay*, 'the first Chucky movie', when she was much younger. More important for our present argument, however, is the fluidity of the film in her memory. It is likely that spectators misremember film in acts of mental remaking in any case (see Burn 1999b). Here, the looseness of the synchronic syntagm (woodcutter+axe / woodcutter+chainsaw) may be also a result of the combinatorial possibilities of the medium of inscription, possibilities which have their mental counterpart in the continued unmaking and remaking of the text in this girl's memory.

Another disaggregated item, the basket that Red Riding Hood's mother gives her, becomes freefloating in the virtual space of the computer network, where all the images are stored. The same girl claims that the image was stolen from their network space by one of the other primary schools, working in the next classroom; and that they also stole their image of Red Riding Hood, or were influenced by it. She signals this as an exciting, illicit incident, refusing to name those involved, and beginning her account with the telltale phrase, 'I happen to know …'.

Thirdly, as is suggested by the examples already given, the elements of the character designs are made collaboratively, and are used collaboratively (or competitively!), with or without permission. The image of Red Riding Hood shown in Fig. 3, for instance, was complemented by a series of eyelids, complete with blue eyeshadow and eyelashes, made by her partner, in order to make the character blink in the animation.

(Un)fixing

Material acts of fixing run throughout all technologies of inscription. We are thinking of material processes usually applied late in a sequence of inscription, in order to consolidate, protect or complete a piece of work. In the oil painting from the late Renaissance to the present day, for instance, the act of applying transparent varnish to the dry painting would be such an act of fixing, rendering the material inscription more durable, more fit for exhibition, homogenising the surface with a uniform shine. Similarly, artists over the last thirty years or so have been able to use aerosol fixers to spray on pencil drawings, rendering them impervious to smudging or deletion. Photography, of course, uses fixing chemicals to make the print permanent.

The fixing process will always carry a semiotic function of closure; will always signal an intention to complete the semiotic act. The nature of this completion, however, will vary considerably. What interests us in the context of digital inscription is the permanence or irreversibility of the fixing; and what this might signify or permit in the social domain. Though there are plenty of examples of texts in different media being reworked in some way after completion, publication or exhibition, these are the exceptions rather than the rule. Furthermore, they are accomplished in spite of the material of inscription rather than because of it. To take a recent example, the film editor Walter Murch, re-editing Orson Welles' film, *The Touch of Evil*, could only re-order sequences from existing prints of the film, and alter the soundtrack in certain places: it was impossible to access the original material from which the film was edited in the first place. Had all the original footage been converted into digital format, the process of revision could have been much more extensive. In this case, the resistance of the material closure of the text to acts of remaking has its counterpart in the power of the studio to maintain its version of the film, a form of closure duplicated through the twentieth century as the inscriptional fabric of the moving image presented a sealed surface to its mass audiences, offering access only as spectators, never as re-makers. The advent of digital inscriptions, and their domestic users, begins to permeate this surface of finished inscription, to unpick it, reorder it, remake it, transpose it.

Our specific point here is that the material of digital inscription makes the fixing process completely reversible in a wholesale way. It not only makes revision possible more extensively than before, it positively invites the unfixing of the

text, makes the act of closure less committed, less final than it always has been in the past.

In this project, the digital grouping of objects within the vector-drawing program functions as the fixing of the synchronic syntagm. We want to say four things about this act of fixing.

Firstly, this grouping is an act of completion, and an act of homogenisation, a bringing together of limbs and costumes to say 'This is Red Riding Hood'.

Secondly, it is provisional, as we suggest all the stages of digital inscription must be. In this case, it is provisional in a very specific way, as the authors intend the grouping to be undone, if necessary, by other pairs of children.

