CRIPT 6th International Primary School Design & Technology Conference 2007 – Paper abstracts

It is ten years since CRIPT was established and we held the first International Primary Design and Technology Conference in Birmingham. Since then, we have hosted the conferences biennially and we are delighted to be able to host this sixth conference

June 29th – July 3rd 2007. Colleagues from every continent have joined in sharing their research and curriculum development work through the many and varied papers presented, and the Conference Proceedings have become a major source of information for those engaged in the development and implementation of the subject worldwide. CRIPT has always subscribed to the notion of the importance of the inter-relationship between theory and practice, and ensured that this was adhered to throughout the conference. CRIPT has continued to place papers into two sections – research and curriculum development, and as in 2005, there were presentations by children involved in a design challenge, set by Sebastian Conran, and in work on Sustainability.

In the two intervening years since the last conference, it appears that the focus of work illustrated by the papers is now on review and consolidation of policy and practice rather than the introduction of the subject into new countries. The papers mainly reflect the work of individuals or small groups working on and researching particular aspects of implementation both in school and in Initial Teacher Education. Designing is certainly one theme that emerged at both this and previous conferences, and is an area that still needs to be explored in greater depth to ensure children are given appropriate opportunities to develop their critical and creative thinking skills.

Clare Benson, Suzanne Lawson, Julie Lunt, Wesley Till
June 2007

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One Teacher's Sociocultural Constructivist Response to the Introduction of a Curriculum Unit

David Barlex, Brunel University
Malcolm Welch & Erin O'Donnell, Queen's University, Canada

Abstract
A sociocultural constructivist approach to learning is based on the concept that human activities take place in a cultural context and are mediated by language and social interaction. Recent research has shown that designing within the design & technology classroom is enhanced when taught as a social activity that utilises pupil-to-pupil and pupil-to-teacher interactions.

In the study reported here, the researchers conducted an in-depth investigation of one teacher's attempts to stimulate 'designerly thinking' in an elementary classroom. The teacher enabled the co-construction of knowledge by a) encouraging interaction, b) using questions and visual stimulus materials, and c) using questions to consolidate learning and demonstrate its utility.

Data were collected using audio and video recordings of the teacher while in conversation with the class. Audio recordings were transcribed verbatim. Analysis involved the identification of substantive open coding categories. This analysis revealed that the teacher's creative use of exemplars as stimulus material, use of open-ended higher-order questions, and ability to allow for free-flowing class discussions resulted in a 'safe' classroom environment in which pupils took creative risks, not only with their responses to questions but also later in response to a design brief.

CRIPT 6th International Primary School Design & Technology Conference 2007 – Paper abstracts

The LMD and Teacher Training in the Field of Sciences and Technology in the Primary School

Marjolaine Chatoney IUFM – Site UNIMECA, Technopôle de Château Gombert, France

Abstract

With the protocol of Bologna, the French university, as well as the European universities, reorganizes the university courses from the point of view of a harmonization at the European level and by extension at the international level. The system Licence, Master, Doctorate (LMD) in three cycles is adopted. Each diploma corresponds actually to the same duration of study, i.e. three years for the licence, five years for the master and eight years for the doctorate. The stake is major for Europe, the university and the students. Europe aims at freedom of movement of the people in European space. The universities aim at the development of their policies of formation and research in European space. The students wish the recognition of their qualifications and their university level at the European level.

