



REVIEW

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**A systematic review of the
impact of ICT on the learning of
literacies associated with
moving image texts in English,
5-16**

Review conducted by the English Review Group

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Statement of conflict of interest

A potential conflict of interests should be noted, in that Burn is also the author or co-author of studies included in this review (see references for details). Steps which address this conflict of interest include:

- the identification of papers through searching and keywording by the whole team – all of Burn's papers were identified in handsearches by other members of the team, and were keyworded by other members of the team;
- a declaration of interest to the co-ordinator of the English Review Group;
- the double data-extraction by the two authors of the sub-review;
- the independent additional data-extraction of one of Burn's co-authored papers (Burn and Reed, 1999) by Diana Elbourne.

LIST OF ABBREVIATIONS

BECTa	British Educational Communications and Technology Agency
ICT	Information and Communication Technology
BFI	British Film Institute

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SUMMARY

Background

The English Review Group completed an overarching systematic review of the impact of Information and Communication Technology (ICT) on literacy learning in English in 2002 (Andrews *et al.*, 2002). In this review, a descriptive map described all the included research in the field. An in-depth sub-review reported on the impact of networked ICT on literacy learning (Andrews *et al.*, 2002). The present review is one of a further four in-depth sub-reviews that address aspects of the overarching question – what is the impact of ICT on literacy learning in English? The broad background to the descriptive map and the in-depth sub-reviews is that there is a growing concern internationally that the investment in ICT in schools is not impacting on literacy development. This concern arises from a belief held by many – including governments as well as schools – that ICT *is* beneficial to learning and specifically literacy learning. The question is a specific one and has to be seen within a wider political, social and technological context in which the symbiosis between new technologies and new literacies (and thus literacy learning) is acknowledged.

The present review is one of those four sub-reviews and addresses a question about a specific form of literacy – moving image literacy – and how the use of ICT impacts on the development of such a literacy.

The background to this question is the growth of engagement with, and production of, moving image texts, using digital technologies in schools. This has been conceived both as a form of expanded literacy and, in wider terms, as a set of cultural practices drawing on popular cultures and the use of digital media beyond school.

Aims

The overall aim of the two-year project is to determine the impact of ICT on literacy learning in English for 5 to 16 year-olds.

The main aim of the present review is to review and evaluate accounts of the relationship between ICTs related to the moving image, and the impact of their use on literacies associated with the moving image. Related aims were to discover theoretical models of moving image literacy and ICTs which could inform classroom practice and research; and to identify gaps which future research could address.

Review questions

The overall research question for the two-year project is ‘What is the impact of ICT on literacy learning in English, 5 – 16?’

The review question for this review is:

What is the impact of ICT on the learning of literacies associated with moving image texts in English?

The four sub-questions are:

- ***Which studies develop theoretical models which will be most useful for practitioners in improving teaching and learning in this field?***
- ***Which studies provide the most convincing qualitative data, taking into account the methodology of the study; theoretical models proposed in the study and the extent to which the data support them; and patterns in findings across studies?***
- ***What discernible patterns, if any, emerge across the findings of the studies which might be suggestive if not conclusive? (that is, patterns suggestive of the validity of certain theoretical models as against others; and of the effectiveness of particular practices).***
- ***What gaps are there which need to be addressed by further research?***

Methods

Defining relevant studies for the descriptive map of the overarching review: inclusion and exclusion criteria

The earlier overarching systematic review (Andrews *et al.*, 2002) mapped the research on the impact of ICT on literacy learning in English for 5 to 16 year-olds. The relevant research was searched for, located, sent for and mapped for the years 1990-2001. In addition to updating the searches for the period 2001-2002 and screening for inclusion of any potentially relevant studies for the period 2001-2002, all the included studies in the original map were re-keyworded using revised generic and review-specific keywording sheets. The English Review Group working document (Appendix 2.1) for the inclusion and exclusion of potentially relevant studies was updated to reflect changes made to the keywording sheets, both generic and review-specific. See Appendix 2.1 for the inclusion/exclusion criteria for the descriptive map of the overarching review.

Characterising included studies for the descriptive map of the overarching review: EPPI-Centre and review-specific keywording

All the studies included in the original database from the review of 2001 were re-keyworded by members of the Review Team using the new guidelines from the EPPI-Centre (EPPI-Centre, 2002). The studies retrieved for the updated database were keyworded by a member of the Review Team (CT), with assistance from other members of the team and the EPPI-Centre where there was any doubt about keywording. The database was fully annotated with the keywords by another member of the team (AR). For pragmatic reasons, the database for 2002 was closed on 30 November 2002. Any studies received after that time will be included in the next update.

Identifying and describing studies for the descriptive map of the overarching review: quality assurance process

For the purposes of quality assurance two members of the Review Team (RA and SB) and one member of the EPPI-Centre (DE) screened a random sample (10%) of the studies (initially screened by CT) in the updated database. Screening was undertaken independently, using the inclusion/exclusion criteria working document. After double-screening the inter-rater reliability scores between CT and RA, CT and SB, and CT and DE were calculated using the Cohen's Kappa.

Defining, selecting, mapping and data-extracting studies for the moving image review

These processes involved the sub-selection of studies under the keyword 'moving image' from studies in the database created by the EPPI English Review Group. Specific inclusion/exclusion criteria for this review were applied leading to a further sub-selection. The identified studies were systematically mapped, double data-extracted by two reviewers, and synthesised in a narrative responding to the review questions.

Results

Thirteen studies were identified, of which nine were included. After mapping the characteristics of these nine studies, the in-depth review presented key features of their evidence and findings, showing that two theoretical paradigms were evident across several of the studies; that practices of digital video editing in England were documented as forms of literacy in small, qualitative case studies; and that this kind of study which explored relationship between ICT and media production was the only kind of study represented in this review, with one exception. Therefore, the benefits for moving image literacy of ICTs could only be suggested by the evidence, not conclusively demonstrated.

Conclusions

The strengths of the review were that it was able, on the basis of the evidence in these studies, to make some systematic judgements about emerging theoretical accounts of moving image literacy and about some of the practices which informed it.

Implications for policy mainly revolve around the possibility for national definitions and curricula of English to take expanded models of literacy and their link with digital production media into account. Implications for practice include the possibility of using the synthesised evidence and findings of the review to underpin moving image work in classrooms, as well as in initial teacher training in English. Implications for research include the need for more diverse types of study with larger samples and longitudinal designs.

1. BACKGROUND

1.1 Aims and rationale for the current review

The impact of ICT on literacy learning in English is a topical and important issue. There is a need for a systematic review of research in this field, not least because governments worldwide are investing heavily in the provision of hardware and software to educational institutions as well as in the training of teachers and students of all ages in the application of ICT in literacy learning.

Between March 2001 and June 2002, the English Review Group carried out the first part of a systematic review in attempting to answer the overall question 'What is the impact of ICT on literacy learning in English, 5-16?' Having mapped the research literature, the first in-depth review focused on *networked* ICT (i.e. email and the internet). The second part – which is the focus of the present report – looks at a number of other in-depth sub-reviews that investigate aspects of the impact of ICT on literacy learning; effectiveness (by identifying and synthesising all the randomised experimental research); moving image literacy; literature-related literacies; and software packages for teaching language and/or literature in English as a first and/or additional language.

The main aim here is to review and evaluate accounts of the relationship between ICTs related to the moving image, and the impact of their use on literacies associated with the moving image. Related aims were to discover theoretical models of moving image literacy and ICTs which could inform classroom practice and research; and to identify gaps which future research could address.

1.2 Definitional and conceptual issues

The main definitions of ICT and literacy are as given in Andrews *et al.*, 2002:

ICT includes stand alone computers, networked technologies with a multimodal interface, mobile phones with the capacity for a range of types of communication, and other technologies which allow multimodal and interactive communication.

Literacy can be defined narrowly, as the ability to understand and create written language. It is, however, frequently defined in two broader senses, and both are included in the present study. Firstly, the scope can be expanded so that written language becomes written language and graphical or pictorial representation. Secondly, the skill can be treated as social, rather than psychological; according to this view, literacy is the ability to operate a series of social or cultural representations. Since sets of expectations or norms differ depending on the situation, the social view of literacy entails a number of different 'literacies'.

This review retains an open view of what might be defined as an ICT; no definition beyond the generic one cited above is used to select relevant studies for the review. However, it is worth noting that the range of ICTs referred to in the selected studies include, most importantly, digital video-editing software; computer animation software; games consoles; multimedia authoring software.

The review does implement a specific definition of literacy, however. Kress and van Leeuwen (1996) point out that the increasing dominance of visual media means that we need new conceptions of communicative practice and new grammars to describe communicative modes other than language, if we are to equip young people with the necessary skills to inhabit this widening semiotic landscape. Similarly, Raney (1997), in a wide-ranging study of the background and current significance of the notion of visual literacy, emphasises the need to treat the visual as a systematic form of communication.

Though both Kress and Raney point out the problems of the term 'literacy' in these contexts, with its implications of a direct analogy with print literacy, and an associated tendency for language always to be the point of reference and departure, there are also advantages in the use of the term.

Firstly, the kind of visual grammar elaborated by Kress and van Leeuwen can be taught explicitly to school pupils as part of a systematic approach to the reading of visual images. Burn and Durran (1998) give the example of a year 8 girl reading comic strip images in this way as part of the English curriculum (1998), while Burn and Parker (2001) describe year 10 pupils analysing images from a film as part of an English GCSE course.

Secondly, the advent of affordable digital technologies for video-editing have enabled a growth in the 'writing' of the moving image by school pupils. Accounts of this work, some of it included in the English Review Group's initial mapping (Burn, 2000; Burn and Reed, 1999; Burn and Parker, 2001), describe pupils' work with digital video specifically as a form of literacy, involving cultural knowledge of film and television, an understanding of the textual conventions of the moving image, and the ability both to interpret these and to deploy them in the making of moving image texts.

A final point about wider conceptions of literacy is to recognise the interrelatedness of different modes of communication, and therefore a growing tendency to regard the literacies required to engage with them as also multimodal. The most extensive account of this theory at present is Kress and van Leeuwen (2001); while more detailed accounts focus on the use of multimedia texts in English (Jewitt, 2002), multimodal communication in Science (Kress *et al.*, 2001), and the deployment of sound and image in a primary school animation project (Burn and Parker, 2002). 'Multimodal' in this context refers to texts which use more than one mode of communication, such as print texts which use word and image, moving image texts which use sound, speech, music and image; and multimedia texts which use image, word, animation and sound, and so on.

At the same time, other influential perspectives in the field of media education take a broader view of media literacy and digital literacy. In these accounts (for example, Buckingham, 1996; Buckingham and Sefton-Green, 1994; Buckingham *et al.*, 1999), the most important aspects of media literacies are the ways in which young people engage with a range of popular media, both as consumers and producers, as active participants in contemporary cultures. They will typically use media forms and technologies to explore their social worlds, to represent themselves and their preoccupations, and to gain satisfying and pleasurable experiences related to conceptions of creativity, identity transformation, and social allegiance. Though this approach, based in cultural studies and audience research traditions, sits alongside the more linguistic-derived perspectives described above, the two approaches in many ways complement each other, and

are, indeed, often evoked together in some of the research studies included in this review.

Finally, while some of the studies attend to the development of moving image literacies per se, others investigate the effect of moving image literacy and experience on the development of print literacy. In this respect, the definition of literacy is as it is defined in our generic review definition.

The definition of moving image literacy adopted for the purpose of this review is:

- *cultural awareness and knowledge of moving image texts*
- *the ability to interpret systematic patterns of meaning in such texts*
- *the ability to design and produce visual, moving image or multimedia texts*

1.3 Policy and practice background

The use of ICTs in the context of moving image media in areas of the curriculum related to English is diverse. The emergent contexts can be described as:

- attention to moving image media, in particular recently available digital video editing and computer animation software;
- attention to multimedia texts, which incorporate moving image elements, including web-based texts;
- attention to computer games, in which a dominant communicative mode is moving image, in the form of animation.

The relation between these kinds of textual engagement and ICTs has shifted as the digital technologies needed to produce such texts have become available and affordable for schools. These include multimedia authoring software, graphic design and image manipulation software, and digital video (DV) editing software and hardware. Though government assumptions about the digital curriculum in England and Wales might focus on changed forms of content delivery, many practitioners are focusing, by contrast, on enabling students to produce their own texts, shifting the emphasis from information delivery to questions of representation, self-representation and digital literacy (Buckingham and McFarlane 2001; Buckingham *et al.*, 1999).

At the same time, mandatory curricula in different countries include requirements to teach children how to communicate in relation to visual or audiovisual media (New Zealand, Canada and Australia); while the last revision to the National Curriculum for English in England and Wales has included for the first time a requirement to teach the moving image within the overall programme for reading. The English curriculum for New Zealand moves further than this, including a strand called Visual Language which has equal status with Oral Language and Written Language. However, it falls short of requiring the production of visual texts, breaking the strand down instead into 'viewing and presenting'. In the Canadian state of Ontario, the English secondary curriculum is constructed as four strands, the fourth of which is Media Studies. Uniquely, this requires that students both 'learn to understand and interpret media works', and 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, there is no statutory requirement to include the moving image in such production; indeed, the examples given of what students might create are, disappointingly, restricted to book jackets, songs and sample web pages.

Yet theoretical models of such forms of communication are under-developed by comparison with those available for print literacy and those available (e.g. Kress and van Leeuwen, 1996) are not widely known in the teaching community, although they are becoming increasingly influential in the academic community.

In England and Wales, the British Film Institute (BFI) has been persistently active in lobbying for the inclusion of moving image media in the curriculum (FEWG, 1999), and in researching and promoting the use of moving image-making technologies in the classroom. This interest is reflected in this review, in that three of the studies have a link with the BFI's research and development work.

The use of ICTs in these contexts has emerged quite recently as the subject of empirical inquiry. Research has largely been confined to small qualitative case studies, as the studies found for this sub-review demonstrate. However, R&D projects are beginning to emerge, such as a recent experiment introducing digital video equipment into 50 schools by the government agency, British Educational Communications and Technology Agency (BECTa) (BECTa, 2002). Although this study has been published too late to be included in this systematic review, its findings extend the evidence base for the understanding of the nature of moving image literacy, its relation to digital filming and editing technologies, and how this relation in turn impacts on notions of creativity in the classroom, what kinds of pedagogy are appropriate, and what kinds of learning styles can be addressed in this context. These perspectives will be referred to in the conclusions of this review.

Finally, it is necessary to locate the review in the specific context of English teaching for 5-16 year olds as this relates to moving image literacy. The reason why the impact of ICTs on visual and moving image texts should be studied in the context of English specifically is partly related to curriculum policy in England and Wales, and partly to the history of work on media texts in English. In the first case, the study of the moving image is only required in the English National curriculum within English, at key stages 2 and 3. In the second place, the history of work in the moving image is closely implicated with the history of English teaching. Even specialist media studies courses at 16 in England and Wales are often taught by English teachers; for this reason, Media Studies would be included in the definition adopted in this protocol of 'English and media education, or their broad equivalents'.

