

## Redesigning a knowledge portal

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In this paper we discuss the design process that took place while creating social software for Amsterdam University of Professional Education (AUPE) and the interactive knowledge platform, called 'Themesites'. Themesites are used collaboratively by nine universities bound by a consortium, Digital University (DU). The DU is experimenting using communities of practice (CoPs) as a way to stimulate the use of ICT in Higher Education. We describe the redesign, for which we used principles of design research (Collins et al., 2004). However in both described cases user experiences revealed that users have difficulties in getting actively involved in the knowledge portal. We propose how we might redesign the knowledge platform to support learning processes better, using theories like Wenger's (1998) related to learning architectures. This paper aims at expanding design knowledge about knowledge portals and CoPs and discusses the yet overseen critical design elements, like the brokering competences that facilitators need.

**Keywords** knowledge management; design research; collaborative learning; communities of practice

### 1. Introduction

Knowledge portals no longer are places where only an editorial staff offers information to other members of the organization. They now aim to facilitate the flow of knowledge as a social activity as well. On the one hand this results in knowledge portals enriched by social software that supports members to communicate online and contribute content themselves. On the other hand designing and implementing knowledge portals is more and more seen as a design for social and organizational innovation. As a consequence more members of our organizations need to be involved in knowledge management and the design of new learning architectures. Organizational changes this size take years, which is why methods are needed that enable us to steer and refine designs over long periods of time. The theory and methodology of 'design research' offers promising opportunities because it provides both a design focus and a methodology to assess critical design elements.

In this paper we discuss the redesign of the use of a knowledge portal tool (§ 2). The portal offered a large amount of attractive content, which led to a high number of visitors that consumed the information. But the number of users contributing content and communicating stayed under 5% of all users, which challenged us to scrutinize the implementation process (§ 3). So we suggest an adjusted design focus (§ 4) and the discussion (§ 5) summarizes our lessons learned and suggestions for further design research.

### 2. Experimental redesign of the knowledge portal

In 2000 the department of Educational Research & Development (ERD) of the Amsterdam University of Professional Education (AUPE) designed and implemented a website to support knowledge dissemination to increase the learning capabilities of the organization as a whole. The resulting website was unique at that time because of its public accessibility and the fact that it did not only contain all sorts of internal material about educational innovation, but also information about the persons, faculties, programs and

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events involved. The department of ERD became an effective stimulator for innovation roughly by detecting urgent themes, matching them on good practices, organizing workshops, channelling discussions and processing all these steps into guidelines. In three years a knowledge portal was developed that contained about two thousand items, more or less proven good practices and guidelines concerning educational innovation within the organization. This website was consulted by an average of five thousand unique visitors per month. In 2003 a redesign of the knowledge portal was required. First, a survey among the users of the website showed that some usability aspects of the site needed to be improved. Second, the site-statistics showed that a large part of the visitors were not from within the own organization or region, but from other parts of the Netherlands. A third point that implied a redesign, was that other institutes for higher education expressed their need for a similar knowledge portal. This last consideration, and the good practice in Amsterdam, convinced the Digital University<sup>1</sup> consortium to grant a project to redesign the tool. The project followed some principles of design research (Collins et al., 2004). Design research offers a framework for identifying critical design elements to determine a design focus and to test and refine designs progressively, based on theoretical principles. It advocated qualitative methods to capture the complexity of how a design works out in a particular setting. It also advocates quantitative methods for generalizing from those settings to guide the design process (Collins et al., 2004).

### 2.1 Theoretical assumptions and design focus

The theoretical assumptions underlying the redesign process were based on constructivist learning theory. Main goal of the project was to improve innovation which entails well informed organizational learning. According to constructivist learning theory learning is the collaborative construction of knowledge (Hendriks & Schoonman, 2006). Because of a already strong tradition within AUPE to share knowledge during workshops and in networks the focus of redesign was directed to digital contributions. We assumed that the more people published their own material and interacted with others, the faster relevant knowledge would flow through the organization. We thus came to the following design focus for redesigning the use of the tool: 1. increasing the possibilities for individual contribution, and thus involvement and feeling of ownership, and of communication, thus allowing collaborative construction of knowledge 2. involving intended users in design to ensure acceptance and critical mass.

