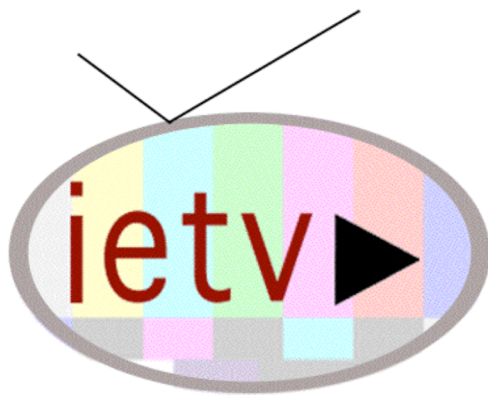# Building a Framework for Interactive Educational Television Content



## Report from the Interactive Educational Content Forum

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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 workshop, funded by the EPSRC,  explored the way in which creativity and technology could be combined to design educationally effective interactive television content.

The Executive Summary brings together the main themes developed at the workshop. The main body of the report is based on notes and video recordings taken at the time and therefore is much more a record of the events as they took place, rather than a carefully polished and reworked synopsis of the event.

Television is not new to education, but the introduction of interactive broadband systems that can carry information both to and from the learner is.  This new development opens up the possibility of personalised, adaptive learning experiences for individuals and groups of learners alike and has resulted in a heightened interest in the potential of television for education.  In addition to which it provides an excellent opportunity for increased collaboration arising from the convergence of different production and design traditions.  The tradition of broadcast TV and filmmaking is strongly rooted in narrative.  The best educational TV or film offers a motivating, gripping and captivating variety of stimulating images.  Those skilled in this medium know how to tell a story, how to intrigue, and how to convey ideas effectively.  In contrast, developers of adaptive educational software have focussed on individualising the content and its presentation, and/or adapting the parameters within which the learner or learners work.  The potential for the production of motivating, engaging and effective learning technology through a combination of this expertise is large.  However, despite all this potential, the future of IETV is unclear.  Policy makers, film and television production companies and academics are struggling with questions that include:

> What type of interactive service will help people learn?
>
> Who should provide the content for formal education?
>
> What is the nature of the business model that could underpin ie-TV provision?
>
> What sort of rights management systems will be effective?
>
> What kind of experience should be offered?

**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 academics, film and TV content providers and policy makers.

**Key Issues**

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 with each participant able to choose to work on two of the four foci. Each of these sessions involved scenario building exercises and design guide proposal formulation. The four foci were:

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Motivation and Engagement through interactivity: The nature of appropriate and engaging educational content.

Personalisation: The extent to which personalisation can yield adaptive individualised learning for all.

Collaboration: The potential for collaborative learning experiences.

Context: The nature of the relationship between formal education in schools, colleges and universities and informal education in homes and clubs.

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Participants were drawn from academic, commercial, and policy-making organisations.

**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 teaching skills but the e-learning skills required by the learner themselves. How are they going to make best use of the IE content?  How can we develop that in tandem with the production of content?

**George Auckland (Head of Innovation of Digital Media for BBC Interactive and Factual Learning )**  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.

**Ian Elwick  (Chairman Brighton Media Centre)** The question of access and affordability is something that comes into this and having worked in education he realises that those issues are important to education.

**Jo Hill (One World International)** There is the challenge of creating interactive content that enables people to interact with each other rather than just interacting with the interface. How do you motivate people? How do you transform passive viewers into interactive users? How can interactivity be encouraged while still maintaining quality control and some direction so that the content is still meaningful and not just a mass of content.

**Jon Yon (Victoria Real)** 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.

**Josh Underwood (University of Sussex)** The challenges are motivating and enabling learners to become effective and autonomous learners in order to make use of the media.

**Karen Davies  (National Museum of Science)** 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?

**Louise Wass (BBC Producer)** The challenges that face both students and teachers when accessing educational content on-line is how does the teacher know exactly how 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? Other challenges include how students work in groups, if they are working at the computer on their own do we lose social interaction between students and how can we work towards collective groupware?  Personalisation and tracking are a big challenge. How do we measure the impact of the learning if the teacher is slightly detached?

**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 challenge is how to get content to be considered and adapted to the learning community.

**Roger Broadie (European Education Partnership)** The biggest challenge is the change in education and everything that means – change of schooling, spread of education outside schooling, and the digital literacy of the learners. The big thing that is holding down and stopping change in education is assessment and examinations.

