MAKING THE MOVING IMAGE: THE PLACE OF DIGITAL VIDEO IN THE CURRICULUM

Andrew Burn
Institute of Education
University of London

The moving image has a long history in education. Following the widespread distribution of videotape player-recorders in the 1980s, the moving image became a source of information in many fields of knowledge. In classrooms, film and television become carriers of curriculum content across all subject areas in the latter half of the twentieth century, in the form of documentary television in the humanities and sciences, filmic adaptations of literature and drama in English, and specialist educational programming as part of public service broadcasting.

The most significant consequence of the digital era, with the increasing availability of digital editing softwares, has been to open up the possibility of making moving image texts in the classroom. The production of moving image texts by young people in schools begins with the history of children's engagement with the cultural forms of film and television. In simple terms, children (like the rest of the general population) have been conceived principally as consumers of film, television and video. Because, in their leisure lives, they are positioned as audiences, they continue, along with their teachers, to be positioned as audiences in schools. The general distribution of video editing software appears to have offered the possibility of a shift from consumption to production.

While there is an obvious appeal in the use of an attractive popular medium to convey and consolidate varieties of subject knowledge, media educators have consistently pointed out a risk. Perhaps best represented as a loose international consensus in a 2001 report for UNESCO (Buckingham, 2001), proponents of media education have argued that these widespread extensions of the child as audience in the curriculum, now complemented by the child as producer, are liable to render the medium itself invisible or transparent, no more liable to critical scrutiny than the traditional textbook which they purport to replace. The media education community insists that young people's engagement with the media should be an explicit focus of work in schools, developing critical understandings of media texts, institutions and audiences.

Media education has always been at the forefront of work in the production of the moving image with children. This tradition, in effect, challenges the notion of children confined to the role of audiences, positioning them by contrast as producers. The rationales for this move are several: those summarised by Buckingham *et al* (1995) include the arguments that making media texts might help children to 'deconstruct' their messages, offer opportunities for expressive, creative work, and provide 'pre-vocational' experience of working in the media industries.

Before the arrival of affordable digital editing softwares in schools, production of moving image texts was always a tiny, marginal activity in formal education, depending on the energies of enthusiasts for media education, and their ability to find funding for analogue video editing suites, which were expensive and unlikely to be used by other curriculum subjects. While television and video were widely used

across the curriculum to deliver subject content, then, production was confined to a very small minority of schools.

As schools began to acquire digital editing equipment and software from the mid-90's, this picture began to change in two ways. Media educators were the first to pick up on the benefits of these new technologies, buying in systems such as the Apple-based Adobe Premiere editing package, typically for courses in Media Studies with students at the higher end of the secondary age range, and in Further Education. However, as such systems required high specification computers, and the software was still expensive, other curriculum subjects remained largely uninvolved. The wider curriculum, and the ICT in education community, only really began to consider the wider learning benefits of digital video with the arrival of the first free entry level software, Apple's *i-movie*, now followed by Microsoft's response, *Moviemaker 2*. In the case of the former, the software itself played a major role in intervention projects discussed in this chapter, Reid *et al* (2003) and Schuck & Kearney (2005). For the first time, the editing of digital video was available free, on ordinary computers, in an accessible form.

The research literature cited in this article reflects, and in some cases anticipates, these developments. Much of the literature, especially the earlier studies, displays the interest of media educators in children as potential producers of media texts, not simply as audiences of film and television. Subsequent studies reflect a widening interest in the use of digital video in other curriculum contexts, repeating, in some ways, earlier debates about the uses of television and film. A broad question, then, for a review of this field, is how has this longstanding debate developed? What case is made in the research literature for the use of digital video production as a learning medium across the curriculum? What case is made for children as critical producers in media education? And how do these two rationales relate to each other?

The expansion of moving image work consequent upon the advent of digital editing technologies has seen a corresponding expansion of research studies in this field, though it is a relatively small body of work. I undertook, with a colleague, a systematic review of research literature four years ago, investigating the relation between digital technologies and moving image literacies (Burn & Leach, 2003). This review found only twelve studies internationally which met its selection criteria. Since then, a number of other studies have emerged, which will be referenced in this chapter.

Most of these are small-scale case studies, often describing the work of a single teacher or classroom. Most of the work originates in the UK, though Australia and the US are also represented. There are only three larger-scale studies: Reid *et al* (2003), which evaluates a pilot digital video project in fifty UK schools; de Block *et al* (2005), which reports the findings of a seven-country European project in the use of digital video by migrant children; and Schuck & Kearney (2004), which looks at the use of Apple's i-movie digital video editing software across five schools in Australia.

Understandably, a good deal of the literature is produced by proponents of moving image work in schools, such as the British Film Institute in the UK, or a range of practitioners engaged in forms of action research. Some of the authors cited here, for instance, received small-scale funding from the Department for Education and Skills

in the UK to develop and reflect on their practice under the supervision of a Higher Education mentor. Other studies were conducted in collaboration with industrial partners, in particular Apple, who supported both the Australian Students in the Director's Seat project (Schuck & Kearney, 2004) and the pilot digital video project run by the British Educational Communication Technologies Agency (Reid et al, 2003). For these reasons, it is sometimes difficult to separate out research findings from advocacy, and there is, arguably, a lack of critical distance in many of the studies. Apart from this general remark at the outset, however, this criticism will not be developed in relation to individual studies. Rather, I will accept that research in a new field of this kind is inevitably accompanied by the enthusiasm of early adopters, and point up the need for larger, longer external studies in the future.

