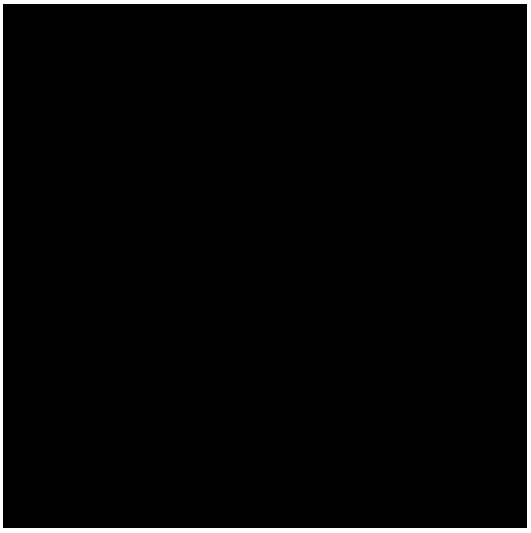
Building a Framework for Interactive Educational Television Content



Report from the Interactive Educational Content Forum

CSRP 561 April 2003

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1. Executive Summary

The two-day workshop was a forum for presentation and discussion, with the emphasis upon discussion. Four key issues were focal to the workshop sessions: Motivation and Engagement through interactivity, Personalisation, Collaboration, and Context. Participants were drawn from academic, commercial, and policy-making organisations.

The workshop succeeded in providing an independent presentation and discussion forum for academics, film and TV content providers and policy makers. Discussions were extensive and resulted in the identification of key items for future research and acknowledged the need for the creation of a pedagogically informed design framework. When the workshop was originally planned the organisers believed that we would be concentrating our attention upon Interactive Educational Television content. Throughout the 2 days of discussion it became clear that the agenda was broader and that much of what we discussed was applicable to all types of interactive educational, digital rich media, irrelevant of its delivery platform.

At the start of the workshop there was considerable scepticism about interactive educational television. There were two main reasons for this: first, there was a feeling that work completed to date had consisted of re-using old computer based learning techniques unimaginatively through a fresh interactive medium, and second, there was no clear business model to underpin the provision of an interactive educational television service. The cost of producing high quality interactive media was seen as simply too great. The challenges identified by participants at the outset fell into three categories of question:

Content, in which questions such as “Can content be dynamic enough to be reused and still be engaging?” were raised.

Learners, with the primary concerns being about: how to motivate and engage so that learners can gain some autonomy over their learning; and about how to deliver individualised learning effectively.

Policy Issues, a category that included questions about access and affordability and about the mismatch between the curriculum and the way that the testing and standards agenda impact on teaching

Through the discussions that took place over the two days it became clear that, in order to be successful, interactive television services need to be usable, useful, desirable, and cost effective. Such a service would need to be:

- Grounded in sound pedagogy and educational practices.

- Designed to take the learners’ context into account: this means including, but also moving beyond, the traditional classroom and recognising the many dimensions that make up a learning context. For example, privacy, control, formality, mobility,

location, temporal constraints, authenticity and social context. We need to identify the ways in which Interactive Screen Based Media would vary according to the intended delivery context and explore how continuity might be maintained for learners moving between contexts.

- Developed with a commitment to providing support for learners' metacognitive skill development as well as their domain level competencies. Designers should recognise the trade-off between being immersed in learning and being able to sit back and comment on the learning: reflection in action and the reflection on action.

- Built upon a dynamic and shared view of each learner. A view that reflects a collaboration between the information available from the system and that provided by the learner and his or her teachers.

- Able to bridge the different production traditions that exist within Education, Interactive Learning Technology and Television.

- Designed with an awareness of the extent to which learning is an emotion-laden activity. In the personalisation session of the workshop, motivational and affective factors were clearly identified as of primary importance. A learner's motivational and emotional needs are factors that must be taken into account in the design of any learning experience. A negative motivational perspective can act as a barrier to learning that need to be overcome. The strong emphasis on affective factors and motivational issues indicates that perhaps the principal concern for IETV developers should be 'emotionally intelligent' design: a consideration of how learners are likely to feel and how these feelings can be assessed and manipulated.

- Collaborative, when designing, we need to ask questions such as: Will the intended collaboration be public or private? How might this affect the way people collaborate? Can we design for this? Can we expect learners and collaborators to be mutually respectful, skeptical of each other, etc…? How do we expect this to affect communication between them? Do we expect collaborations be emotional or dispassionate? How does this affect our designs?