The University Institute of Teacher Training, Institut Universitaire des Maîtres (IUFM) in French, hitherto independent of the university are like many of other Institutes and high French schools, gradually integrated into the university. (the IUFM of Aix Marseilles is the first to be integrated). Its integration is effective since January 2007). The training of the Masters such as its conceived in France lends rather badly to integration into LMD for several reasons: First, is that the future teachers are recruited starting from a licence by way of contest. The contest is difficult to obtain, the demand is keen and the high standard level institutional. The second reason comes from the difficulty of the perception of the nature of teaching socially. Some people think that the trade of teacher does not offer sufficient development of ideas, that it is insufficient to acquire some social competences and to provide a good base for disciplinary knowledge to be taught. This acceptance denied the professional competences. It is thought that they gain through innate activity or through testing ideas on the pupils. Others think that the socially acquired competences associated a good range of disciplinary knowledge are not sufficient criteria professionally. For them, knowledge to teach comes from specific professional knowledge. There are gestures, techniques, organizations, associated instruments has epistemologies, which have to be known. In this context, the process of inscription of the teacher training courses LMD supposes the passage of a design of a vocational training under the responsibility for the employer (the contest) to a university vocational training (competences). This new configuration imposes a new design for the formation of the new course.

In this paper, we will begin to present the idea of the LMD and the problems of opening teaching to the trades. Then we will present successively an LMD implementation in direction of sciences and technology education and the new design of the teacher training in the field of sciences and technology.

What do Mental Models Have to Offer the Primary Design and Technology Teacher?

Christine Edwards-Leis, James Cook University, Queensland, Australia

Abstract

The longitudinal project, Mental Models and Robotics, investigates twenty-five, eleven year old students and their teacher in a socio-economically diverse Australian urban primary school. It aims to establish how the identification of participants' mental models can assist in the authentic assessment of learning through a richer understanding of the cognitive development taking place in a technology-based learning experience. This paper discusses the mental models that students bring to a learning experience. It shows how addressing specific mental models through learning experiences in Design and Technology can provide students with the opportunity to develop functional mental models that will enable them to problem-solve independently. The implication for teachers in Design and Technology classrooms is that having clearer understandings of students' mental models enables appropriate intervention at the appropriate times so that students can become not only independent problem solvers but also better designers and makers.

A Reflection on Practice: Evaluating a Design and Technology Project

Anna Doorbar. Stirling Grid for Learning

Abstract

Before coordinators can support others in a school, they must be aware of the nature of the subject, and be able to reflect critically on their own practice. It is this reflection that will enable them to better support colleagues in their schools, to raise teaching and learning standards, and perhaps, most importantly, to offer opportunities for greater enjoyment for both teachers and children during design and technology sessions.

This is a summary of a piece of research that was carried out as an assignment for an MA course.

CRIPT 6th International Primary School Design & Technology Conference 2007 – Paper abstracts

RESEARCH

Exploring Issues Related to Gender in Primary Technology Education Introducing UPDATE: A European Union Funded Longitudinal Research Study

Wendy Dow & John R Dakers, University of Glasgow

Abstract

UPDATE stands for 'Understanding and Providing a Developmental Approach to Technology Education' and is a European Union funded project which started in January of this year and will complete in December 2009. The value of the contract is €922,300. The constitution of the project team is made up of a Europe wide consortium of sixteen institutions from eleven different countries. The University of Jyväskylä in Finland acts as the Coordinator of the project. (See appendix for a complete list of participating countries).

The project consortium has created a unique developmental approach for technology education: Compared to many other projects that have tried to involve girls in technology, the UPDATE approach includes a strong focus on early childhood and primary education, phases in which the attitudes are often formed. From this understanding, it is far too late to start to try raising the girls' interest at only at secondary or later stages. We are convinced that with new, improved technology education practices it is possible to make science and technology more attractive for young people, promote their interest, and encourage their critical and creative ways of thinking.

Several studies conducted by the European Union (e.g., Eurostat 2004, Implementation of 'education & training 2010' work programme) demonstrate that women and girls are continuously dramatically underrepresented in science and technological education, areas, and jobs. This is highlighted in the Joint Interim Report 'Education and Training 2010' by the European Commission under domain of Maths, Science and Technology (MST). The joint report points out the persistent shortage of women in scientific and technical fields and calls on Member States to encourage the development of a scientific and technical culture among its citizens. In particular, action was recommended in order to motivate young people, especially girls, to undertake scientific and technical studies and careers. Even in countries where gender imbalance is not a problem in the areas of mathematics and science, there is a marked imbalance when technology subjects are taken into account. Technology, is an area where the gender imbalance culminates, and therefore the focus of the UPDATE project.