Three broad rationales can be identified for moving image production in education across the research literature. By far the largest of these in terms of research is the rationale derived from media education. The second largest rationale is the argument for video production as an expressive form, in the context of arts education. The third largest group represents an argument for the use of video to enhance or mediate learning in other curriculum areas. Accordingly, these will form the subheadings of this chapter.

Media Education

Internationally, there is a good degree of international consensus about what media education constitutes (Buckingham, 2001), insofar as it revolves around a conceptual framework which young people can be expected to grasp. This framework covers concepts of media institutions, texts, and audiences. For the purposes of this chapter, it also assumes that the learning of this conceptual framework will be attained by both analysis and production of media texts.

As Buckingham points out (2003), media education should lead to the outcome known in many countries as media literacy. This idea is differently understood in different contexts and countries. In the UK, the media regulator OFCOM's definition of media literacy includes access to, understanding of, and creation of media texts. However, statutory curricula in different countries may be much less balanced in actually requiring that children learn to make media texts as an entitlement. In the UK National Curriculum, for instance, attention to the moving image is limited to the reading section, so that children in England and Wales are required to 'read' the moving image, but not to 'write' it – so that the statutory requirement is at odds with the media regulator's definition. By contrast, in the Canadian state of Ontario, the English secondary curriculum is constructed as four strands, the fourth of which is Media Studies. While this requires that students both "learn to understand and interpret media works", it also specifies that they should "learn about the media through the process of creating their own media works, using a range of technologies to do so." However, this requirement applies very generally to all media: examples given are book jackets, songs and sample web pages. The moving image is not, then, prescribed specifically.

In the US, while there is no clear pattern of curricular provision for media education, there is a tradition of such work, often co-ordinated by voluntary organisations such as the Center for Media Literacy. One of most influential articulations of the related

notions of media education and media literacy, by Kathleen Tyner (1998), proposes an expansion of traditional literacy into visual media and new technologies, and associates such literacies with access to forms of social power.

A question about this more general notion of media literacy which is raised by some studies cited in this chapter is to what extent it might need to be complemented by more specific competences with particular media. Some studies propose an idea of moving image literacy. However, it is important to realise that there is not simply one model of moving image literacy at work here. Perhaps the dominant model in this field derives from the traditional understanding of filmic conventions outlined in its most familiar form by the standard film studies textbook, Bordwell and Thompson's *Film Art* (2004). Even where it is not explicitly referenced, the research of practitioners in digital video often seems to be using a default model best described in terms of this framework, which incorporates the dramatic aspects of film (*mise-en-scene*) and the twin processes of filming and editing. Another model in the UK has been the cine-literacy framework proposed by the British Film Institute (FEWG, 1999), which emphasises the importance of film texts. A third is the multimodal model proposed by Burn and Parker (2003), who argue that the moving image is not one signifying system, but an ensemble of many, and that any model of literacy needs to be responsive to this ensemble.

A strong common feature of much of the research is the relation of digital video as a signifying system to the social and cultural interests of the young producers of moving image texts. Perhaps the earliest study (Sefton-Green, 1995) shows how secondary school students making trailers for the film *The Outsiders* feel empowered by their new ability to manipulate the material of filmic texts, to move from the cultural role of audience to that of producer. This theme is echoed in many subsequent studies: Burn & Reed (1999), Sweetlove (2001), Burn *et al* (2001), Burn & Durran (forthcoming). Judgments about this empowerment are in most cases based on interview or observation data, in which young people report feelings of control, of being the director or editor, and of the excitement of being on the other side of the production process.

A problem for this kind of research is how to account for the motivation of *individual* students. The media production work reported by all the studies is characteristically group work, and there is a danger of collapsing the individual motivations of young film-makers into claims about the motivations of the group as a whole. This is balanced to some extent by detailed attention either to aspects of the video work contributed by subsets of the group, or by the use of interview data or written work by students to differentiate between participants. Sweetlove (2001) shows, in the context of a media project within English, that peer tutoring in pairs made up of a more experienced user of the software and a novice produces more effective learning of the digital editing process than teacher demonstration or worksheet, but distinguishes finely between different degrees of success with different individuals. Kelsall, in Burn *et al* (2001) shows how A Level Media Studies students making music videos negotiate differing cultural interests and emphases in their choices of image, sound, rhythm and pace, using recordings of student talk during the editing to reflect different aesthetic preferences shown by different individuals. Burn (2000) shows how a group of four boys in a Media Studies class splits, in response to different motivations, into two pairs, which are able to follow their own interests, the pair

being, in many ways, a more natural editing unit for computer-based work than the foursome.

