Medium-Based Design: Supporting Bricoleur Designers

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Abstract: The design of learning environments is a fundamental part of education research today. In this article, we put forth a design method, medium-based design (MBD), to create useful learning environments that foster inquiry, support artifact construction, and enable interaction with targeted learning content through a medium.

Keywords: design, medium-based design, educational technology, design of learning systems

Introduction

Designing systems that foster significant inquiry, enable meaningful artifact construction, and encourage useful interaction is fundamental to the field of learning sciences. In education, these types of environments have a substantial history going back to Fröbel's gifts and Montessori's prepared environment. In this article, we put forth a design method, *medium-based design*, to create such systems. We do not believe that MBD is a completely new approach to designing learning environments. Rather, we believe that designers have intuitively used similar methods, and that, by describing details of medium-based design and providing guidelines that follow this approach, we are showing support and value for this approach. Although other methods are effective in designing learning environments, these have concentrated on a top-down approach, neglecting the *bricoleur* designer. The bricoleur style of design is different from, but not worse than, other approaches (Turkle and Papert, 1991). Our method, MBD, is a well-formed method grounded in theory that offers designers an alternative approach to designing learning environments.

Medium-Based Design

MBD starts with a medium that seems to address important learning goals. Next, the affordances of that medium for achieving those and other learning goals are explored. Then, MBD proceeds by investigating the environmental needs and social context necessary for making those affordances recognizable and graspable. Finally, appropriate tools are built to accommodate different learning goals. In a conventional approach, it is important to first clarify and investigate an important problem. Because MBD is bottom-up, this proves problematic. The designer may find that the chosen medium actually supports learning goals that are substantially different than that first intuition. Therefore, in MBD, it is important to first clarify and investigate the solution—the medium. Solving an important learning problem is still essential to the goals of MBD, but that does not necessitate that the method focus on the problem initially. In both a conventional and MBD approach, solution and problem evolve together; the difference is that the initial focus is on the problem in the conventional approach and the solution in MBD.

We have constructed two systems using MBD. AudioExplorer is an inquiry-based tool to explore the physics of sound by examining the frequency domain (Rick, 2002). DigiQuilt is a construction kit for learning about math and art by designing patchwork quilt blocks (Lamberty and Kolodner, 2002). Both of these systems allow for active, constructivist learning. We offer these as examples that MBD can produce these types of systems.

References

Lamberty, K. K. and Kolodner, J. L. (2002). Exploring digital quilt design using manipulatives as a math learning tool. In Bell, P., Stevens, R., and Satwicz, T., editors, *Keeping Learning Complex: The Proceedings of the Fifth International Conference of the Learning Sciences (ICLS)*, pages 552-553, Mahwah, NJ. Lawrence Erlbaum Associates.

Rick, J. (2002). AudioExplorer: Multiple linked representations for convergence. In Stahl, G., editor, *Online Proceedings of CSCL 2002*.

Turkle, S. and Papert, S. (1991). Epistemological pluralism and the revaluation of the concrete. In Harel, I. and Papert, S., editors, *Constructionism*, pages 161-191. Ablex Publishing Corporation.