1.4 Research background

There is no history of research reviews, either systematic or non-systematic, in this field. The research background, as indicated above, is of a number of small, isolated research projects; although research institutions with a specialist interest in this field have begun to develop more extended programmes of research with teachers, in particular the BFI, whose work features in the review.

The immediate background for this review is the systematic identification of studies of ICT and literacy, from which the studies reviewed here are a sub-selection. A study from the first year of the current project (Andrews *et al.*, 2002) – a mapping exercise on the impact of ICT on literacy learning and an in-depth review of the impact of *networked* ICT on literacy for 5-16 year olds – identified 188 papers published since 1990 that examine the impact of ICT. Most of these originated from the US, although a significant minority arose from research in England, Canada, Australia and New Zealand. Of the total, 67 percent were set

in primary/elementary schools (especially in the 7-11 age range), with about 44 percent set in secondary/high schools (some studies were conducted in both types of setting). About two-thirds of the studies assumed a psychological representation of literacy: that is, they assumed that literacy development was an individual matter concerned with writing and reading processes. One third adopted a more sociological conception of the practice: that is, one that assumes that literacy development is a matter of the academic and social communities in which you learn. Of the 188 studies, 57 percent were focused on writing, graphical or pictorial production, whereas 46 percent had an interest in reading.

1.5 Authors, funders and other users of the review

Richard Andrews is the Co-Ordinator of the English Review Group. His immediate team consists of Carole Torgerson (Research Fellow at the University of York) and Alison Robinson (Research Secretary for the Review Group), Sue Beverton (University of Durham), Jenny Leach (Open University), Andrew Burn (Institute of Education), Graham Low (University of York Language Teaching Centre), Terry Locke (University of Waikato, New Zealand) and Die Zhu (University of York), who each took responsibility for sub-reviews; they also read interim drafts, attended training and acted as a project *team* in the creation of the review. During the mapping exercise, Torgerson managed/administered the process, with team members contributing. During the writing-up of the review (undertaken on two levels: the writing-up of the overall descriptive map of the overarching review, co-ordinated by Torgerson, Robinson and Andrews, and the composition of chapters for a book to be published by RoutledgeFalmer, co-ordinated by Andrews¹), team members played a more individual role – while maintaining the collective critical eye on the development of the material.

Reference was made to our international colleagues: Wendy Morgan and Eileen Shakespeare. Nancy Rowland advised from a NHS CRD perspective; Diana Elbourne and Katy Sutcliffe from the EPPI-Centre acted as independent reviewers for sets of the abstracts and sample papers at the mapping, keywording and the data-extraction stages, using the review's final set of criteria.

The English Review Group also consists of Nick McGuinn (University of York), Maggie Snowling and Peter Hatcher (both at the Department of Psychology, University of York), James Durran (Parkside Community College, Cambridge) and Gloria Reid (City of Kingston-upon-Hull Education Services). More achieved drafts of the emerging review – and any other questions that arose in the process of reviewing and writing – were presented to this advisory group, both at and between formal English Review Group meetings. The advisory group contains members representing 'user groups': for example, Gloria Reid for primary schooling and the education advisory services, James Durran from secondary schooling, and Nancy Rowland as parent governor of both a primary and secondary school².

In our first in-depth review (Andrews *et al.*, 2002), users were involved in determining the topic to review, commenting on the protocol, commenting on drafts of the report, disseminating the results of the review (most notably at the

1 RoutledgeFalmer have commissioned a book from the Review Group, edited by Andrews with contributions by Beverton, Burn, Die, Elbourne, Leach, Locke, Low, Rees and Torgerson. The book, *The Impact on ICT on Literacy Education*, was submitted in July 2003 and published in 2004.

2 Almost all members of the Advisory Group are parents of school-age children.

launch of the first reports in June 2002) and in writing user summaries. In this present in-depth review such involvement has continued. In addition:

- users on the advisory group have commented, and will continue to do so, on the emerging sub-review;
- they will take a more proactive role in disseminating the results of the review;
- discussion of the draft conclusions and of the methodology of the reviews took place with senior figures at the Teacher Training Agency in a meeting in York in June 2003;
- students in initial teacher education will be invited to our dissemination meeting to provide critical feedback;
- James Durrant has commented on the value of the review for various aspects of his work as a practitioner. These comments are summarised in section 4.5.

1.6 Sub-review question

The review question is:

What is the impact of ICT on the learning of literacies associated with moving image texts in English?

This question has been chosen because there is evidence of an expansion of work in schools in recent years in this area, with the relatively recent introduction of digital technologies for the manipulation and editing of video; and also, more recently, evidence of an interest in the possible impact of computer games in the curriculum (BECTa, 2002; Beavis and Durrant, 2001). However, it is unclear so far whether any generalisable findings emerge across these studies, and what priorities might be determined for future research. It is also unclear what models of moving image literacy might be adopted as useful theoretical underpinnings both for future research and for classroom practitioners. In the light of these uncertainties, then, this review specifies the following sub-questions:

- ***Which studies develop theoretical models which will be most useful for practitioners in improving teaching and learning in this field?***
- ***Which studies provide the most convincing qualitative data, taking into account the methodology of the study; theoretical models proposed in the study and the extent to which the data supports them; patterns in findings across studies?***
- ***What discernible patterns, if any, emerge across the findings of the studies which might be suggestive if not conclusive?***
- ***What gaps are there which need to be addressed by further research?***

2. METHODS USED IN THE REVIEW

2.1 User involvement

User involvement for this sub-review involved consulting a member of the Review Group who is a practitioner in this field. His comments are summarised in section 4.5.

User involvement also took place throughout the process of systematic reviewing in the following ways: firstly, the English Review Group's advisory group determined the topic for the review; secondly, it commented on the draft protocol; thirdly, it commented on the map of studies, advising which particular sub-areas of ICT and literacy were most appropriate for in-depth review; and fourthly, it commented in the draft in-depth review report.

A dissemination strategy for the project as a whole was developed in consultation with the parent governor/Director of Dissemination for NHS CRD.

2.2 Identifying and describing studies

2.2.1 Identification of potential studies for the descriptive map of the overarching review: search strategy

The potential studies for this review were identified through an updating of the original electronic searches and handsearches. In August 2002, Julie Glanville (NHS CRD at the University of York) re-ran the electronic searches on PsycINFO, ERIC, BEI, SSCI, SIGLE, C2-SPECTR and Dissertation Abstracts using the original search strategies (see Appendix 2.2). In addition, members of the Review Team and advisory body who handsearched key journals in the field for the 2001-2002 review, undertook handsearching of the same journals for the period July 2001-Oct 2002 in order to identify any other potentially relevant studies not retrieved through the updated electronic searches. All potentially relevant studies were sent for.

2.2.2 Identification of potential studies for the descriptive map of the moving image review: search strategy

The initial focus of this review was on studies which provided evidence about the development of literacies associated with visual, moving image, and multimodal texts; and the initial search used keywords reflecting this emphasis.

After updating of searches to locate any further relevant studies that were undertaken after 2001 and re-keywording (using EPPI-Centre (2002a) *Core Keywording Strategy: Data Collection for a Register of Educational Research Version 0.9.5*), the keywords 'moving image', 'visual learning', and 'multimodality' were used to identify any studies from the updated database.

Subsequently, however, the review was narrowed by agreement with the EPPI-Centre and the English Review Group, since it seemed that the width of the range made it difficult to achieve a conceptual unity in the review, whereas the narrower focus on 'moving image literacy' addressed a quite specific set of

practices and theories. Accordingly, the initial search adopted the most relevant keyword: moving image.

2.2.3 Defining relevant studies for the descriptive map of the overarching review: inclusion and exclusion criteria

In order to be included in the mapping section, studies had to meet the following inclusion criteria:

- Studies had to be one of the following study types: an exploration of relationships, an evaluation (naturally occurring or researcher manipulated) or a systematic review.
- Studies had to have as their main focus ICT applications to literacy development.
- Studies had to focus on literacy learning and teaching in schools and/or homes.
- Studies had to be about the impact of ICT on literacy development.
- Studies had to be published in English, in the period 1990-2002.
- Studies had to look at literacy and ICT in English-speaking countries.
- Studies had to be completed.
- Studies had to be on participants/the study population include children at ages 5-16 and young people.
- Studies were not to be opinion pieces.

The English Review Group working document for the inclusion and exclusion of potentially relevant studies (see Appendix 2.1) was updated to reflect the changes made to the keywording sheets, both generic and review-specific (see appendices 2.4 and 2.5) since the 2000-2002 review. In terms of the generic keywording sheet the main differences for 2002-2003 are the changes made to question 10 on study type. In terms of the review-specific keywording sheet, the main differences for 2002-2003 are the streamlining of the literacy, learning and ICT focus keywords (question 12), and the inclusion of a glossary sheet to clarify definitions for all the review-specific keywords (see Appendix 2.6).

2.2.4 Defining relevant studies for the descriptive map of the moving image review: inclusion and exclusion criteria

The sub-questions of this review determined the nature of the studies to be included in the descriptive map. It was important that they should be rooted in some theoretical basis which clarified or developed the nature of moving image literacy, since the understanding of this both in the research community and in the teaching community is poorly developed, and the review might contribute to a better understanding, at least in terms of which models are available.

Clearly, the studies had to investigate the relationship between ICTs and moving image literacy.

Finally, the context of 'English' set by the overall review needed some interpretation in this context. Therefore, 'media education' is included in the criteria, perceived as related to English; and 'broad equivalent subject domains' are included to permit the inclusion of primary school-based studies where projects might be more loosely related to English or literacy curricula.

Inclusion criteria

In addition to the generic inclusion and exclusion criteria, this review includes studies which are explorations of relationships or evaluations; and which address:

1. conceptions of moving image literacy or communicative practice
2. the impact on, or relationship with, these literacies of ICTs
3. educational contexts (5-16) in which such literacies and ICTs are investigated
4. such literacies within the context of English and media education, or their broad equivalent subject domains

Exclusion criteria

The review excludes:

1. studies which are not explorations of relationships or evaluations (exclusion 1);
2. studies whose theoretical basis does not incorporate a model of moving image literacy or communicative practice (exclusion 2);
3. studies which do not investigate the relationship between this literacy and ICTs (exclusion 3);
4. studies of contexts other than 5-16 education (exclusion 4);
5. studies of subject domains other than English and media education, and their broad equivalents (exclusion 5).

The studies keyworded as 'moving image' were then re-screened. One (Higgins, 2002) was excluded on exclusion criterion 3, since it was an investigation of moving image literacy in primary schools, but did not include ICTs in any form.

The bulk of the remaining studies squarely addressed links between literacy, the moving image, and ICTs, and therefore presented no problems. Two further studies (McClay, 2002; Mackereth and Anderson, 2000) dealt with the relation between computer games and literacy, which is a very different kind of context for the moving image, in terms of cultural context, traditions of classroom use (or lack of them), and understandings of the relation of games both to the moving image and to literacy. However, we decided to include them as they fitted the criteria for inclusion, and allowed us to explore these different contexts a little further.

One study referred more marginally to the moving image as an element within multimedia design (O'Brien *et al.*, 2001). Again, we decided to include this, to raise questions about this more complex context, and to help establish what further research might be needed (one of the review sub-questions).

2.2.5 Characterising included studies in the descriptive map of the overarching review: *EPPI-Centre and review-specific keywording*

All the studies included in the original database from the review of 2001 were re-keyworded by members of the Review Team using the new guidelines from the EPPI-Centre (EPPI-Centre, 2002a). The studies retrieved for the updated database were keyworded by a member of the Review Team (CT), with assistance from other members of the Review Team and the EPPI-Centre where there was any doubt about keywording. The database was fully annotated with the keywords (AR). For pragmatic reasons the database for 2002 was closed on 30 November 2002. Any studies received after that time will be included in the next update.

2.2.6 Characterising included studies: EPPI-Centre and review-specific keywording

The included moving image-related studies were characterised using the EPPI-Centre (Appendix 2.4) and review-specific keywords (Appendix 2.5).

2.2.7 Identifying and describing studies in the descriptive map of the overarching review: quality assurance process

For the purposes of quality assurance, two members of the Review Team (RA and SB) and one member of the EPPI-Centre (DE) screened a random sample (10%) of the studies in the updated database. Screening was undertaken independently, using the inclusion/exclusion criteria working document (Appendix 2.1). After double-screening the inter-rater reliability scores between CT and RA, CT and SB, and CT and DE were calculated using Cohen's Kappa. For the purposes of quality appraisal a random sample of 18 papers was double re-keyworded by two members of the EPPI-Centre (DE and KS).

2.2.8 Identifying and describing studies in the descriptive map of the moving image review: quality assurance process

Two reviewers (AB and JL) independently re-screened the studies retrieved from the database, compared results, and agreed which studies to include.

2.3 In-depth review

2.3.1 Moving from broad characterisation (mapping) to in-depth review

In this review, the inclusion/exclusion criteria for the in-depth review remained unchanged from those used to draw the descriptive map. The reviewers considered that these criteria were sufficiently rigorous, and sufficiently clearly related to the review-specific research questions.

2.3.2 Detailed description of studies in the in-depth review: EPPI-Centre and review-specific data-extraction

Data-extraction was undertaken by two reviewers working independently. The included studies were data-extracted and quality-appraised using the EPPI-Centre guidelines (EPPI-Centre, 2002b). Any disagreements between the reviewers were discussed and resolved.

2.3.3 Assessing quality of studies and weight of evidence for the review question

In addition to the quality assessment of the study in terms of the trustworthiness of its findings in answering the study question, two review-specific 'weight of evidence' areas of appropriateness of research design for the review question, and the relevance of the study for the review question, contribute to the overall weight ascribed to each study.

2.3.4 Synthesis of evidence

A narrative synthesis of the included studies was undertaken, structured around the four sub-questions of the review.

The EPPI Guidelines were used to establish the relative 'weight of evidence' that was ascribed to each included trial. This information was taken into account in the narrative synthesis.

2.3.5 In-depth review: quality assurance process

Two reviewers independently screened all included studies and coded them for inclusion or exclusion, using the four exclusion criteria (AB and JL).

Quality assurance of data-extraction and quality assessment of the included studies was provided by the data-extraction undertaken by DE from the EPPI-Centre. There were minor disagreements between the data-extractions here, but these were resolved, and the general agreement about the value of this kind of study was a useful precedent in considering similar studies elsewhere in the review.

3. IDENTIFYING AND DESCRIBING STUDIES: RESULTS

3.1 Studies included in descriptive map of overarching review from searching and screening

Figure 3.1 illustrates the process of identifying, obtaining and describing reports for the current review. Unless otherwise stated, each report contains only one study¹.

A revised version of the mapping study retrieval process reported in Andrews *et al.* (2002) is shown in column 1 in Table 3.1. The revisions were the result of further de-duplication of the database (four papers deleted), annotation of reports received outside of the review's original timeframe (n = 8), and re-keywording of included reports in accordance with EPPI's revised guidelines (EPPI-Centre, 2002a), which led to further exclusions (n = 8). In addition, five papers originally excluded at the second stage were included in the current review following re-keywording. Column 2 shows the mapping study retrieval process for those additional reports identified by an update of the electronic and handsearches. The final column merges the original mapping study retrieval process with the update to show the process of retrieval of the reports in the mapping study for the current review.

