

## Today's Stories

Marilyn Panayi<sup>1</sup>, David Roy<sup>1</sup>, Walter Van de Velde<sup>2</sup>, Jack Klaff<sup>2</sup>, Ozan Cakmakci<sup>2</sup>,  
Kristiaan, De Paepe<sup>2</sup>, Niels Ole Bernsen<sup>1</sup>,  
Göran Lassbo, Ilse Hakvoort, Dennis Beach<sup>3</sup>,  
Christos Bouras, Vaggelis Kapoulas, Afrodite Sevasti, Aghsilaos Konidaris<sup>4</sup>,  
Yael Barlev, Aharon Aviram<sup>5</sup>, Giorgos Neofotistos<sup>6</sup>.

<sup>1</sup> Southern Danish University, Odense University, Faculty of Science and Engineering,  
Natural Interactive Systems Laboratory, Odense, Denmark.

{panayi, roy, nob@nis.sdu.dk}

<sup>2</sup> Starlabs, Starlab Research Excelsiorlaan 40, B-1930 Zaventem, Belgium

{klaff, wvdv, ozan, [kristiaan@starlab.org](mailto:kristiaan@starlab.org)}

<sup>3</sup> Department of Education, Göteborg University, Sweden

{Göran.Lassbo, Ilse.Hakvoort, Dennis.Beach @ped.gu.se}

<sup>4</sup> Computer Technology Institute, Patras, Greece

{bouras, kapoulas, sevasti, konidari@cti.gr}

<sup>5</sup> Ben-Gurion University of Negev- Beer-Sheva, Israel

{yaelbl@netvision.net.il, roniam@mail.atid.amalnet.k12.il}

<sup>6</sup> Lambrakis Foundation- Greece

{georgen@lrf.gr}

**Abstract.** Research frameworks are being developed that involve very young children in the process of development of future technologies. Children, their teachers and parents from schools in Israel and Denmark are coming together with researchers, educationalists, psychologists, designers and technologists to develop a wearable technology for educational use- the KidsCam. This example of a hyper-camera will facilitate and support the development of social, communicative and emotional skills in the context of the everyday activities of children. It is envisioned that such digital technology will become embedded in educational culture and create opportunities for shared reflection on early life experiences. Integral to the work is the development of an ethically theorized and ethically led practical framework to consider the issues that surround the development and deployment of new technology by and for children. These will include issues of appropriateness, need and value. A series of interactive presentations will be used to illustrate both the work in progress and the vision of the project.

# 1 Introduction - Pedagogy and Interaction Technology Perspectives

## 1.1 Framing The Scene

The Today's Stories project is evolving a wearable technology facilitated approach to learning for young children (4 to 8 years old) that is aimed at supporting the development of social, communicative and emotional skills of children in the context of the everyday activities. The facilitating role of technology will be complemented by the discovery of novel forms of educational interaction and the development of new media that often follows new technologies. Wearable technology will allow children to learn from reflecting on their actions and learn from other children's perspectives on their own actions. The technologies will facilitate capture and document such "reflective experiments in living". Children will build up their own but interrelated digital portfolio of their day's interesting events. A community memory of a group of children will be co-created and evolve through a didactic process of dialogue and reflection, leading to understanding. Children, teachers, parents, educationalists, developers, researchers and designers are focusing on the co-exploration of technology development in the context of a model of knowledge sharing. At the Israeli site a future-oriented educational framework, *The Autonomy Oriented Education* paradigm is geared towards the development of autonomy, morality and belonging in children [5]. In Denmark researchers are working both in local schools and focus groups to set up 'Communities of Enquiry'.

These children form groups of 'KidSearchers'<sup>TM</sup>, that are contributing to the development of this future technology. These interactive research paradigms have arisen from previous work by Roy et al [6] and Panayi and Roy [7] and are being developed within a Danish cultural context. The conditions for acceptance and success of deploying such technology in a social, cultural and ethical context are being investigated [8]. It is envisioned that these interactive digital artifacts will enhance and also contribute to cross-cultural understanding and critical technology awareness.

## 1.2 Aims and Content – Future Education

Key questions that may guide our thinking in terms of the nature of education in the future could be framed in terms of technological context and distance learning.