Several studies report that a powerful motivating force is self-representation: the use of digital video as an expressive form to represent aspects of young people's developing identities, social roles, and aspirations. This is a feature of Sefton-Green's study, in which the teenage heroes of *The Outsiders* provide attractive territory for the exploration of selfhood by the teenage video-makers. Reid *et al* (2003) place considerable emphasis on the value of DV as a medium for the exploration of identity, citing several examples, one of which, from a Media Studies classroom, showed how two girls used their documentary film to engage with their relationships with their parents in the aftermath of their fathers' redundancy as workers in South Wales. Burn & Parker (2003) analyse a skateboarding video made by three sixteen-year-olds, concluding that it allows aspirational representations of the makers' peer culture, while also addressing a Media Studies examination system in which they wish to perform well.

Another aspect of identity which is explored as a powerful motivating force in a number of studies is the beliefs and convictions of young people. For Goodman (2003), this is a central purpose of the video-making of the teenagers at his centre in New York; indeed, the central use of the documentary genre here presupposes that the articulation of social and political beliefs, particularly about the place and rights of young people in modern urban societies, will be a key function of the work with video. Burn & Parker (2001b) analyse an advertisement for Fair Trade chocolate made by 16-year-old students, who struggle to represent the abstract notion of Fair Trade, and the distant phenomenon of African cocoa-framing, resorting to symbolic images (tropical plants) and on-screen text to convey these messages. They find themselves torn between these distant cultural references and their own more immediate interests in their peer culture, represented by their teenage protagonist and their hip-hop soundtrack.

Another common feature is the exploration of what students learn about the formal systems of signification in the moving image through, in particular, the process of digital editing. For instance, Sweetlove & Tuohey (in Burn *et al*, 2001) show how 12-year-old students learn to indicate aspects of place and time through the order of shots and the use of transitions, as they edit their own film of a class play.

As remarked above, these systems of signification are differently conceived in different studies. In some studies, a general deployment of well-understood notions of camerawork and editing points towards the conventions of filming and editing laid out in standard textbooks of film theory such as Bordwell and Thompson (2004). In other cases, however, these conventions are explicitly referenced. Coxon (2002), for instance, describes how his A Level Film Studies students used Adobe Premiere to edit a series of rushes for the UK television adaptation of Pride and Prejudice, provided by the *bfi*, in accordance with classic principles of continuity editing. Reid *et al* (2003) give examples of specialist media studies work with a similar conceptual focus:

> Elsewhere, work was clearly associated with forms of moving image literacy conceptualised in terms of traditional film grammar and the meta-language

> associated with it. For example, it was reported in one of the school visits that a Scottish Advanced Higher media studies student had an '… understanding … that the film would highlight and reinforce the various techniques such as 180 degree rule, eyeline match etc, and also to experience the whole film-making process – from the initial idea through to planning, scripting, shooting, storyboarding, filming and editing.' (2003: 24-25)

Elsewhere, However, there is some uncertainty about what kind of 'film language' students are using or learning in many of the studies whose context is Media Studies. This may be because work produced for public examinations in the UK tends to be confined to 'short form' genres, such as TV adverts, film trailers, title sequences and music videos. These forms make frequent appearances: the making of film trailers appears in Sefton-Green (1995), Burn & Reed (1999), Burn (2000), Durran (in Burn *et al*, 2001); making adverts appears in Burn & Parker (2002); and music video appears in Kelsall (in Burn et al, 2001), and Archer (forthcoming). These short forms are not ideal for the teaching and learning of the continuity system of editing as Bordwell & Thompson describe it. The continuity system evolved as a narrative strategy based around the unfolding of events in logical relations between units of space and time. By contrast, trailers, adverts and music videos are condensed, impressionistic, and not typically subject to straightforward narrative sequence. Arguably, they might be best theorised in terms of classical montage theory (Eisenstein, 1968), which considers how the juxtaposition of moving image images and sounds produces new meanings; or more recent formulations of montage theory in the context of new media (Manovich, 2002). Burn & Reed (1999) consider this kind of condensed form in their account of a film trailer made by four girls, who select and edit together key moments from the film, theorised by the authors in terms of Barthes' cardinal points in narrative (Barthes, 1978).

In some studies, questions are raised about the limits of conventional models of 'film language'. Burn & Durran (2006) give an example of a boy who writes about aspects of dramatic movement in Luhrmann's *Romeo + Juliet* which are difficult to account for in terms of Bordwell and Thompson's schema, for instance. They propose instead a multimodal approach, elaborated more fully by Burn & Parker (2003), drawing in particular on Kress & van Leeuwen (2001). In this study of a skateboarding video made by three teenage boys, they propose the idea of the *kineikonic* mode (from the Greek words for move and image), as an overarching idea of how the contributory modes of the moving image are assembled in any given text. While on the one hand these modes include the forms of spatial and temporal design usually associated with the moving image, they also include performative, dramatic, improvised actions and gestures of the subjects of the film, conceived here in terms of Goffman's notion of dramatised selfhood (1959). This theory is applied and further refined in a number of subsequent studies in the context of other curriculum areas considered below.

The model of multimodality used in these studies has a number of clear advantages. It enables the researchers to be quite precise about which semiotic modes and media are used by children and for what purpose. It gives a more complete picture of the use of these modes than earlier models of moving image literacy, where the focus was more on the visual, and on the specific signifying properties of the filming and editing processes. However, these studies, in developing their own analytical framework, are often unclear about how explicitly the children themselves understand what they are

doing, or indeed the extent to which this might be necessary. Further research and debate is needed, therefore, on the question of whether a multimodal semiotics is best used as an analytical tool for researchers to explain what children are doing; or whether such a tool, at some level, can be made available to children themselves, and if so, what the benefits would be.