- Recognize the tension between providing direction and limiting choice. In order to identify the amount of control a learner needs to have at any point in their learning experience developers may need to pay attention to improving learners' metacognitive skills and designing appropriately scaffolded guidance.

- Capable of solving some of the thorny problems with the technology. It will have to be able to store, recombine and deliver a vast array of learning resources and yet: there is insufficient bandwidth to ensure delivery and insufficient people to tag all the content that is already available let alone what might be produced in the future.

1. Introduction

This report was formulated from discussions held at the first meeting of The Interactive Educational Content Forum in Brighton on 11 and 12 July, 2002. The two-day

Objectives

It was considered too ambitious to suggest that all the above concerns could be addressed in a single workshop. The objectives of the workshop were therefore constrained to:

1. The construction of an initial outline framework for the construction of IETV content. This content creation framework would be pedagogically informed and not therefore subject to changes in delivery technology or business strategy fluctuations.

2. Identification of a research agenda for the work that would need to be done for this framework to be fully specified and evaluated.

3. The provision of an independent presentation and discussion forum for

Table 1 An overview of the two day IETC workshop

Plan of Activities	
Day I Morning Session	
Brief introductions and position statements from all participants	Plenary
Why we need a framework and how we might start: an Academic View of the Future Dr. Rose Luckin	Talk
Film/TV and education in the future: an Industry View of the Future Robin Mudge	Talk
Day I Afternoon Session	
Group 1 (half the participants) work on key issue: Collaboration	Workshop
Group 2 (half the participants) work on key issue: Personalisation	Workshop
Feedback from the Collaboration and Personalisation groups	Plenary
Commentary on the day	Plenary
Day II Morning Session	
Interactive Educational Programmes and their Design Motivation John Mateer	Talk
What is Emotional Intelligence (EQ) and why might it be important to Interactive Educational TV? Dr. Julie Coultas	Talk
Building technology that motivates learning Professor Ben du Boulay	Talk
Group 1 (half the participants) work on key issue: Learning Contexts	Workshop
Group 2 (half the participants) work on key issue: Motivation and Engagement	Workshop
Day II Afternoon Session	
Feedback from the Learning Contexts and Motivation and Engagement groups	Plenary
Commentary on the morning	Plenary
Final Session	Plenary

Workshop Participants

In the introductory session of the workshop all participants provided a brief position statement about their current work and interests in Interactive TV content for education. (A complete list of workshop participants is provided in Appendix 1 of this report)
A summary of the participants' perceptions of what challenges were inherent in designing educationally effective interactive television content is presented below.

The challenges

Content

- How can we break up content so that it can be used effectively and meaningfully?
- Can content be dynamic enough to be reused and still be engaging?
- What can bring user generated content to a level where it is acceptable to other people?
- How can content be adapted for the learning community?

Learners/Users

- How can we provide content for a diversity of learners?
- How can we transform passive viewers into interactive users?
- How can we motivate learners to become effective and autonomous learners?
- How can we make IETV compelling so that people engage?
- How do we switch from push to pull learning and give the power back into the hands of learners?

Policy Issues

- We need to address the question of access and affordability
- How does the teacher know exactly how the students are performing when they are on-line?
- There is a mismatch between the curriculum and the way the testing and standards agenda impact on teaching
- The change in schooling where education is spread outside the classroom

Examples from workshop participants:

Alix Gryce (Digitalbrain) How do you break content up so that it can be used effectively and still meaningfully?

Anthony Butterfield (Digital Brain) The greatest challenge is to make sure games and content is dynamic enough to be used over and over again and that these engage the kids.

Atul Sharda (E-Learning Strategy DfES) How can we provide loads of content that are centre specific in terms of not just being schools focused but can be of use to adults with basic literacy or who might be doing GCSE? How do we personalise it enough and what are our learning objectives? Another major challenge is not just the

Lynn Dawes (Consultant for Becta, De Montfort University) The challenge is the mismatch between the curriculum and the way the testing and standards agenda impact on teaching. What we need to do is to help and support the teachers.

Peter Bates (PJB Associates) What are all the component parts that enable an interactive learning experience particularly in the home? What format is that going to take place in? How is it going to happen? And what are the business models related to it? The biggest challenge is putting all the parts together.