### 2.2 Critical design elements of first redesign

The factors mentioned above that led to the redesign together with the design focus helped to identify critical elements of the redesign. We intuitively intervened in the contextual design elements that we thought to affect the outcomes most and that would enhance contributions and flow. In this phase we did not distinguish between dependent and independent variables (Collins et al, 2004). This distinction is not so clearly defined. It seems that the dependent variables concern the shaping of the learning itself, while we considered how to shape the conditions for learning. In table 1 we will give an overview of the critical design elements we considered, the related requirements and the design features.

## 3 Evaluation

Evaluation of the results of the AUPE knowledge portal took place in 2006 with a survey in which twenty colleagues were interviewed who were involved in using the knowledge portal as a part of their daily work. For the evaluation of the DU knowledge portal a Review Committee of experts was asked an advice before implementation started. During the DU event some users were asked to make a mindmap of the mental concepts they associate with Themesites. Table 2 contains the results of both evaluations.

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<sup>1</sup> The Digital University is a consortium consisting of nine higher education institutes which stimulates the use of ICT in higher education by funding numerous projects.

**Table 1** Design focus for first redesign

Critical design elements	Requirements	Design features
Required re-sources	Search function and lay-out, the usability of information	AUPE + DU: The set of keywords was brought back from 300 to 60 keywords; The classification of materials was limited to nine categories; Allowing members to contribute content; Rating of and reacting on content to allow emergence of relevance; Clustering existing materials on virtual table for a group discussion; Visibility of each person's network of self chosen contacts; Matching on persons with the same interest; Choice between copyright/some rights reserved <sup>2</sup> /public domain.
Professional development	Increase the number of internal visitors for enlarging innovation power	AUPE: Involvement of users in redesign; Workshops on incorporating contributing in daily work; Mini conference. AUPE + DU: Workshops and meetings.
Implementation path	more higher education institutes should use similar knowledge portals in order to improve innovation	AUPE: Continuous involvement of the intended users during the making and introduction of the tool. DU: Access to knowledge platform; Meetings with DU coordinators; DU coordinators providing materials; Registration of users at DU event.

**Table 2** Overview of evaluation results at AUPE en DU

Critical design elements	Evaluation results AUPE	Evaluation results DU
Required re-sources	Tool was experienced as easy to use and clearly structured (information provision); Minor problems with perceiving login; Contributing content poorly used; Rating and reacting poorly used status; Doubts on what to contribute; Problems with valuing the relevance of items; Lack of social presence.	Positive on the matching of users and available content; Feelings of being lost in all information; Minor difficulties in re-finding their contributions; Sociability design gave the impression the Themesites are a very close communities, which puts new visitors off.
Professional development	Lack of time to contribute actively; Doubts on return on invested time; Reluctance to discuss issues publicly on the internet, and because of availability of knowledgeable colleagues nearby.	Lack of recognition of informal learning (i.e. discussing topics online).
Implementation path	Unique visits from five to eight thousands, with more than 50% internal visits.	12,5 percent of the registered users and 3 percent of all visitors contributed content; Implementation just started but DU is finishing so uncertain future for the knowledge portal.

<sup>2</sup> The Creative Commons licenses for sharing and reusing were incorporated in the community tool (<http://creativecommons.org/>).

#### 4. Adjusting the design focus

At the AUPE and the DU the most important reasons which prevented people from becoming active contributors in the knowledge portal were:

*Required Resources:* (1) the relevancy of materials, due to the poor use of the rating and reaction functions: Here we may rely on Wenger (1998) who expresses the need for different roles in a community of practice, and Lave and Wenger (1991) with their concept of legitimate peripheral learning. We did not considered asking experts to rank material, while this may provide a better basis for engagement in the knowledge platform, both for experts and the less experienced users; (2) social presence, related to the poor use of the communication tools: part of this problem may be understood as as related to the usability design of community sites (Ten Thij, 2004). However, issues concerning the adoption of the platform seem more important here, which we will discuss under 'Implementation Path'.