A total of 2,319 potentially relevant reports were identified for the current review. Of these 2,319 reports, 1,891 (just over 81%) were excluded by screening titles and/or abstracts and 428 were sent for. Of these, 34 (fewer than 8%) were not received within the timeframe of the review or were unavailable. A reading of the full paper resulted in the exclusion of a further 182 studies, leaving a total of 212 that met the criteria for inclusion in the mapping study. This information is presented in Figure 3.1.

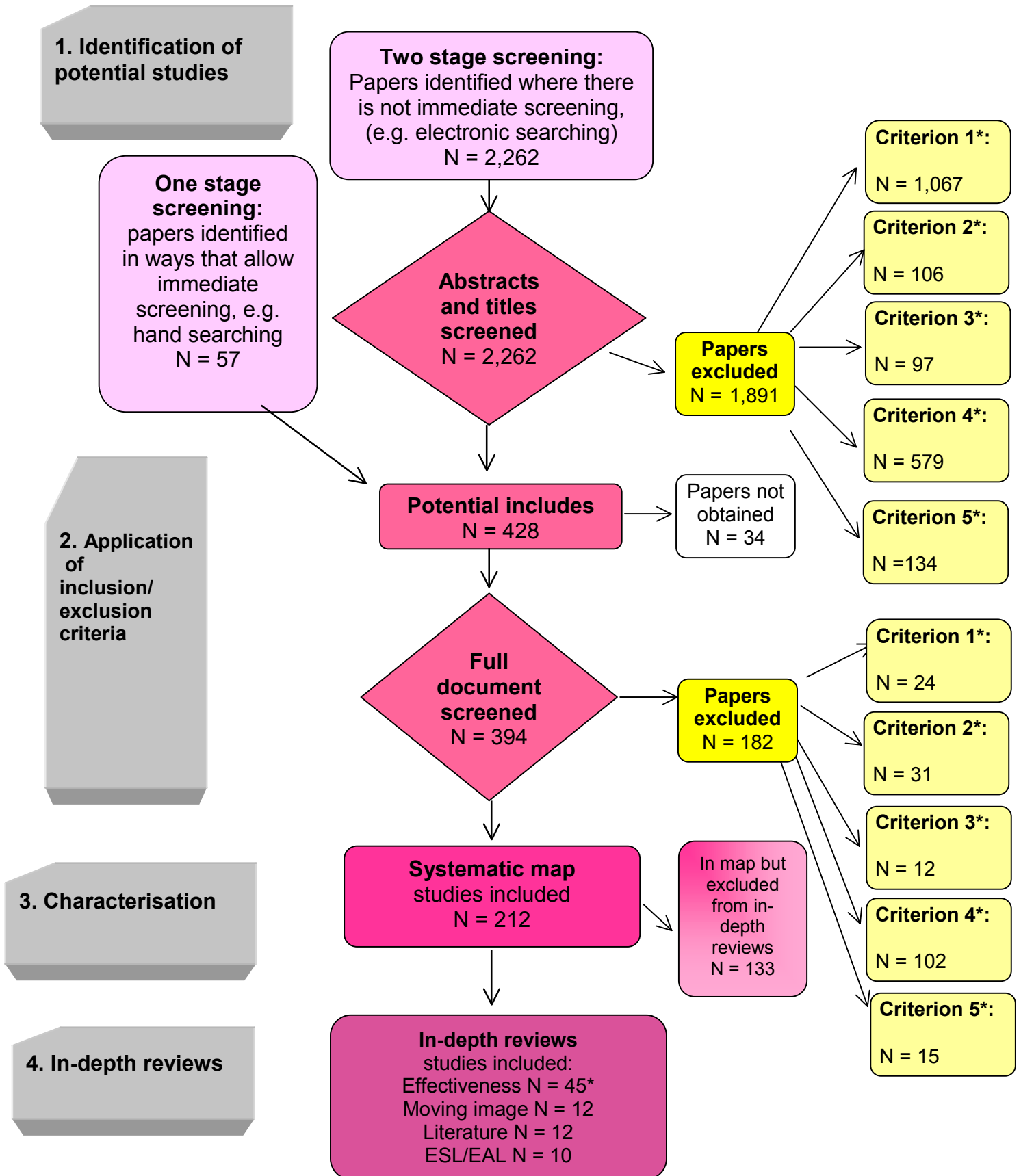
Table 3.1: The process of retrieval of the reports in the mapping study

	Andrews <i>et al.</i>, 2002 (revised)	Review update	Current review
Total number of 'hits'	1,867	452	2,319
Met mapping study inclusion criteria on the basis of the title or abstract	358	70	428
Not received or unavailable	22	12	34
Full reports available	336	58	394
Full reports that did not meet mapping study inclusion criteria	159	23	182
Met mapping study inclusion criteria and keyworded	177	35	212

Table 3.2 presents the origin, by database or other method of retrieval, of all the 212 reports included in the mapping study. It also shows the process of retrieval for each database.

¹ It is possible, for instance, for a report (article, report, book) to include more than one study. This was the case in one of the reports we reviewed.

Figure 3.1: Filtering of papers from searching to map to synthesis – generic review
 *Criteria for exclusion are not mutually exclusive



*This refers to the number of studies in the generic review keyworded 'RCT' and therefore included in the effectiveness map. The effectiveness review covers 12 of the 45; see section 3.4 and Figure 4.1.

The majority of the reports found to meet the mapping study's inclusion criteria (185: 88%) were found with the database searches. Handsearching found an additional 22 (11%). The checking of citations (systematic review bibliographies and citations in the text of full reports) and reviewers' searches of their own shelves identified a further four and one relevant report respectively. No reports were identified solely through C2-SPECTR or webpage searches.

Table 3.2: Origin of reports in the mapping study

	Found	Included
PsycINFO	849	97
ERIC	880	62
BEI	295	20
SSCI	59	2
Cochrane	26	0
SIGLE	48	2
C2-SPECTR	49	0
DisAbs	56	2
Handsearch	43	22
Citation	8	4
Website	3	0
Contact	3	1
Total	2,319	212

Note: Reports could originally have more than one origin but a hierarchy of databases and other sources was created resulting in each category being made mutually exclusive.

3.2 Characteristics of the included studies: the impact of ICT on literacy learning in English for 5-16 year olds

The remaining tables in this section present analyses of the included and keyworded studies contained in the 212 reports.

Table 3.3 shows the number and proportion of studies according to the country in which they were conducted. Most (63%) were conducted in the US. A total of 39 (18%) were from the UK (all from England, more specifically). In three cases (2%), it was not possible to determine where a study had taken place. These figures may reflect bias within the bibliographic sources searched towards reports published within the North America, Australasia and the UK.

Table 3.3: Study country

	Number
USA	134
UK	39
Australia	17

	Number
Canada	15
New Zealand	2
Sweden	1
Netherlands	1
Not stated	3

Note: All studies were conducted in one country only.

Table 3.4 describes the educational setting for the studies. A study could be conducted in more than one setting. Primary education was the most frequently studied (66 percent of reports look at this kind of setting, compared with 34 percent that look at secondary settings). A total of 32 studies were conducted in both primary and secondary settings. Thirty studies were conducted in other settings, including independent schools, special needs schools and the home.

Table 3.4: Educational setting

	Number
Primary education	140
Secondary education	74
Other	30

Note: A single study could be conducted in more than one type of educational setting.

Table 3.5 presents the number of studies that conceptualised literacy in psychological and/or social/cultural/critical terms and the number that focused on reading and/or writing. Of the studies identified, about two-thirds (62%) assume a psychological representation of literacy. One-third (34%) adopt a more sociological conception of the practice. Two-thirds (62%) focus on writing, graphical or pictorial production, whereas half (50%) have an interest in reading. Studies could have more than one focus with respect to both of these dimensions of literacy. For both dimensions, there were a number of studies where reviewers were unable to categorise the aspect of literacy under study.

Table 3.5: Principal aspect(s) of literacy

	Number
Conceptualisation of literacy	
Psychological aspects or representations	131
Social representations and/or cultural/critical representations	73
Unclear	21
Reading/writing	
Writing print and graphical or pictorial representation	131
Reading print and graphical or pictorial representation	106
Unclear	5

Note: Studies could theoretically focus on two to four of these aspects of literacy.

Table 3.6 shows the overall distribution of reports according to study type. Most

(179) of the 212 reports meeting the inclusion criteria for the mapping study evaluated outcomes; of these, 169 were researcher-manipulated and 10 were naturally occurring. Of the 169 researcher-manipulated evaluations, 45 were RCTs, 84 were trials and 41 were other types of evaluation. One report contained both an RCT and a non-randomised controlled trial.

Table 3.6: Study type

	Number
Evaluation: researcher-manipulated	169
RCT	45
Trial	84
Other	41
Evaluation: naturally occurring	10
Exploration of relationships	28
Description	3
Review	6
Systematic review	5
Other review	1

Note: Studies could be defined as more than one type.

The type of ICT focused on by the identified studies is illustrated by Table 3.7. This shows the relative popularity of 'stand-alone' ICT as a topic of study in comparison with networked ICT systems. The use of email was studied more frequently than internet use.

Table 3.7: Type of ICT

	Number
Computer – stand-alone (software)	191
Computer – networked (email and/or internet)	24
Computer – networked (email)	20
Computer – networked (internet)	11

Note: Studies could focus on more than one aspect of ICT.

Table 3.8 illustrates the process of identification by keyword of reports for inclusion in the four specific in-depth reviews introduced in section 1.6. Each report was subject to the inclusion/exclusion criteria of the specific in-depth review for which they were identified. This process is described in the individual review reports contained in sections 4(a) to 4(d).

Table 3.8: Identification of reports for inclusion in the specific in-depth reviews

Keyword	Total reports
RCT	45
Moving image	12
Literature	12
ESL/EAL	10

Note: Reports could be included in more than one in-depth review.

3.3 Identifying and describing studies in the descriptive map of the overarching review: quality assurance results

Screening

The inter-rater reliability score between CT and RA was 0.65 (good); the inter-rater reliability score between CT and SB was 0.39 (fair); and the inter-rater reliability score between CT and DE was 0.36 (fair). CT and RA were initially less inclusive, possibly because of greater experience of screening educational databases. SB and DE were consistently more cautious in excluding papers in the initial screening, including papers where there was any doubt.

Keywording: EPPI-Centre generic keywording sheet

Inter-rater agreement was very high. Out of a total possible 180 'keywords', disagreement occurred in only 30 keywords (i.e. 16.7%). Most of these disagreements (19) were in the area of study topic (keyword 6) where the EPPI-Centre members were consistently more inclusive. Review Team members coded all 18 papers as 'curriculum'. The two EPPI-Centre members coded these 18 papers as 'curriculum' but in all cases also coded them as 'assessment' and/or 'teaching and learning'. The other 11 disagreements were mainly omissions, and disagreement on educational institution and age.

Keywording: English Review Group ICT and literacy keywording sheet

Agreement was again very good. Out of a total possible 794 keywords, disagreement occurred in 88 cases (i.e. 11%). Most of the disagreements were additions by members of the EPPI-Centre in keywords 14 and 17 (again due to them being more inclusive), and omissions by the members of the EPPI-Centre in keyword 16 where members of the Review Team tended to apply a keyword to both a *and* b. In addition, there were a few disagreements on study type. It was anticipated that these disagreements would be resolved at data-extraction stage. The results of this quality assurance exercise highlight the importance of including a glossary for review-specific keywords.

3.4 Studies included in the moving image review from searching and screening

A total of 12 studies were identified from the updated database, using the keyword 'moving image'. An additional study (Mackereth and Anderson, 2000) was included, although it was not keyworded for 'moving image', on the basis that it investigated the relation between writing and computer games, which had been included in the definition of 'moving image' for the purpose of this review.

3.5 Characteristics of the included studies (systematic map)

The systematic map was based on the keywording (EPPI generic keywording and review-specific keywording) of the 13 studies.

Most of the studies were identified through handsearches, in particular of journals associated with English teaching in the UK and Australia.

Table 3.9: Origin of identified studies

	Number
PsycINFO	2
ERIC	2
BEI	1
Handsearch	8

The largest number of studies were undertaken in England; and several of these were sponsored, either directly or indirectly, by the BFI. The prominence of England in this respect is unusual in comparison with the other sub-reviews. Possible explanations can only be speculative, but three factors may be considered:

- an emphasis in media education in the UK on creative production (e.g. Buckingham *et al.*, 1995);
- the specific role of the BFI in promoting media education, and in researching it;
- the sponsorship by the UK government of specialist media arts schools in England and Wales, whose additional funding have allowed them to invest in digital video production equipment earlier and more extensively, perhaps, than is the case in other countries; this specialist context features in three of the studies included in this review.

The discussion of the findings will also take into account the recent publication of the largest study in this field published so far; the BFI evaluation of the BECTa digital video pilot project in England and Wales, which was published too late to be included in the review.

Table 3.10: Countries where studies were undertaken

	Number
USA	2
Canada	1
UK	7
Australia	3

The majority of the studies focused on older children, for the reason that the introduction of digital technologies for the making of the moving image has tended to be in secondary schools. An exception to this pattern is the three BFI-related studies which look at the use of animation software with primary-aged children in England.

Table 3.11: Age of participants

	Number
5 to 10	4
11 to 16	6
5 to 10 and 11 to 16	3

Most of the studies investigate mixed sex classes. Those that focus on one sex also raise questions of gendered engagements with the moving image, or, in the case of two studies, with computer games.

Table 3.12: Sex of participants

	Number
Male	2
Female	2
Mixed	8
Not stated	1

The educational settings reflect the focus on older children, for the reason given above. The 'other' settings are interesting here: two of them refer to work conducted in an arts cinema as part of a film education project; one is 'self-sponsored' writing by one boy at home, but in contact with his language arts teacher.

Table 3.13: Educational setting of studies

	Number
Primary school	6
Secondary school	8
Other	3

Note: A study could be conducted in more than one type of educational setting.

The majority of the studies approach moving image literacy from a social/cultural rather than a psychological/cognitivist perspective.

Table 3.14: Principal aspects of literacy

	Number
Psychological aspects or representations	3
Social representations and/or cultural/critical representations	13

Note: Studies could focus on more than one aspect of literacy.

The study types reveal a predominance of explorations of relationships between, typically, moving image literacy, relevant technologies, and a range of social and cultural factors. The evaluations are mostly studies which further relate these variables to the development of print literacy, in which case some measurable impact is sought.

Table 3.15: Types of study

	Number
Exploration of relationships	9
Evaluation (researcher-manipulated)	4
Evaluation (naturally-occurring)	0

3.6 Identifying and describing studies: quality assurance results

Both reviewers agreed on the inclusion of 13 studies.

4. MOVING IMAGE IN-DEPTH REVIEW: RESULTS

4.1 Selecting studies for the in-depth review

Studies were included in the in-depth review if they matched the inclusion criteria (see section 2.2). In addition, the two studies of computer games were included, although it is recognized that, because this field is difficult to categorise easily, there is an emergent literature beyond the studies identified here, which will be referred to in the discussion below. This resulted in nine studies included in the in-depth review.