The UPDATE project's aim is threefold: 1) to examine why girls drop out from technology education at different stages of their education, and 2) to create new ways and educational methods to make the image of technology and technological careers more attractive for both boys and girls, and 3) to promote, encourage and mobilise especially girls and young women for engineering and technology, both as a career, and as active users of modern technology.

The EdaDe in the Museum

Antônio Martiniano Fontoura & Renato Bordenousky Filho, Pontifical University Catholic of Paraná

Abstract

This paper presents the results of the experience promoted by EdaDe – Education by Design associated with Heritage Education, developed in the Museum of the Pontifical Catholic University of Paraná, during the exhibition 'Dimensions of Design – 100 Classical Seats'. The exhibition took place in 2005 and it was brought to Brazil by the Göeth Institute. The experience was constituted by: oriented visitations, didactic materials related to the exhibition theme and EdaDe activities about design, history and material culture, conceived for children from Curitiba Primary schools.

Playing with Designing: Ways in Which Young Children's Play Influences their Capabilities as Emergent Designers

Gill Hope, Canterbury Christ Church University College, Canterbury.

Abstract

This paper reports on observations of how children's early play styles and role-playing experiences impact on their emerging design capabilities.

Young children actively engage in 'being' a whole number of adult roles: postman, taxi driver, and so on. They have skills that will enable then to 'be designers': knowledge of how things come apart in their hands, how to construct products from components (e.g. Lego), how things look from different angles, and how different materials respond under pressure. Plus they have cognitive skills that are important for emergent designers (imaging, wondering, tolerating ambiguity).

Gender differences appeared in the way design activities were tackled that were reflections of the observations of different play styles at a younger age. There appears also a strong correlation between the play opportunities provided in school and the way in which design tasks were tackled. The paper concludes with suggestions for encouraging emergent designers to develop their design capabilities.

CRIPT 6th International Primary School Design & Technology Conference 2007 – Paper abstracts

The Starting Point Approach to Design and Technology in Action – An Examination

Keith Good, University of Greenwich, London
Esa-Matti Järvinen, University of Oulu, Finland

Abstract
This study examines the starting point approach (spa) to design and technology. This is intended to maximize creativity while being manageable for the teacher. The purpose of the study was to examine whether the children could do what the approach requires and in particular whether it promoted their innovative thinking. Data were collected during teaching sessions with 27 Year 6 children in London and rural Finland (ages 11 – 12). The theoretical framework of the study is qualitative in nature. The participant researchers videoed sessions in their respective countries, that were taught to an agreed 'script'. This included guided brainstorming chaired by the researchers. Children were introduced to some technology and explored its use in the wider world. They were then shown how to make their own working example that was the starting point for their designing. After brainstorming, children went on to develop a wide variety of different projects of their choice.

In the UK and Finland, all children in a class are usually required to design products with the same purpose. In the study, the starting point approach allowed the children to design products with many different purposes within one class. They developed the starting point to fit with their own experience and interests or the needs of others around them. A major advantage of the spa is that it seems to reconcile the apparently conflicting demands of teaching specific skills and knowledge with whilst encouraging individuals to be as creative as possible. The common starting point was crucial to making this feasible.

Designing Better Worlds? Values for Vision through Primary Design and Technology Education

Steve Keirl, University of South Australia, Australia

Abstract
If the world could be a better place, does Primary Design and Technology Education have a role to play? This paper argues that the world(s) we inhabit are so as a result of design activity. Thus, if we deemed it important enough, we could design our world(s) differently.

