

# Digital Play Spaces: Designs for Learning

## Introduction

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Ask your favorite child what he or she does on the computer at home. Without a doubt, the child will mention a computer game.. or two... or perhaps a whole host of digital play environments.

Kids do use computers to do schoolwork and to find information on the Internet, but they also use computers to play. In fact, recent data from the U.S. Census Bureau (1997) suggests that games are children's primary use of computers in the home.

The members of this symposium contend that, rather than objecting to this playful impulse in their children, educators and parents should take advantage of it.

Recent studies such as the Kaiser Family Foundation's *Kids & Media@ The New Millennium* and the Markle Foundation's *Children and Interactive Media* indicate that children now spend as much time using media as they do in school, with family or friends. They urge an accelerated research agenda to understand how intense media experiences such as digital play affect children's development. They also call for increased efforts in building common ground among researchers from different disciplines and conducting research that is useful to content producers, including those in the commercial sector.

Since September 2000, the presenters in this symposium—all members of the Center for Innovative Learning Technology's (CILT) Digital PlaySpace Collaborative—have been pursuing just these objectives. In this session, we will report on original research about the observed and potential learning that occurs during on-line play, and we will outline a rubric for identifying and evaluating the features in digital play spaces that promote learning.

## Background on the Digital PlaySpace Collaborative

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The Digital PlaySpace Collaborative is supported by The Center for Innovative Learning Technologies ([www.cilt.org](http://www.cilt.org)), which is an NSF-funded project intended to seed collaborations across academic, commercial, and direct service sectors that will improve the landscape for children's learning in this country. Members of the Digital PlaySpace Collaborative include researchers, practitioners, and designers from the United States and South America.

The Collaborative has been meeting since September 2000 to examine a variety of computer-based play environments and to identify features in the play spaces themselves, as well as in children's appropriations of these spaces that promote learning.

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\* This document was derived from the project "PLAYSPACE: An examination of learning in multicultural, digital play spaces". This project was sponsored by a CILT seed grant. Further details on the project are available at <http://concepts.concord.org/playspace>

## Theoretical Framework

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The presenters in this symposium draw upon a rich and interdisciplinary corpus of theory about play and learning, about the design of effective learning technologies and educational software, and about the impact of computer use on children.

Our work is grounded in classic investigations of play by Huizinga (1972), Sutton-Smith, Pelligrini (1995), and Csikszentmihalyi (1991) as well as more recent commentary on computer-based play and learning (Papert, 1980; Prensky, 2001). These authors detail the meanings and functions of play in society. They also map out the psychological dimensions of learning through play, including the enhanced dimensions of user interactivity, control and experimentation provided in computer play environments such as simulations and microworlds.

Similarly, we are informed by design perspectives as related to the development of educational software and learning technologies. Our influences include the work of Galvis (1992), Scardamalia (1998), Soloway (--), and Kafai ( ). These authors describe ways in which designers can scaffold the learning process with appropriate learning tasks, instructional supports, prompts and opportunities for feedback that are embedded in the learning environment.

Finally, in our presentation, we visit the literature about the impacts computer-based play on children, including the summaries of Wartella et al. and the recent work of Greenfield and Subrahmanyam.

## Session Overview

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In this session, members of the symposium will:

- Report on original research and on the literature at large to demonstrate how ‘playful’ computer games can lead to positive learning outcomes for children across abilities, cultures and income-levels;
- Discuss specific design features of digital play spaces that render them amenable to learning in both school-based and out-of-school contexts;
- Outline a rubric that will assist both parents and educators in shaping the digital play experiences of youth and also help designers more consciously design for learning.

The following papers will be featured in our discussion:

### **What do game designers know about scaffolding? Borrowing SimCity design principles for education**

Game designers have expertise in scaffolding engagement, as anyone who has observed a young person captivated by a video game can attest. Unfortunately many game designers’ techniques have limited applicability for education because they use controlling feedback, put students into a purely reactive role, and do not allow the processes of reflection, inquiry, or self-direction that are necessary for meaningful learning. The popular game SimCity may be an exception,

however, because it uses ‘organic’ feedback, which responds and adapts to the user without wresting control. This paper examines game feedback from the perspective of motivation research, and analyzes the organic feedback model of SimCity to isolate the design principles most applicable for education. The paper also details what sorts of other adaptations would be necessary to make a SimCity-like game useful in a K-12 context. The last 1/3 of the paper details a ‘wish list’ of K-12-friendly features, including access to the internal simulation engine, assessment aids for teachers, and support for experimental comparison of cities.

### **Critical Factors in the design of playful learning environments: Reflections based on “The Return of the Incredible Machine: Contraptions”**

This paper analyzes "The Return of The Incredible Machine: Contraptions". Described by one reviewer as "easily the best puzzle game to come along in years (McDermott, 2000)", TIM is chosen as an exemplary environment for exploring principles of engineering and physics in a playful way. The structure and some key features of TIM are explained, and four exemplary design aspects are discussed: the TIM method of providing constructive and non-controlling feedback, the use of player history to sequence challenges, the balance of user-controlled exploration and system-controlled demonstrations, and the user-controlled help system which exemplifies the principle of illumination with indirect light.

### **When the Sims get real: An analysis of how digital play spaces promote learning in low-income, diverse communities**

This paper examines how low-income, pre-adolescents in a multicultural setting appropriate the popular computer game, The Sims™, for their own learning, social and sense-making activities. The paper documents a variety of educative moments that the children experienced in playing and reflecting about the game and its design. It also suggests features of the game’s design that might be enhanced to further promote self-discovery, cultural understanding and serendipitous learning.

### **Designing digital play environments for all learners**

Drawing on formative research that has accompanied the development of KidCode, a prototype digital play environment for young children, as well as related research on accessible design, this paper will discuss design features that help to insure the accessibility of digital play environments for all children. KidCode is an innovative interactive software system that consists of a sequence of two-person learning activities that are set within the context of an email system. The purpose of these activities is to help young children develop an understanding of symbolic representation in its many manifestations, an important prerequisite for developing competence in reading and mathematics. Formative research has accompanied the development of the KidCode software from the initial design phases. This presentation will highlight features of the design and use of the online learning activities that have helped to insure that the software is accessible to learners who differ in their backgrounds, experiences, abilities, and developmental levels.

## Implications

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Computer games have enormous potential to promote self-regulated learning, discovery, and positive social interactions among children. Computer play environments have also managed to successfully penetrate the hearts and minds of children in a way that many other, more formally instructive techniques have failed to do.

In shaping the effective educational experiences, it would be wise for educators and parents to learn from their children and these ever-engaging (and fun!) digital play environments. Similarly, it would be lastingly beneficial to our children and our society as a whole if designers took some tips from educators and education researchers about how to deepen the opportunities for learning and growth in the games they create. With its reports and design rubric, members of the Digital PlaySpace Collaborative hope to foster just this dialogue between designers, research and educators.

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