Rob Wilson (Director of RWCS) is very keen on knowledge shaping. The greatest

3. Day 1

3.1 The Future of Interactive Educational TV

(powerpoint slides from presentations given at the workshop can be found at http://www.cogs.susx.ac.uk/users/joshuau/iecf/index.html)

Two presentations about the future of Interactive Educational Television provoked an initial discussion during which the following issues arose:

Issue 1: What is Interactive TV Content (IETVC)?

This section identifies definitional issues linked to IETVC.

- How can we define IETV and what can be included and excluded?
- How different are IETV, CDROM/DVD based multimedia, and web-based interactive learning systems?
- To what extent is what we already know about any of these aforementioned media types applicable to IETV?
- One potentially 'significant' difference is the synchronous broadcast aspect of IETVC. However, this difference may fade with the impact of digital video recorders. In order to clarify what we mean by IETVC we settled on the 'inclusive' term "Stuff" (or rich multimedia). The implication here is that much of what is known about educational systems in other media may be applicable. It was suggested that the potential of interactive television was to move an individual from being a passive viewer to an active learner.

Issue 2: What does the system need to know about the learner?

This section identifies questions about the system's model of the learner and considers the question of how we can design a system to accommodate different user styles.

- Would the accommodation of different user styles be at the subject level?
- Does the focus need to be on a specific subject where there is a certain type of learning style that is consistent enough for commercial development to be viable?
- Is GCSE a specific area where learning styles are similar enough and where many users can be accommodated?
- How much information about the system's model of the learner should each learner be given?
- How much information should learners be enabled to provide about themselves?
- Diversity in the classroom needs to be acknowledged and inclusion issues (e.g. people with learning difficulties) need to be incorporated. Guidance needs to be available to indicate where the resource needs to have different levels of support. In time the higher ability students can leave that support behind while the lower ability students can have access to visual material and a lot more feedback. This leads on to the question of whether it would be a teacher's role to say that one learner should

work with the system in one way and that another learner should work with the system in a different way

Issue 3: What does the learner need to know about the system?

This section identifies issues linked to the learner's understanding or model of the system. It was agreed that we need to pay attention to the learner's view of learning. Learning is a dynamic process and there are many theories about how we learn. In addition, the developing maturity of the learner needs to be taken into account. The following questions and answers were raised during the discussion.

- What do teachers do to help learners into learning?
- There seems to be a lack of understanding of what makes a 'good learner' and there is also the learner's inability to articulate why they are good at learning and why they are much better than some people. This is about the practical approach to learning;
- What are the preferences for information presentation?
- There is a need to understand how the learners are going to internalise, grasp and work with the theory of learning so that they can make intelligent choices in controlling the learning system. They are going to have to do this very often and very fast. They may have one topic where they need a totally structured approach which leads into something where they are much more comfortable and want a much more fluid environment. The learners are going to have to make the choices so it is important to identify common sense tags that would indicate to the learner that something was important.
- What do you say to the learner so that they will understand at the practical user level the stuff that is available to them?
- Somehow the learner has to be able to manipulate the information and control it. This is a really important issue and throws light on and 'trashes' learning management systems. Knowledge management systems that incorporate people (people within systems) are one 'element' that can deliver that sort of awareness. However the learner needs to have some cues to what kinds of other humans are there to help and when they ought to get that of help in order to overcome particular problems. It was suggested that Knowledge Management Systems could identify the expertise levels of the individual people so that there could be automatic grouping that would enable people to help the individual. The general understanding of E-learning linked to knowledge was considered to be rather narrow. People are quite skilled at learning management but only in a very narrow sense and this is driven by a skills based, work based competence activity. The critical notion is how the individual profile starts to impact on why the content is relevant to them and how people chose to extend from that. There are two issues here (1) the individual stuff and (2) the power of the system. The system needs to be truly adaptive.
- There was also the necessity of protecting users from too much choice. For instance, the user might ask for something about landforms and might be presented with 3,000 or 5,000
- How can the choice be limited so that people are not overwhelmed?

- IETVC does not want to go down the route that is the equivalent of satellite television where there are 600 channels and only one is used . One thing that has been worked on is how to enable teachers to create their own content and then share it with other teachers at ow to lnntm and then

3.2 Personalisation Session

Session Aims:

This session aimed to explore the variety of factors that have made learning experiences successful or unsuccessful for individual workshop participants.