Thirdly, and consequent upon the provisionality, it subsumes the process of unfixing. Pairs of children will ungroup images made by their colleagues, and regroup them for their own sequence. A clear example is the image of the granny in one of the films. This image was ungrouped by the pair of children making the sequence of the wolf waiting for Red Riding Hood. In order to disguise the wolf as the granny, they removed the granny's cap from the first pair's image, and placed it on the image of the wolf, re-grouping that image, and converting it into a fixed stamp for the animation. Fig.[8*]
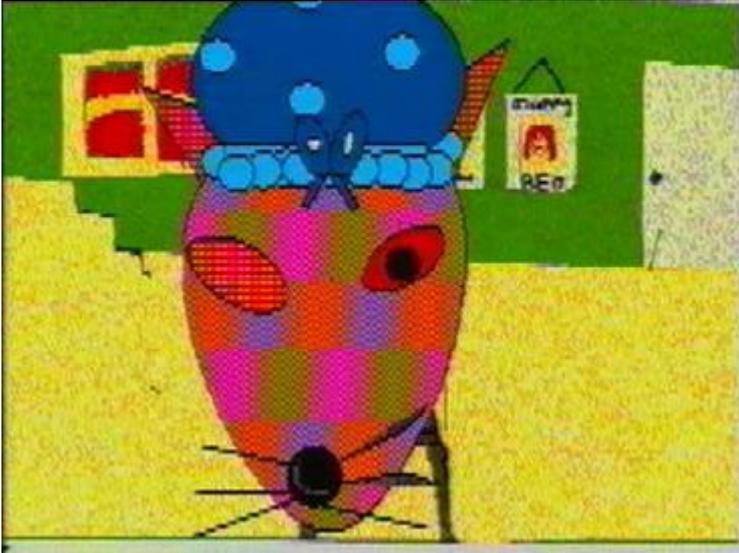
Fourthly, the grouping and fixing follow the design intentions of the whole syntagm, obedient to the ruling kineikonic grammar. We have argued elsewhere that the grammar of the synchronic syntagm in the moving image is determined by its place in the diachronic syntagm. It makes references backward and forward to other moments in the moving sequence. It is a still image which, on viewing, is immediately pulled into the moving flow. In its design and its realisation, it shows a loyalty to the dynamics of rhythm, duration, speed which govern the grammar of the moving image (for an account of how spectators read still images from film in this way, see Burn, 1999a, pp. 86-90). In these cases, then, decisions about grouping are made with an eye to the composition of the moving sequence, which we will consider in the next section. Most obviously, certain elements of the character designs are left ungrouped, either in order to animate limbs, eyes, objects separately; or because the children know that they will use the element in a close-up shot which needs only that element. In the case of one pair of children, their entire animated scene was of the wolf knocking on the granny's door. The only object they used for this was the wolf's arm in close-up (Fig. 4).

Interactivity

These designs are, as we have suggested, interactive: they can be altered, remade, remodelled, revised, re-edited by other children in the group. Such interactivity, in which children rapidly alternate between modes of reception and production, at one moment admiring another's design, in the next moment appropriating it as part of their own image, employs digital spaces and surfaces for this production/reception oscillation. The computer screen, unlike the cinema screen or (until very recently) the TV screen, is a surface of reading/reception and of writing/production. The network linking their machines is a repository for finished designs, a bank of designs for retrieval, a space of temporary completion, of designs in flux. It is a space governed by contradictory motivations of collaboration and competition: they save; they retrieve; they borrow; they steal. Though in many senses a very simple process, this kind of inscriptional interactivity moves well beyond the conceptions of ICT as content delivery which dominate thinking in the UK government's education policy forums (see, for instance, the critique of this approach in Buckingham, 2001).

The word interactivity risks some confusion, evoking its popular use in the context of multimedia. We will risk the confusion in order to problematise the term; but a little further explanation is needed. The essential feature of interactivity in its popular sense is a kind of active readership – the user/spectator can interact physically to alter some aspect of the text – such as the order, as in random access patterns; the point-of-view, as in digital TV playercams in sports TV. We recognise the positive aspects of this shift in text-reader relations; but consider that it fails to signal the much bigger shifts already possible, where readers/receivers of texts may want roles in production rather more extensive than being able to hit a few buttons.