Most of the studies, from Sefton-Green (1995) onward, suggest that the principal difference made by digital editing software is the ability to revise work endlessly and instantly. This was simply not possible with analogue video, as those practitioners who have moved from analogue to digital point out (Burn & Durran, 1998). This feature of digital editing derives from what Manovich (1998) calls the principle of *variability*: because digital media consist of databases of media objects provisionally configured by algorithms, the configurations is infinitely variable, which the user experiences as the plasticity and provisionality of digital video which many of the studies comment on.

Reid *et al* (2003) identify four affordances of the digital medium: feedback, dynamic presentation, integration and iterative design. The first is noted both in this study, and in other studies: Kelsall and Durran (in Burn *et al*, 2003) both note the importance of the instant viewing of their work by students, both in terms of motivation and in terms of reflection on the developing edit. Dynamic presentation is presented by Reid *et al* as the possibilities for screening the finished work on TV screens, projectors, intranets and the worldwide web. These varied platforms for exhibition are certainly at least partly characteristic of the digital medium specifically; though as Reid *et al* point out, the degree to which they might be described as 'dynamic' varied considerably. Integration refers to the convergence of different authoring tools (graphic, audio, moving image) within the assembled video. Finally, iterative editing refers to the ability to endlessly rework the edited piece, a feature of digital video mentioned in many of the studies. Burn & Reed (1999) break this feature down into more specific functions. They point out that the raw material for the edit can be stored in 'bins' in the software in a way that would not have been possible with analogue video, allowing for much more ambitious and experimental successive edits. Rather than making a new text each time, each successive edit was a revised version of a previous one – genuinely an 'edit' rather than a complete rethink. The girls using the software also spent some time adjusting the pace of the piece by trimming clips on the timeline of the software, which, again, is a function not possible in analogue video, where the length of shot initially decided on would then be fixed.

The emphasis in nearly all of the studies is, as we have seen, on the notion of moving image production: as a technology, as a cultural and critical practice, as a dimension of moving image literacy. One study, however, displaces the emphasis onto the analysis of media texts through the use of digital editing software. Burn & Durran (2006) describe how 13-year-old media studies students use the free software Microsoft Moviemaker to analyse aspects of a film. This software, like some others, has a 'clip detection' function which splits up incoming media into shots. The teacher had pre-loaded the whole film into the software, so that it showed up as hundreds of individual shots in the 'bin'. Students were then able to sort, analyse, edit together, and export shots into Powerpoint to make visual 'essays' about the 'grammar', style and meaning of the film.

In general, then, in the specific context of media education, digital video is seen as having a number of significant benefits. In many of these studies, it has provided access to moving image production for the first time. It has extended such work down the secondary age range. It has allowed for a more profound learning experience through iterative editing in which students can experiment, and connect the experience of composing moving image sequences with their developing conceptual understanding of the moving image as a semiotic system, however this may be represented by their teachers or by the researchers. In addition, it provides a powerful connection to the moving image cultures in which learners develop their first understandings of the medium, and on which they draw as resources for their own creative work.

Digital Video in Arts Education

This category overlaps with the previous one. This is largely because some of the projects described in these studies, while they are clearly constituted as Arts projects in relation either to Arts subjects in the formal curriculum or in the informal education sector, are conceived of, by researchers or practitioners or both, as forms of media education.

Like many studies in the other categories, studies of digital video-based arts projects frequently emphasise the value of the medium for the exploration of the social identity of young people, enabling forms of self-representation in which young film-makers can explore their social roles in the world, play with fantasy identities, and test out aspects of selfhood such as race and sexuality. De Block *et al* (2005) reports on a large EC-funded three-year project in which migrant children in different European countries use digital video artwork to represent the experience of migration, working with video artists and educators in after-school clubs. The study shows that the children's identity as migrants can be represented either directly, for instance as a form of narrative; or indirectly, by displacing images of migration and origin in favour of identity claims based in global media cultures. Though this is an arts project, its rationale and the interpretive framework of the research are those of media education; so that the expressive form is seen as becoming available to the children through a combination of the formal signifying properties of the moving image and the cultural resources on which the children choose to draw, especially those from popular media such as music video, television drama and cartoons.

Overton (2004), an Art and Drama teacher in a special school for children with physical disabilities, describes his own practice in an action research project funded by the UK's department of education (DfES), and supervised by the British Film Institute and the Institute of Education. He shows how children use digital video to represent aspects of their disability, transforming these into positive images through dance and sci fi narratives. Again, the motivation for the work proceeds from the students' sense of self, and the contradictory needs both to face their disabilities and escape them. While this was conceived by the teacher as a Drama project, in which digital video would compensate for the difficulty for the children in the physical aspects of drama, it resembled a media education project in many ways. In particular, like the projects already referred to, it taught specific moving image conventions, such as shot types and technical roles, which were explicitly reinforcement by the teacher, through the use of wordwalls, labels attached to equipment, and group discussion. The

teacher also recognised the students' popular cultural experience, such as their interest in videogames, making a reference to *Tombraider 4* a central reference for the content and style of the piece.