Table 4.1: Studies included, and the inclusion criteria

Study	Year	Inclusion
Burn	2000	1,2,3,4
Burn <i>et al.</i>	2001	1,2,3,4
Burn and Parker	2001	1,2,3,4
Burn and Reed	1999	1,2,3,4
McClay	2002	1,2,3,4
Mackereth and Anderson	2000	1,2,3,4
O'Brien <i>et al.</i>	2001	1,2,3,4
Parker	1999	1,2,3,4
Parker	2002	1,2,3,4

Four studies were excluded, all on exclusion criterion 3 (see section 2.2.4 above); that is, they did not focus specifically on moving image literacy and its relation to ICTs. Although Bigum *et al.* (1997) is a wide-ranging study of digital literacies, it has no central focus on the relation of digital technologies to moving image literacy. Vincent (2001) focuses on the combination of still image and print. Cramer and Smith (2002), although a 'movie project' is included in the scenario it explores, does not relate this aspect to ICTs, or theorise it as a literacy. Higgins (2002) contains no reference to ICTs. These decisions were difficult, in that most of these studies at first sight appeared to conform to the inclusion criteria, but on a stricter application of these were excluded at this stage.

Table 4.2: Studies excluded and the exclusion criteria

Study	Year	Exclusion
Bigum <i>et al.</i>	1997	3
Cramer and Smith	2002	2, 3
Higgins	2002	3
Vincent	2001	3

4.2 Further details of studies included in the in-depth review

All but three of the included studies were identified by handsearch.

Table 4.3: Origin of identified studies

	Number
PsycINFO	1
ERIC	1
BEI	1
Handsearch	6

The majority of the studies were from England, although the two computer game studies were from Australia and the US.

Table 4.4: Countries where studies were undertaken

	Number
USA	1
Canada	1
UK	6
Australia	1

As in the systematic map, the majority of studies focus on older children, although there is an association between animation and younger children in two of the studies.

Table 4.5: Age of participants

	Number
5 to 10	2
11 to 16	6
5 to 10 and 11 to 16	1

The studies include four which address questions of gender and moving image technologies, two of them related to computer games.

Table 4.6: Sex of participants

	Number
Male	2
Female	2
Mixed	5
Not stated	0

The focus on secondary settings repeats the focus on older children; again, as observed in respect of the systematic map, this reflects the tendency for secondary schools to have been better equipped with moving image technologies than primary schools.

Table 4.7: Educational setting of studies

	Number
Primary school	3
Secondary school	6
Other	2

Note: These data are not mutually exclusive.

The distinction between social/cultural and a psychological cognitivist approaches to literacy becomes much more marked in the studies included in the in-depth review, all of which adopt the former perspective. Early attempts to understand how children interpret and produce moving image texts are located within research traditions which emphasise the social and cultural nature of communication.

Table 4.8: Principal aspects of literacy

	Number
Psychological aspects or representations	0
Social representations and/or cultural/critical representations	9

Note: These data are not mutually exclusive.

Related to this is a predictable emphasis on qualitative research techniques, although one of the studies makes a quantified measure of the impact of moving image work on print literacy development.

Table 4.9: Types of study

	Number
Exploration of relationships	8
Evaluation (researcher-manipulated)	1
Evaluation (naturally occurring)	0

Table 4.10: Weight of evidence

Study	Year	A	B	C	D
Burn	2000	medium	low	medium	medium
Burn and Parker	2001	medium	medium	medium	medium
Burn and Reed	1999	medium	low	high	medium
Burn <i>et al.</i>	2001	high	medium	high	high
McClay	2002	medium	medium	medium	medium
Mackereth and Anderson	2000	high	medium	low	medium
O'Brien <i>et al.</i>	2001	medium	low	low	low
Parker	1999	medium	medium	high	medium
Parker	2002	medium	medium	medium	medium

Weight of evidence A: soundness of method of each individual study according to general and study type specific criteria

Two of the studies were assessed as being of 'high' weight of evidence and seven were assessed as being of 'medium' weight of evidence in terms of the trustworthiness of each individual study's findings in answering its own study

question. The studies we judged as 'high' earned this largely through the fact that the research answered its study question in both cases by using more extensive samples than in the other studies, and by using rigorous conceptual frameworks, in the case of Mackereth and Anderson (2000) in the form of specific questions about computer games in both the qualitative and quantitative sections of the study; and in Burn *et al.* (2001), through the use of a conceptual model of video editing.

Weight of evidence B: appropriateness of study type to answer the review question

Six studies were assessed as being 'medium' on appropriateness; three were assessed as 'low'. This means that, for the purposes of this specific systematic review, it was difficult to find studies where the type and design of study were completely appropriate to answer the review question. This is largely because of the implications of the word 'impact' in the review question. Impact suggests measurable effects, which most of these studies are not designed to produce. In addition, one of the studies judged to be 'low' in this respect (O'Brien *et al.*, 2001) spent relatively little time on the moving image specifically, being more concerned with multimedia more generally.

Weight of evidence C: relevance of the topic focus of the individual study to the review question

Three studies were assessed as being of 'high' relevance, four were assessed as being of 'medium', and two were assessed as 'low'. The conceptual focus and the focus of the empirical investigations here were generally relevant or very relevant to the review question. The judgement of 'high' was made in the cases where qualitative data analysis methods were judged to have a high validity, in one case (Parker, 1999) because it related both to detailed evaluations of children's writing and to National Curriculum outcomes; in another case (Burn and Reed, 1999) because the analysis triangulated data from the students' video work, from their written evaluations, and from the interview; and in the third case (Burn *et al.*, 2001) because a rich variety of data was discussed in detail by several teacher-researchers, and consistently related to the conceptual model.

Weight of evidence D: overall weight of evidence

Seven studies were assessed as being of 'medium' weight of evidence, one as of 'high' weight, and one was assessed as being of 'low' weight of evidence. For the narrative synthesis, all nine are discussed. The study assessed as 'high' overall (Burn *et al.*, 2001) had a strong conceptual model, a broader and larger research sample, and was the most appropriate study type for answering the review question, as well as being very relevant to the focus of the question on moving image literacy. Of the seven studies assessed as 'medium' overall, five (Burn, 2000; Burn and Reed, 1999; McClay, 2002; and Parker, 1999, 2002) were relevant to the research question, helping to develop a theoretical model of moving image literacy in particular; but less convincing in their research method, either because fewer data types were used (Burn, 2000), the sample was much smaller (Burn, 2000; Burn and Reed, 1999; and McClay, 2002); or the study only reported tentative initial findings (Parker, 1999); or because the study summarized smaller studies, themselves producing only tentative conclusions (Parker, 2002). Mackereth and Anderson (2000) was judged 'medium' overall because, although its method was robust and appropriate to its own question, its focus on computer games was less relevant to the review question's focus on moving image literacy. Similarly, the study judged to be 'low' overall (O'Brien *et al.*, 2001), while its ethnographic approach was appropriate for its exploration of

multimedia authoring, its topic focus was less relevant to the review question, and its methodology contained no developed reference to moving image literacy.

4.3 Synthesis of evidence

This narrative account of the evidence presented by the nine studies will follow the structure of the review's sub-questions.

a. Which studies develop theoretical models which will be most useful for practitioners in improving teaching and learning in this field?

There are a number of consistent threads running through the theoretical models proposed by many of these studies, which is unsurprising given that there is overlapping authorship in six of them. One of the most consistent themes is the argument for a wider conception of literacy beyond print, which can include visual and other communicative modes. This argument is rooted mainly in the work of Kress and van Leeuwen (1996), and in associated work by the New London Group (for example, Cope and Kalantzis, 2000) and by others in the general field of social semiotic approaches to language and other media (Halliday, 1985; Hodge and Tripp, 1986). These references are made by six of the studies. The evidence here is that, in order to approach the practices of moving image interpretation and production in schools, researchers have needed to find an approach to communication which will cast light on how the moving image is understood by learners. This approach is promoted by these studies for various reasons. Firstly, it includes a theory of visual grammar (Kress and van Leeuwen, 1996), from which a 'grammar' of the moving image can begin to be developed. This is the explicit concern of Burn and Parker (2001). Secondly, this approach makes an explicit association between literacy and the moving image, in particular because the social semiotic approach is developed partly from systemic-functional linguistics, which is influential in the understanding of literacy, especially in the UK and Australia. Secondly, this approach places emphasis on the social nature of communicative practices. All these studies view literacy from a socio-cultural perspective, as the keywording demonstrates. They are, then, either influenced by the arguments of variants of this socio-linguistic tradition, or they are located in other research traditions which accommodate easily to such an approach.

The latter suggestion is borne out by the other most consistent set of references, which is to cultural studies models of media education, in particular those developed by Buckingham and Sefton-Green (Buckingham, 1996; Buckingham and Sefton-Green, 1994; Buckingham *et al.*, 1995). These references are invoked in seven of the studies and indicate an emphasis on the cultural contexts of moving image media and computer games. Particular aspects of this emphasis include the nature of popular culture and how this can be accommodated by school curricula and conceptions of literacy; the emergence of new technologies which allow children to become producers of moving image and multimedia texts for the first time; and the link between media experience and the development of social identities.

In terms of actual models of learning, some specific suggestions are made. Burn and Parker (2001) propose a series of processes characteristic of the use by children of different software packages to produce animation. These processes include ways in which the flexibility of the media allow for the audiovisual equivalent of redrafting in writing, although more emphasis is placed on how the

existing available semiotic resources and tools are shaped by the cultural interests and communicative needs of the children.

Burn *et al.* (2001) propose a conceptual framework arising from an action research project led by the BFI. Here, the processes of digital video-editing are categorised under those which relate to social roles, those which relate to creativity, and those which relate to literacies and communicative practices. The research of the teachers largely confirmed the model, although it was judged in the conclusions to the article to be weak in its specificity about the kinds of literacy process involved and in its attention to the affective dimension of editing.

McClay (2002) proposes, much more tentatively, a process whereby the experience of computer games informs the fantasy writing of a young boy. The proposal is that the influence of games results in more fluid, episodic narratives, and new genres of writing of which literacy educators need to become aware. There is little evidence on which the proposal can generalise, since this is a case study of one boy and the study applies no analysis to the games as texts, so part of the claim rests only on interview evidence or on assumption.

Mackereth and Anderson (2000) propose no particular model for the digital literacy which they see games as representing, although their findings about girls and games are relevant to the third and fourth sub-questions.

Parker (1999; 2002) proposes a model in which the development of moving image literacy can be fruitfully linked with the development of print literacy. This is tested by a controlled experiment (Parker, 1999) in which children who have worked on the animation of a story as well as reading it are shown to have progressed further in the quality of their writing than children in a comparable group without the animation experience. Specific effects demonstrated relate to understandings of narrative, quality of descriptive writing, and quality of empathetic writing.

Taken together, there is a strong sense across these studies that a literacy in moving image media should have certain characteristics. It should, on the one hand, be systematically understood as a communicative practice, in which the details of semiotic work can be addressed by educators; and, on the other hand, as a practice which is rooted in the cultural experience of children across a wide range of media. It should be a literacy which includes both the interpretation and analysis of moving image media, and the production of such media using the digital technologies now available. It should also be a literacy recognised by formal education, a point most strikingly made by Mackereth and Anderson (2000), who site their exploration of girls and computer games in a high school, although games form no part of the formal curriculum.

A gap opens up, however, between the studies concerned with the making of the moving image and the two papers about computer games. Although both of these are concerned very much with active notions of literacy, the playing of computer games (Mackereth and Anderson, 2000) and the production of writing influenced by them (McClay, 2002), it is not clear conceptually how such 'literacy' relates to the proposals to study and produce the moving image in schools which are typical of the other papers. There is a link, however, between McClay's focus on the improvement in writing caused by the influence of games and Parker's focus on a similar effect in respect of animation. Both explain their findings in relation to an expanded awareness of visually-based narratives in their subjects.

b. Which studies provide the most convincing qualitative data, taking into account the methodology of the study; theoretical models proposed in

the study and the extent to which the data supports them; patterns in findings across studies?

The main weakness of these studies, taken together, is the sample sizes. Apart from the first part of Mackereth and Anderson's study, which is a quantitative survey for contextual information across a whole year cohort in a high school, all the other sample groups range between one child (McClay, 2002) and 30 children (the experimental group in Parker, 1999). Even in the larger groups (Mackereth and Anderson, 2000; Parker, 1999), the studies are located in a single school, so it is difficult to claim results typical across diverse socio-economic or ethnic ranges. The studies themselves are typically cautious about their findings, calling them tentative, preliminary, suggestive, and not making claims that they are typical in any way of a given population. The only studies judged to be of 'high' quality in providing evidence to answer their own questions were those of Mackereth and Anderson (2000), which combined quantitative findings from a whole year group with observation and interview data from a group of six girls, thus providing a robust account of girls' engagement with computer games; and Burn *et al.* (2001), which provided a conceptual unity for a diverse action research project by relating the research process to a clear conceptual framework.

The stronger points of the qualitative data, of course, are in the depth of analysis. Here, the attention to detailed analysis work was related to explicit models of moving image literacy in Burn *et al.* (2001), and in Parker (1999) and Burn and Reed (1999). These studies provide rich accounts of children's descriptive and narrative writing as influenced by animation, of the collaborative decision-making of digital editing, and of a culturally-informed semiotics of moving image production. In these respects, these studies were highly relevant to the review question, in the sense that they strongly suggested how moving image literacy might be developed, and what it might be.

There is some unevenness of method, however, in these forms of in-depth analysis. McClay (2002) analyses the writing of a teenage boy to show the influence of computer game images, narratives and structures; but does not analyse the games themselves, so that claims for effect are based solely on interview evidence, where there could have been a textual comparison which could have made an innovative contribution to this area of research. Similarly, Burn (2000) analyses the video production of two boys, but uses no interview data, which could have deepened the analysis and made the study more robust.

The studies with the same or overlapping authorship share conceptual approaches. In these cases, although the samples are small in each study, the aggregation of data strengthens the case for the findings. So, for instance, the study of animation reported in Parker (2002) complements the evidence in Parker (1999) and Burn and Parker (2001), to show that the production of computer animations by primary schoolchildren in England promotes understandings of narrative texts. However, in each of these studies, the ability of the research design and method to rule out other explanations of the data was judged by the reviewers to be 'a little'; so where the studies complement each other's data and findings, they also replicate each others' weaknesses in this respect.

Similarly, Burn and Reed (1999) and Burn (2000) complement each other by adopting similar theoretical bases and by studying different groups in broadly similar ways, so that the limitations of the sample in terms of quantity, gender and academic attainment is to some extent compensated for. However, the two

studies still add up to a sample of six, and that within the same socio-economic setting; so this is still a very limited study. Also, again, in the case of the second of these two studies, the design and method is unable to rule out other explanations. In the first case, however, a triangulation design which analyses data from classroom observation, interview, video text and pupils' writing provides more robust data and more demonstrably valid analysis.

Finally, in spite of the richness of the analysis in many of the studies, there is often a failure in the conceptual design to distinguish sufficiently clearly between key variables. Although claims are made for the benefits of digital technologies, some of the studies do not sufficiently distinguish between the impact of media production in general and the impact of digital media in particular. This particular lack of clarity makes it difficult, on the basis of this evidence, to answer the present review question with confidence.