Secondly, and more importantly for our immediate argument, the unfixedness of the digital medium means that the text is permanently interactive, as long as it remains in digital formats. Anyone who receives it will be both a viewer and a potential remaker. This, again, is a more profound view of interactivity than that imagined by commercial multimedia manufacturers.

Thirdly, the word interactive, as we have implied, suggests a changing text-audience relation. The social semiotic view of communication we employ in this article lays out three overarching functions of any system of communication: the functions of representing ideas; communicating between people; and forming texts. The second of these, the *interpersonal metafunction*, is where we would locate the idea of interactivity. We wish to associate the word interactive with the interpersonal metafunction, suggesting a shift in the distribution of power between author, text and audience consequent upon the advent of digital technologies and the social uses which determine them, and are determined by them.

Inscriptions of theDiachronic

We want here to think through how the kind of inscriptional practices used by the children might develop when moving from still to animated image creation; to describe inscriptions of the diachronic syntagm, the temporal dimension of the moving image text.

The movement of characters or objects through space and time is the major difference between our kineikonic grammar and the grammar of visual design proposed by Kress and Van Leeuwen. Although we see still images as holding a series of

potential movements which are often articulated verbally by children as they develop their drawings, we need to find a new way of describing the criterial aspects of motion and temporality as they unfold through animation.

Transformation

With synchronic syntagms designed, fixed (albeit provisionally) and stored on a network drive a second stage of transformations could begin. Whereas the initial drawing materials in the Acorn package had been pre-set circles and squares the pupils now had a more defined set of iconography to work with. Each moveable part, be it a character's limb or an object, could be edited by taking it out of the shared drivespace and back into *!Draw*. Certainly, some pupils did take the opportunity to rework existing drawings after having first experimented with them within the animation package. Changes in colour, line or overall style often suggested themselves only after seeing the constituent parts assembled in successive frames and set in motion. This further emphasises the essential provisionality we have already spoken of. But more than this, it offers evidence of an expressive creativity which may be fostered by the freedom to revise, exchange and reconstitute visual elements using digital media. Further, the fact that the animation package added new concepts - movement, shifting perspectives, temporality - meant that the original act of inscription in *!Draw* was finally assessed through the mode of reception: and the children toggle between modes of reception and production from then onwards, viewing and transforming both their own images and those of others.

(Re)combination

The individuality of the drawn images was somewhat proscribed by the shared network of visual designs. This 'image bank' was free to be used by all groups and although some never strayed beyond using their own designs, there were others who made ample use of other pupils' vector drawings. This had implications for the act of (re)combining images at the animation stage, some aesthetic, others pragmatic in nature. For example, one group who were responsible for animating the section of the Red Riding Hood story which takes place in Grandma's house were able to use different combinations of drawn body parts to create firstly an image of Grandma in her nightgown, but then, by importing an image from another group's file, were able to recombine

aggregated images to form the wolf in Grandma's clothing. Although this recombination was primarily a pragmatic step - it saved the time it would have taken to draw a new character - there were also many different wolf heads to choose from and the selections made were based on aesthetic choices. Aesthetic choices were also always social choices - peer group allegiances, a group's discussed preference for a particular drawing, a perceived stylistic 'match' between elements of disaggregated designs. This points towards representation-as-*design*, rather than representation-as-*reference*, a shift which Kress and Van Leeuwen predict will gain momentum as synthesising technologies and their concomitant ontologies replace older technologies of communication. This suggests that by using the new semiotic resources and tools made available through digital technology the pupils moved towards 'signification' rather than 'referentiality', they created new texts through combinations of visual image and movement. In this context, creativity on the part of the pupil can be assessed in terms of the varying combinations of limbs, objects and other visual 'nouns' which are drawn together from the semiotic palette. These nominal structures were communally available in our project and consisted of elements of existing potential meaning, the synthesis at different stages of the animation of circle and square, pathway and forest, wolf and woodcutter, Red Riding Hood and grandmother or any combination of these. Organising them in varying relationships creates different versions of the same narrative and these differences draw attention to the meanings held in *potentia* by the basic constituent elements.