Potter (2005) describes an arts project in which he works with a primary school class at the end of their last term in the school, using digital video cameras and editing software (Pinnacle Studio) to make short films of their memories of the school. He explores how two boys in the class construct playful images of themselves, elaborating on and exaggerating aspects of the social roles they play in the school. This project is conceived in general terms as a digital arts project, and, unlike some of the media education projects described in other studies, avoids emphasis on the formal conventions of the moving image. It finds, however, that a sophisticated grasp of television conventions, from a range of shot types to generic features of chat shows and youth television, are deployed by the two boys.

Burn (2003) describes a project in which six bilingual teenage girls make short films of their performances of their own poems about language and identity. Here, aspects of identity are closely related to how the girls have constructed the moving image text: for instance, a sequence of shots in which a girl faces alternatively in different directions represents her bilingualism in English and Bengali. This project also raises questions about the limitations of the conventions of media education: while these are clearly moving image texts, they are not identifiable popular cultural forms. This project takes place in a hybrid context. The poetry exercise originated in the study of a poem for an exam set text in English; the films were supervised by an English and Media teacher with an expertise in digital video. The emphasis, as in several of the Arts projects referred to here, is both on the conventions of the moving image and on expressive forms which are traditionally highly valued, in this case poetry.

An aspect of identity which occurs in several studies is that of cultural taste. Video made by young people often represents specific pleasures in forms of popular music, in televisual and filmic styles and genres, and in dress codes and forms of (sub)cultural performance. Potter shows how the two boys whose video he analyses incorporate music by the Red Hot Chilli Peppers and other bands to indicate their sophisticated tastes in music (2005). De Block *et al* give several examples of children using music as a cultural marker, either of their own ethnic or national origins, as in a Turkish boy's performance in song and on a traditional instrument; or through global musical forms, such as hip-hop (2005). Doyle shows how two thirteen-year-old girls making a trailer for an imaginary horror film play with conventions of the genre which appeal to teenage fascinations with death (2005), producing images in which they use their friends as 'the two girls who are dead', and construct shots that directly imitate films such as Kubrick's *The Shining*.

A strong emphasis in research into digital moving image production in Arts projects is, unsurprisingly, creativity. This theme engages with policy expectations about artistic production as a creative process (cf NACCCE, 1999). There is some tension between this conception and the more conventional media education rationales in which making the moving image serves the more general aim to develop critical awareness and a conceptual grasp of the nature of media texts. However, media educators also see moving image production as creative in ways that exceed these more limited purposes: Buckingham (2003) devotes a chapter to notions of creativity

in media education, for instance. Similarly, the four teacher-researchers whose work is collected in Burn *et al* (2003) construct a conceptual model of digital editing in which creativity is one of three components, the others being social roles and skills, and literacies.

In Potter (2005) creativity is conceived, following Loveless (2002) and Cziksentmihalyi (1996) as 'interaction between people within specific domains and contexts which give rise to the production of work but also construct the value of that work'. Thus, the primary school children described in his research interact through the use of digital editing tools in ways which also relate to the social context of their life in primary school, represented and valued in their film.

Reid *et al* (2002), in their evaluation of the use of digital video across the curriculum in fifty schools in England, make a number of references to the use of digital video in the arts. In particular, the wider evaluation contains three detailed case studies, one of which describes the work of an Art teacher who conducts a number of animation projects with different classes of different ages. The children work in a range of media to make drawn and plasticine animations. The media education emphasis on critical understanding and concept development is here replaced by an emphasis on expressive work, on the craft of the artist in different media, and on creativity conceived as originality. In contrast to the reference to popular media encouraged in media education, originality is here seen by the teacher as opposed to popular television. However, the normal practices of Art education do move in the direction of media education in recognising the moving image as a structured system of signification: the children storyboard their narratives, and learn basic conventions of shot construction.

As for the value of the digital medium in this project, the feedback and dynamic display functions proposed in the wider study are the most obvious. The teacher gathers the class around the edited film at various stages of its completion to see the progress so far, and comment on how it might develop. And the finished films of the groups are projected in assemblies and parents' evenings (though again, this exhibition is difficult to distinguish from pre-digital forms of film or video exhibition).

The discussion of creativity in Reid *et al*, following Sharples (1999), suggests that creativity in the use of digital editing software and digital camcorders is found most clearly in projects where teachers are clear about the constraints of the activity. These constraints are associated in some cases with the conventions of moving image 'language'; so that the teachers who give explicit instruction in techniques of shot construction and continuity editing provide greater opportunities for successfully expressive work than those who allow greater 'freedom' for children to experiment. Security with the 'rules' of this language allowed children to produce witty, subversive, ironic pieces with some degree of confidence. What this study was unable to test, however, was whether repeated opportunities to experiment with production would have allowed children to discover and evolve a comparable grasp of techniques and conventions. In this respect, this study is limited in the same way as all the literature in this field, which consists entirely of snapshots and short-term case studies. A clear gap in the research is longitudinal studies which might explore recursive learning with digital editing software.