**Sivasegaram Manimaaran (The Engineering and Physical Sciences Research Council )** What research issues are being raised and what kinds of ideas the EPSRC can help to support.

**Tom Hamilton (Director Worth Media)** 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?

**Ben du Boulay (University of Sussex)** The possibility of bringing together the traditions from interactive TV and TV itself to the tradition of intelligent learning environments to see whether there can be a meeting between the two.

# 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 their school, within their LEA, and also nationwide.

**Issue 4: Metadata - The Management of 'Stuff'**

If the amount material that is presented to the learners is to be reduced then there needs to be more accurate metadata describing the content. This idea elicited the comment that if teachers/learners are to produce their own content then they need to be given the tools in order to tag their own data in a meaningful way without using a scary word like metadata. Tagging can be seen as quite a sophisticated task and it needs to be done by people who understand the 'stuff' so it might have to be the responsibility of somebody else to start tagging.

What if any number of people tag exactly the same thing and it ends up representing something different?
The notion of subjective and objective tagging also needs to be tackled because most people interpret metadata in its true sense as a way of describing data and its location. One of the challenges is to get people to think about how to use informed descriptions in the form of a layering of activities.
How do we restrict the amount of stuff provided?
This is certainly a problem and the tuning between the learner profile and the metadata is the key to gauging the size of the body of stuff. At the same time, if there is not enough stuff, a simple way of getting round it would be to use a constraint resolution. This notion puts a lot of emphasis on the quality of the learner profile and on the metadata. There is also a problem when helping learners learn themselves in that there is a tension between the learning process and assessment. When you start talking to children about their ability to ask for help and their understanding of the learning process then there is a big contradiction between what they are expected to do in terms of individual performance. Students are being asked to perform in pen and paper tests, individually, and then they are asked.
How can we make it easier for people to ask for help and to collaborate with each other?
There is a big tension between what we might like learners to do in the learning process and the product driven agenda.

## 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 two motivational and emotional needs featured strongly as positive aspects that were important for learning. It is also evident that while group one identified individual learning styles as important group two linked some learning style issues directly to motivation.

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.<br><br>**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 challenge, need for structure – signposts, sense of progress, feedback – so that the student would know exactly how they were developing and that the feedback were tailored to the specific performance. |
| **Learning as dynamic** - the need to have self awareness about one's own learning and progress.<br>**Learning styles** - observation, visual, linguistic preferences that were linked to 'media preferences'. They also created a bridge between boredom and motivation.<br>**Practical issues** - learning by doing, the applicability to the real world, self-sufficiency linked to problem solving and trial and error learning. | *Cognitive* - motivation and health issues were linked to specific learning needs e.g. dyslexia or autism via the cognitive area. Other factors involved in the cognitive included: learning styles, visual, hands on, discovery, and problem solving. |
| *Time constraints* – a physical barrier to learning? | *Social* - teamwork and group-work formed a bridge between the social and the emotional. Collaborative work could counteract some of the negative emotional aspects e.g. less isolation and working together more cooperatively rather than competitively.  Age and gender also affected learning styles.<br><br>*Health* - physical disabilities, poor sight, poor hearing, and motor impairment that could affect learning style. |

### 3.3 Collaboration Session

**Session Aims:**

This session aimed to explore the potential for collaborative learning experiences with IETV.

**Session Tasks:**

Participants were asked to perform the following tasks:

1. Think about the people or groups of people that you collaborate with as a learner/when you were a learner.
2. Draw yourself in a network of learners and map out to the people that you collaborate with when learning.  You can represent people in groups and/or individually.
3. Copy your drawing onto a larger sheet of paper and talk about your learning network to the group.
4. As a group identify the dimensions in the links that have been created.
5. Pick 3 dimensions that you think are the most relevant to interactive educational television and write on post-its why you think the dimension is relevant and why it is educationally interesting in the context of educational television.
6. Create a new list of dimensions using the educationally relevant dimensions chosen by the participants.  Are there any other dimensions that ought to be considered?

**Session Outcome:**

Table 3 (below) lists the educationally relevant dimensions as identified by workshop participants (see task 6 above).  Below some of these dimensions we include comments made by workshop participants in an attempt to clarify how they perceived the dimension at the time. It is also important to note that (for most dimensions) neither extreme of the dimension was identified as necessarily good or bad, rather such judgements were considered to be dependent on the specific individual learning experience and context.