Session Structure:

Participants were asked to complete the following tasks:

1. Think about the learning experiences that you have engaged in both as a child and as an adult, both formal and informal. Write down, one per post-it, as many factors as possible that make (have made) you special as a learner (i.e. distinguish you from other learners) and influence/ed whether a learning experience works/ed especially well for you. (DO NOT THINK ABOUT IETV SYSTEMS).
2. Recall two contrasting personal learning experiences, one successful and one unsuccessful. For the successful learning experience choose two of the factors from Task 1 that played a strong role in making it successfull and put a large tick on each post-it. Do the same for the unsuccessful learning experience and put a large cross on each of two factor post-its. It may be possible that the same factor gets both a tick and a cross.
3. Collaboratively organise your learning experiences and come up with a cumulated and organised list of factors that make you special as learners. Transfer the list of factors to a large piece of paper and mark those that play/have played an important role.
4. Nominate a spokesperson for the sub-group to present to the whole group.

Session Outcomes:

A list of the principal factors identified as personally important for learning are summarised in table 2 (overleaf). While there is much overlap in the factors identified by both groups there were some potentially interesting differences.

Session Summary:

Motivational and affective factors were clearly identified as very significant by both groups. In their summaries, group one seemed to emphasise negative motivational and affective factors or barriers to learning rather than what facilitates learning. For group

The list of factors identified includes many of the issues one would normally consider when trying to develop personalised learning materials (cognitive styles, specific disabilities, age, gender, time constraints etc…). However, the strong emphasis on affective factors and motivational issues/consequences indicates that perhaps the principle concern for IETV developers should be 'emotionally intelligent' design: a consideration of how learners are likely to feel and how these feelings can be assessed and manipulated.

Table 2 Factors perceived as important to the individualisation of learning

Personalisation group 1	Personalisation group 2
Emotions and feelings - expectations, confidence, embarrassment, also links to motivation and boredom.	***Emotional*** – rewards, positive environment, secure, safe and comfortable environment, non-judgmental environment where you could take risks, make mistakes and be supported.
Motivation – linked to curiosity, engagement, interaction, collaboration and feedback. **The 'top-down' learner**- with an overarching strategy and a need to have clear objectives - 'Where are we going?'	***Motivation*** - sense of purpose, relevance the content has to be relevant to the students and their life, clarity – in the materials delivered, challenge – there needs to be the appropriate level of

3.3 Collaboration Session

Session Aims:

expect this to affect communication between them? Do we expect collaborations be emotional or dispassionate? How does this affect our designs?

Table 3 Educationally relevant dimensions of collaboration in the context of educational television

DIMENSIONS OF COLLABORATIONS	
Synchronous	**Asynchronous**
Face to face	**Virtual**
Accessible	**Exclusive**
Free	**Paid**

3.4 Commentary on Day I

The discussion in the groups over the day seemed to be engaged in working their way round the triangle shown in figure 1.

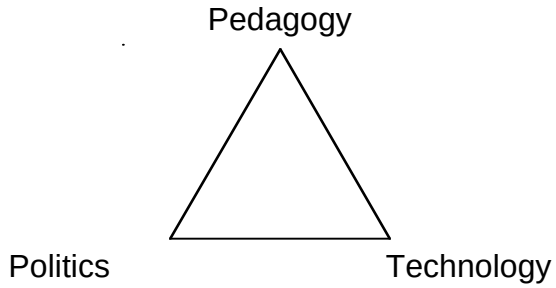

Figure 1.

Pedagogy

There were four main facets to the discussions that centred on the pedagogical theme: Individualisation, Motivation, Collaboration and Control. The notion that the learning experience should be adapted to the individual learner was a central feature of the pedagogical approach outlined in the opening talk. This adaptability is hard to achieve though some headway may be gained through the use of profiles and stereotypes. In the discussions through the day the importance of motivation and engagement also came to the fore. In particular, the maintenance of motivation was linked to narrative and the notion of a good 'story'. The third facet of pedagogy that was prevalent throughout the day was that of collaboration. It was at the root of the theory presented at the outset and was prevalent within the session discussions. Several questions were raised including:

How can collaboration be achieved?
What kind of collaboration should we aim to support?
To what extent can technology assist with collaboration?
Is the collaboration *with* the technology or *through* the technology?
Is the collaboration mediated by the technology?
Or is the collaboration set up by the technology?