Three different directions in which the implementation of technology and distance learning can be developed in the future will be presented:

- *Technocratic*
- *Fundamentalist*
- *Humanistic*

In terms of Humanistic pedagogy for education in the future, examples of didactics that are being developed by the Center for Futurism in Education will be reviewed in

the context of emerging technologies being developed in the Today's Stories project [yael & ronni ref].

## 2 KidsCam - A Deployment Scenario

The technology embodiment is currently envisioned as a **KidsCam**, a 'wearable' device to be worn by children that audio-visually captures events in the child's daily life, and relays them to a collective memory of interrelated episodes. KidsCam is a hyper-camera, i.e. an ad-hoc network of communicating cameras that record a hyper-video document of interleaved episodes from different perspectives. The KidsCam is designed to have image and audio processing capabilities operating over a wireless local area network. The network will connect the wearable computers to a server with two modes of operation for the

KidsCam: 1) on-demand operation controlled by the children and 2) autonomous mode where the camera notices interesting events occurring and triggers the recording of cameras that share the same view.

Wearable cameras have been proposed by Starner et al [1], Healy et al [2] and Mann [3]. In [2] Healy describes a camera called the Startle Cam, which is triggered upon the detection of the "startle response" indicated by the wearer's skin conductivity. Techniques suggested in [2] and [6] for gathering information about the physiological states of the wearer using physiological signals, may be of interest to Today's Stories in later stages of development. Mann proposed in a recent paper [4] the possibility of automatic generation of photo albums. These techniques may be of interest to Today's Stories in optically determining which cameras may be sharing the same visual view given that an interesting event is happening or about to happen.

Today's Stories differs from previous work by specifically targeting the ease of pedagogical implementation of new technologies in learning environments. The children will be wearing the hyper-camera during school-time. Usability issues are being explored and the interplay between functionality, novelty and intrusion are example of elements of the interaction being traced. The recognition algorithm will have two functions: 1) detection of interesting events occurring and 2) determining which children are sharing the same view given one particular interesting event. Machine vision techniques such as optical image flow are to be investigated to calculate distances between children as a feature for "*interest value*" of events. Image flow calculations can be aided by inertial data, received from accelerometers and gyroscopes as described in [9]. In [10] Davis and Bobick present a temporal template approach to represent and recognize actions such as aerobic exercises. Starlab already has a prototype of a camera that is able to gather inertial information about the camera motion, called the Metacam.

It is envisaged that temporal templates could be created, from different visual points of visual view. These representations of actions from each child's perspective could be used to infer specific information of interest in the visual field. Joint audio and video analysis of events may result in more robust decisions about the '*interest value*' of events. Coupling the KidsCam with biosensors is also a promising way of

improving the '*interest value*' criterion. Feedback from children, during the authoring stage, could also be used to improve the recognition algorithm.

### **3 Artifacts for Reflection -'Composer', 'Memory Boxes' and 'DigiComs'.**

#### **3.1 'The Composer'**

*'The Diary Composer'* is a multi-media environment under development that will allow children to form their ongoing portfolio out of the different sequences that capture events from various perspectives. Digital events will be augmented with voice, graphics and sound effects. A suite of annotation features will include stylized faces to express various emotions and special sound effects to highlight for example surprise or fear. A survey of state of the art multimedia editing and authoring packages and their current use in educational settings is being carried out and incorporated into Roadmaps that will support the technology development [11]. A novel feature that is proposed with the 'composer' is the option for children to interact with the scene and objects at different levels of abstraction thus creating rich artifacts for reflection.

Several types of abstraction and metaphor are being explored. Features currently under development include video filing system, video navigation, browseable timeline i.e. temporal event ordering. For example the child will be able, by browsing in the diary's pages to choose a month, a week or a day and select a video files they wish to view. At that point, they will be able to narrow their selection to one video file by clicking on e.g. the first snapshot of a video taken the previous day's morning being optionally tagged by a graphic or text sub-title, where the children's videos and notes will be automatically arranged. In this way, the Diary Composer will support organization of files, according to the date of their creation, that will be transparent to the child. In navigation mode the children will be able to navigate inside each video and pause, playback at any moment, entering a frozen frame mode, associate sounds and images with the situation shown in the frozen-video window. After a video part is fully processed by the child and augmented with sounds and graphics, it will be stored in its enriched format. The next time the child will load and edit the same video instance, all the graphics and sounds previously added will have been linked with the video playback.