**Session Summary**:

The set of potentially relevant dimensions of collaborations in an IETV environment is of course not exhaustive and some of the dimensions identified may not be relevant to some situations.  However, they do provide an interesting perspective on learners' possible attitudes towards collaboration, collaborations themselves and from here we might go on to thinking about how to design for these dimensions in any specific IETV project: 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?

**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** |
| **One dimension (one to one)** | **Many dimensional (One to many)** |
| **Structured** | **Unstructured** |
| **Superficial** | **In depth** |
| **Cross platform modality** | **Single modality** |
| Collaboration and content through a single platform (IETV) or distributed over multiple platforms (TV, phone, web, etc…)? | |
| **Event driven** | **Ad hoc** |
| **Formal** | **Informal** |
| Formal does not mean that it is something that one has to do or something that is not enjoyable, Should people learn formally or should they be given a chance to explore | |
| **Family** | **Distant** |
| **Emotional** | **Dispassionate** |
| **Training** | **Exploration** |
| **Scheduled** | **Serendipitous** |
| Is scheduling necessary, maybe for 'live events', personal versus the universal, element of excitement if everyone is watching at the same time and that is part of the engagement and collaboration? | |
| **Even** | **Uneven** |
| **Active** | **Passive** |
| **Practical** | **Theoretical** |
| **Immediately useful** | **Long term** |
| **Uni-directional** | **Bi-directional** |
| **Goal oriented/results driven** | **Freeform** |
| **Intrinsic** | **Extrinsic** |
| **General** | **Personalised** |
| **Hard skills** | **Soft skills** |
| **Public** | **Private** |
| People might be watching TV as a group, learning as a group or individually, many people may prefer to learn in private | |
| **Want to learn** | **Have to learn** |
| Is it something a learner wants to learn or something she needs to learn?  Should we be forced to learn or do we really want to learn? | |

## 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.
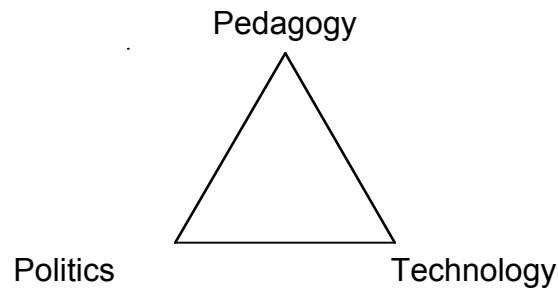
Pedagogy

Politics                    Technology

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.

**Technology**

The three main issues linked to technology were storage, recombination, and delivery. In relation to storage the term 'stuff' was thought to be a useful term because of its inclusiveness of all media types.   This accepted, it then becomes the effective description of this stuff or the metadata that is important.  However, defining the  correct granularity and generality of these metadata descriptions was felt to be a difficult problem to solve.  As was the definition of informal and formal learning, which is vital to the provision of useful metadata descriptions.  The discussions of collaboration, metacognition and motivation with respect to pedagogy support the idea that learners may benefit from building resources themselves so that they can recycled for themselves and other learners.  However, if such resources are to be recycled then the system or the new teacher that will be using them will need to be able to access good descriptions of them.  In essence the stuff itself becomes an epiphenomena and it is the description of the stuff that is important.

Recombination raises the question of how to put all the pieces of appropriately described 'stuff' together in ways that might work for learners.  This might mean that we need to consider the way that constituent resources were originally put together and certainly requires that we consider the differences between pulling resources together linearly or pulling them together in parallel, where, for example,  a number of different cameras are filming the same scene from different perspectives.

Once resources have been described and the possibilities for their combination and/or recombination have been constrained then attention must turn to the delivery of the resultant learning experiences.  With respect to this issue, the notion of gaps was seen as important. The way in which one might 'fill in the gaps' between different resources could be used to create or maintain coherence and to provide for further individualisation.  It was recognised that even if individual resources were internally coherent, the maintenance of this coherence upon combination with other resources needs great attention. This lead the group into a discussion of the extent to which the relationship between the parts can be described through metadata and maintained or enabled by the technology either automatically, or in collaboration with teachers?