The fourth issue was that of control with discussions directed by one major question: How much control does/should the learner have over the experience that they are taking part in? Participants felt that there was lot of tension between providing direction and limiting choice, and giving learners a 'free rein' to do what they wanted when they might not have an accurate insight into their own capacity as learners. As developers,

we may need to pay attention to improving learners' metacognitive skills and designing appropriately scaffolded guidance.

interactive digital media for education. There were interesting divisions between the workshop participants on what counts as ‘proper’ learning, and a deal of concern about inclusion and the degree to which technology might exclude people. As always from a business point of view there was concern about the issue of learners/teachers as customers and how much people would be prepared to pay for the technology.

The following problems were identified as particularly important:

Insufficient bandwidth to ensure delivery.
Insufficient people to tag all the content that is already available let alone what might be produced in the future.
The need for an exemplar proof of concept system to illustrate how well large scale rich digital interactive media for education might work
The need for collaboration between developers rather than competition.

Discussion and questions stemming from the commentary on the day:

What is the relationship between collaboration, individualisation and learning context?
What can IETV provide that is not being offered by existing technologies or existing approaches to learning - what is unique and distinctive about this method of learning?
There is a gap in understanding between the research community and business and this chasm needs to be bridged, but how can we do this? The research community have had great ideas but no good business models. Over the years people have tried to exploit computers in education and failed, as is now happening again with e-learning.
Three general business models were identified, each with its own set of advantages and disadvantages:
The commercial training business model where content is developed and then pushed in a very targeted way towards learners. The problem here with this approach is its didactic nature, poor pedagogy and lack of attention to learner motivation;
The public service model which is epitomised by the BBC where the problem is with

4. Day 2

The discussions for day 2 were introduced through three presentations, which discussed the design motivation for Interactive Educational TV, learner motivation and the relevance of Emotional Intelligence.

4.1 Learning Contexts

Session Aim:

Session Summary:

Participants identified two activities as important next steps:

1) The identification of ways in which Interactive Screen Based Media would vary according to the intended delivery context. Each of the characteristics above could act as a starting point for the consideration of how any specific delivery context interacts with the resources being developed. Such questions as these must be addressed:

•

the utility of Pythagoras by showing how the stunt designers used angles to make sure that the car crashed in exactly the right place.

Session Outcome:

The group organised motivating factors into three aspects: cinematography of motivation in terms of the audio (music/voice) and the visuals, contextualisation, and personalisation. These factors were further separated into positive and negative aspects (see table 4), although it was clear that what proved positive for one individual learner might be negative for another and vice versa.

After identifying these factors, participants were asked to suggest ‘improvements’ to the video in order to achieve a more productive learning experience. There were suggestions for including pre-viewing and during viewing tasks to give learners an introduction and some information before they watch the video and to engage them specifically while they watch. These tasks might also allow an assessment of whether the students are at the right level to understand the task. Possibly, students could be

Table 4 Positive and negative motivating factors identified

Factors	Positive	Negative
Audio (music/voice)	Dynamic and inclusive: the music was exciting, the voice-over had a regional accent, and the overall effect was dynamic.	

Collaboration

The whole idea of peer-to-peer applications should *not* be ignored. The *range of interactivity* is not just between an individual and a system. It is between multiple users all over the world and this means that there is a huge range of possibilities for interacting with other people as well as interacting with the technology. Social interaction and collaboration are therefore interesting aspects. A logical extension of this is that we need to build things that people *cannot* do without help. Learning that such creative collaboration is possible is in itself an invaluable lesson.

Who are we building for?