Altogether, the quality of the studies emerges as 'medium' across all studies apart from two. In general, this is because the sample limitations are often compensated for by the quality of qualitative analysis, which produces strongly suggestive outcomes, if not conclusive ones. In the case of the study judged to be 'low' overall (O'Brien *et al.*, 2001), this is not necessarily because of the methodological quality of the study, but because the focus was less helpful in answering the review question. In the case of the study judged to be 'high' overall (Burn *et al.*, 2001), the same sample size was wider and more diverse, as the study combined action research work from different schools, and the conceptual model was more explicit.

c. What discernible patterns, if any, emerge across the findings of the studies which might be suggestive if not conclusive?

The findings of the studies are given in Appendix 4.1. Three strongly-marked patterns emerge.

Firstly, several of the studies find a connection between media literacy and the cultural experience and preoccupations of young people, suggesting that curriculum content which recognizes this factor is more likely to motivate high quality work, to locate learners as determiners of their own meanings, and to be aware of ways in which the developing social identities of young people are implicated with their media cultures. So O'Brien *et al.* (2001), for instance, documents how the most effective multimedia production by young people with literacy problems incorporated moving image sequences of favourite rock stars, interpreted and manipulated within a multimedia text. Although this study was judged to provide a low weight of evidence relevant to this review, this finding can be set against similar findings in other studies judged to have a stronger relevance. Thus, Burn (2000) finds that the pleasure of the horror genre, even in the context of an 'old' horror film, becomes a part of the literacy required of two low-achieving boys to make a moving image text. Again, the experience of computer video games (McClay, 2002) is found to have specific influences on narrative structure, point of view, and character-construction in fantasy writing.

However, prior cultural experience is not always found to be beneficial. Mackereth and Anderson's quantified findings about less time spent by girls on computer consoles, coupled with their perception of games as a predominantly male activity, is set against the qualitative finding that the sample of girls are both competent at playing the selected games, and do not conform to stereotype in their diverse preferences for game genres. Here, the suggestion is that curricular

incorporation of a literacy normally based outside the school can redress a cultural imbalance (an argument promoted elsewhere in the literature about girls and games in education; see Orr Vered, 1998).

Secondly, several studies find that the incorporation of moving image media in curriculum programmes led to gains in literacy, broadly defined. In some cases (McClay, 2002; Parker, 1999; Parker, 2002;), this meant specific gains in print literacy as a result of the experience of, respectively, making computer animations and playing computer games. Aspects of these findings are questioned by this review. Firstly, Parker (1999) does not exclude the possibility of other explanations, in particular the novelty for the experimental group of working with a new approach and new equipment. Secondly, McClay (2002) does not analyse the computer games alongside the writing it is claimed is influenced by them. Thirdly, as we have seen, both studies work with limited samples. However, both sets of findings are suggestive if not conclusive.

Elsewhere, gains are related to moving image literacy and, in particular, the literacies required to produce the moving image. Burn and Reed (1999) report that the process of digital production allows for the internalisation of abstract notions of genre, narrative and audience which are then realised in the composition of the students' own video sequence. In relation to this, they find that metalinguistic scaffolding helped students of high ability to conceptualise their work.

Other findings related specifically to literacy are those related to particular aspects of audiovisual composition. The importance of spatial-visual communication is noted in McClay (2002), who observes that drawings based on computer game characters take the place of descriptive writing. Similarly, Burn and Parker (2001) report that, in the computer animation project under investigation, children construct spatial elements – the synchronic aspect of the text – before they construct temporal elements – the diachronic. There are a number of implications here for how such skills can be taught in sequence.

Although most of the studies produce some findings as evidence of the development of moving image literacy through production, it is less easy to discern the specific impact of digital technologies. The studies often do not sufficiently separate out this factor, by asking, for instance, how many of the gains observed could have been achieved with analogue technologies. Specific reference to digital formats are made in the findings of only four of the studies.

In Parker (2002), a finding is reported from an earlier study (Parker and Sefton-Green, 2000) that editing promoted 'cine-literacy', but that the digital 'edutainment' software explored in this study also constrained what was possible by limiting functionality. This finding is extended into the conclusion that better quality, accessible editing software is needed for this age group (a conclusion to some extent overtaken by the development of Apple's i-movie).

Burn (2000) reports that the process of audiovisual composition is observably a form of literacy, involving a variety of forms of assembly of image and music sequences, and that this process is enabled by the digital format. (In this study, the reviewers pointed out a lack of clarity over how the data were collected, rendering the findings less authoritative.)

Burn and Reed (1999) report that digital media blur the distinction between theory and practice, analysis and production. It is not clear, however, on what evidence this particular conclusion is based.

Burn and Parker (2001) suggest that digital production is characteristically provisional – that the undoing and redoing of work is a specific affordance not to be found in analogue technologies. (The reviewers agreed with the findings and conclusions of the study.)

Thirdly, two of the studies report findings which relate to the collaborative nature of media production. Burn and Parker (2001) report that an important aspect of the animation-making they describe was the sharing of digital images in a networked image bank. In Burn *et al.* (2001), all three of the action research studies report positive findings about the collaborative nature of the work, and the social roles adopted by pupils as part of the editing process. However, across all the studies, these findings are curiously restricted, bearing in mind that all the studies apart from McClay (2002) are exploring engagements with digital media which are characterised by social and collaborative work. Furthermore, the collaborative nature of media production work is a well-known phenomenon, raising well-known questions (for example, Buckingham *et al.*, 1995; Buckingham *et al.*, 1999).

Fourthly, five of the studies report findings indicative of motivational aspects of working with moving image media, while one (Mackereth and Anderson, 2000) finds a negative effect in the case of girls and computer games; that is, that girls are less motivated to play games than boys, even when they have equal access to consoles. The five studies reporting positive effects mention the social and aesthetic pleasures of editing (Burn *et al.*, 2001), the improvement of motivation by moving image production in the context of print literacy development (Parker, 2002), the greater duration of reading and writing for students with special needs when working with multimedia (O'Brien *et al.*, 2001); the increased sense of self-worth in two low-attaining boys (Burn, 2000); and increased self-esteem among four able girls (Burn and Reed, 1999). In most of these cases, however, it is difficult, if not impossible, to separate out the effect of media production in general from the specific effect of the digital medium.

d. What gaps are there which need to be addressed by further research?

This sub-question will be addressed in section 5.3, covering the implications for policy, practice and research.

4.4 In-depth review: quality assurance results

Both reviewers included the same 13 studies, excluded the same four studies and agreed the application of the exclusion criteria. The only doubt (shared by both reviewers) was about the decision to include the two studies that explored computer games, and the study of multimedia authoring. The two reviewers discussed and agreed this decision.

There are nine studies in the in-depth review for this research question. All were independently double data-extracted by AB, JL and DE, who double data-extracted one of the studies written by AB, to secure independent judgment in the

case of studies authored by one of the reviewers. The data-extractions were compared and all disagreements resolved.

4.5 Nature of actual involvement of users in the review and its impact

The draft report was discussed with a member of the Advisory Group representing potential users of the report in the English and Media teaching community, James Durran (Parkside Community College, Cambridge). His comments were as follows:

- The report will be helpful on occasions in which he has to justify moving image work in the classroom as a form of literacy work; it will provide a synthesis of theoretical approaches to cite on these occasions. The example he gave was an animation project with primary schools, the outcomes of which he has often been required to present and which forms the subject of one of the included studies: Burn and Parker(2001).
- The report will be useful to cite in his work with trainee teachers at the Cambridge University School of Education, where his work with PGCE students involves practical experiences of media production with children, but also the need to underpin this with theoretical explanation and analysis.
- The report will be helpful to him in his analysis of his own practice. He pointed out that theory and practice should not be divided between researcher and practitioner, but that practitioners should research and theorise their own work. As a disseminator of good practice in a wide variety of contexts (PGCE teaching, INSET work with teachers, Best Practice Research Scholarships), he would find the report useful.
- On the specific subject of the studies relating to computer games, he commented that this is an area he recognises as influential part of pop culture, which should be included in the teaching of literacy. Any research evidence about how games might be conceived of as a literacy, or how they might be incorporated into teaching programmes, would be welcome.

5. MOVING IMAGE REVIEW: FINDINGS AND IMPLICATIONS

This review reports the results of a systematic search for, and synthesis of, findings from research studies related to the moving image, literacy and ICTs. The report represents, in many ways, an incomplete picture, as indicated in sections 5.2 and 5.3, but the picture it does present indicates that the evidence for the benefits of digital formats in moving image production are strongly suggested by all the studies which explore this, although on the basis of limited evidence which is not conclusive in the case of any of the studies.

5.1 Summary of principal findings

5.1.1 Identification of studies

Table 5.1: Studies produced by 'moving image' keyword

Study	Year
Bigum <i>et al.</i>	1997
Burn	2000
Burn and Reed	1999
Burn and Parker	2001
Burn <i>et al.</i>	2001
Cramer and Smith	2002
Higgins	2002
McClay	2002
Mackereth and Anderson	2000
O'Brien <i>et al.</i>	2001
Parker	1999
Parker	2002
Vincent	2001

5.1.2 Mapping of all included studies

Thirteen papers were identified for the systematic map.

5.1.3 Nature of studies selected for in-depth review

Table 5.2: Studies included in the in-depth review

Study	Year	
Burn	2000	exploration of relationships
Burn and Reed	1999	exploration of relationships
Burn and Parker	2001	exploration of relationships

Study	Year	
Burn <i>et al.</i>	2001	exploration of relationships
McClay	2002	exploration of relationships
Mackereth and Anderson	2000	exploration of relationships
O'Brien <i>et al.</i>	2001	exploration of relationships
Parker	1999	researcher-manipulated evaluation
Parker	2002	exploration of relationships

5.1.4 Synthesis of findings from studies in the in-depth review

Since patterns emerging across findings was one of the review-specific sub-questions, this is dealt with in part (c) of section 4.3. The section here will discuss the findings in relation to the background outlined at the beginning of this report.

Firstly, a group of findings from the two BFI studies, and from the McClay study, suggest a beneficial impact on print literacy (writing) of engagement with digital moving image media – computer animation production and computer game-play. In both cases, it was impossible to rule out other possible explanations; so these findings must be regarded as tentative, but suggestive of the need for further research in this area.

Secondly, a larger number of the studies found confirmation of theoretical models of moving image literacy, based in several cases on social semiotic models of multimodal communication (Kress and van Leeuwen 1996, 2001), and in two cases on the BFI-sponsored notion of cine-literacy (FEWG, 1999). In so far as these findings rest on their relation to a growing body of theoretical research in this field, which has been widely influential in Australia, New Zealand and the UK in particular (see Bigum *et al.*, 1997), and to a lesser extent in the US (for example, Lemke, 2002), these studies can be regarded as contributing to an understanding of multimodal literacies in ways which can be used to inform educational practice. In so far as they rest on demonstrable features of the data they analyse, they are more convincing in the case of some studies than other, so the evidence is mixed. There does appear to be some evidence, however, that social semiotic theories of multimodal communication offer useful ways to understand learning processes related to the moving image.

The tentative models of moving image literacy which emerge in these studies can now be read against the much larger BFI study of the BECTa DV (Digital Video) pilot project in England and Wales (BECTa, 2002), which analyses data from 50 schools using digital video cameras and editing equipment. This study proposes, on the basis of observations and interviews, a more comprehensive idea of moving image literacy, related to findings of how such a literacy might be manifested in a wide variety of contexts, looking at details of pupil texts, use of specific aspects of hardware and software, and at teacher interpretations of the process.

Thirdly, the findings, like the data analysis, often fail to distinguish sufficiently between media production and digital media production. Where they do, they make quite specific points about the affordances of particular software (e.g. the ability of animation software to help children construct temporal elements of animation; or the limitations of edutainment editing software); but it is difficult to

form a general picture of the benefits of digital formats on the basis of these studies. An optimistic reading would recognise particular benefits, the one general benefit observed (the plasticity of the medium), and the motivational benefits observed, and conclude that on balance, digital formats seem beneficial, but that much more research is needed.

Fourthly, the findings in many ways confirm the view of media literacy, whether in formal education, informal education or the home, as a set of practices inextricably bound up with the cultural lives of children, and with their uses of media in the interests of self-representation and identity (Buckingham, 1996; Buckingham and Sefton-Green, 1994). Several of the studies in this review emphasised this context, citing their subjects' experiences of horror films (Burn and Reed, 1999), rock music (O'Brien *et al.*, 2001) and computer games (McClay, 2002) as powerful shaping influences on children's work with moving image media. It is less clear from these studies, again, how such cultural contexts relate specifically to digital media.

Fifthly, the findings' claim for the motivational power of digital moving image media should be acknowledged, although in some studies it was impossible to rule out other explanations for the increased motivation of pupils. While digital cultures are often optimistically represented in the wider literature, some commentators balance such optimism with more cautious questions about access, the need for adapted pedagogies, and the need for more research into the social uses of such technologies (Buckingham *et al.*, 1999).

Finally, the findings in respect of the relation between moving image literacy and computer games permit only very limited conclusions. The suggestion that schools can intervene in wider cultural disincentives for girls to enjoy games, when they are shown to be able to do so in the right conditions, is borne out by other studies (for example, Cunningham, 1995; Jenkins, 1998; Orr Vered, 1998). The proposal of a link between print literacy and computer game experience and culture should be read against similar work in other studies not found by this review, such that represented in Beavis and Durrant (2001), which looks at the relationship between writing and the playing of specific games, in the context of secondary school English in Australia.

5.2 Strengths and limitations of this systematic review

The main strength of this review is that it provides a systematic analysis of the research available in the field of literacy, ICTs and the moving image. It is possible, thus, to make some judgments about how dependable the findings of these studies are, what aspects of the field they have covered, how this contributes to current debates about moving image literacies, and what further work should be prioritised.

The principal weakness is that the search strategy relies heavily on the electronic databases, whereas the review has revealed that the research cultures surrounding this specialised field seem to militate against inclusion in those databases; three of the six studies were identified by handsearch. It is clear that more relevant studies could be included, in particular studies published as book chapters, and missed by the search strategy; and reports published after the initial search was undertaken. These studies include Beavis and Durrant (2001), the BFI evaluation of the BECTa DV pilot (Reid *et al.*, 2002) and a number of other studies which can, along with these, be considered in the update to this

review, as well as in the book chapter which has been adapted from this review (Burns and Leach, 2004).

5.3 Implications of the moving image review: what does it mean?

5.3.1 Policy

Implications for educational policy fall into two main areas.

Firstly, the argument that pupils' interpretation of the moving image and understanding of it can only fully be regarded as a 'literacy' if they also have opportunities to produce moving image texts, has implications for literacy policies produced by government education departments. In England and Wales, for instance, the National Curriculum for English includes the moving image, but only in the 'reading' section of the curriculum. The emphasis on production in these studies make a case for it to be regarded as a form of 'writing' also, so that pupils make their own moving image texts as well as analysing those of others.

At the same time, the studies suggest that moving image-making in schools is a literacy with wider implications beyond the English curriculum, and should be addressed also within the Arts, and within models of ICT curricula, whether discrete or distributed across other subject domains. This implication, although not strongly represented in this group of studies, would be reinforced by the findings of the BECTa DV pilot (Reid *et al.*, 2002).