**Politics**

The issue of what the role of public broadcasting systems might be was discussed, as was the direction that the UK is going in comparison to the USA. The nature of the education system in the UK, and in particular the  National Curriculum was seen as something that could enable, but also constrain the enterprise of providing rich

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 'paternalism' and potentially very high costs;
*The community model* where everyone contributes and everyone benefits.  This is potentially very attractive, but it brings with it problems to do with trust and authenticity.
Current IETV is not ubiquitous, learners need to see the need for such systems.
TV has so much baggage with it that it is going to take a long time for the paradigm shift to interactive TV to be successful.
From the technical point of view we need to be aware that the technology is not in place to support IETV for everyone. Also the question of what type of education is best suited to TV needs to be addressed. If it is linked to any kind of National Curriculum then the fact that a large proportion of the population do not have that technology is a problem.
TV can provide things that current educational technology lacks, narrative media combined in extremely powerful ways, for example. However, the broadcast or scheduled TV paradigm is not going to offer anything more than Edutainment whilst a personalised TV paradigm could offer opportunities.

# 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:**

The aim of the session was to identify potential learning contexts and discuss their suitability for interactive learning.

**Session Structure:**

Workshop participants were asked to complete the following tasks:
1) Name locations in which learning might take place and an associated learning activity. Name as many as you can using post-its (one location/activity pair per post-it) Examples might be learning woodwork at a D.I.Y evening class, researching for school project information in an library, learning to speak a foreign language at home in the kitchen.
2) As a group, discuss each location and activity and decide for each if it is suitable for IETV delivery. For each location the reasons for its suitability or lack of suitability must be specified.
3) Individually, pick two contrasting learning locations suitable for IETV delivery. For each, specify the features of the learning locations and activities that make them similar to each other and those that differentiate them.

**Session Outcome**:

Participants identified a large number of contexts in which learning might take place, with the principal ones being the home and the office. Other locations mentioned as suitable for learning, were the library, entertainment venues, theatre, the cinema, internet cafés, learning while on the move, and the experience of travelling as a learning context.

Participants then tried to clusters similar contexts. After listing and discussing different learning contexts, the group came to the conclusion that what makes learning interesting is not the physical location itself but the characteristics of the location and this is what has an impact on the learning experience. Below, we list the characteristics of physical learning contexts that participants considered educationally relevant.

## Table 3: Educationally Significant Characteristics of Learning Contexts

| Privacy |
|---|
| The home was identified as an important learning context.  Home was seen as a relatively private environment.  This sense of intimacy has an impact on learning. Significant aspects of the home learning context included issues of aesthetics, visual space, the use of props and the utilisation of naturally occurring artefacts, flexibility and convenience.  Within the home, the bedroom and bathroom were seen as more personal and private spaces whilst the kitchen was perceived as a more social and public learning context  Two examples of public learning contexts were the workplace and the public house. The pub situation was perceived as being relaxed and free from constraints, a very different public space to that of, more formal public spaces like the library.  Work as a learning environment broke down into many different aspects, depending on location: designated learning areas or private offices etc... |
| **Control** |
| A negative side to public spaces as learning environments is that learners do not have the same level of  control over the environment as they do in the home.  The home is a trusted and familiar place where the learner may have control over the environment. This control includes the option of changing the environment and limiting the amount of distraction/noise. |
| **Formality** |
| Classrooms and possibly dedicated training rooms were described as traditional formal learning contexts. Conferences were seen as voluntary public activities where there was mass involvement, where common ground between the participants was guaranteed, and there was a mix of informal and formal learning contexts.  One point that arose in relation to formal learning contexts was that there might well be the 'baggage' of expectation, where people have memories of learning at school, the pressures of learning for exams, and the expectation of assessment , for example.  An example of moving from the formal environment of a conference to the informal environment of the pub was proposed as a situation where location changes and although the conversation topic continues its nature might change. |
| **Mobility** |
| Learning on the move, for instance while commuting, was seen as a possibly useful opportunity for learning. The learner is moving, the context is changing, and the changing surroundings might be factors for learning. A negative aspect to learning whilst on the move might be that a learner's focus may be reduced, for example, if they are walking and needing to concentrate on that as well. |
| **Temporal Constraint** |
| Learning experiences are sometimes time-bounded in a physical context and sometimes not.  For example, if learning while travelling there is an end to the journey and therefore a limited time in which the work can be completed or something can be achieved.  Similarly, classes might have set start and finish times.  In contrast, a visit to a museum might be fairly unbounded with start and end times much more clearly under the control of the learner. |
| **Context Authenticity** |
| A key point about learning in museums and art galleries is that the learner is physically present and interacting with the reality. There are authentic resources of high quality and the learner can wander around freely. There is a non-linearity to the learning experience and learners can engage with whatever catches their eye. |
| **Social Context** |
| Participants also recognised that the environment (and people present) could have a significant impact on the freedom with which individuals express ideas and perhaps have the confidence to take risks and make mistakes. |

**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:

Will the learner/s be in a public, private, formal, informal, relaxed or restrained (social context) setting, how will this affect them, how should this affect the material we design?
How much control can learners be expected to have over the physical environment they are in (noise levels, access to other devices, lighting, seating arrangements, etc…), how will this affect the learners, how should this affect the material we design?
Do we expect learners to have access to 'authentic' material/situations in the delivery context, does this impinge on how we design the material?

