Objects-to-think-with-together

Rethinking Papert’s Ideas of Construction Kits for Kids in the Age of Online Sociability

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Abstract. The spread of the Internet has led to a change from a TV-childhood to a computer-childhood. We investigate how this shift towards networked forms of communication is reflected in constructionist learning environments and elaborate the concept of objects-to-think-with-together in the context of using computers as tool and social medium at the same time. In doing so, we propose four design aspects that should be considered in the context of socially-oriented constructionist learning environments: providing an integrated platform for construction and socializing, supporting re-mixing and re-using as well as self-expression and appreciation, allowing collaborative projects of non-collocated learners, and supporting enculturation and team-building.

Keywords: End User Development, Constructionism, Social learning, Social Media, Scratch, Logo, Constructionist Learning Environments.

1 Introduction

Several representative empirical studies have shown that children’s media use has been changing over the last years. For example, in Germany a majority of children’s households provide Internet access and 50% of children state that they are using the Internet on a regular basis; furthermore, 31% of the children state to (rather) conduct this activity on their own. This trend has been described by Hammer and Schmitt (2002) as a change from a TV-childhood to a computer-childhood, indicating the replacement of television as the lead medium in favor of computers and the Internet. At the same time, there has been a significant increase of social networks usage in the last years. One out of three children regularly use communication services such as online communities, chats and instant messengers and assert those as their online favorites.

These empirical findings demonstrate that online sociability has become a common part of children’s everyday life worlds. Based on this situation, it is important to investigate how this shift towards networked forms of communication and creating/sharing could be integrated into collaborative learning environments for children, especially with regard to artifact-centered approaches of supporting learning such as constructionism.
2 The Social Turn in Constructionist Learning

Constructionism as a learning approach has been developed by Seymour Papert in the 1970ies, adopting ideas from Piaget’s constructivism as well as from Activity Theory (Papert 1980). His key thought is that knowledge cannot be exchanged in abstract forms. Instead, knowledge exchange is considered to be dependent on practical and cognitive re-construction on behalf of the learner. Hence, the construction of tangible and personally meaningful artifacts plays a seminal role for the learning process. Against this backdrop, a number of computer based environments for supporting constructionist learning have been developed, called constructionist learning environments (CLE, see for example Figure 1b, left).

The initial focus of Papert’s work lay on the domain of technical sciences and individual learning approaches, where the computer serves as an “object-to-think-with” (Papert 1980) that allows learners to realize their personal objectives. At that time, it was a common necessity to edit the source code in one tool, then use another tool for compiling the code, and afterwards execute it manually. This cycle created a “gulf” between code and behavior analog to the gulf of evaluation and execution as outlined by Norman (1986). The seminal innovation of Papert’s Logo environment was to bridge that gulf, by making the effects of coding directly visible for the learner.

Beyond the individual focus, recent research has a stronger focus on communities and social aspects of constructionist learning (Bruckman 1997; Chapman 2004; Shaw 1995). One example of this second generation approaches the concept of distributed constructionism elaborated by Resnick (1996) as a socially oriented enhancement of Papert’s work. Intellectually, this second generation of constructionism is shaped by learning theories that emphasize the social and distributed nature of learning in practice (Wenger 1998; Salomon 1997). They are typically focused on collaborative learning efforts in communities, where the constructionist learning activities include several participants. In such settings, learning becomes richer and more effective, as

![Fig. 1. Social learning in (a) co-located learning environments and (b) computer mediated environments](image_url)