#### **3.2 Memory Boxes**

The issue of how to deal with the amount of information that one captures in any given digital record has been raised during system development discussions. In order to explore this issue the concept of a 'digital information continuum' has been pro-

posed. **Memory Boxes**, are being constructed as a means of capturing a 'constrained record' or 'digital memory'. A Memory Box can be used to collect memories of objects, places or people (i.e. information item) which have been marked by special Memory Tags. By opening the little box in the presence of objects, places or people, a memory of them is stored into the box. Technically, a memory could be a pointer to a multi-media document that is associated with the information item - but not necessarily a representation of it. By opening the box next to a computer screen its content is visualized. By opening boxes near to each other their contents are mixed. And by shaking, a box it is emptied. With the boxes, the only 'recording' of the event will be in the collection of e.g. three pointers, 'memories' of two children and an object. This leaves the initiative to explain what it recollects about the event and in what way it experienced it, completely with the child, and thus stimulates an alternative basis for reflection.

The 'Memory boxes' are currently being used with children to explore a number of notions of representation, relationship and interaction e.g. containment, information capture and exchange, proximity, intimacy, privacy, space and time. Digital portfolios are being created for individual and collective using existing technologies e.g. cameras, video cameras and digital toys and the new technologies as they come on stream. This project provides the opportunity to explore how new technologies become embedded in educational culture, Panayi and Roy [12]. Prototypes and mock-ups of the Memory Boxes and the KidsCam will be made available during the exhibition.

### **3.3 DigiCom's**

A series of videos and CD-roms are being developed for the children, teachers, parents and researcher to 'reflect' on the progress of the project and for presentation at academic meetings, exhibitions, teaching purposes and dissemination to press and media.

Key elements in the design of the series include the collaborative nature of the research with children as key people in the process and the involvement of the schools as communities. The creativeness of the children is highly valued in the context of both the in the technology development and their comments in relation to technology in society and how it may affect them in the future. These videos aim to illustrate the atmosphere at the Danish and Israeli schools and the Natural Interactive Systems Laboratory sites. Footage includes activities of the children and teachers, and researchers involved in the project, e.g. video clips of the 'everyday' activities at school and their 'Stories', and photographic stills. At the Danish site the 'Today's Stories' work has involved working on storyboards and making the characters and props for simple 'video theatre narratives' (black backdrop), and some reflective discussion work about what the children have been doing as an illustration of the 'Community of Enquiry'. A group of children also work on storytelling using traditional and digital media. Examples of the short 'video theatre narratives' will be shown. Early examples of children's design work will also be included. The video includes some

short 'video comments' from the teachers. Extracts from the 'Digital Interactive Community Memory' , (DigiComs), will be presented.

#### **4. Interactive Drama Experience**

An interactive experience will be designed and presented that will use age and theme appropriate props and presentational media to give a complex, varied and polyphonic representation of the project and its development. As a conceptual form of interactive theatre, we shall use and adapt techniques from 'Boal's' Forum Theatre. An innovative form of theatre which is extremely flexible and effective as facilitating audience participation and 'live' involvement in examining societal issues and personal perspectives [13] [14]. This work has been used by members of the consortium in the development of interactive media [15]. It offers a linking substrate to explore several of the education and cultural issues that have been raised in relations to the development of future technology that could support children's learning. Among the issues are the development of living, innovative education that follow the paradigm of Autonomy Oriented Education (AOE) mode. A forum will also be created that both demonstrates and examines ethical values and standpoints, "as lived out" in practice, e.g. in new, living partnerships, through involvement, empowerment, hegemonic de-stabilization. Finally, interactive theatre offers an accessible medium, which can be recognized by many other ESE projects, several of which also operate with the concept of (learner) empowerment.

#### **5 The Box of Stories – Playground Installation.**

##### **5.1 The Concept**

*The spider went to the god of the Horizon and begged for the BOX OF STORIES. After all, the box of stories is filled with all of the stories of all of nature's creatures: own it and you rule the world.*

*It cost the spider everything – including his own mother and his own son! But then he had to be given that box. The spider got everyone's stories, even yours and mine.*

*Then the whole planet screeched, and stopped. And all of the beings of the sea and the land and the air screamed with such force that the box burst open. And all of the stories of the world were sent into the sky and blown to every corner of the Earth.*

*So that no one creature could ever own them.*

Ownership of stories - of one's own story - lies at the heart of this project. THE BOX OF STORIES will also provide opportunities for important and profound lessons. Pandora's box sent sorrows out into the world. Stories send happy endings, too and Truths.