2) The exploration of how continuity might be maintained for learners moving between contexts.

## 4.2 Motivation Session

**Session Aim:**

The aim of this session was to explore the sorts of methods that can be used to engage learners and also to maintain engagement and longer term motivation.

**Session Structure:**

1) Participants watched a video clip from a prototype interactive TV series for GCSE students and noted all the techniques that they felt the producer of the clip had exploited to try to motivate the learners to engage with the material.  Participants also noted down whether they felt these techniques were working or not.
2) Each participant presented their own individual set of techniques observed and added them to the group list of techniques.  These were then organised by the whole group.  After this the group discussed how the video might be improved to appeal to other learners and to make a more productive learning experience.

The video clip was taken from a popular TV Drama series and showed a woman driving a car when the brakes fail. She made a number of manoeuvres with the car and the car went round the corner and smashed. The idea behind the programme was to illustrate

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 asked to perform an experiment while watching the video; i.e. the drawing, cutting out, and practical exploration.  Control of the video (pausing, rewinding, etc…) could be under the control of the learners.  This would offer an opportunity for them to collaborate and form their own simulations. Learners could also be asked to think of their own examples of the utility of Pythagoras that they could elaborate this, maybe using role-playing techniques. Learners could also be asked to design tasks for other learners; which might be an inventive way to get the students to think about how applicable the theorem is.


**Session Summary:**

Participants identified choice of music (tempo, style, etc…), voice (accent, male, female etc…), visual style (quick cuts, locations, etc…), and contextualisation (narrative, cultural, etc…) as some of the significant variables that could be adjusted to make material more or less engaging for specific individuals.  It is interesting to note that all the suggestions for improving the video to make it *a more productive learning experience* were in fact to do with making the learners more active and contextualising the viewing experience within other learner activities.  No comments appear to have been made, during this part of the session, about improving the video material itself; i.e. by changing the sound, visuals, narrative context etc…  Perhaps, this is a reflection of the fact that this was a group of people trying to globally improve a piece of material and the 'attractiveness' of all these variables might be very dependent on individual tastes.  However, there seems to have been widespread agreement on make the overall activity more active than just viewing.  It might be worth looking at the outcomes from this session in conjunction with the outcomes from the personalisation session.

**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. | The quality of the voice change: the voice-over at the point when the maps were being explained changed from a professional voice-over to that of the stunt person. |
| Visuals | Quick cuts were exciting Contrast: between night and day context, indoors and outdoors. | Too quick, Confusing, Frantic, demands concentration. |
| Contextualisation | Embedded in exciting narrative, beginning, middle and an end with a Payoff. There was a Stake and Danger (life or death; for example, if the angles weren't right then the woman in the car would die), Cultural relevance would be an issue for consideration here. | For some this film clip was not a good vehicle for maths for people who didn't know anything about Pythagoras Theorem. The programme did not get the serious information over well. The programme went through the maths really quickly but then used words such as 'this is a simple thing' that made the people who didn't understand maths feel a little bit stupid. For people who did really like maths they found it facile and not a good way of communicating mathematical problems. Unbelievable (Life or death; for example, if the angles weren't right then the woman in the car would die?), No explanation. |
| Personalisation | It was felt that something that was as exciting as a car chase was probably aimed at teenagers. A number of participants felt it was targeted at teenage boys though others suggested that it was also relevant to teenage girls. | A negative aspect of the personalisation was that some felt that this would not be appealing to the presumed teenager target audience; maybe the language used was too plain. Some felt there was a gender bias. |

### 4.3 Workshop Summary and Reactions

This section summarises the final session of the workshop and highlights the issues raised both by those present at this session and by other workshop participants who contributed subsequently via email.

