

Distributed Construction through Participatory Design

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INTRODUCTION

This article presents an empirical study of an online learning community that collaborates with the course design team under the Participatory Design methodology. The different phases of this methodology were implemented using a four-stage participatory design process (Zaphiris & Zacharia, 2001):

- 1) building bridges with the intended users,
- 2) mapping user needs and suggestions to the system,
- 3) developing a prototype, and
- 4) integrating feedback and continuing the iteration.

We took advantage of the online and distributed nature of the student community to asynchronously design, implement, and study the course. We carried out the participatory design methodology by following the Distributed Constructionism pedagogical theory. During the different phases of the design process, we measured the student participation and the changes in their behavior when new design elements were introduced. We conclude that the most important element of this course was our discussion board, which helped us to promote student collaboration and the identification of the key community users who can participate productively in Participatory Design activities.

There are three main sections to this article. After defining the key terminology, our Participatory Design approach is presented and its linkage to the Distributed Constructionism pedagogical theory specified. The article ends with ideas for future research and a set of conclusions.

BACKGROUND

Participatory Design

Participatory design (PD) refers to a design approach that focuses on the intended user of the service or product, and advocates the active involvement of users throughout the design process. PD is often termed as the “Scandinavian Challenge” (Bjerknes, Ehn & Kyng, 1987), since it was researchers from Scandinavian countries who pioneered its use in information systems development (Blomberg & Henderson, 1990; Bodker, Gronbaek & Kyng, 1993; Ehn, 1988).

User involvement is seen as critical both because users are the experts in the work practices supported by these technologies and because users ultimately will be the ones creating new practices in response to new technologies (Ellis, Jankowski & Jasper, 1998).

Blomberg and Henderson (1990) characterize the PD approach as advocating three tenets:

- The goal is to improve the quality of life, rather than demonstrate the capability of technology.
- The orientation is collaborative and cooperative rather than patriarchal.
- The process is iterative since PD values interactive evaluation to gather and integrate feedback from intended users.

By involving the users in the design process, the designers also gain knowledge of the work context, so that the new technology explicitly incorporates the values, history, and context of the work system (Ehn, 1988). The users take part in the entire design, implementation, and decision-making processes. Their involvement ensures that their activities are taken into account. Also by participating in the design, the users have a sense of “ownership” (Brown & Duguid,

2000), and the final system will have an increased user acceptance.

Distributed Constructionism

Simply put, Constructionism can be thought of as “learning-by-making” (Papert, 1991). It is both a theory of learning and a strategy for education (Papert, 1993). It focuses on the construction of a system rather than the information that will be used. The theory views computer networks as a new medium for construction, not as an information distribution channel. By embedding construction activities within a community, new ways for students to learn arise (Papert, 1993). Based on Piaget’s constructivist theories, people don’t get ideas, they make them. Learning is an active process where people construct knowledge from their experiences (Resnick, 1996).

Distributed Constructionism (Resnick, 1996) extends the Constructionism theory (Papert, 1991, 1993) to knowledge-building communities, where the online learning community (instead of one student) collaboratively constructs knowledge artifacts (Resnick, 1996). Distributed Constructionism asserts that “a particularly effective way for knowledge-building communities to form and grow is through collaborative activities that involve not just the exchange of information but the design and construction of meaningful artifacts” (Resnick, 1996). The three major activities of DC, within the context of an online learning community, are (Resnick, 1996):

- *Discussing Constructions:* Students discuss their constructions during the design, implementation, evaluation, and reiteration phases.
- *Sharing Constructions:* Web-based systems allow students to share their constructions and make them part of the shared knowledge.
- *Collaborating on Constructions:* The community can use online communication to collaborate on the design and development of the knowledge artifacts.
- *Distributed Constructionism:* Was enhanced among the users of the system, due to the iterative structure of our Participatory Design approach. Both the learning experience of the users and the content and functionality of the course itself were enhanced by the knowledge artifacts that were contributed to the course.

DESIGN APPROACH AND COURSE EVOLUTION

In this section, a case study applying the theories presented in the previous section is described.

Our focus has been to design an online learning community around a Computer Aided Language Learning (CALL)

course. We believe that online interaction and community would increase users’ motivation, commitment, and satisfaction with the online course. The Participatory Design methodology blends nicely with our goal. In particular, involving users during system development is thought to lead to greater user commitment, acceptance, usage, and satisfaction with the system (Baroudi, Olson & Ives, 1986).

In the design phase of the online course, we implemented PD as a four-step process (Ellis et al., 1998).

1) Building Bridges with the Intended Users

This step opened lines of communication between intended users and the development team. Specifically, this step involved the initialization of a multidisciplinary development team, identifying key groups of end users, and creating new methods of communication with users.

The development team in this project came out of the Kypros-Net (2002) group. Through their involvement in Cyprus and Greece related projects, they had longstanding relations with the intended user community.

The intended users have been especially people of the Greek Diaspora, travelers to Cyprus and Greece, and other Greek-speaking areas, and people who are generally interested in the Greek culture and language or languages in general. In our case, bridges with the intended users were built through our years of work at providing information about Cyprus through the Web pages of Kypros-Net, which primarily attracts the same user population as our intended Greek language online course.

2) Mapping User Needs and Suggestions to the System

Our conceptual design model has been “to design an effective online Greek language course that can build and sustain an online learning community of students.” Based on the questions and inquiries we received from our users, we tried to match their needs (they wanted an easy-to-follow, both elementary and advanced course that they could attend at their own pace) with our conceptual design model.

3) Developing a Prototype

The project consists of 105 audio files, which were originally recorded as Radio lessons in Modern Greek for English speakers in the 1960s. The lessons were retrieved from the archives of the Cyprus Broadcasting Corporation, digitized in Real Audio 5.0 format, and published online through the course. Although, an optional textbook accompanied the original radio lessons, the online lessons were designed as a complete standalone course. We used several tools to assist students with the lessons, including an online Eng-

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