1. We need to keep the outlook fairly broad and not get too focused on school education. Adult education and training can inform in school education and vice versa. This is in tune with the political agenda with the government trying to reach everybody including adult learners. We need to cater for a range of activities, facilities and services, from the use of digital resources in the classroom, through to interactive online packages, which can be used separately or together for a range of users. Importantly, this can be both online or offline.
2. Attention should be concentrated on specifying: educational aims of using IETV; deciding on learning objectives (within and outside the National Curriculum); relating these to the design of content; ensuring the educational effectiveness of interactivity; evaluating learning outcomes; and feeding all this back into further activity and learning.
3. There will be additional benefits from synergies between projects and coherence across initiatives we need to collaborate.
4. We need to provide evidence – the DFES are increasingly being asked to better target e- learning investments to maximise the benefit to the wider educational environment.
5. The fact that some of the examples presented and discussed at the workshop are 10 years old seems to indicate that we have not moved on quite as much as we had hoped or predicted.
6. Cost-effectiveness of content creation: will online production houses start to emerge over the next 5 years which can produce TV/web-ready content at a fraction of the criuF1.0 10 -cm BT 50 09w of the examples preseF1.0 1 Tf ( ) Tj Eo9r -0fn0.

   educational ICT Rich Medium? Unless we can measure the educational value we

Appendix 1

Workshop Participants

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In the introductory session of the workshop all participants provided a brief position statement about their current work and interests in Interactive TV content for education. This overview of the expertise of each participant and their perception of what challenge was p50 0 -50 225 2bMfRoland Tongue

integrated into management so that formative judgement can be used to assess whether the content is appropriate for the user at any given time. It is very much about knowledge pooling rather than knowledge pushing so it actually begins to conflict with the curriculum models we see currently. His latest interest is in looking at the way that the semantic web has been formed so that subjective and objective methods can describe learning content. He is very keen on knowledge shaping. The greatest challenge is how to get content to be considered and adapted to the learning community.

Tom Hamilton (Director Worth Media) is interested in interactive learning in the education community. He has been working most recently looking at how groups share information and how they track learning through communication with each other. He is looking at action learning from specific questions that are relevant to learners. This includes, how learners obtain the information to answer a question, how they share that information, how they derive learning from it, and how this can be facilitated by communication. The greatest challenge is switching from push to pull learning and giving the power back into the hands of the learner to self-direct their own learning pathway. How can this be done whilst still ensuring sufficient and effective learning? It's easy to look at information nuggets but how do you maintain that in content?

Alix Gryce (Digitalbrain) is a software developer who advises and helps people who have content already on how they can address the issues of chunking it up in a meaningful way. One of the challenges she identified was the need to break content up so that it can be used effectively and still meaningfully.

Peter Bates (PJB Associates) runs a small consulting company that focuses on innovative approaches to learning using new technologies. They are currently focussing on two projects that are interrelated. They are doing some work for the learning and skills development agency on looking at the trends and developments around the use of interactive TV for learning and lifelong learning. They are trying to take a macro/global perspective and asking questions such as, what are all the component parts that enable an interactive learning experience particularly in the home? What format is that going to take place? How is it going to happen? And what are the business models related to it? One part of the output is two papers for the learning skills agency one title is: From mass media to personalised TV what is the role of interactivity for learning opportunities in the home?' The larger study funded by the European Commission is on T-learning looking at global developments and trends. The biggest challenge is putting all the parts together.

Karen Davies (National Museum of Science) is head of the interactive galleries looking after the 'hands on' stuff for children. She wants to know what interactive educational television is. In terms of the future technology is it limitless or limiting? How limiting is it? How would it be different from a CD-Rom with interactive games? Could it be social? The greatest challenge is to make interactive television compelling enough so people seek and are driven to engage with it. The questions are: who is the target audience?

What prior knowledge do they have? What motivates them to interact? How are these questions going to be answered?

Jon Yon (Victoria Real) made the interactive TV version of Big Brother. Victoria Real has been involved in interactive TV since 1994 when they developed over 2000 hours of interactive TV. Over that period of time a lot of lessons and mistakes have been made that could be learnt from. There is a portfolio or history of things that have value to and could feed into the discussions about interactive educational television. Jon is an interactive developer and has also become a strategic consultant for digital TV in the last couple of years. He developed the first masters in digital TV at the University of Brighton. One of the challenges from a public sector point of view is ensuring that there is social inclusion. It is no good if only half the people have access - it needs to have educational value for everyone.

George Auckland (BBC Head of Innovation for Interactive Factual Learning) has been involved in interactive TV from 1994. He currently runs a project based in Kingston upon Hull where they have a unique telephone system. Potentially every household in Hull can have ADSL. He runs a project called Head Start that is 'modestly interactive TV' (video on demand via the telephone line and the box on top of the TV). This project reaches the percentage of the population that don't have computers. There is also a brother/sister version that is broadband PC. The project involves quite a few schools in Kingston including the lowest performing secondary school in the country. With these schools there is a plan to try to move towards computer generated content. That is, to move the BBC away from the delivery model that they have now and into a mixed market. The greatest challenge is to find out what it takes to get user generated content up to a level where it is acceptable to other people (not necessarily broadcast standard) and that they would find useful. They are looking for a bottom-up project starting in a primary school that will eventually become an international user generated project.