### What is Interactivity?

*Interactivity* was not defined during the workshop. Attention was drawn to the fact that we need to separate out operational interactivity from conceptual interactivity and then build a bridge between them. *Operational interactivity* can be typing using a keyboard but can also be any activity at the interface including interaction with toys or screens. *Conceptual interactivity* is about the interaction with the message rather than the medium, so it's about science, scientific concepts, language and learning about language techniques. Often what is happening at the operational level can distract the learner from what the designer of the system wants to happen at the conceptual level. So bridges need to be built and, for instance, clear goals for the sessions provided. There is a clear difference between interactivity on a technological level and interactivity in actually engaging somebody's thinking. Questions and observations arising include:

1. If we leave out the technology, what levels of interactivity are required? What are accepted as particular interactive needs?
2. When we start to match these against particular tools – what don't these tools achieve in terms of interactivity?
3. Interactivity works best when you don't actually notice the tool. The whole thing marries itself up and there is engagement.

### What is the role of Pedagogy?

There was consensus amongst those present that we need a pedagogical framework to underpin educational interactions with a whole range of media and devices. However amongst the many unanswered questions are:

1. At what level is the pedagogical framework common no matter what interactive device is being used?
2. How can different devices be used to best advantage in order to engage people?
3. Is there a sound pedagogical basis for doing something with each particular platform or medium?
4. How do we achieve a pedagogical framework that can be simply expressed in order for it for it to be understandable and usable by ordinary heads, teachers, and even politicians? Teachers need to be able to acknowledge the value and see themselves getting a higher quality of life and a much better education.

5. How do we also encompass metalevel skills? Huge assumptions are made about learners being aware of their early learning needs and being able to access information when they want it. These levels need to be addressed.

**Technology and Pragmatics**

The convergence of material is not happening in one place on one system, it is happening on lots of different systems all at the same time. There are more and more choices in devices with different tasks suited to different contexts and different devices. We need to find out what they are so that we can make the best advantage of these devices. Issues include:

Users need processing power to do anything interesting, for instance to do anything beyond level one activity (this is what the current ITV delivers).

We need to pay attention to wireless enabled devices. These devices or series of devices can deliver the stuff via wireless routes in reasonably high bandwidth.

There is a need to look at two-way communication to be able to develop a community in conversation between people and devices.

Sustainability is a big issue.

We need to think about terms – 'Interactive Screen Based Rich Medium' does describe what we are talking about?

Software advances and more particularly, widely adopted standards in this area will be key drivers to the take-up of any educational content. Time should be put aside to keep abreast of initiatives that appear to be taking hold: structured data capture on a quarterly basis could be a good thing to do.

Delivery is another key driver, broadband (always-on, relatively high bandwidth connectivity) is fast-becoming a reality and it's only a matter of time before it can be taken for granted for the wealthier nations. We should plan with this in mind. The impact of mobile networks is more difficult, but at worst it will extend the reach of any service available. Timing and cost of availability are the 2 key variables and because control rests with very few enormous companies, there is little that any of us can do to influence either.

**Motivation and Understanding the audience**

1. The context and motivation analysis raised questions about designers' understanding of the 'rhetoric audience' and how, in some instances, they can be very effective and, in other instances, produce things that *appears* to be effective but are in reality way off the mark.
2. There are many ways of working out how to engage the audience, for example, building on existing trends that are of interest to the audience.
3. Fun and learning must go together, but engagement is not the same as motivation. When engaging learners using interactive technologies it is easy to assume that engagement automatically results in learning; it does not, but is instead dependent on the motivation to learn, not just the motivation to interact.

**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 <u>without</u> help.  Learning that such creative collaboration is possible is in itself an invaluable lesson.

**Who are we building for?**

There is a need to know more about learners: the audience.  In particular, we need to think about how they feel as well as what technology they have and what they want to learn.  For example, in a group situation when members are not individually strong enough to come up with solutions they may work best as a group collaboratively. The key issues underpinning success could in fact be about how we keep track of the emotional state of the learner or how we use the television medium as the place for delivering materials that help to develop emotional skills.