We also need to consider how different combinatorial possibilities relate to the movement within the animations. The combinations of aggregated designs in a sequence, demarcated by 'frames' within the *Complete Animator* package, were made up from a number of discrete elements. There were different styles of drawing, ranges of colour and shape juxtaposed with one another, there were changes in scale and size to create illusions of movement in 3-D space and a sense of perspective. And, of course, there was the overriding element of duration - the length of time the frames took to play through from beginning to end. Precisely how these temporal processes were worked through by the pupils and how they contributed to the grammatical sense of their narratives requires an explanation of a number of elements associated with the 'stitching together' of time and we will outline each one in turn. Fig.9* shows the Animator Screen, with the play bar and frame creation tools at the bottom, and the toolbar at the left (for more on the use of Animator at Parkside, see Burn, 2000 -

www.bfi.org.uk/education/teachers/classroom/miic/index.html chapter 4).
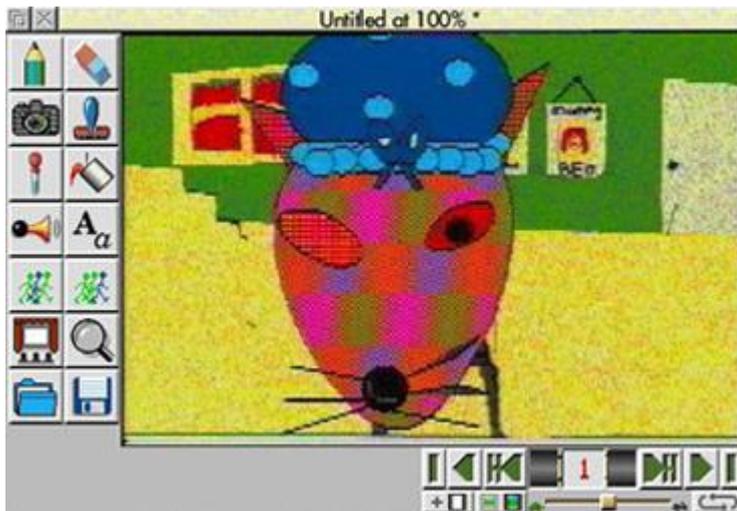
'Stamping' is the term used in the *Complete Animator* to describe the inscription of a grouped vector drawing. Each drawing was imported into Animator and saved as a 'stamp'. This allowed complete sets of objects or characters to be repositioned or resized without the need for re-drawing, and opens up a number of devices to suggest movement.

Scaling/zooming

Using imported vector drawings gave pupils an advantage in that their designs did not pixelate when scaled up or down in size, as bitmapped images would. Using close-ups or extreme long shots to give a sense of perspective was a useful way of moving characters over a number of frames. Not only were these movements fairly straightforward pieces of animation, they also hinted at narrative developments and character motivations, point-of-view and implied audience position. A good example of this is a sequence in which Red Riding Hood is seen from inside the wolf's mouth. This sequence, in which the jaws ominously close over the young girl, was constructed by restamping the jaws in close-up and Red Riding Hood in long shot through a series of frames, each time slightly altering the position of the jaws so that they shut tight when the sequence was played through. In another animation, Red Riding Hood is animated walking along the forest path. The character starts in the bottom left hand corner of the screen in medium close-up and then moves along the path in a direction that takes her towards the top right-hand corner of the screen. To give the necessary sense of perspective the pupils scaled down the drawing, a decrease in size of approximately 10% each frame. This gave the illusion of the character moving away from the spectatorial position and alluded to Red Riding Hood's motivation to take the ill-fated short cut through the forest. Fig.[10]* So on a number of levels,