## 5.2 Installation Description

The BOX OF STORIES will be a playground installation available for families throughout breaks from the Conference. The BOX OF STORIES site will consist of an intriguing box 4 cubic meters in dimension. This box-shaped structure will bolster a central notion of the project – that of *containment*. Within this larger box, at the entrance to the installation, there will be a box 1.5 cubic meters in size, filled with scraps of paper on which short sentences will be written or images drawn. Visitors to the box will use these as messages triggering them subjectively. Thus prompted, they will begin to create a scenario in concert with other participants who will also have drawn a story hint from the box.

Along one wall of the installation itself there will be a bank of TV monitors. Television is, of course, the quintessential modern Box of Stories. Within the box, and among the boxes, people – especially children - will make tele-visual tales that they – rather than any media ‘spider’ - will own.

Each storyteller will be issued with wearable video-camera equipment – the KidsCam. Three budding filmmakers at a time will develop the collaborative stories created within the box.

Starlab personnel will make sure that the region is safe, organized and attractive, but they will be discreet, so that the storytelling process itself will be unsupervised.

At a given signal from a member of the Starlab team all three cameras will begin running simultaneously. The participants will encounter each other, and improvise with each other, while at the same time recording the exchange.

Then the footage will be viewed. Generally speaking, structured material, and self-conscious playacting will not actually be as interesting – even to the participants - as the spontaneous and real-life incidents: overcoming shyness, getting to know each other, dropping concentration – in short: moments that are true and *human*.

The viewing process will be greatly enlivened by ‘fast-forwarding’ through the more predictable sequences and, of course, using slow motion for the ‘charged’ moments, highlighting them and stretching them for amusement and also, tangentially, for instruction.

## 5.3 Rationale and Reflection

While nothing will interfere with the atmosphere of play, and while the KidsCams with their magical videos are above all toys, THE BOX OF STORIES will be a place of learning as well as a place of wonder. Most childhood activities involve the simultaneous pursuit of pleasure and research. During the viewing process participants will examine a number of aspects and issues that have been raised during the first phases of the Today’s Stories project.

### *ASPECTS OF LEARNING*

*It is said that lessons are learned when experiences are:*

- captured

- contained
- re-embodied
- reflected upon

*It is said that episodes from life are best understood when appreciated from a number of different points of view:*

- Subjective impressions vs objective evidence.
- Memory - essential in storytelling - is confirmed or contradicted.
- Histories, however fragmented, are best understood when they are inter-related.

*It is said through the analysis of experience and through our own stories we learn to:*

- Empathize
- Identify
- Resolve conflicts
- Become peacemakers.

*It is said that analyzing experiences is supposed to require a level – or a number of levels - of abstraction:*

To this end the Kidscam wearers will (be filmed and film each other) while they are watching the videos

***ISSUES OF PRIVACY: (some corrections to be added)***

- Children have their bottoms wiped, their tears mopped, their nakedness witnessed many times a day –What is invasion of privacy?
- Children’s thoughts, children’s secrets
- A quintessential child’s question is: ‘Are feet private parts?’
- Is the need for privacy learned?
- The value of privacy
- Privacy as a moral issue.
- Would you do anything to get on TV?

For budding filmmakers or TV directors, a linear narrative will be compiled from all the recorded material. The Box of stories will be a step towards the development of communities of the Deep Future, and the building up of rich sediments of experiments in living. It will also provide excitement, delight and simple, glorious fun.

The final step in the sharing of this box of stories, will be the broadcasting of these video tales via the Internet and onto those other story-boxes, computers around the globe.

## **6. Concluding Comments**

The innovative character of the project lies in the potential of how a child would use such a wearable technology. In the pedagogic context such technology could be described as the ‘paper and pen’ of the future and as a starting point for introducing advanced learning skills. Within future creative learning arena the control and ac-



cessibility of the means for manipulation of your digital records gives rises to greater opportunities for reflection, discussion and re-embodiment of ideas, events and interactions. The ability to transform your digital records could give rise to the creation a new media for reflective learning. These new media would have the potential of supporting the development of understanding of inter-personal relationships and interactions for very young children.

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