To achieve such an end is to entertain particular visions – of alternative futures and alternative pathways to those futures. Design is a powerful educational entity and human tool and one of its potentials is its capacity to enact change – to change one set of circumstances into another. In doing so, value-judgements and value-decisions are made. This paper explores the relationship between ethics and design in our lives and investigates the kinds of values we might promote in a Design and Technology Education for the future. Nine 'visioning values' are put forward and, it is argued, they may both serve to enhance future world(s) as well as to empower Design and Technology Education's importance to twenty first century curriculum thinking.

What is the Impact of Design and Technology on Non-fiction Writing?

Davinder Kaur Khangura, Giles Junior School, Hertfordshire

Abstract
This study investigated the impact of design and technology on children's non-fiction writing. In a Hertfordshire primary school, children in Class A were asked to watch the teacher and then write instructions of how to make a simple cam model. They were not able to assemble the materials until they had completed the instructions. Four Class B children were asked to first assemble the materials to make a simple cam model and then asked to write instructions about how to make it. Qualitative data was collected, children were observed during the designing and making process and when completing the questionnaires. Children's instructional writing was assessed by the class teachers, in order to establish the impact of D&T on children's instructional writing.

I aim to show that D&T can play an influential role in aiding learning and skills in Core subjects such as Literacy. I hope to promote cross curricular links within my school.

CRIPT 6th International Primary School Design & Technology Conference 2007 – Paper abstracts

RESEARCH

Ten Years of Primary Design and Technology Teacher Education in South Australia: More Head, Less Hands, Always with Heart

Steve Keirl & Denise MacGregor, University of South Australia, Australia

Abstract

This paper addresses the conference theme of 'Ten years on…' by reporting developments and issues that have arisen in Primary Design and Technology (D&T) Teacher Education in one Australian university over the same period.

As a major Primary D&T provider in Australia, the University of South Australia School of Education has undergone a decade of considerable change – of the kind affecting all universities (globalisation, markets, new policy directions etc). In the same period, D&T curriculum design has also moved significantly.

This paper describes some of the principal changes and innovations that have occurred in Primary D&T education at the University. Some context – historical, curricular and political – is presented and the paper addresses matters of demography, program (degree) and course (subject) design, pedagogy, innovation, influences, challenges and opportunities.

Having described the evolution of the D&T developments, the paper concludes with summary reflections and it speculates on what the next ten years might bring.

Investigating Pupils' Perceptions of Writing Tasks in Design and Technology

Julie Lunt, CRIPT, University of Central England, Birmingham

Abstract

Writing has traditionally been an element of children's activity in most subjects of the primary curriculum. In design and technology, children's writing is often combined with other forms of representation such as drawing, talking and working with materials to create multimodal texts. What meaning do children make of these writing tasks as an element of their experience of learning and participating in design and technology? What is their reaction to them?

Children are increasingly seen as key stakeholders in education and central actors in the teaching and learning situation with very particular insights to offer us to help us develop our understanding. This paper presents initial findings from the analysis of interviews with 65 children, aged 9 – 11, from three primary school classes in England. The data was collected as part of a larger on-going collaborative action research based study.

The findings show that these children's views of writing tasks in design and technology are influenced by their construct of design and technology as a goal-oriented activity built around the creative act of designing and making a product. The children were more positive about the writing tasks they experienced in design and technology when the tasks were closely related to this creative act; were a relevant form of writing; presented an appropriate level of challenge; and did not impact too heavily on the time available for making.

CRIPT 6th International Primary School Design & Technology Conference 2007 – Paper abstracts

Conceptions of Simple Machines and their Functionality: A Study for the Enrichment of Technology Education in Primary Schools

Julia Menger, University of Oldenburg, Germany

Abstract

Although children often experience the influence of technology around them, there is not much room given to an education in technology in the conception of scientific education at primary schools (cp. Strunk et al. 1998). The aim of the study presented here is to create a situation that enables and motivates children to actively and purposefully work on questions of technical procedures. This ability is necessary to understand technical procedures (cp. Soostmeyer 2002, p.72).