semiotic choices are made here in terms of size and position, direction and orientation in respect of a goal, all of which move the story forward and give the moving images an organising grammar to anchor choices within an overall schema of design possibilities.
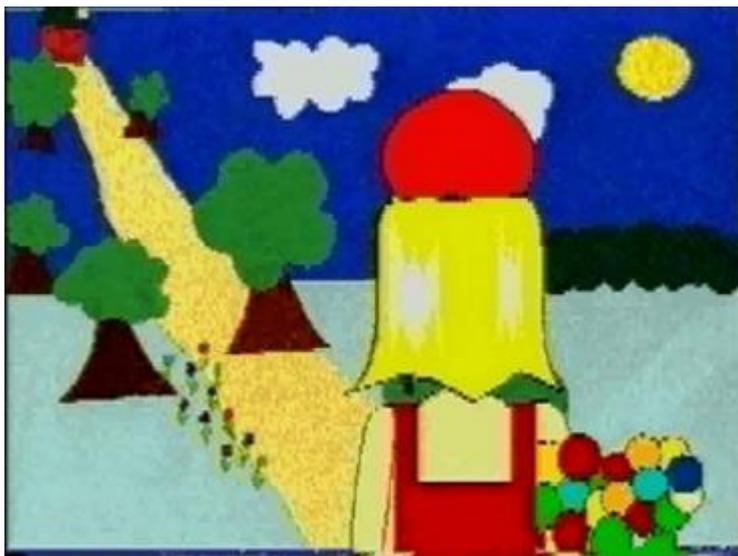
Movement within the frame

One of the concepts made explicit during the project by the *bfi's* animation officer was frame rate and the way the fluidity of movement within animated stories is always relative to the standard film speed of 25 frames per second. The closer each movement in the frame correspond to this rate the smoother the animated sequences would be. This developed an understanding of the concept of frame rate for most of the pupils (though it needed to be revisited frequently), and that even if the 'real-time' represented by the 25:1 figure could not be attained, a smoother animated sequence would still be possible if the ratio of frames to movements was kept high. This understanding of duration and the role it played in conveying the drama of a story was manifest through many sequences. In constructing the movement of objects relative to other objects - eyes rolling, crossing, winking, or an arm knocking at a door, for example, pupils who repeated a relatively long sequence of frames and then altered a single referent in relation to all other objects (the pupil of the eye, for example), created sequences that flowed very smoothly indeed. Fig.[11*]

At the other end of the motion spectrum, there were examples of establishing shots (Red Riding Hood's house or the kitchen inside it, for example). In these sequences there was often no need for movement at all, yet the frame rate was still significant in the sense that the length of time the shot would remain onscreen depended entirely upon the number of repeated frames and the speed at which they were replayed. Both of these examples suggest that pupils had internalised the relevance of frame rate to their work, but more importantly, it also implies that they understood where to use the knowledge most effectively within the context of a short narrative.

Transitions

Throughout the editing phase of the project – when smaller groups of children returned to Parkside to create a final combination of the separate sequences designed during the animation phase – more transition devices were added to the cuts composed in Animator: dissolves and fades were used to create a series of (re)combinations. There was a traditional film grammar at play in this (re)combining. The splicing together of images in montages or juxtapositions created certain visual and spectatorial effects, which illustrated how the Eisensteinian principle of montage could be redeployed using the tools of digital inscription available in this software. One girl described how when using Media 100 to edit together her classmates' animation, she found the dissolve feature provided a useful visual metaphor for the power relationship between the wolf and Red Riding Hood:

We used quite a lot of dissolves … so two scenes would come together, and the, the next one, er, would overpower it.

