Shared Learning: Mobile Interactive TV to Link Home & School

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1. Introduction

The HOMEWORK[1] project combined expertise in educational software design and television production to develop an exemplar interactive TV system for children aged 5-7 years, their parents and teachers. Our aim was to use the construction and evaluation of this system to better understand how to create a coherent, learning experience centred on TV media, shared by child, family and teacher, and delivered in instalments using appropriate technologies across school and home contexts. This paper summarises key findings.

2. HOMEWORK System Description

At an abstract level the HOMEWORK system aims to support the planning and coherent delivery of rich media learning experiences to groups and individuals using personal and shared devices across learning contexts. Each learner has an individual mobile device that carries content between contexts and records learner activity. 'Episodes' are 'broadcast' at school along with supporting (personalised) content to individual portable devices in the context of classroom numeracy sessions. This content then persists on the portable device and is 're-visitable' at a later date and in other contexts (for example, the kitchen, in the car, the living room, etc…) irrespective of connectivity. The device itself provides a return channel by capturing interaction data and 'viewer' comments and 'delivering' these to the system and teacher on connection to the school network. HOMEWORK is interactive TV both in the sense that it involves interaction between people around TV media (Chorianopoulos, 2007) and interactivity with TV related content[2].

Our exemplar system used broadcast video media (The Number Crew[3]) and associated interactive resources for numeracy learning along with lesson plans and ideas for supporting activities to be done at home or in school. The teacher and every child had an individual tablet PC and in class an interactive whiteboard was available. Teachers planned sessions with linked home activities prior to delivery and the requisite content was pre-loaded onto the individual tablets. School numeracy sessions typically involved whole class viewing and discussion of an episode centred on the large screen interactive whiteboard and related individual and/or group numeracy activities on Tablet PCs as directed by the teacher. Children took individual tablet PCs home at the end of the day and could re-watch the relevant episodes, revisit related school numeracy work and complete homework activities, either working alone or with their family, in the kitchen, in the car, or elsewhere.

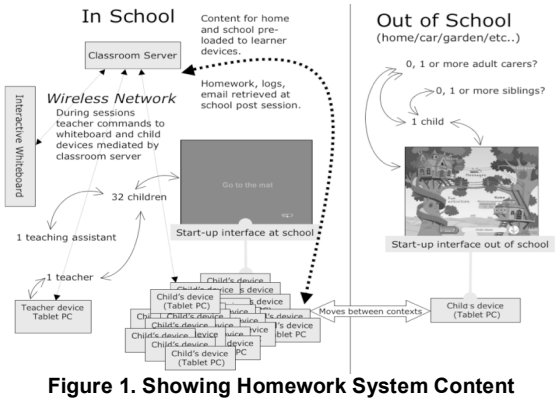

Figure 1. Showing Homework System Content Distribution in School and out of School

At school, the learner tablets and the interactive whiteboard are controlled from the teacher's tablet over a wireless network. When a learner's tablet PC is started up within range of the school wireless network it launches the 'school' interface. This provides no access to any applications. The teacher controls activity by launching and stopping activities and videos on individual devices, groups of devices or the interactive whiteboard. Hence when in school, learners have limited control over which activities they work with. When the tablets are started up out of range of the school wireless network, they launch the Home interface. This provides structured access to learning resources and related information relevant to 'today's' numeracy session including the 'episode' viewed at school. It also provides access to previously viewed episodes and related material.

[1]http://ideas.fcs.sussex.ac.uk/projects/Homework/
[2]http://en.wikipedia.org/wiki/Interactive_television
[3]www.openmind.co.uk/television/numcrew.htm

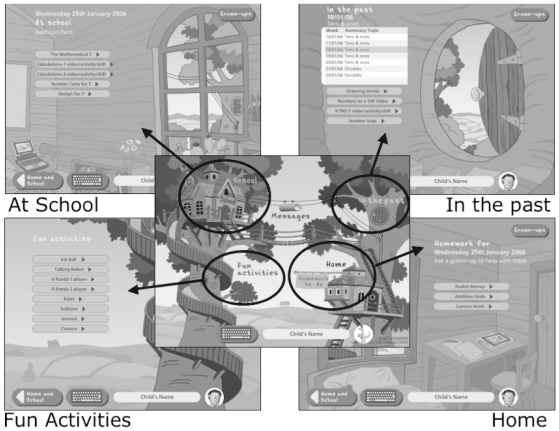

Figure 2. In the centre, the start-up screen of the Home Interface with links to the four main sections.

The Home interface consists of five sections:

1. "Home" provides access to current homework,
2. "At school" provides access to media (e.g. video, interactive games, etc…) used in today's numeracy session,
3. "In the past" provides access to previous school and home tasks and media,
4. "Messages" opens a mail client which can be used to exchange email with the teacher,
5. "Fun activities" provides access to a selection of applications less directly related to current educational objectives

Each section has a "Grown Ups" button that reveals information which contextualises the page content with current numeracy objectives, key vocabulary, and suggestions about how parents might support and practise this learning in out-of-school contexts.

3. Relevance of Work

Prototype versions of HOMEWORK have been used and evaluated at school and in homes in a series of studies (Kerawalla et al, in press), the longest of which involved almost daily use in school and at home by 32 children, their teacher and home carers over a period of a month. Data collection included observation notes, home diaries, questionnaires, interviews, focus groups and system logs (Underwood, 2006). Children used the system extensively at home and it was very positively evaluated by children, parents and teachers. Several parents reported greater understanding of children's learning and increased engagement in numeracy activities at home. Here we summarise some key features that we consider contributed to the success of the HOMEWORK system and which differentiate it from web-based and 'broadcast' alternatives:

- An individual device is used in, and travels between home and school contexts.
- Content is synchronised to current learning objectives and school activity and delivered through a single purpose interface.
- A home Internet connection is not required.
- High quality rich media full screen content is stored locally on the device.
- The device has sufficient memory to hold several weeks' worth of such content.
- Learner content is associated with quality contextual information and content for parents relating activities to objectives.
- The device is small, light and responsive and has a good enough display to allow shared viewing and reading.
- Personalised content can be delivered.
- The system and device support creation and delivery of (ideally multimedia) messages between children, parents and teachers.

In this paper we described a prototype system largely built and evaluated in 2005, which delivered content on Tablet PCs and interactive whiteboards. We would now use smaller, more responsive and cheaper handheld devices (e.g. UMPCs, PMPs, etc…) and where appropriate smoothly integrate with home media systems, for example allowing streaming of content to family TVs.

5. Commercial Statement

HOMEWORK was developed in collaboration with Open Mind Productions and 4Learning. It is a research prototype funded by the PACCIT initiative ESRC/EPSRC grant number RES-328-25-0027 and DTI grant number THBB/003/00072C. It is ripe for commercial investment and exploitation. We would also like to thank teachers, pupils and parents at Little Horsted and Westdene schools.

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