The study starts with the investigation into the pre-knowledge of 9 – 10 year old children about simple machines (lever, inclined plane, pulley and pole) and how they work. Based on these results a suitable surrounding for further studies will be created in which students can start to develop theories and experiment on applying them.

The Potential Conflict within Design and Technology: Creativity versus Practical Skill Acquisition

Inger Morris

Abstract

Earlier this year I completed an MA module focusing on Design and Technology in Primary Schools. The focus of my study was the QCA Year Three topic: Moving Monsters. The children who were involved in this topic were split into two classes, each containing twenty eight children. Both teachers are NQTs in their first year of teaching and it was interesting to note the differences in teaching styles and the effect of this on the way the two classes approached the topic. One teacher, whom I shall call Teacher A, completed an Arts degree before training to be a teacher, whilst the other, Teacher B, has a History degree. As I looked at how the topic was being taught and learned, I became aware of a potential conflict between the new skills that were required and the creativity which was desired. This became the focus of my study.

Auditing Design Decisions in Food Technology: Experiences of Initial Teacher Primary Design and Technology Students

Marion Rutland & Sue Miles-Pearson, Roehampton University, London

Abstract

The paper presents work carried out at Roehampton University with primary student teachers building on two previously reported small scale research and development projects (Barlex and Rutland, 2004; Rutland, Barlex and Jepson, 2005) with specific reference to food technology. The projects focused on the impact of deliberate interventional curriculum strategies aimed at enhancing the design ability and design teaching skills of trainee teachers on a one year post graduate certificate of education (PGCE) initial teacher education (ITE) Design and Technology (D&T) course.

Initially, the paper briefly refers to the background of the research activities including a summary of the findings from the two projects. It outlines the development and refinement for food technology of a conceptual model to enable student teachers, teachers and pupils in schools to audit the design decisions made in a design and making activity (DMA).

This paper focuses on a food technology module taken by Year 2 BA Primary Education with Design and Technology student teachers at Roehampton University in Autumn 2006. A decision was made to introduce the design decisions model for food technology during the course and evaluate how it was used by the students and its effectiveness as a tool to audit and track the students design making decisions during their food technology coursework project. The paper reports on the findings based on the design portfolios and course work presented by the students.

The paper concludes by considering the potential impact of using the design decisions model for food technology in a simplified form in the primary classroom.

CRIPT 6th International Primary School Design & Technology Conference 2007 – Paper abstracts

RESEARCH

Developing Designerly Thinking in the Foundation Stage – A Case Study

Tara Treleven, James Dixon Primary School, London

Abstract

This is an exploratory case study focused on developing designerly thinking in a nursery setting. Different activities were designed to encourage designerly thinking skills through a problem solving approach that also linked to creative and critical thinking. Findings suggest that young children, through discussion, were well able to evaluate and discuss products critically, suggesting possible users, uses of, and needs for, products, and justified choices that they made.

This paper is a summary of an unpublished MA dissertation and supports the need for more research into designerly thinking with young children. Further detailed information can be obtained from the author.

Re-Think Your Design and Technology Teaching: Linking Sustainability with D&T

Suzanne Coles, Earls Barton Junior School, Northants

Abstract

This paper is the result of an area based initiative in Northamptonshire linking the teaching of design and technology with sustainability. Although the National Curriculum is clear about the need to promote awareness about sustainable development many teachers are unaware of the possibilities that are available to us. Many schools follow closely the QCA units of work in D&T as they do not have the confidence or knowledge to widen their experiences. In the Northamptonshire initiative, Aileen Dunkley, adviser for design and technology, developed units of work that highlight the possibilities for primary teachers to develop sustainability through design and technology. In this paper I report on a trial of two of these units of work, one focusing on desk tidies with a Year 3 class (children aged 7 – 8) and the other focusing on textile containers with a Year 4 class (children aged 8 – 9).