By overlapping the image of wolf and girl she was able to dissolve from one to the other. As the outline of the girl dissipates, replaced by the sharper lines of the wolf there is a split second where the girl and her potential attacker overlay each other, a merging of actor and goal, or in traditional language grammar, subject and object. Her use of the verb 'overpower' seems to suggest that the transition is an inscriptional choice underlining the conflict between the characters. Fig.12*

(Un)fixing

During the animation phase the process of (un)fixing was linked to the combinatorial possibilities each group explored through the kinds of (re)combining outlined above. By this, we mean that it was through the experience of diachrony, the testing out of movement by sequencing frames of grouped vector drawings, that decisions were made about the fixedness of each visual design. The kinds of revising they were able to undertake after seeing their embryonic narratives 'brought to life' by the animation package were an important feature of the digital animation package, which contains an instant fullscreen play mode – an example of what we refer to below as inscriptions of display, in this case provisional. The particular characteristic of this digital mode of inscription, toggling between composition and exhibition, is, again, the extreme provisionality and plasticity of the medium.

The ability to revise and rework material is, as we have repeatedly shown, a defining aspect of this kind of digital creative experience. For the pupils there were a series of possibilities which could be chosen, but which were never completely closed. There were always alternatives and provisionality was always present in the work. However, as pupils moved through the verb-like processes outlined above their visual designs became increasingly fixed (though even when at their most rigid, they were always just a mouse-click away from disaggregation). As the number of animation frames increased the disaggregated items stored in the image bank were revised less and less. Changes were made more often within the Animator package which meant that images were not ungrouped, but were altered at the micro level using colour palettes, erasers and snapshots.

At the post-production stage, different kinds of unfixing and fixing became available. Four children, editing their class's animation on Media 100, were able to import the whole animation, edited in Animator, place it on a timeline, and chop it up again into segments. They could then decide whether to keep these in the same order (they did), change the transitions, as described above, and whether to keep all the footage. They decided at one point on the most drastic form of unfixing: deletion. They decided to cut a scene made by a classmate, because 'it was too long'.

Interactivity

The understanding of 'interactivity' in the context of digital media is apparent throughout the compositional and editing process. These films, up to the final inscription on VHS or digital videotape for exhibition, are offered by one group of children to another group as a provisional assemblage of visual units, available to be entered, reordered, remade, employed as raw material for a new text. As we have mentioned above, this implies an oscillation on the part of the children between modes of reception and production, reading and writing.

Inscription of Display

This phase of the process of inscription is the one most oriented, in Kress and Van Leeuwen's scheme, towards the aspect of inscription they categorise as 'surfaces'. The dominant impulse in this process is towards closure, and towards the repositioning of the (provisionally) finished text in a place of what the film industry traditionally calls exhibition. There were, in this project, however, degrees of closure, and degrees of completed exhibition.

Firstly, there was the exhibition of completed sequences of animation on the computer screens of the Acorns. This form of provisional display is invited by the software, which includes a tool, represented by an icon of opening stage curtains, for fullscreen display. This function was employed frequently by the children, both to view their own completed or partially completed sequences, and to show their friends their sequences. As, in many cases, these friends are sitting next to them, and working on the preceding or succeeding sequence, this form of display could inform the production work of the neighbouring groups. In this case, the oscillation between modes of production and reception is rapid, fluid, and turns on the screen's ambiguous nature as both a surface of working production and a surface of display. It should be noted that, as frequently, pairs of children did not make use of this tool, or provisional display mode, where it might have been useful, so that discontinuities between sequences arose where they might have been avoided.

Secondly, the selected groups who edited the films as the second stage experienced the partly-completed sequences displayed in a different way - on the screen of powerful Apple computers, within a professional editing package. They also

moved towards the final process of completing the films for translation to their final display contexts: on TV screens and on a full-size cinema screen. The degree of closure at these stages becomes more complete; and the question of agency increasingly complex, as the processes and choices as governed as much, or more, by the adults in the project as by the children.