Secondly, the studies do not make specific cases for the purchase of specialised equipment for schools. This question, again, would be more clearly revealed by the findings of the BECTa report, which, while it makes a case for high levels of access to digital editing software, does so in the context of Apple's I-movie, which is either very cheap or free, depending on circumstances. At the time of this review, following the release of Windows XP, it is also clear that editing software is incorporated as standard in this operating system. The question, then, rather than one of financial outlay, becomes one of curriculum time, appropriate pedagogies, and of interpretations of literacy. Similarly, the perception of computer games as both literate practices and as objects worthy of analysis and study in schools is a question of curriculum design rather than of cost.

5.3.2 Practice

The comments of the practitioner member of the advisory group are reported in section 4.5 above. It is worth considering further how these implications for practice might have a more general impact on the teacher community. It is already the case that moving image technologies in England and Wales are beginning to be explored by teachers through voluntary training and in-service provision, provided, for instance, by the National Association for the Teaching of English, by the BFI, by the English and Media Centre in London, and by Film Education, amongst others.

All of this, however, relies on the enthusiasm of relatively small sub-sets of the English teaching community; and it seems fair to suppose that the position is similar in the other Anglophone countries. The obvious implication, not from this

review, but from further research, should it confirm the tentative findings of this study, would be the incorporation of digital moving image production in the initial training of teachers.

5.3.3 Research

The implications of this review are that more research is needed, of specific kinds. Firstly, the general character of these studies as small, qualitative case studies needs to be complemented both by more in-depth qualitative analysis of children's moving image work, but also by larger studies, combining qualitative and quantitative methods. Mackereth and Anderson's study shows, for example, how a quantitative survey can produce important contextual data for a large sample, to be combined with smaller qualitative studies of process and outcome.

Secondly, further research needs to distinguish clearly the impact of digital formats in particular, and not allow this to become confused with the impact of media production work in general, or with other, motivational, factors.

Thirdly, the comments of the practitioner-adviser point to a strength of some of the work carried out in England, which often consists of action-research-based collaborations between specialist agencies, academics and practising teachers. If these kinds of detailed case-study work can be extended, for instance into longitudinal studies (the ones in this review are mostly cross-sectional) and, if they can be systematically co-ordinated to produce generalisable findings, then this model, already supported by the UK's education ministry, should provide clear research outcomes which future practice can take into account.

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APPENDIX 2.1: Inclusion and exclusion criteria

English Review Group Working Document

**Systematic review on 'The impact of ICT on 5-16 year olds' literacy in English'
Screening studies for inclusion in 'Mapping' section of review.**

Exclusion criteria: to be included, a study must NOT fall into any one of the following categories.

IF A STUDY IS TO BE EXCLUDED, RECORD REASON BY USING APPROPRIATE EXCLUSION CODE (ONE, TWO, THREE, FOUR, OR FIVE)

EXCLUSION ON SCOPE

ONE Not ICT or literacy

- < *Definition of ICT: ICT stands for 'information and communication technologies', networked technologies with a multimodal interface, i.e. networked and stand-alone computers, mobile phones with the capacity for a range of types of communication, and other technologies which allow multimodal and interactive communication.*
- < *Definition of literacy: Literacy can be defined narrowly, as the ability to understand and create written language. It is, however, frequently defined in two broader senses, and both are included in the present study. Firstly, the scope can be expanded so that written language becomes written language and graphical or pictorial representation. Secondly, the skill can be treated as social, rather than psychological; in this view literacy is the ability to operate a series of social or cultural representations. Since sets of expectations and norms differ depending on the situation, the social view of literacy entails a number of different 'literations'.*

TWO Not children aged 5–16, or main focus not children aged 5–16

THREE Not about the impact of ICT on literacy learning and/or teaching, or vice versa

- < *Definition of the impact of ICT on literacy: Impact will be defined as the result on end-users (here children between 5 and 16) of an intervention aimed at improving the teaching or learning of literacy. It may also be the result of a non-intervention activity which could reasonably be expected to increase or decrease literacy. Either can be considered as 'literacy-related activities'. Entailment: A research study which focuses on teachers' or learners' perspectives, opinions or strategies, may be considered to deal with the impact of ICT on literacy as long as it refers to a specific literacy-related activity.*

EXCLUSION ON STUDY TYPE

- FOUR
- (a) Editorials, commentaries, book reviews
 - (b) Policy documents
 - (c) Prevalence or incidence of ICT in literacy learning
 - (d) Non-systematic reviews
 - (e) Non-evaluated interventions
 - (f) Surveys examining a range of curricular activities
 - (g) Resources
 - (h) Bibliography
 - (i) Theoretical paper
 - (j) Methodology paper

- (k) Non-evaluated non-interventions*
- (l) Dissertation abstracts (unless RCTs)

EXCLUSION ON SETTING IN WHICH STUDY WAS CARRIED OUT

FIVE Settings in which a language other than English is being used as a primary medium for literacy learning, i.e. include ESL and EAL, exclude EFL.

Acknowledgements: This document was developed from the EPPI-Centre Working document on Inclusion Criteria for Mapping. Training and support are acknowledged.

* A non-evaluated non-intervention would typically describe a naturally occurring phenomenon, rather than evaluating it. So an ethnographic case-study of a classroom, or a learning site of some other kind, could fall into this category if it didn't attempt to evaluate processes or outcomes. Of course, all description is a kind of evaluation (as it will be based on selection according to certain principles); but if those principles aren't articulated, then it is hard to judge the work as research.

APPENDIX 2.2: Search strategy for electronic databases

ICT AND LITERACY – UPDATE SEARCHES

Searcher: Julie Glanville, NHS Centre for Reviews and Dissemination

Completed 20 August 2002

1. Databases

1a. ERIC

ERIC was searched on 16 August 2002, using the BIDS Ovid interface. The database was searched for the period of updates May 2001 to June 2002 and 181 records were retrieved.

The records were loaded into an Endnote library.

1. exp children/ or exp adolescents/
2. exp early adolescents/ or exp late adolescents/
3. exp preadolescents/ or exp secondary school students/
4. students/ or elementary school students/ or high risk students/
5. lower class students/ or middle class students/
6. middle school students/ or special needs students
7. exp special schools/ or disadvantaged youth
8. exp early childhood education/
9. exp elementary education/ or exp british infant schools/
10. exp elementary schools/ or exp middle schools/
11. exp public schools/ or exp secondary schools/ or exp state schools/
12. or/1-11
13. exp computers/ or computer centers/ or computer games/
14. computer graphics/ or exp computer interfaces/ or computer managed instruction/
15. computer mediated communication/ or exp computer networks/ or exp computer software/
16. exp computer uses in education/ or exp expert systems/
17. hypermedia/ or gateway systems/ or information systems/
18. information technology/ or exp man machine systems/
19. multimedia materials/ or natural language processing/
20. exp optical disks/
21. "screen design (computers)"/
22. telecommunications/ or virtual reality/ or workstations/
23. multimedia instruction/ or nonprint media/ or world wide web/ or internet/
24. or/13-23
25. 12 and 24
26. literacy/ or exp functional literacy/ or exp reading/ or "writing (composition)"/
27. literacy education/ or exp reading skills/ or reading ability/
28. reading failure/ or reading habits/ or reading improvement/
29. exp reading instruction/ or basic writing/ or children's writing/
30. creative writing/ or descriptive writing/ or exp handwriting/
31. exp sentences/ or spelling/ or exp writing ability/
32. writing exercises/ or writing improvement/ or writing instruction/

33. sentence structure/ or syntax/ or alphabetizing skills/
34. or/26-33
35. 25 and 34
36. *adult education/
37. *postsecondary education/ or exp *adults/
38. *adult learning/ or *adult literacy/
39. exp *adult programs/
40. *adult basic education/ or *workplace literacy/
41. or/36-40
42. 35 not 41
43. limit 42 to english language
44. (computer\$ adj3 literacy).mp.
45. (computer\$ adj3 literacies).mp.
46. (computer\$ adj3 read).mp.
47. (computer\$ adj3 reading).mp.
48. (computer\$ adj3 spell).mp.
49. (computer\$ adj3 spelling).mp.
50. (computer\$ adj3 write).mp.
51. (computer\$ adj3 writing).mp.
52. (computer\$ adj3 learn).mp.
53. (computer\$ adj3 learning).mp.
54. (cal adj3 (read or reading or spell or spelling or write or writing or learn or learning)).mp.
55. (cai adj3 (read or reading or spell or spelling or write or writing or learn or learning)).mp.
56. (call adj3 (read or reading or spell or spelling or write or writing or learn or learning)).mp.
57. (multimedia adj3 (read or reading or spell or spelling or write or writing or learn or learning)).mp.
58. (ict adj3 (read or reading or spell or spelling or write or writing or learn or learning)).mp.
59. (www adj3 (read or reading or spell or spelling or write or writing or learn or learning)).mp.
60. (software adj3 (read or reading or spell or spelling or write or writing or learn or learning)).mp.
61. or/44-60
62. 61 not (43 or 41)
63. limit 62 to english language
64. 50 and 12
65. 63 and 12
66. 65 or 42
67. 65 or 43
68. ("200105" or "200106" or "200107" or "200108" or "200109" or "200110" or "200111" or "200112" or "200201" or "200202" or "200203" or "200204" or "200205" or "200206").em.
69. 67 and 68

1b. British Education Index

The BEI was searched on 19 August 2002, using the BIDS Ovid interface. The database was searched for the updates from the first quarter 2001 to first quarter 2002 and 67 records were retrieved.

The records were loaded into an Endnote library.

1. ict.mp.

2. (information adj technolog\$).mp.
3. (communication adj technolog\$).mp.
4. (cal or cai or computer\$ or multimodal or multimedia).mp.
5. (networked adj technolog\$).mp.
6. (mobile adj phone\$).mp.
7. (digital adj media).mp.
8. (internet or cdrom or hypertext or www).mp.
9. (world adj wide adj web).mp.
10. (worldwide adj web).mp.
11. software.mp.
12. "computer uses in education".sh.
13. ("computer assisted learning" or "educational software").sh.
14. information systems/
15. "educational technology".sh.
16. exp "screens (displays)"/
17. "electronic books".sh.
18. "multimedia approach".sh.
19. "computer games".sh.
20. or/1-19
21. (literacy or literacies).mp.
22. "spelling teaching".sh.
23. reading comprehension/
24. reading skills/
25. reading teaching/
26. (learn adj4 english).mp.
27. (learn adj4 read).mp.
28. (learn adj4 reading).mp.
29. (learn adj4 writing).mp.
30. (learn adj4 write).mp.
31. (learn adj4 spell\$).mp.
32. (learning adj4 english).mp.
33. (learning adj4 read).mp.
34. (learning adj4 reading).mp.
35. (learning adj4 write).mp.
36. (learning adj4 writing).mp.
37. (learning adj4 spell\$).mp.
38. (teach\$ adj4 english).mp.
39. (teach\$ adj4 read).mp.
40. (teach\$ adj4 reading).mp.
41. (teach\$ adj4 writing).mp.
42. (teach\$ adj4 write).mp.
43. (teach\$ adj4 spell\$).mp.
44. (develop\$ adj4 english).mp.
45. (develop\$ adj4 read).mp.
46. (develop\$ adj4 reading).mp.
47. (develop\$ adj4 writing).mp.
48. (develop\$ adj4 write).mp.
49. (develop\$ adj4 spell\$).mp.
50. (reading adj3 disab\$).mp.
51. reading ability/
52. reading improvement/
53. spelling/
54. writing skills/
55. reading difficulties/
56. or/21-55

57. computer assisted reading/
58. computer assisted language learning/
59. 20 and 56
60. or/57-59
61. adult literacy/
62. adult basic education/
63. adult basic education.id.
64. higher education.id.
65. professional education.id.
66. or/61-65
67. 60 not 66
68. ("200101" or "200102" or "200103" or "200104" or "200201").up.
69. 67 and 68

1c PsycINFO

PsycINFO was searched on 19 August 2002, using the WEBSPIRS interface. The database was searched for the updates from April 2001 week 1 to August 2002 week 1 and 122 records were retrieved.

The records were loaded into an Endnote Library.

- #1 explode 'Computers-' in DE (222 records)
- #2 explode 'computer-applications' in de (1274 records)
- #3 'computer-games' in de (45 records)
- #4 explode 'computer-simulation' in de (751 records)
- #5 explode 'computer-software' in de (382 records)
- #6 'Electronic-Communication' in DE (231 records)
- #7 explode 'information-systems' in de (913 records)
- #8 'internet-' in de (771 records)
- #9 'word-processing' in de (18 records)
- #10 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 (2940 records)
- #11 'literacy-' in de (323 records)
- #12 'literacy-programs' in de (75 records)
- #13 explode 'language-arts-education' in de (307 records)
- #14 explode 'reading' in de (399 records)
- #15 'reading-development' in de (144 records)
- #16 explode 'reading-measures' in de (26 records)
- #17 explode 'reading-skills' in de (329 records)
- #18 'writing-skills' in de (179 records)
- #19 #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 (1394 records)
- #20 'computer-assisted-instruction' in de (365 records)
- #21 #10 or #20 (2940 records)
- #22 #19 and #21 (64 records)
- #23 (ict near (literacy or read or reading or spell or spelling or write or writing)) in ti,ab (0 records)
- #24 (information technolog* near (literacy or read or reading or spell or spelling or write or writing)) in ti,ab (5 records)
- #25 (communication technolog* near (literacy or read or reading or spell or spelling or write or writing)) in ti,ab (3 records)
- #26 (cal near (literacy or read or reading or spell or spelling or write or writing)) in ti,ab (0 records)
- #27 (cai near (literacy or read or reading or spell or spelling or write or writing)) in ti,ab (2 records)
- #28 (networked technolog* near (literacy or read or reading or spell or spelling or write or writing)) in ti,ab (0 records)

- #29 (multimodal near (literacy or read or reading or spell or spelling or write or writing)) in ti,ab (3 records)
- #30 (digital media near (literacy or read or reading or spell or spelling or write or writing)) in ti,ab (0 records)
- #31 (internet near (literacy or read or reading or spell or spelling or write or writing)) in ti,ab (42 records)
- #32 (cdrom near (literacy or read or reading or spell or spelling or write or writing)) in ti,ab (0 records)
- #33 (hypertext near (literacy or read or reading or spell or spelling or write or writing)) in ti,ab (5 records)
- #34 (wide web near (literacy or read or reading or spell or spelling or write or writing)) in ti,ab (13 records)
- #35 (www near (literacy or read or reading or spell or spelling or write or writing)) in ti,ab (1 record)
- #36 (worldwide web near (literacy or read or reading or spell or spelling or write or writing)) in ti,ab (0 records)
- #37 (software near (literacy or read or reading or spell or spelling or write or writing)) in ti,ab (33 records)
- #38 (computer* near (literacy or read or reading or spell or spelling or write or writing)) in ti,ab (163 records)
- #39 (electronic near (literacy or read or reading or spell or spelling or write or writing)) in ti,ab (23 records)
- #40 #23 or #24 or #25 or #26 or #27 or #28 or #29 or #30 or #31 or #32 or #33 or #34 or #35 or #36 or #37 or #38 or #39 (236 records)
- #41 'adult-development' in de (253 records)
- #42 'adult-education' in de (48 records)
- #43 'adult-learning' in de (42 records)
- #44 (ADULTHOOD in AG:PY) or (AGED in AG:PY) or (MIDDLE-AGE in AG:PY) or (THIRTIES in AG:PY) or (VERY-OLD in AG:PY) or (YOUNG-ADULTHOOD in AG:PY) (45840 records)
- #45 #41 or #42 or #43 or #44 (45904 records)
- #46 #22 or #40 (258 records)
- #47 #46 not #45 (137 records)
- #48 #47 and (la='english') (133 records)
- #49 (20000809 in UD:PY) or (20000816 in UD:PY) or (20000823 in UD:PY) or (20000830 in UD:PY) or (20000906 in UD:PY) or (20000913 in UD:PY) or (20000920 in UD:PY) or (20000927 in UD:PY) or (20001101 in UD:PY) or (20001108 in UD:PY) or (20001115 in UD:PY) or (20001129 in UD:PY) or (20001206 in UD:PY) or (20001213 in UD:PY) or (20001220 in UD:PY) or (20001227 in UD:PY) or (20010103 in UD:PY) or (20010110 in UD:PY) or (20010117 in UD:PY) or (20010124 in UD:PY) or (20010131 in UD:PY) or (20010207 in UD:PY) or (20010214 in UD:PY) or (20010221 in UD:PY) or (20010228 in UD:PY) or (20010307 in UD:PY) or (20010314 in UD:PY) or (20010321 in UD:PY) or (20010328 in UD:PY) (5963 records)
- #50 #48 not #49 (122 records)

1d. Cochrane Library

Issue 2002/2 of the Cochrane Library was searched. Three hundred and thirty-eight records were identified. As it is not possible to limit to a range of update periods, the records were hand- sifted by the information officer to exclude large numbers of records about computer-based training of health professionals. The resulting records (11) were loaded into an Endnote library.

