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This study addresses the problem of designing an appropriate learning space or architecture for distributed online courses using net-based communication technologies. We apply Wenger's criteria to explore, identify and discuss the design architectures of two online courses from two comparable online Master's programmes, developed and delivered in two different educational cultures, Ireland (MIC) and Denmark (OL). The investigation will take the shape of a discussion of the 'walls of the learning spaces' of the two courses, with reference to Wenger's criteria and values for an appropriate learning architecture. In an earlier evaluation study, both courses were deemed to be examples of online learning communities of practice, despite their geographical and cultural diversity in contexts of development. The findings of the present study confirm and document several significant design elements of the two courses, which are stressed in the design criteria suggested by Wenger as being vital for community building.

Introduction

Education in general, and further and higher education in particular, is increasingly transforming to incorporate learning in virtual contexts. Consequently, the task of generating pedagogic–didactic designs conducive to learning in distributed virtual environments is a qualitatively new challenge within educational design. However, frequent solutions to these new design challenges seem to mirror the assumption that learning is a highly individual matter and provide stand-alone designs in which the learning processes unfold as predictable, formalized and designer-governed processes between the learner and the learning software. In contrast, extensive research (Koschmann, 1996; Collis, 1997; Bates, 1999; Harasim, 1999; Collins *et al.*, 2001) indicates the significance of the social aspects of a learning process in terms of learning quality and outcome. Taking these research findings into account, the challenge of creating pedagogic–didactic designs of good quality must inevitably

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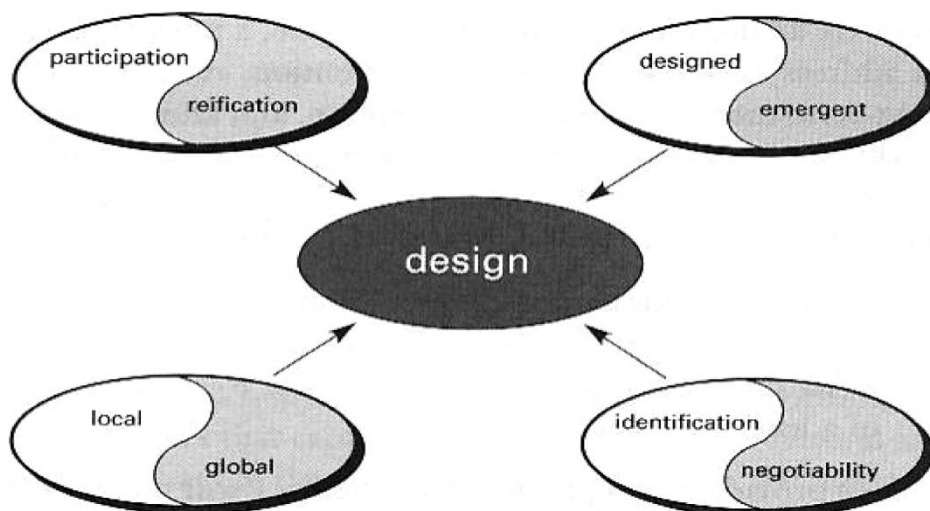
Figure 1. The four dimensions of a design architecture (Wenger, 1998)

depart from a design perspective of learning as a social process and aim at establishing learning designs, which, despite potentially dispersed learners and asynchronous time conditions, allow for unpredicted, democratic and interactive student-centred processes of collaboration and knowledge building.

Research design

Our earlier investigation and findings from the two master courses in Denmark and Ireland suggest that both of these courses developed into true online communities of practice (COP) (Ó Murchú & Sorensen, 2003) according to Wenger's (1998) perspective.

In the present study we move a step further and use the two course designs as the empirical basis for discussing, from the perspective of the characteristics of a Wengerian design architecture, the extent to which the two designs of online COP relate and correspond to the basic criteria of the model suggested by Wenger (1998).

Theoretical optic: an architecture for participation

In an overall perspective 'design' is a question of creating learning architectures of good quality (Wenger, 1998). Acknowledging that it is not possible to directly 'design learning', the initial design focus should be directed towards the features of a learning architecture. This means initially addressing the *dimensions* of the design space, a space of possible approaches to design.

Wenger suggests four dual dimensions within which pedagogic–didactic design decisions concerning the learning process itself are situated (Figure 1):

1. *the duality of participation and reification* (decisions on how to create a balanced

design between participation and reification. What and when to reify, whom to involve, and when, with respect to which forms of reifications);

2. *the duality of the designed and the emergent* (decisions on a good balance between prescriptive and emergent elements in terms of both practice and identity, as both are responses to, rather than results of, design);

3. *the duality of the local and the global* (decisions on an appropriate division of labor and on conceptualization and realization processes. Designing for learning cannot fruitfully be founded on a division between learners and non-learners, e.g. teachers, or on a sequential order of activities);

4. *the duality of identification and negotiability* (decisions on how to shape communities of meaning. This includes the distribution of ownership and power to define, adapt or interpret the design, with the awareness that design creates fields of identification and negotiability that orient practices and identities in terms of creating social energy and direct this energy towards participation and non-participation).