The surfaces of the various screens through which the animations pass are laden with specific semiotic values. We know that the Acorn screens, as display vehicles, possessed low value, as they did in their role as tools of production, because of their age and shabbiness. On moving on to the Macs for the editing phase, one pupil remarked 'Wow - so this school does have good computers', comparing the Macs to the powerful PCs many of the children have at home. As display surfaces, then, a hierarchy of value was in evidence, determined by how well the children regarded the computers as examples of modern technology. By contrast, we can assume that the cinema screen would be invested with a high level of cultural value. In this case, the use of a cinema screen is deliberately chosen by the adults managing the project - the member of staff in the school (one of the authors of this article) and the Film Education Officer at the cinema, one of a chain of commercial arts cinemas, with a subsidised education programme in partnership with the school organising the project. Our intentions for this exhibition are to do with a harnessing of the cultural value of the cinema screen and context to re-present and re-value the work of the children. Surfaces of display on which children's moving image texts are exhibited are usually ones that carry low status: cheap TV screens showing poor quality VHS videos, in a school classroom, library or hall. Kress and Van Leeuwen argue that the surface of inscription carries its own semiotic - that glossy photographic paper will signify quality at one level, or the cheap aspiration to quality at another. For us, the cinema screen and the physical environment of the cinema announce the children's films as part of the world of film that, until recently, their makers could only belong to as consumers, spectators, paying customers (see, for extended accounts of this: Sefton-Green, 1995; Burn, 1999a, 1999b; Buckingham, 2001). The ability to digitally project on this most valued of all surfaces, replete with a century of cultural associations, moves the work beyond the kind of simulation, pretend, pale mimicry of 'the real world' that educational work is so often confined to. This, then, is a form of the inscription of display which makes a historical loop: the grammar of the moving image, made through access to widely-distributed digital technologies by those who used to be confined to the

role of audience, is inscribed on the same screen as the films made by the older technologies of analogical recording, by those whose role as author was protected by a triple alliance of economy, ideology and technology.

Conclusion

We have argued, then, that digital inscription needs to be seen as a series of processes which deploy the tools, substances and surfaces that Kress and Van Leeuwen describe. We have distinguished between the design of the synchronic syntagm, using drawing tools in such a way that the intentions of the moving image are crucial to the design; and the design of the diachronic syntagm, inscribing the effects of movement and duration. We have emphasised that the availability of the tools of digital inscription offer a kind of text-making that is highly plastic, fluid and reversible, subject to the kinds of revision essential in the development of young artists; and essential to the collaborative combinatorial processes of composition which mark this making of a moving image text.

We have also argued strongly that the growing proliferation of these kinds of inscriptional technology accompany a shift from engagement with the moving image largely confined, for the mass audiences of the twentieth century, to spectatorship, to one where such spectatorship slides easily into, and is informed by, modes of production. In the early 1980s, Raymond Williams argued, in a prescient essay, that an epochal change was about to occur in which the technologies of media production would become so widely distributed that the resulting shift in power between producers and consumers of the media would produce profound social change (Williams, 1981, p.191). Even five years ago, we could not easily have designed the complex of collaborative digital inscriptions that have allowed these children to make their own digital animation and screen it on local cable TV and in the cinema. The interplay between digital, synthesising modes of inscription and the social action which this educational project represents has produced a partial dissolving of the usual production/consumption relation. In terms of the broad cultural history of literacy and communication, this development is perhaps best imaged by Bakhtin's vision of dialogic utterance (1952/1981), where the acts of speaking and response are dialectically related, the first utterance anticipating the response, the response remaking the initial utterance. A contemporary 'take' on this, which provides the

context for our account of the creative oscillation between the reception and production of the moving image, is that of Gunther Kress (1993, p. 8):

What have seemed the settled distinctions of reading and writing, of consumption and production generally; of speech and writing; or reference and signification; of the commonsense notion of the monomedial text; … all of these are even now being undone and altered in ways which are dimly discernible but by no means fully settled.

Red Riding Hood has travelled a long way. From the dramatised oral modes of the mediaeval folk-tale; through the specialised requirements of the seventeenth century French bourgeoisie; to the digital bricolage of twenty-first century primary school children. These young digital writers become their own first digital readers; a new generation of digital reader-writers goes to the movies, makes the movies, makes its mark on surfaces of inscription both new and old.

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