1. COMPUTER* near LITERACY
2. COMPUTER* near LEARN*

3. COMPUTER* near SPELL*
4. cOMPUTER* near READ*
5. COMPUTER* near WRIT*
6. HYPERMEDIA near LITERACY
7. hypermedia near LEARN*
8. hypermedia near SPELL*
9. hypermedia near READ*
10. hypermedia near WRIT*
11. SYSTEM* near LITERACY
12. system* near LEARN*
13. system* near SPELL*
14. system* near READ*
15. system* near WRIT*tECHNOLOG* near LITERACY
16. tECHNOLOG* near LEARN*
17. tECHNOLOG* near SPELL*
18. tECHNOLOG* near READ*
19. tECHNOLOG* near WRIT*MULTIMEDIA near LITERACY
20. MULTIMEDIA near LEARN*
21. MULTIMEDIA near SPELL*
22. MULTIMEDIA near READ*
23. MULTIMEDIA near WRIT*DISK* near LITERACY
24. DISK* near LEARN*
25. DISK* near SPELL*
26. DISK* near READ*
27. DISK* near WRIT*TELECOMMUNICATION* near LITERACY
28. TELECOMMUNICATION* near LEARN*
29. TELECOMMUNICATION* near SPELL*
30. TELECOMMUNICATION* near READ*
31. TELECOMMUNICATION* near WRIT*VIRTUAL near LITERACY
32. VIRTUAL near LEARN*
33. VIRTUAL near SPELL*
34. VIRTUAL near READ*
35. VIRTUAL near WRIT*WORKSTATION* near LITERACY
36. WORKSTATION* near LEARN*
37. WORKSTATION* near SPELL*
38. WORKSTATION* near READ*
39. WORKSTATION* near WRIT*wide NEAR LITERACY
40. wide near LEARN*
41. wide near SPELL*
42. wide near READ*
43. wide near WRIT*WORLDWIDE near LITERACY
44. WORLDWIDE near LEARN*
45. WORLDWIDE near SPELL*
46. WORLDWIDE near READ*
47. WORLDWIDE near WRIT*WWW near LITERACY
48. WWW near LEARN*
49. WWW near SPELL*
50. WWW near READ*
51. WWW near WRIT*INTERNET near LITERACY
52. INTERNET near LEARN*
53. INTERNET near SPELL*
54. INTERNET near READ*
55. INTERNET near WRIT*ICT near LITERACY
56. ICT near LEARN*
57. ICT near SPELL*

58. ICT near READ*
59. ICT near WRIT*cal near LITERACY
60. cal near LEARN*
61. cal near SPELL*
62. cal near READ*
63. cal near WRIT*cai near LITERACY
64. cai near LEARN*
65. cai near SPELL*
66. cai near READ*
67. cai near WRIT*
68. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49 or 50 or 51 or 52 or 53 or 54 or 55 or 56 or 57 or 58 or 59 or 60 or 61 or 62 or 63 or 64 or 65 or 66 or 67

1e. Canadian Business and Current Affairs (CBCA) Fulltext Education database

Not available to CRD; not searched for update by CRD.

1f. Dissertation Abstracts

Dissertation Abstracts was searched using the Dialog Service. The search covered the period from July 2001 to July 2002. Forty-five records were identified and the free formats were downloaded. These records give title and indexing only and should be scanned. Any of interest can then be sent back to the information officer who will obtain bibliographic details and abstracts.

- 1 S COMPUTER?
- 2 S EXPERT()SYSTEM? ?
- 3 S HYPERMEDIA OR INFORMATION()SYSTEMS
- 4 S INFORMATION()TECHNOLOGY
- 5 S MULTIMEDIA OR NATURAL()LANGUAGE()PROCESSING
- 6 S OPTICAL()DISK? ?
- 7 S TELECOMMUNICATIONS OR VIRTUAL()REALITY OR WORKSTATION? ?
- 8 S WORLD()WIDE()WEB OR INTERNET OR WWW
- 9 S ICT OR CAL OR CAI
- 10 S LITERACY OR READING OR WRITING
- 11 S SENTENCES OR SPELLING OR SYNTAX
- 12 S ADULT? ? OR POSTSECONDARY OR UNIVERSITY OR HIGHER()EDUCATION
- 13 S S1:S9
- 14 S S10:S11
- 15 s s13(3n)s14
- 16 s S15 NOT S12
- 17 s S16/ENG
- 18 s UD='200107':UD='200207'
- 19 s S17 AND S18

1g. Social Science Citation Index

This database was searched, using the Dialog service (file 7). This was used in preference to the Web of Science interface because it allows more focused

searching. The database was searched for the period June 2001 to August 2002 week 3. Forty-two records were identified and the free formats were downloaded. These records give title and indexing only and should be scanned. Any of interest can then be sent back to the information officer who will obtain bibliographic details and abstracts.

- 1 S CHILDREN OR ADOLESCENTS
- 2 S SECONDARY()SCHOOL? ?
- 3 S ELEMENTARY()SCHOOL? ?
- 4 S MIDDLE()SCHOOL? ?
- 5 S SPECIAL()SCHOOL? ?
- 6 S CHILDHOOD
- 7 S ELEMENTARY()EDUCATION OR INFANT()SCHOOL? ?
- 8 S PUBLIC()SCHOOL? ? OR STATE()SCHOOL? ?
- 9 S COMPUTER?
- 10 S EXPERT()SYSTEM? ?
- 11 S HYPERMEDIA OR INFORMATION()SYSTEMS
- 12 S INFORMATION()TECHNOLOGY
- 13 S MULTIMEDIA OR NATURAL()LANGUAGE()PROCESSING
- 14 S OPTICAL()DISK? ?
- 15 S TELECOMMUNICATIONS OR VIRTUAL()REALITY OR WORKSTATION?
?
- 16 S WORLD()WIDE()WEB OR INTERNET OR WWW
- 17 S LITERACY OR READING OR WRITING
- 18 S SENTENCES OR SPELLING OR SYNTAX
- 19 S ADULT? ? OR POSTSECONDARY OR UNIVERSITY OR
HIGHER()EDUCATION
- 20 S ICT OR CAL OR CAI
- 21 S S1:S8
- 22 S S9:S16 OR S20
- 23 S S17:S18
- 24 S S22(3N)S23
- 25 S S24 NOT S19
- 26 S S25/ENG
- 27 S UD>200106
- 28 S S27 AND S26

1h. SIGLE

The SIGLE database was searched using the ARC WinSPIRS service. The database was searched from updates from January 2001 to June 2002. Three records were retrieved and loaded into an Endnote library.

1. (ict near (literacy or read or reading or spell or spelling or write or writing)) in ti,ab
2. (information technolog* near (literacy or read or reading or spell or spelling or write or writing)) in ti,ab
3. (communication technolog* near (literacy or read or reading or spell or spelling or write or writing)) in ti,ab
4. ((cal or cai or networked technolog*) near (literacy or read or reading or spell or spelling or write or writing)) in ti,ab
5. ((multimodal or digital media or internet) near (literacy or read or reading or spell or spelling or write or writing)) in ti,ab
6. ((cdrom or hypertext or wide web or www or worldwide web) near (literacy or read or reading or spell or spelling or write or writing)) in ti,ab

7. ((software or computer* or electronic) near (literacy or read or reading or spell or spelling or write or writing)) in ti,ab
8. #1 or #2 or #3 or #4 or #5 or #6 or #7

2. Internet

A selection of key internet sites were searched. Given the largely unstructured nature of web pages, it is difficult to restrict searches to material added since a previous search. Where possible, pages visited previously were revisited and researchers will need to look through the printouts and downloaded files to identify new material.

2a. Voice of the Shuttle (<http://vos.ucsb.edu/>)

Web page for humanities research. Accessed 20 August 2002.

Search terms: literacy

The resulting pages of links were printed out for scanning by researchers.

2b. British Educational Communications and Technology Agency (<http://www.becta.org.uk>)

Accessed 20 August 2002. Printed out web page on literacy information (<http://www.becta.org.uk/start/literacy.html>) and other 'research' oriented BECTA pages.

Followed links to Literacy Time website (<http://vtc.ngfl.gov.uk/literacy/index.html>). Printed out Research and Reports page (http://vtc.ngfl.gov.uk/literacy/features/research_reports.html).

2c. OFSTED (<http://www.ofsted.gov.uk>)

The A-Z of OFSTED Publications list was printed out on 20 August 2002. (<http://www.ofsted.gov.uk/public/index.htm>). In addition the list of publications for 2002 was printed out separately.

2d. National Literacy Trust (<http://www.literacytrust.org.uk>)

This website was searched on 20 August 2002.

Searched ICT subsections.

Searched Ongoing research database.

Searched Research Findings database using Subject heading assigned by NLT: "Information technology and literacy". Retrieved 1 record.

Searched Literacy researchers list and printed out.

Printed out a wide range of bibliographies and links pages.

The web pages were saved as files nlt1.htm to nlt12.htm and will need to be scanned for new and relevant information.

2e. Teachers Evaluating Educational Multimedia (<http://www.teem.org.uk>)

Accessed the website on 20 August 2002. This website still focuses on case studies, teachers' evaluations of software and publishers' product information. No further information on research evidence was identified.

APPENDIX 2.3: Journals handsearched

All journals were searched for the period July 2001 to October 2002.

Australian Journal of Language and Literacy

English in Australia

English in Aeoteroa

Literacy Learning

Education Media International

Dyslexia

Reading and Writing

Education, Communication and Information

English in Education

Research in the Teaching of English

Journal of Educational Computing Research

Changing English

APPENDIX 2.4: EPPI-Centre educational keywording sheet

V0.9.5 Bibliographic details and/or unique identifier.....

<p>1. Identification of report Citation Contact Handsearch Unknown Electronic database (Please specify.)</p> <p>2. Status Published In press Unpublished</p> <p>3. Linked reports <i>Is this report linked to one or more other reports in such a way that they also report the same study?</i></p> <p>Not Linked Linked (Please provide bibliographical details and/or unique identifier.) </p> <p>4. Language (Please specify.) </p> <p>5. In which country/countries was the study carried out? (Please specify.) </p>	<p>6. What is/are the topic focus/foci of the study? Assessment Classroom management Curriculum* Equal opportunities Methodology Organisation and management Policy Teacher careers Teaching and learning Other (Please specify.).....</p> <p>*6a Curriculum Art Business studies Citizenship Cross-curricular Design and technology Environment General Geography Hidden History ICT Literacy – first language Literacy further languages Literature Maths Music PSE Phys. Ed. Religious Ed. Science Vocational Other (Please specify.)</p> <p>7. Programme name (Please specify.) </p>	<p>8. What is/are the population focus/foci of the study? Learners* Senior management Teaching staff Non-teaching staff Other education practitioners Government Local education authority officers Parents Governors Other (Please specify.)</p> <p>*8a Age of learners (years) 0-4 5-10 11-16 17-20 21 and over *8b. Sex of learners Female only Male only Mixed sex</p> <p>9. What is/are the educational setting(s) of the study? Community centre Correctional institution Government department Higher education institution Home Independent school Local education authority Nursery school Post-compulsory education institution Primary school Pupil referral unit Residential school Secondary school Special needs school Workplace Other educational setting (Please specify.).....</p>	<p>10. Which type(s) of study does this report describe?</p> <p>A. Description B. Exploration of relationships C. Evaluation a. naturally occurring b. researcher-manipulated D. Development of methodology E. Review a. Systematic review b. Other review</p> <p><i>Please state here if keywords have not been applied from any particular category (1-10) and the reason why (e.g. no information provided in the text)</i></p> <p>..... </p>
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APPENDIX 2.5: EPPI English Review Group keywording sheet

KEYWORDS FOR ENDNOTE NO

<p>14. Focus of the report (Tick all that apply.)</p> <table border="0"> <tr> <td>literacy</td> <td>learning</td> <td>ICT</td> </tr> <tr> <td>genre</td> <td>assessment</td> <td>CAI/CAL</td> </tr> <tr> <td>literacies</td> <td>dyslexia/hypertext</td> <td></td> </tr> <tr> <td>literature</td> <td>learning difficulties</td> <td>moving image</td> </tr> <tr> <td>multimodality</td> <td>learning disabilities</td> <td>multimedia</td> </tr> <tr> <td>reading</td> <td>motivation</td> <td>word processing</td> </tr> <tr> <td>spelling</td> <td>teaching</td> <td></td> </tr> <tr> <td>writing</td> <td>ESL/EAL</td> <td></td> </tr> <tr> <td></td> <td>audience</td> <td></td> </tr> <tr> <td></td> <td>comprehension</td> <td></td> </tr> </table>	literacy	learning	ICT	genre	assessment	CAI/CAL	literacies	dyslexia/hypertext		literature	learning difficulties	moving image	multimodality	learning disabilities	multimedia	reading	motivation	word processing	spelling	teaching		writing	ESL/EAL			audience			comprehension		<p>15. Type(s) of intervention or non-intervention (Tick all that apply.)</p> <p>computer – stand-alone (software) computer – networked (email) computer – networked (internet) mobile phone other technology _____ (Please specify.)</p>
literacy	learning	ICT																													
genre	assessment	CAI/CAL																													
literacies	dyslexia/hypertext																														
literature	learning difficulties	moving image																													
multimodality	learning disabilities	multimedia																													
reading	motivation	word processing																													
spelling	teaching																														
writing	ESL/EAL																														
	audience																														
	comprehension																														
<p>16. What principal aspect(s) of literacy is the study focused on increasing? (Tick all that apply.)</p> <p>16a. psychological aspects or representations social representations and/or cultural/critical representations</p> <p>16b. writing print and graphical or pictorial representation reading print and graphical or pictorial representations</p>	<p>17. Which outcomes are reported? (Tick all that apply.)</p> <p>test results - reading - writing - spelling</p> <p>examination results motivation/engagement self-esteem/attitude quality of writing increased awareness of process quality of reading quality of response to multimedia</p>	<p>18. If study type in question 10 is C.b. (researcher-manipulated), is it:</p> <p>A. RCT B. Trial C. Other</p>																													

KEYWORDER

DATE

APPENDIX 2.6: Glossary for review-specific keywords

Literacy

The ability to read and write.