Sankofa: Aspirational Learning about Identity and Values

Cathy Growney, Kennet School, Thatcham
Barbara Lowe, Reading International Solidarity Centre (RISC), Reading

> *'Sankofa' – A symbol of education and heritage.'Sanko' meaning go back, 'Fa' meaning take.*
> *"The symbol represents the wisdom of learning from the past, to help build the future. It is sometimes depicted as a bird, which flies forwards whilst looking backwards. It reminds us to value our culture and history."*

Abstract

This paper describes the development of a Technology Education project using Adinkra cloth from Ghana to explore pupils' identities and values. The Sankofa symbol shown is one of hundreds of Adinkra symbols. The symbols represent aspects of knowledge, history, beliefs and values.

The project aims were to raise pupils' awareness of the diversity of cultures within Africa; to promote understanding of our interdependence and shared history with Ghana; to consider pupils' own values and identities, and respect those of others. Simultaneous to these aims were curricular aspects of design and technology, art and design, geography and citizenship/personal, social and health education (PSHE).

The methodology described used artefacts as a starting point. Rather than exhibiting these artefacts as interesting primitive/exotic decoration, they were handled and investigated thoroughly thus increasing understanding of Global Citizenship and bringing a meaningful aspect of Ghana into the classroom.

The paper explains how the projects took place in twelve schools in England, the differences between the projects and the impacts. The analysis of the projects (predominantly with year Year 5 classes but also with pupils in other year groups from Nursery to year Year 6) led to the development of an educational resource.

CRIPT 6th International Primary School Design & Technology Conference 2007 – Paper abstracts

Thinking Globally whilst Designing Locally

Kate Ter-Morshuizen, University of KwaZuluNatal, South Africa

Abstract

This paper examines the application of the design process within a local context. We need to develop our pupils to engage with changing times as active, thoughtful and reflective local and global citizens. When investigating a problem, need or product, global trends or comparative examples are studied/investigated. Once the product, has been evaluated, a local solution is compared. Learners then design and make their own products. An important part of technological literacy is looking at values within products and processes and reflecting on the effect that products will have on society and how they are valued (Martin 1996 p4).

Technology can help to meet the massive disparities that exist between the different worlds – between the North and the South; between the industrialised West and the rest of us; between the first and second economies. But most importantly, technology is used to meet our local problems and needs by investigating and applying appropriate, meaningful solutions to these problems within a local context. This can contribute to a better understanding of the human dimension of technological literacy.

Case Studies of work carried out in classrooms are used as examples of 'thinking globally whilst designing locally,' using the core content areas of the curriculum. The examples are not dependent on special equipment nor expensive resources and have been taught in classrooms which in some instances are still traditionally under-resourced and overcrowded.

From Birmingham to Jyvsäkylä

Wesley Till, UCE Birmingham, Birmingham

Abstract

This paper outlines a teaching exchange between the University of Central England, Birmingham, England and The University of Jyvsäkylä in central Finland. The exchange was funded as part of the Erasmus programme. The point of contact at Jyvsäkylä was Professor Aki Rassinen who is well known amongst international Technology Education circles.

The exchange has been two way. As well as UCE tutors visiting Finland on three separate occasions between February 2005 and April to Jyvsäkylä 2007, their Finish counterparts also visited UCE in the summer of 2005. Another visit is planned by two Jyvsäkylä tutors for the autumn of 2007. I shall also discuss some of the effects that the exchange has had on my teaching when back in Birmingham.

The ONTDEKPLEK: Going Dutch

Harry Valkenier, School of Education, Inholland Alkmaar, Stichting Ontdekplek, BS De Dolfijn Haarlem

Abstract

This paper outlines the work of Ontdekplek, a very successful organisation, based in the Netherlands that supports the development of primary technology education. It started by providing after school opportunities for children, and now works with children, teachers and Initial teacher education students. It is based on the principles of making learning fun, accessible, relevant and appropriate. Children are given starting points and it is up to them where their learning goes.