*Professional Development:* doubts on return on invested time: users need to experience that they may benefit from contributing and using the knowledge platform. We assumed the knowledge platform would be self explaining, but we overlooked the possibility that its use may involve changes in work practice. We expect that training might help here. We may also look at the possibilities of just-in-time intelligent retrieval mechanisms helping the user to align the knowledge portal in their daily work.

*Implementation Path:* (1) reluctance to discuss issues publicly on the internet, (2) motivation to use communication tools because of availability of knowledgeable colleagues nearby, (3) lack of time to contribute actively: part of the motivation problem may have been caused by AUPE and users of DU already using three or four tools to upload and manage their documents and communication.

**Table 3** Critical design elements for next redesign phase

Critical Design Elements	Requirements based on rules of thumbs experience and theoretical mechanisms	Design features
<b>Required resources</b>		
Transparency of relevance of information	Allowing legitimate peripheral learning (Lave & Wenger, 1991); Roles (Wenger, 1998)	Expert judgements
Distinction between open and closed information & discussion spaces	Usability research; Cultural change	Solution at the interface, login (button, default settings); Training, management development
<b>Professional development</b>		
Transparency of return on invested time	Incorporation of publishing in working process; Intelligence in the tool; Personal digital library.	Reduce number of tools; Experiences of efficiency by training; Experience of effectiveness by training; Smart feedback through the tool.
<b>Implementation path</b>		
Need for active brokering	Appreciative Inquiry of brokering results (Wenger, 1998; Cooperrider & Withney, 1999)	AI interviews with brokers to reveal the succesfactors they use to span boundaries, create connections and explore new territories; Use these insights to train new coordinators of knowledge portals.
Critical mass of active users	Alignment with HRD-instruments to ensure active contributors (Judge, 2000); Guided gradual limitation of number of available tools	Personalized recognition systems; Exclusive choice for one sound knowledge platform

The solution for AUPE might be to close down one or two of the existing tools. For DU users of different institutes of Higher Education the exclusive choice for one sound knowledge platform could form the solution. More importantly, use of the knowledge portal may benefit from alignment with personalized recognition systems (Judge et al., 2000). Also, coordinators may develop their competence as brokers within a large network of experts (Wenger, 1998). To act as a broker between communities of experts means to create connections and engage in 'import-export', and to rather stay at the boundaries of many practices than move to the core of any one practice. An overview of the critical design elements for the next phase of redesigning the (use of) the platform is to be found in Table 3.

## 5. Discussion

Design seems a somewhat chaotic process in spite of its intention to structure the process. We learned from the redesign of the knowledge portal and the method we used that designing a knowledge portal does not automatically lead to the intended use, in spite of users' support during the design process. It also does not lead in itself to a well functioning system of contributions and flow of knowledge sharing. A design focus on the use of social software in an organization should aim at the alignment of organizational goals and knowledge management first. This means the design focus should also be on organizational change inducing and reinforcing communities as well as on the technology used. The processes that already steer knowledge management should also be taken into consideration. For example, important unused powers were hidden behind long tradition of sharing knowledge at AUPE, which was assumed to ease the implementation. This tradition is partly made by enthusiastic experts who were not asked in the design to play a role in the judgements of the relevance of material. The theory of appreciative inquiry could play an important role here. Design research is a comprehensive and complex design method. It offers promising tools, but we lacked criteria to structure the iterations of design and evaluation. We probably are in need of more generalized knowledge about relationships between critical design elements to guide the design of knowledge portals and underlaying CoPs. Future research will concentrate on identifying a new design focus and to construct an evaluation method to assess organizational change, innovative power, and the effect a CoP design might have. We also will focus on recognizing already existing competences for brokering and facilitating online CoPs, and if necessary help to develop them. Based on Watzlawick, Weakland and Fisch (2002) we keep in mind that the pitfall of design research might be to keep on watching for solutions within the system, whereas in both cases strong stabilizing factors may prevent social innovation to come to full growth.

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