Burn & Parker (2001) describe a media arts project conducted by a consortium of a specialist media arts school and a cinema, providing an artist-in-residence project for a group of local primary schools. The children made animated films using a computer animation software, *The Complete Animator*, with teachers from the secondary school, the Film Education officer from the cinema, and an animator-in-residence. In this study, creativity was conceived as specific forms of work with successive layers of authoring software in the primary school animation project they explore. They consider how the children appropriate basic shapes in a vector-drawing package, *Acorn Draw!*, and invest these with cultural meanings, by, for instance, designing a Red Riding Hood character beginning with a circle which suggested the feminine shapes derived from experiences of teenage pop divas like Britney Spears; or a woodcutter modelled on Arnold Schwarzenegger which begins with a more 'masculine' square. These images, subsequently imported by the students into the animation software, are seen as derivative (from popular cultural experience) but also creative, in that they are adapted to represent particular preoccupations and interests of the young authors. Creativity and the moving image here is seen as transformation both of semiotic-cultural resources and of self. However, this project is conceived, both by the practitioners and the researchers, as a form of media education, so that a strong emphasis is placed on shot construction, narrative structure, and the conventions of editing. The point if interest, perhaps, is the synthesis of these explicit meaning-making processes which the project was concerned to teach, and the popular cultural references which the children found unaided, indeed, often unnoticed.

As in the studies of media education projects, there is a strong theme which emphasises the importance of the moving image's formal properties as a system of signification. Again, this is sometimes conceived in terms of the traditional conventions of the continuity system, so that shot types and edit sequences are explicit features of the teaching, as we have seen, in some of the projects in Reid et al (2003), in Overton (2004), in Burn & Parker (2001), in Doyle (2004), and in de Block et al (2005). However, the researchers do not always interpret the outcomes of the projects in the same terms. As in the media education literature, one approach which produces a more complex analysis is rooted in theories of multimodal semiotics (Kress & van Leeuwen, 2001). Potter (2004) interprets the film made by the two primary school boys in his study in this way, considering how their film integrates different semiotic modes, such as their own dramatic performances, the music they have selected, culturally salient objects from their world like toys and costumes, and different forms and styles of spoken language. Doyle (2004) analyses how the girls in her study combine the semiotics of filming and editing with the signifying properties of objects, buildings, costumes, makeup, and, again, dramatic action and speech. Burn & Parker (2003) analyse how music, speech and moving image combine in a children's computer animation of an African folktale, identifying different combinations of the modes, such as anticipation (where the music suggests an event ahead of the image track), complementarity, and contradiction, for instance for ironic effect.

Very few of the studies make many claims for the differences made by digital cameras. An exception is de Block *et al* (2005), who describes how digital cameras helped to speed up the process of learning, providing instant feedback through flip-out LCD screens, which could be viewed by a group of children. Along with 'on-location editing', made possible by laptops with Apple's i-movie, the whole production

process was able to keep up with the pace of learning needed by the children, rather than slowing it down and fragmenting it into different phases.

Three other studies address the nature of the digital medium. Reid *et al* (2003) show that, in some of the schools in their study, computers as editing tools make possible many different social models of editing, from small groups of four to individuals working on their own project, which was much less likely in the days of analogue video edit suites, though of course possible. Sefton-Green and Parker (2000), exploring how primary school children use three different computer animation softwares, observe how the children used the computer as a kind of co-worker, in a 'choric' process which they compare to children's drama. Finally, Burn and Parker (2001) report how the primary school children making a class animation shared a common bank of digital images on the school's computer network, to which they had all contributed, and from which they all borrowed to make their designated sequence.

Digital Video across the curriculum

Beyond the media education and arts education perspectives, there is a smaller and more recent body of work concerned with digital video as a learning technology. Some of these are small studies (eg, Tschirner, 2001; Swain et al, 2003; Ross, Yerrick & Molebash, 2003), in which digital video is presented as a relatively transparent medium through which curriculum content can be mediated, or which can aid the development of concepts specific to a curriculum area such as science or history. In addition, a small number of studies explore the value of digital video for students with special needs. Overton's study (2004), which has already been cited above, describes how DV can allow access to physical expressive forms such as Drama and Dance for students with a range of physical disabilities. Dimitriadi and Hodson (2005) find that digital video offers valuable forms of multisensory learning, and helps to develop collaborative skills, second-language fluency, and reflection among bilingual children with special educational needs in six inner-London primary schools.

Two of the larger studies of digital video in the classroom address the wider curricular context. One of these, Reid et al (2003), has already been discussed above, as it also includes discussions of data representing digital video in specialist media classrooms and in the arts. However, this project extended to uses of DV in all curriculum areas, though some, such as Maths and Religious Education, only took place in one school (fig 1).