Louise Wass (Interactive Executive at the BBC) has worked on school-based productions for the past four years for the BBC and more recently on additional, curriculum pilots. She thinks that interactive educational content at its best is motivating, challenging, self-paced, and centring but the challenges that face both students and teachers when accessing educational content on-line means that the learning is not so visible to the teacher. So a big issue is how does the teacher know how exactly the student is performing. The impact of interactive digital resources in the classroom changes teaching styles and learning styles and we don't understand the true impact of this. How can content be created that actually caters for different teaching and learning styles? In terms of creating content there are a number of platforms but interactivity is very limited at the moment. However, social reach can be extended, for instance, with BBC bite-size that can be accessed with set-top boxes. Other challenges include how students work in groups, if they are working at the computer on their own do we lose sbrot7lee extended, for instance, with

motivating and enabling learners to become effective and autonomous learners in order to make use of the media.

Jo Hill (One World International) is the multimedia producer at One World International: an Internet portal for human rights and development issues. They have developed One World TV, which is an interactive prototype that provides easy to use tools for collaborative storytelling on-line. They have developed the concept of the open documentary as a departure from traditional TV programmes. Stories are created out of short clips, fragments of evidence, testimony and opinion linked in storyline sequences and the viewer can navigate their way through the matrix of clips exploring the interwoven narratives and then by joining the One World TV community users can also upload their own clips as a contributor perhaps adding a different perspective or new characters or new evidence to develop the existing storylines. As a result the stories start to overlap and interlink and branch off from one another. Each storyline starts to become part of a diverse tapestry. They are beginning to address the challenge of creating interactive content that enables people to interact with each other rather than just interacting with the interface. This work has thrown up other challenges such as how to motivate people, how to create, and how to transform passive viewers into interactive users. A key challenge for them is how to encourage interactivity while still maintaining quality control and some direction so that the content is still meaningful and not just a mass of content.

Sivasegaram Manimaaran (The Engineering and Physical Sciences Research Council) is a manager in the area of human factors in IT. He wants to find out what research issues are being raised and what kinds of ideas the EPSRC can help to support. The EPSRC are also in consultations looking at creative uses of IT and one of these could obviously be television. So the EPSRC are at the workshop to find out what are the issues are and how these can be supported.

it's the tools, it's the approaches, and it's the data." The key things that need to be achieved are sustainability, scalability, and replicability and if those aren't present then all the research goes nowhere. He is also concerned about the specification of the added value of ICT: if the added value cannot be identified then the investment can't be justified, the political case can't be made, the educators can't be convinced and so nothing happens. The biggest challenge is the change in education and that means: the change of schooling, the spread of education outside schooling, and the digital literacy of the learners. The big thing that is stopping change in education is assessment and examinations.

Julie Coultas (University of Sussex) is a psychologist in education. She is going to be talking about emotional intelligence and what implications it might have for interactive educational television content.

Louise Hammerton (University of Sussex) is part of the HCT group at Sussex working on developing some educational software focusing on supporting children in accessing help and how they chose what activity to do. More recently she has been working on developing an IET demo.

Giles Palmer (Runtime Collective) is a director of Runtime Collective, a systems development house. They have developed an online school system that has been accredited by Adexcel. It is in conjunction with a school in London.

Roland Tongue (Director Open Mind Productions) See Appendix 2.

Robin Mudge (Exuberant Digital) See Appendix 2.

John Mateer (University of York) See Appendix 2

Ben du Boulay (University of Sussex) See Appendix 2.

Rosemary Luckin (University of Sussex) See Appendix 2.