**The need for an exemplar system**

It is very easy to get caught trying to do too much for too many audiences. We need to look at something small, something that is widely applicable but manageable. This can serve as a small flagship application that can show the power of existing interactive television technology and be a stepping-stone so that there is pedagogic merit and commercial viability.  This should involve:

1. Collaboration between researchers and commercial companies. If this happened there would be a lot more information available.
2. Enabling learners and educationalists to be creative with the medium and to share their creativity.  Providing people with tools to create video content to add to a pool but also mark out their own trails through existing content, to share those trails, and to allow others to annotate that trail.
3. Compelling content, community and collaboration but not necessarily merged into one platform. We need to neutralise the multiple devices in order to join up these different elements.
4. Local processing power with the user so that we can exploit that to build a system that can, in some sense, make choices and help the user to manage their living? This doesn't mean taking charge of their living but to assist people either in their peer-to-peer interaction or in their dealing with the content.
5. Remembering that there will not always have been a teacher ahead of each learner designing stuff or seeking stuff.

Points to remember as we move forward included:

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 cost it is now? Or will people like online educators/publishers learn how to do it themselves cost-effectively?
7. What is the reference frame against which we can measure the value of this educational ICT Rich Medium? Unless we can measure the educational value we cannot talk about reengineering education?

## 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 inherent in designing educationally effective interactive television content is outlined below.

**Rob Wilson** (Director of RWCS) has, over the last 7 or 8 years, been working on learning technologies specialising in the way information standards are formed so that adaptive content can be created. The latest activity has been collaborating with some colleagues in implementing a number of learning content management systems. This is very much looking at the deconstruction of content into very small twenty minute chunks of learning so that content becomes adaptive. The adaptive content can then be

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 social interaction between students and how can we work towards collective groupware?  Personalisation and tracking are a big challenge. How do we measure the impact of the learning if the teacher is slightly detached?

**Atul Sharda** (E-Learning Strategy DfES) The role of his unit is to look at how ICT within teaching and learning can be enhanced. This was in terms of enhancing educational standards and the experience of learners not just within schools but also across further education, higher education and community learning. What he had heard from other people he saw as challenges as well. He would be interested in seeing issues around how we can 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 teaching skills but the e-learning skills required by the learner themselves. How are they going to make best use of the IE content? How can we develop that in tandem with the production of content? He is also project manager of an innovative project named Cybrarian which is looking at improving access to the internet in terms of how people, particularly those with low literacy skills and those with general information handling problems, are first greeted with browsers and search engines. What he is concerned with is providing access to the infrastructure through various initiatives but there are still issues about whether people can access content appropriately and effectively. The Cybrarian project is in its second year and is going into its development phase.

**Anthony Butterfield** (Digital Brain) is a content designer working on making games and interactive learning tools to be used in the class on whiteboards (interactive whiteboards). He is interested in bringing content to interactive TV where there would be a chance to make the content richer and more engaging. Interactive educational media is engaging content that adds to and enhances learning in the class and 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.

**Ian Elwick** (Chairman Brighton Media Centre) is from the digital content forum that is supported by the DTI for digital content. This has a number of different angles and his particular angle is to do with clustering and the way that networks develop but there is another action group that is linked to education that is focused on interactive learning. He is attending the workshop partly to pass information back and partly to feed information in about how infrastructure is very useful in supporting the development of interactivity. For instance, the question of access and affordability is something that comes into this and having worked in education he realises that those issues are important to education.

**Josh Underwood** (University of Sussex) is currently working as the interface designer on an EU project that is helping radiologists to make use of technology and assisting them to learn how to make use of the technology in diagnostic tasks. He previously worked for 9 or 10 years as a language teacher and is particularly interested in applications of the interactive TV and interactive digital media in language teaching and language learning. He used video, film and computers a lot when he was teaching languages and as a learner learnt a lot of language from television. He is interested in starting some research to look at how interactive media might be used to support teachers in the classroom as well as language learning at home. The challenges are

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.

**Lynn Dawes** (Consultant for Becta De Montfort University) works with the Open University helping children to work with computers and teaching them that the spoken language is a tool for thinking collaboratively. By helping children to have effective communication skills they are helping them to get more out of themselves and out of their interaction with the computer. They see interactivity as the best metaphor for a dialogue where the child speaks, listens and thinks while the computer has input, output, and processing. There should be high quality of these things at every stage. She is attending the workshop as an educational consultant for BECTA to look at the declarative? learning aspect. She also teaches at the Open 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.

**Roger Broadie** (European Education Partnership) is chief executive of the European Education Partnership (EEP), a director of Learning Market Analysis looking at ICT for learning in Europe, and a consultant working with people like Apple, SUN, and ACORN. He is interested in the definitional issues linked to 'content' and sees content as everything that surrounds the learner – "it is the room, it's the people, it's the syllabus,

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.