Having reviewed the criteria proposed by Wenger, we now describe the rationale and goals behind the faces of the two courses in question, MIC (Ireland) and OL (Denmark). Following these descriptions, we provide an analysis of the design of the courses in the light of the criteria presented above.

Design of 'Qualitative research methodologies and online learning possibilities' (Ireland) and 'Online learning' (Denmark)

Course on 'Online learning'

The course on 'Online learning' (OL) is one of several courses on the Danish cross-institutional online MS in ICT and Learning (MIL).[1] MIL is a 2 year (part-time) Master of Education degree in ICT and Learning. MIL provides continuing education for working adults engaged in educational planning and integration of ICT in learning processes in schools and all types of educational institutions. Employees with educational responsibilities in different types of organizations also enter the programme. MIL is structured into three categories of study: four modules (each consisting of three or four courses), one project and a Master's thesis. Many of the approximately 40 MIL participants were highly qualified teachers at the high school level. They had an extensive university education and a high level of competence within their individual work areas.

The ambitions and visions on which the OL course was designed are to a large extent a result of insights partly obtained through 15 years of practice and research within technology-supported open and distance learning and partly resulting from the Danish pedagogic tradition and its historical preferences (Sorensen, 1997). In the list of quality criteria envisioned, the design of the OL course was expected to:

- promote interaction and collaboration;
- create interaction between the participants;

- make use of participant experiences and operationalize them as resources to create relevance, motivation and ownership;
- collect teachers and learners in a kind of 'shared' learning project;
- structure, via the logic behind creation of discussion forums, a student-centred process of interaction and collaboration;
- bring participant perspectives and opinions into the discourse;
- make space for a differentiation not predicted and determined by the teacher;
- change the hierarchical role distribution between teacher and students;
- explore the use of different roles (to allow participants to feel 'security of identification' in relation to expected communicative behaviour and in order to ensure narrative maintenance of, and presence in, the interaction) (Sorensen, 2003)
- utilize the reflective character of the virtual universe as well as the learning value of formulating oneself in writing (Mason, 1993; Sorensen, 2003).

Course on 'Qualitative research methodologies and online learning possibilities' (MIC)

This Master's degree course (MEd and MA in Education) is a 2-year taught programme which is undertaken by working adults from various walks of life in education (elementary, secondary and tertiary levels), adult education, the private sector and business.[2] As in the case of MIL in Denmark, the Master's programme is structured into three categories of studies: four modules (each consisting of three to four courses), one project and one Master's thesis. The majority of participants (56%) were practicing teachers or involved in education management (18.6%). The remainder hailed from administrative or private businesses or general education (25.4%). They had an extensive university education and a high level of competence within their individual work areas. Having firstly completed a preliminary Diploma at the university and submitted a 'project' on a topic of their own choosing, the participants were deemed eligible to further their studies to Master's level in the second year by attaining a recognized 'honours' standard in their work.

The ambitions and visions which formed the basis of the design of the qualitative research methodology module of the MIC course are to a large extent determined by pragmatic conditions. As such its design represents an opposition to the traditional and essentially mirrors, in terms of possible choices of action, the specific political, cultural and geographical context. The core rationale motivating the design may be captured in the following list of elements:

- the frustration experienced by the designer being faced with in excess of 40 adult learners in a traditional teacher-centred, face-to-face classroom environment throughout the entire module;
- a belief that a well designed, collaboratively inspired virtual learning environment might provide a more meaningful and social learning milieu for adult learners and teachers alike;
- a desire to decentralize an accepted learning process and experiment with other

innovative possibilities based on 20 years of working and designing with various technologies in education;
- a 'burning' aspiration of the designer to expose the students to existing international practice in virtual learning environments in the hope that they may, in their future careers as educators etc., go beyond the traditional mode of delivery and encourage responsible, meaningful, innovative and integrated technology use in their chosen professions.

Analysis of OL and MIC: configuration of an architecture for design of online learning COPs

Our present ambition is to investigate the design architectures (whether intentionally or unintentionally achieved) of the two online courses, OL and MIC. This investigation will take the shape of a discussion of the 'walls of the learning spaces' of the two courses, with reference to Wenger's (1998) criteria and values for an appropriate learning architecture. We evaluate and discuss, with reference to the four dimensions introduced by Wenger (section 3), the areas and extent to which the two courses investigated, OL and MIC, align with these principles of a learning architecture.

Participation and reification (learning as negotiation)

This design dimension of the architecture focuses on the building and balancing of reificatory and participatory elements in the processes of negotiation of meaning.

