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Mixed artefacts as mediators for collaborative learning

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eLearningLab at Aalborg University conduct teaching and research in the intersection between Human Computer Interaction (technology), Information architecture (organization) and learning and development (human action). Inspired by the lay out of workshops spaces at architecture schools, eLearningLab has build a lab with both tangible materials and digital touch technologies arranged in a room with various forms of furniture to stimulate movement and ways of positioning the body other than sitting on a conventional chair. The overall purpose of this design lab is to facilitate teaching-through-construction as part of the Problem Based Learning pedagogy, and to increase students' awareness of the role of embodied interaction in learning. Simultaneously the Lab facilitates design of prototypes and exploration of use situations within the fields of Human-Computer Interaction, Computer Supported Cooperative Work and Computer Supported Collaborative Learning. This paper presents the ideas behind the eLearning Lab's DesignLab.

Keywords: design, learning space, concept construction, touch technologies and setting.

INTRODUCTION

Today's professional roles mix analytic and constructive competencies, making it important that academic teaching enables also humanistic students to acquire core competencies of construction - not to become designers, but in general to make them problem solvers, who understand the web of stakeholders in a project, and able to guide and facilitate informed decisions - an increasingly paramount challenge in today's global and multidisciplinary world. Case based teaching, project based teaching, and problem based learning are ways to make analytical and constructive skills merge into a professional competence, described by Schön under the heading 'the reflective practitioner' (Schön 1983).

While web 2.0 technologies are widely integrated and promoted in university settings (Ryberg et al., forthcoming) to augment learners' construction and problem solving activities, the physical layout of learning environments still seems stuck in an old format. Lecture halls and the other spaces, which universities at most dedicate to teaching, do not support the development of construction skills, and even though Problem Based Learning is a central part of our pedagogical framework at Aalborg University, teaching is still based on teacher led lectures with limited student activity and construction. Fortunately, a lot of inspiration can be found in the way architecture schools lay out workshop spaces.

THE RESEARCH OBJECTIVE

In order to create an environment where to explore learning potentials across digital and physical borders, we focus our research on touch technologies' and tangible materials and how they affect perception, cognition and habituation, and influence interaction, collaboration, and knowledge sharing. The teaching/learning environment "eLearningLab's Design Lab", www.designlab.ell.aau.dk, supports concept construction employing Smart boards and a surface table, social software like Twitter, Prezi, Google docs, and tangible objects such as a sandbox, Lego Serious Play, as well as a "theatre" corner. With these artefacts in place, we explore activities such as storytelling, scenario building, Forum theatre,

classification and categorization, and concept-development. Organized around a case or problem, and using data from field studies, students are invited to engage in problem formulation, development of conceptual solutions, and ways to provide stakeholders with a common ground for making informed decisions. We wish to transform some of the traditional characteristics of university teaching by employing a more neutral and reconfigurable setting. Hence, we also invite students to become active and engaged in a negotiation and reconfiguration of the lab setting, in terms of materials, activities, as well as in the ways we employ digital technologies.

EMPIRICAL FOUNDATION OF THE RESEARCH

In our research we try to make lab-activities part of our action research methodology. We conduct field studies on the ground in collaborative learning environments, school settings, health informatics practices, and knowledge sharing in business and administration, as well as on the use of smart utility interfaces in households. We collect data in the form of videos, logs, and interviews. We try out our interpretations in the vicarious settings in the DesignLab by employing touch technologies and tangible materials in storytelling, scenario building, prototypes and concept-development.

PEDAGOGICAL PERSPEKTIVES

Supported by related research, we argue what distinguishes scholastic and experiential learning in terms of requirements to physical-haptic support and kinaesthetic interaction: the main differences being in relation to the power over codification: of space, of content, of means of communication and of outcome. Emphasising doing and discovering, we seek to lay the foundation for learning-by-doing and learning-to-reflect-in-and-on-action through kinaesthetic feedback.

Theory-wise we build our design principles on Dewey's, Kolb's and Vygotsky-Engeström's models of learning as cycles going from the outside to the inside to the outside/ from the social to the individual to the social, all the way mediated by the utilization of mixed artefacts. Regarding the design of the re-configuration of learning environments, we draw on Luckin (2011), who emphasizes metaphors for learning environments taking into account inherent limitations of space as well as place. The layout of the Design Lab supports students in exploring concepts through movement and language provoked by various materials and artefacts. Here we build on Sheets-Johnstone (2009), who argues that moving and touching form a basic kinaesthetic memory for humans. The key to change from traditional academic schooling producing analytical skills to collaborative learning to become reflective practitioners, we – as mentioned above – see as a shift in power over codification. Based on theory and experience we believe that a more soft-coded (Szulewicz, 2010) learning environment with a variety of mixed artefacts can produce collaborative learning with students and teachers as mutual learning partners.

The lab is still in the making; only one semester of teaching has taken place here so far. Through longitudinal research over the next couple of years we hope to be able to find, which among the open coded facilities offers the best support for construction and concept development processes with high level of student involvement. Our goal is to arrive at some guidelines in line with what has been developed in the UK, the so-called Design Quality Indicator (DQI), which has proved to be helpful also as a tool for thinking about design of environments for teaching and learning (Gann, Salter & Whyte, 2003)

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