Genre

Basically, a type or category of text. In the Australian tradition, it means ‘text-type’. In the North American sociological tradition, it means identifiable patterns of ‘social action’ grounded in texts.

Literacies

Literacy can be defined narrowly, as the ability to understand and create written language. It is, however, frequently defined in two broader senses, and both are included in the present review. Firstly, the scope can be expanded so that written language becomes written language and graphical or pictorial representation. Secondly, the skill can be treated as social, rather than psychological; in this view, literacy is the ability to operate a series of social or cultural representations. Both these expansions of the narrow term ‘literacy’ can be termed ‘literacies’.

Literature

Fictional, dramatic or poetic texts.

Multimodality

The use of more than one mode of communication to convey ‘information’. All texts, in a sense, are multimodal in that printed writing is both visual and verbal. Multimodality is usually reserved for the combination of word and image and/or sound conveyed via the computer screen.

Reading

The act of bringing meaning to print.

Spelling

Orthographic representation of phonemes, morphemes and words.

Writing

This term should be reserved for papers that study the impact of ICT on general writing skills and capabilities: for example, the structure and expression of compositions.

ICT

ICT is taken to include stand-alone computers, networked technologies with a multimodal interface, mobile phones with the capacity for a range of types of communication, and other technologies which allow multimodal and interactive communication.

CAI/CAL

‘Computer-assisted instruction’ and ‘computer-assisted learning’. The former tends to be associated with self-supporting computer programs which replace the teacher, rather than complementing him/her.

Hypertext

Computer-readable text which allows for extensive cross-referencing, particularly 'vertically'; that is, it is possible to conceive of and present text in vertical layers rather than conventionally, in a horizontal plane.

Moving image

Film, video, animation.

Multimedia

The use of more than one medium of communication to convey information. Whereas 'multimodality' refers to the combination of more than one mode of communication (e.g. the verbal and visual), multimedia is a more technical term referring to a range of media which can convey such modes of communication.

Word-processing

The composition of verbal language on screen, usually on computer and in substantial form – as opposed to 'texting'.

Learning

The transformation from one state of personal knowledge to another.

Assessment

The measurement of learning performance, either 'summative' (at the end of a process of learning) or 'formative' (during the process of learning).

Dyslexia

Difficulty with learning to read or spell, arising from problems with grapho-phonemic equivalence. Also known as 'specific learning difficulties'.

Learning difficulties

These are difficulties with learning encountered by any children or young people at any age, and are associated with a variety of barriers to learning that may be temporary and which may be overcome by teaching strategies, appropriate curricula, etc.

Learning disabilities

These are more profound and developed difficulties with learning encountered by children and young people at any age, and are associated with a variety of barriers to learning that are usually more permanent.

Motivation

The impulse and/or desire to learn.

Teaching

Teacher-centred strategies for encouraging, eliciting and developing learning in pupils and students.

ESL/EAL

'English as a Second Language' (as opposed to English as a Foreign Language) refers to the language as learnt and taught by people for whom English is not a first language or mother tongue, but is acquired (often with much teaching help) as a second language with distinct functions in society. 'English as an Additional Language' is now the preferred term, as it implies that English may be learnt not only as a second language, but as a third or fourth language in a culture.

Audience

This term can refer to an audience of one, as in a single respondent or listener, to an audience of inestimable size via the Internet.

Comprehension

Understood by psychologists as a key activity in learning to read, and complementing 'decoding' of printed text. Understood by English teachers as a now outmoded form of textual analysis and appreciation in which text is subjected to a series of questions to elicit understanding.

APPENDIX 4.1: Characteristics of included studies

Author, date and country	Study type	Aim	What was studied?	How was it studied?	Findings
Burn A (2000) UK	Exploration of relationships	To explore the relationship between the cultural nature of horror films, the new kinds of literacy involved in making moving image texts with digital equipment, and the classroom processes which partly determine the outcomes	Two male GCSE students making trailers for <i>Psycho</i> using digital editing equipment.	Cross-sectional study of opportunistic sample from the classes, analysing pupil videos	There is an observable literacy involved in the making of the video, in which the processes of selecting clips, assembling them, repeating shots, and adding a music track are all components of the making of meaning, and all enabled by the digital technology. As well as being evidence of the ability to produce video, this work is evidence of the ability to read and interpret aspects of film such as narrative and genre. The making of meaning is associated both with the boys' distance from the canonical text of <i>Psycho</i> , but also with their pleasure in horror films, and even some aspects of this one. Distinctions can be made about the relative complexity of this production as compared to those of other students whose pieces are more complex in certain ways. Students' sense of self-worth has grown.
Burn A , Parker D (2001) UK	Exploration of relationships	To try to distinguish what the particular characteristics might be of these digital tools [computer animation software and vector-drawing software], and of the processes of their use by children in the making of a moving image text	Four primary school classes working on a secondary-run project, partly located at the secondary school, partly in their own schools, partly at a local arts cinema. The project involved designing and making computer animations. The study explored the relationship between the affordances of the three ICTs used (drawing package; animation software, editing software), processes of audiovisual composition, and the cultural and social	Cross-sectional study of opportunistic sample from the classes, using pupil texts, observation and interview	The digital inscription of the moving image is characteristically provisional. There are three principal categories of digital inscription in the moving image: synchronic, diachronic, and display; and four subordinate processes within each – transformation, (re)combination, (un)fixing and interactivity. Children invest basic design options (e.g. circles and squares) with cultural properties from an early stage. Children effectively share resources which are aggregated to make moving image sequences; and that these design decisions are determined by the moving image/kineikonic grammar. The animation software helped the pupils understand and create the temporal aspects of

Author, date and country	Study type	Aim	What was studied?	How was it studied?	Findings
			meanings of the texts.		animation. Different display screens were differently valued by pupils.
Burn A, Reed K (1999) UK	Exploration of relationships	<p>(a) To explore 'how digital technologies change the nature of literacy, and literacy as a social practice - how they alter acts of textual reception and production, how they colour or transform the cultures in which these acts take place, how they transform the social spaces in which meanings are made and exchanged'</p> <p>(b) To describe a case study of a GCSE media studies coursework assignment using non-linear video-editing</p> <p>(c) To use project to consider value of digital communication in the classroom</p>	Four female GCSE students making a trailer for <i>Psycho</i> , using digital video editing software. Concepts explored included the nature of moving image literacy; the nature of narrative interpretation by students; digital editing as a form of literacy; meta-cognitive understanding by the students of the processes at work; social and cultural factors involved in such work.	Cross-sectional study of opportunistic sample from the classes, using analysis of pupil videos, interview transcripts, and pupil writing	<p>Combining genre, narrative and audience with processes for digital production enabled the students to work through abstract ideas in material form and appropriate and internalise them, and make them subject to their own textual decisions.</p> <p>It extends ideas about nature of theory.</p> <p>The layer of metalinguistic scaffolding is potentially useful in different ways for students of differing abilities.</p> <p>There are digital media blur distinctions between theory/practice, analysis/production.</p> <p>There are implications of nature of task for social working and sense of self-esteem.</p>
Burn A <i>et al.</i> (2001) UK	Exploration of relationships	To test a conceptual framework of how students use digital editing software	Three groups of students in three different secondary schools, all using digital video-editing equipment. The study focused specifically on social roles and learning styles; creativity; literacies and communicative practices, in the context of digital video editing.	Action research projects, all involving classroom observation and interview.	<p>The first two studies find that the conceptual model is a useful analytical and descriptive tool for the processes they observe; the third study finds that aspects of social and cultural pleasure in video editing are not sufficiently represented in the framework.</p> <p>The study concludes:</p> <ul style="list-style-type: none"> -that the conceptual model develops as an iterative process; - that much of it is tentatively confirmed by the studies; - that it is too vague in its description of filmic

<i>Author, date and country</i>	<i>Study type</i>	<i>Aim</i>	<i>What was studied?</i>	<i>How was it studied?</i>	<i>Findings</i>
					literacy; - that it does not sufficiently recognise the social and aesthetic pleasures of editing.
McClay J (2002) Canada	Exploration of relationships	To explore the influence of interactive video games on the development of student self-sponsored writing; and specifically issues of writing development, assessment of writing, and awareness of ownership and copyright.	A 13-year-old boy whose fantasy writing draws on his experience of computer games. The study is concerned with the relation between aspects of interactive computer games, such as narrative causality, characterisation, visual design and episodic structure, and analogous aspects of the writing of the boy who forms the subject of the study. It is also concerned with how such writing can be incorporated into aspects of the school literacy curriculum: in terms of its generic qualities and how these might be recognised and valued; in terms of the inappropriateness of conventional systems of evaluation and assessment to deal with such writing; and its character as a borrower of influences, images, ideas from many media forms, and how this relates to the questions of ownership and copyright.	Qualitative case study over time, including interviews and analysis of the subject's writing.	The written narrative uses initial drawings of characters to 'assist his planning', rather than representing the details of physical appearance The writing is influenced by fantasy novels as well as computer games The episodic structure of the narrative and move from third person to first person point of view indicate an attention to 'character motivation and development, both internal and external conflict, and humour' which is beyond that found in the 'strategy game' cited as the influence.
Mackereth M, Anderson J (2000) Australia	Exploration of relationships	'... to examine what girls think of video games as an initial step in developing a picture of students' exposure to electronic media prior to	The prior experience of, and access to, computer games of 15-17 year-old girls in a whole year group in a South Australian school; and the	A cross-sectional study combining a quantitative survey method to explore access to and use of game consoles among a cohort of	For part 1: There was no significant difference between access to consoles claimed by boys and girls (80.8% of boys; 61.2% of girls). There was a marked difference in claimed

Author, date and country	Study type	Aim	What was studied?	How was it studied?	Findings
		school'	experience of playing three selected games of a sample of six girls.	118 15-17 year-olds and a qualitative interview method with a group of six girls to explore perceptions of games played.	ownership of consoles (71.2% of boys; 19.3% of girls). There was a significant difference in the amount of time spent on computer games (27% of boys said they played more than four hours a week, compared with 9.1% of girls). Boys' attitudes to video games were significantly more positive than girls, with an analysis of mean differences giving a t-value of 6.01 (df=116). For part 2: Contrary to expectations, no marked preference arose from the sample group of six for a particular type of game from the three games played (adventure game, racing simulation, shoot-em-up). Each game was chosen as favourite by at least one of the sample. Therefore, individual differences outweighed gender as a determinant of game enjoyment. No evidence was found that factors intrinsic to the games tended to alienate females. All participants exhibited levels of skill and were interested in the games. Five of the six saw games as a predominantly male pastime, conflicting with other social claims on girls' time. Some of the interview evidence suggested that the content of games in general seemed unappealing to girls.
O'Brien D <i>et al.</i> (2002) USA	Exploration of relationships	To create and study a curriculum for 'at-risk' learners, which would allow the students to 'develop literate practices as a social and cultural process mediated by their interest in and expertise with popular culture, particularly media.' (p 106)	The multimedia productions of nine students within a high school learning support centre – the 'Literacy Lab'. The study is concerned with the provision of a literacy programme for at-risk students based on themes and topics drawn from popular cultural engagement; and with the use, in this programme	The study is a cross-sectional qualitative analysis of a sample of student multimedia productions, aiming to explore the relations between literacy development and motivation, the range of media technologies on	'Literacy engagement can be best defined by looking at how individual students construct their social identities and share in cultural meaning through various literate practices' (p 115). 'When given choices, these students will almost always avoid schoolwork' (p 115). The projects which construct their message though the use of media other than print are more successful than those which attempt to present their message in written form.

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		To explore how the programme deals with traditional notions of school failure and remediation	and definition of literacy, of a range of media beyond print, and centering on electronic technologies. It is concerned with the phenomenon of literacy in the context of multiple modes of communication - how this can be understood in relation to meaning-making, social and cultural context, and motivation.	offer, and the topics available to the students, based on their own cultural interests.	They read and write for longer duration if they are working on projects of their own choice.
Parker D (1999) UK	Evaluation: Researcher-manipulated	To investigate how the use of moving image media can enhance the literacy skills of pupils at Key Stage 2 in an English primary school	Two comparable Year 3 primary school classes, both working on the same Roald Dahl story; one (experimental) group using animation software; the other (control) group not. The study is concerned with the integration into literacy - specifically, writing - programmes of approaches built on a development of the children's awareness of film adaptation of books, and a subsequent practical project in which the experimental group make their own animation based on their reading of <i>The Fantastic Mr Fox</i> , by Roald Dahl.	The study was designed as an intervention in one experimental group, a class of 30 Year 3 children, with a comparable class serving as the control group.	The class that used a moving image approach demonstrated a measured increase in literacy (reading and writing) of, on average, one National Curriculum Level, as against the control group, who showed an average increase of less than one level.
Parker D (2002) UK	Exploration of relationships	To offer an overview of recent activities undertaken by the British Film Institute (BFI), relating textual production and reception of the moving image to print literacy	In all three of the interventions described, the relation between moving image literacy and print literacy is being explored. In one project (Story Shorts), the relation is between film-viewing and	The study is a review of three development projects. Rather than seeking to amalgamate their outcomes, it seeks to explore the relations between forms of textual	A 'virtuous cycle' of learning occurs where print and moving image literacies are taught in conjunction with one another (p 39). 'Cine-literacy' can scaffold print literacy (p 40). The editing of the moving image is a central creative activity for cineliteracy; but that better software without the limitations of 'edutainment'

<i>Author, date and country</i>	<i>Study type</i>	<i>Aim</i>	<i>What was studied?</i>	<i>How was it studied?</i>	<i>Findings</i>
			writing, organised as forms of creative writing based on analytical forms of film viewing. In Edit-Play, the act of editing the moving image is the focus, analysed as a process with 'some conceptual and cognitive cross-over with writing print'. In Animation for Storytelling, the making of the moving image was related to the print literacy skills required to write the scripts.	reception and production in print and in the moving image, proposing an argument derived from empirical work in the three projects and a body of theoretical work, to the effect that there are conceptual, cognitive and cultural overlaps between the two forms of literacy, and this, as well as educators' attention to the new technologies of textual production, should be addressed in an integrated way by schools.	packages needs to be available (p 40). Moving image production improved literacy, but also motivation (p 42).