Appendix 2

The Organising Committee

The organising committee was drawn from both academia and commerce. A profile of the members of the committee is presented below:

Rosemary Luckin is a founding member of the Human Centred Technology Group in COGS. She is currently: the principal investigator on an EPSRC funded grant to explore the nature of metacognitive software scaffolding (JAMeS: Jointly Adaptive Metacognitive Scaffolding GR/N18406); Co-investigator on a project to explore children's interactions with Digital Toys funded under the joint EPSRC/ESRC PACCIT; Manager and co-investigator on an EU funded project developing a GUI for a medical system to support radiologists making decisions about brain tumours using magnetic resonance spectroscopy (IST-1999-102310). Dr Luckin was a member of the evaluation team for the DfEE Digital Broadcasting Competition. She was recently commissioned by Becta (British Educational Communications and Technology Agency) to produce a guide for educational software designers and has been working as a consultant for Pearson Broadband on the production of a pilot educational interactive television service.

Benedict du Boulay has spent many years working in the area of the applications of artificial intelligence in education and is about to become the editor of the International Journal of Artificial Intelligence in Education. He is former Dean of the School of Cognitive and Computing Sciences (COGS), the current dean of the School of Science and Technology, and a founding member of its Human-Centred Technology Research group. He is currently co-investigator on two EPSRC grants concerned with the issue of the representations in education and teaching. He acted as a consultant (with Luckin) on a broadband television pilot for Pearson Broadband. Professor du Boulay has produced seven books and more than 100 papers and book chapters in cognitive science and artificial intelligence in education.

John Mateer has been actively involved in interactive television, advanced new media and broadcast television projects for over fifteen years. He was the chief application consultant for the First Cities project, one of the first large-scale iTV initiatives in the US, which involved Apple, IBM, US West, Bell South, Lucas Arts and many others. Recently he has been the lead technical consultant for the DfEE's Digital Broadcasting Competition and has also consulted to numerous government, educational and entertainment organisations, both in the UK and US. In addition, he also has produced and directed numerous broadcast TV as well as major new media projects. John recently joined the University of York's Electronics department as a lecturer to help establish and shape a new Media Technology programme.

Robin Mudge is the founder of Exuberant Digital, an International consultant specialising in the conceptual development and origination of on-line and interactive TV and related projects. Before this he has had a distinguished career in the BBC as both a documentary filmmaker and producer of new media projects. He was the chief architect

and creative director for the BBC Learning Station, a suite of sophisticated on-line services for children, parents and teachers. His extensive experience of traditional television production, combined with a deep understanding of network media gives him a very special insight into new service opportunities that the connected world offers. In this area, he has produced a number of industry leading and award winning projects. These include a nation wide distributed learning system and educational TV project for the UK Government and the envisioning of a global broadband education service for Pearson PLC.

Mike Sharples holds the Kodak/Royal Academy of Engineering Chair in Educational Technology and is director of the University's Centre for Educational Technology and Distance Learning (CETADL), a University facility for research and development in online learning. The focus of his research is the application of studies of human cognition and social interaction to the design of computer-based learning environments and personal technologies for lifelong learning. Current projects include the development of mobile technologies for learning, the design of conversational learning environments, the design of a knowledge-based training and decision support system for neuroradiology, a study of children's development of photographic skills, and the development of a socio-cognitive account of creative writing. Recent Major Research Grants include: A Developmental Psychology of Children as Photographers. Co-investigator with Prof. G. Thomas, School of Psychology, ESRC.

Roland Tongue is Managing Director of Open Mind Productions, which was founded in 1989, and is currently the biggest supplier of programmes to Channel 4 Schools television. The company specialises in using new technology to make cost-effective and imaginative educational programmes. Television productions to date include: National Curriculosaurus for NLLC; Images of the Earth, Physical Geography: Landforms, and Investigating Britain for BBC Television and BBC Worldwide; The Number Crew, The Word Machine and WebWhiz for Channel 4 Schools and The Shiny Show, a series of 40 puppet programmes for BBC Digital Children's. Currently in production is Maths Mansion, a series of 40 programmes for Channel 4 Schools. Living Proof received the Royal Television Society Best Junior Programme Award for 1996 and was nominated for both the Japan Prize and BAFTA (1996). Rat-a-tat-tat IV was nominated for the BAFTA Children's Award in the pre-school category, and Rat-a-tat-tat V won the Royal Television Society Best Pre-School & Infant's Award for 1998. Rat-a-tat-tat VI won the BAFTA School's Factual (Primary) Award in 1999. The Number Crew won Best Educational Programme at the Education Show 2000. Partnering with IBM, Open Mind has just completed a large, fully functioning, broadband television pilot for Pearson Broadband.