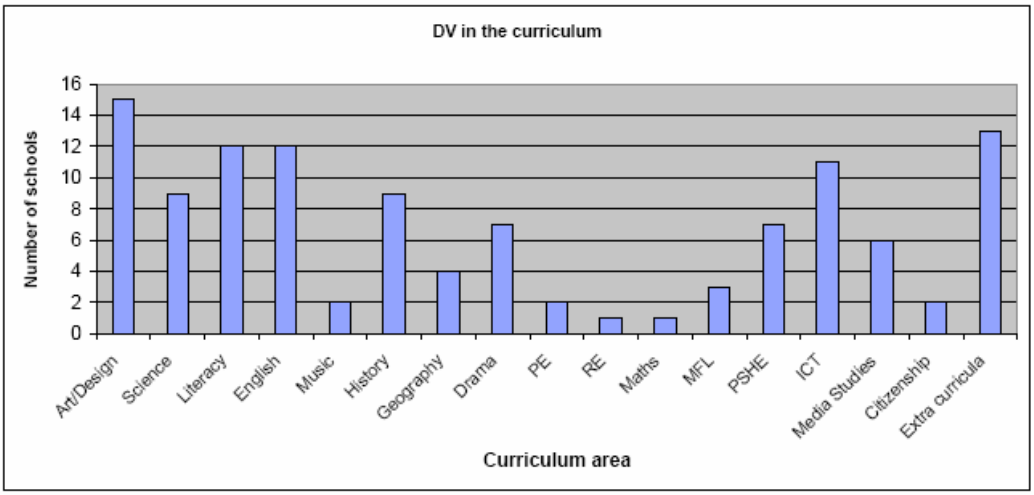

Figure 1, from Reid et al (2003)

The other study, Schuck & Kearney (2005), investigates the use of digital video in five Australian schools, in classrooms which ranged from Kindergarten to Year 12, and in subjects which included ICT, RE, History, Maths, Science, ICT, and an LOTE (Languages Other Than English) classroom.

The findings from these studies echo certain themes of the media education literature. In particular, both studies emphasise the motivating effect of digital video; and they take possible explanations further than other studies. Reid et al offer possible explanations for the increased motivation which was widely reported by teachers. Firstly, the use of DV depends on, and engages with, children's experience of television and film, which are widely distributed, in contrast with other ICTs, leading to a democratising element in digital video work. Secondly, the study identified students' ownership of the work, especially noticed among disaffected students, and in projects where students took the initiative, sometimes where teachers were uncertain of the new medium. Thirdly, the study speculated that the novelty of the medium might have raised motivation among some students.

Motivation is also reported as a key consequence of the use of DV by Schuck & Kearney. Again, it is associated with increased ownership of work, and with a higher than usual degree of autonomy for students. However, this study also suggested that the nature of the medium itself may be partly responsible for increased motivation. Although this idea is not fully explored, it does echo suggestions in other studies, such as Durran's (in Burn et al, 2001), which emphasises the intense pleasure of the editing process, or Burn & Reed (1999), who describe how the editing activity held a group of girls for many hours after school. While these observations are not theorised, they do point towards later uses of the 'flow' theory of the psychologist Mihaly Csikszentmihalyi (1991) in explaining the immersive experience e of using digital media in general (cf Loveless, 2003).

Both studies also emphasise the importance of attention to the language of the moving image. Reid *et al* (2003) show how certain of the case studies in their study produce high quality films through explicit teaching of the conventions and language of the moving image, in some cases consisting of quite formal employment of the rules of continuity editing. This study finds, across the fifty schools in the project, that

effective work must, in some way, pay attention to the language of the moving image, in fact; and that there can be no 'transparent' use of digital video to convey ideas, information or other content of different curriculum subjects.

Schuck & Kearney emphasise the importance of media literacy, and their examples demonstrate that this includes critical awareness of the medium (a project on advertising), developing understanding of textual structures (a project on narrative in Hollywood films), and learning detailed editing conventions at both practical and metalinguistic levels.

However, both studies make important distinctions between different emphases in the use of digital video. Reid et al's finding that the best work was in many cases related to the most explicit attention to the language of the moving image, and its consequent argument that there can be no transparent use of the medium, also rests on a judgment that those schools which simply used digital video as a way of recording subject content were missing out on its expressive potential, and on students' extensive knowledge of moving image culture. In the case of Schuck & Kearney, although they cite examples of attention to the medium, they also find that outcomes relating to autonomy and motivation were more evident that those relating to metacognition or development of conceptual understanding. This finding is less easy to interpret than Reid *et al*'s clear, though somewhat polemical, argument about the importance of the medium. On the one hand, it could suggest that attention to media literacy as a conceptual framework is less important to teachers of a variety of curriculum subjects than the motivational power of DV simply to enhance students' interest in their subject. On the other hand, Schuck & Kearney develop an argument for 'authenticity' which, while independent of some aspects of media literacy, also captures features of learning with digital video which are absolutely complementary to media literacy. The specific points they make are that authentic learning involves engaging with real-world problems and situations (through video journalism, for instance); filming real events or processes rather than learning through simulations; and making films for real audiences, who provide real feedback. This echoes a similar point by Burn & Parker (2001), who point out that showing children's animations in a real cinema breaks out of the culture of simulation in which many school experiences are locked.

Finally, these two studies make additional points which are important, and which are not developed elsewhere in the literature. Schuck & Kearney find that a critical factor in the successful adoption of digital video as a learning tool is the school environment, listing a number of features from supportive head teachers to essential technical support staff. Reid *et al* make two related points which reach beyond the projects described in their study, to ask how student films might be evaluated, and how learning progression in the moving image might be structured. These points recognise the fact that, outside formal assessment criteria in Media Studies exams, no clear sense has yet emerged of how teachers and students can tell how successful their films are; nor how learning in one course can lead to more advanced learning the next time. These problems are partly consequent upon a situation in which the use of DV typically happens only once or twice in a child's school career; though forms of progression are now being mapped by schools with a particular interests in media forms and technologies, such as the specialist media arts colleges in the UK (Kirwan *et al*, 2003; Burn & Durran, forthcoming).

One more research focus may be mentioned: the question about how moving image literacy relates to print literacy. This does reflect the curriculum priorities of English and literacy curricula; though in fact all the studies cited here in relation to this focus are clearly within the media education paradigm, and are exploring the ezxtensive shared territory between English and media education. A key hypothesis here is that by understanding and making moving image texts of their own, children will come to understand and deploy features of print texts better. Parker (1999, 2002) reports on a project in which a class of primary school children improve aspects of their narrative writing such as visual description after having worked on their own computer animation of a Roald Dahl story. Similarly, Henson (2005) finds that a group of under-achieving Year 9 boys score better than predicted in national English tests after working on an animation project. There is some question about the correlation between small qualitative case study accounts of production work and raw scores here; and also a difficulty in distinguishing between the motivating effects of media production work and specific cognitive gains. Also, though these are both accounts of work using digital media production technologies, the difference made by the digital medium is not really isolated. Nevertheless, these studies suggest that digital moving image production does connect with aspects of print literacy, and that exactly how this happens is a question well worth exploring in future research.

CONCLUSION

The research literature summarised here presents a picture which, though unclear and murky in places, neverthess contains strong indications about the value of digital moving image production and learning. It also clarifies question which need further research.

The picture is, unsurprisingly, of a new technology in its infancy. Many of the studies represent early forays into digital editing, and are limited by the one-off nature of the project, or by its novelty. Nevertheless, one important theme of the research tells an old story. The use of media technologies, forms and genres as learning tools prompts the question about whether these forms can be used transparently to contain, record, re-present, curriculum content with no explicit reference to the system of signification and the cultures from which it derives – what Buckingham (2003) calls learning through the media rather than learning about the media. Like Buckingham, many of the authors represented in this chapter (including the present author) believe that to do so not only misses important learning opportunities, but fundamentally misunderstands the medium. The moving image cannot produce ‘transparent’ meanings: it will always structure meaning through framing, shot type, and the editing of image and sound, as Reid *et al* argue (2003).

A general point about the moving image, in this respect, is that, although all digital media in a sense have analogue predecessors, digital editing softwares are particularly strongly connected with analogue editing of video and celluloid film editing, for three reasons. Firstly, in many ways digital editing is doing essentially the same job as its analogue forebear, that is, producing film and television. Secondly, like earlier editing technologies, digital *editing* is only half the picture: it depends on its relationship with the process of filming, which is in several respects unchanged by the digital medium, still depending primarily on the composition of shots through a lens and viewfinder. Thirdly, digital editing proceeds in certain very clear ways from a history of a century

of film production and half a century of television, and employs the signifying systems, cultural frameworks and social production processes which have evolved through these histories.

Arguably, what is happening here can be related to Lev Manovich's parallel histories of representational technologies; and the computer (1998). He proposes that the former begins with Daguerre's daguerreotype and the latter with Babbage's Analytical Engine, both in the 1830s. The two histories, the first concerned with visual recordings and constructions of the world, the second with calculation and information, proceeded separately until very recently, when the convergence of computers with the representational technologies of photography and the moving image bring them together. Manovich describes this as the fusion of two layers: the computer layer and the cultural layer. The implications for education, perhaps, are that those whose principal concern is the use of ICTs in education, perhaps in the context of e-learning, need to understand the cultural history and uses of the moving image; while media specialists need to understand what it means for their familiar televisual and cinematic texts to become computable.

The difference made by the digital medium has been a focus of attention, as we have seen, in some of these studies, in particular the specific affordances isolated by studies such as de Block et al (2005) and Reid et al (2003). These suggest that digital video combines traditional conventions of moving image composition with generic and transferable processes of ICT authoring of the kind described by Sefton-Green (2005). While these begin to suggest what the learning benefits are of digital video editing, they also indicate how important it is to see the use of digital video as a form of continuity in practices of communication and representation. Rather than seeing digital video as a brand new technology, it might be better to see it as a stage of development in a moving image culture that has a history of over a century.

Finally, it is clear that this research field is marked by a preponderance of studies rooted in theories of media education. A consequence of this is a particular view of learning, emphasising theories of new literacies, such as multimodality, the importance of popular cultural texts and contexts, and the conceptual framework of media education. There is much less evidence of learning theories which are typical more generally of research in e-learning, such as constructivist approaches, though there is, in this field, some accommodation between Vygotskyan learning theory and media education perspectives, which explore forms of progression from children's informal experiences of the media outside school to more formal conceptual learning about the media in school (Buckingham, 2003; Burn & Durran, 2006). Again, the nature of learning in relation to this medium needs further research, and futher consideration of how different interpretive traditions might complement each other.

Perhaps the arrival of free editing software on every computer will usher in a new dawn of video-making in schools, taking its place alongside other forms of digital authoring: music composition, web-authoring, game design. Alternatively, it could be argued that, like other artistic or expressive media, filmic forms will struggle for a place in an overcrowded curriculum, like painting, music and photography have before them. Whatever the case, there will be a need for larger studies to produce more authoritative conclusions than the existing small case studies, valuable though

their collective suggestions are; and longitudinal studies to develop models of recursive learning in this medium.

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