> … it is in the meanings we are able to negotiate through learning that we invest ourselves, and it is those meanings that are the source of the energy required for learning. (Wenger 1998, p. 266)

Educational reification somehow inserts what could be termed an extra artificial level or stage between practices and learners. It is about providing structures and procedures, based on carefully predicted educational elements. It is about being dependent on decontextualized knowledge and it often involves a narrow instructional structure and pedagogical authority that may lead to students reproducing rather than constructing knowledge and taking ownership. Reifications appear visible and tangible and are therefore easier to relate to than the more diffuse and spontaneous processes of participation. However, while it is more visible for, for example, newcomers than the participatory opportunities, it does not guarantee access to relevant forms of participation.

From Wenger's perspective, design therefore is about creating a proper balance of participatory and reificatory elements in the instructional design:

- which elements to structure and produce procedures for on the basis of prediction;
- to what extent should the design depend on decontextualized knowledge;
- how to balance student initiative/ownership and pedagogical authority.

Both the OL and the MIC courses dealt with this balance of design through supporting and sustaining both learning processes of involvement (participation) and learning processes of (meta)reflection (on the basis of reifications).

In the OL course the instructional elements were very structured in terms of preparing the space and motivation for participant-driven discussions and the design adopted a pedagogic strategy in which openness, imagination and improvisation in student initiative in relation to the shared knowledge building processes were given a lot of free space to thrive. The prediction in terms of content was made only in terms of some obligatory literature and what to reify from the dialogic processes was a decision left to the students. This minimized the demonstration of didactic authority. A further fundamental design dimension and goal of the OL course was the request to reflect and engage in meta-discussions in a meta-forum, parallel to the process of involved discussions of course readings, on ones own experience of the course and to relate this in the discussion to the readings for the course. The expectations were emphasized by the designer/teacher in the introductory message of the meta-forum. Another recurring element of the OL course was the request, after a period of dynamic participation and interaction, to reify the dialogue process in terms of producing summaries of the interactive and collaborative knowledge building processes.

The MIC course undertook this experience of reification, sustaining and supporting learning and 'producing' summaries in a face-to-face, lecture room environment and not solely in an E-learning, E-tutoring, online environment. This was due to the fact that the structure of the course (as already outlined), combined with the varying and diverse levels of technological expertise of the participants, demanded opportunities for reflection, participation and negotiation to be provided for in a verbal forum. The virtual environment was placed in a real-time environment with inter-human, inter-personal discussion at its core. The intended vision of the lecturer here was to minimize face-to-face, traditional instruction through negotiation and further maximize learning opportunities through ownership of the process involved.

The designed and the emergent (teaching and learning)

From Wenger's perspective learning is a response to the pedagogical intention. Instruction creates a context, like other contexts, in which learning takes place. Resources and negotiation are the important factors decisive for whether learning is going to take place:

> In this regard, teachers and instructional materials becomes resources for learning in much more complex ways than through their pedagogical intentions. ... Teaching must be opportunistic, because it cannot control its own effects. (Wenger, 1998, p. 267)

The important element here is the interaction between the planned (predicted) and the emergent, in other words, the ability of teaching and learning to interact in such a way that they become structuring resources for each other. Important considerations in designs are:

- how to minimize teaching (the predicted) in order to maximize learning;
- how to maximize processes of negotiation of meaning enabled by interaction?

The OL course was a carefully designed course with an inbuilt shifting rhythm between reflective and involved periods of activity as well as a considerable dimension of space for uncontrolled, student-driven emergent elements to evolve. Within the course the collaborative knowledge building process and negotiation of meaning formed the core curriculum. The emergent character of the learning process was coupled to the evolving collaborative knowledge building dialogue, to which the students were asked to bring, and to operationalize in the discussions, their personal knowledge, insights and opinions. In this way the establishment of negotiation processes was a high priority of the design ambitions, while their realization keep the actual teaching aspects at the periphery.

The MIC course, in contrast, was not as carefully designed from the outset, for the reasons already outlined above. Moreover, the emphasis of the 'forum' was on allowing meaningful and reflective dialogue to take place between students in a fully collaborative, negotiated environment of their own construction and conception. 'Necessity is the mother of invention' and, in the case of MIC, this undoubtedly held true, as the openness and informal character of the (online) course combined with the motivation and ownership of all aspects of the course by all involved led to a communal, social activity in which students shared their knowledge, expertise and reflective thinking as a vibrant community of learners and in which actual authoritative teaching was virtually nonexistent.

The local and the global (from practice to practice)

One of the important challenges is to balance design between the scope of educational experience and the locality of engagement, or the need to be detached from practice with the need to be connected to it (Wenger, 1998):

> If school practices become self-contained they cease to point anywhere beyond themselves. … While training focuses on specific practices, education has a broader scope. … The traditional approach to this conundrum is informational: to seek generality in more abstract formulations that have a wider range of applicability and subsume other practices under an overarching, self-contained educational programme. (Wenger, 1998, p. 267–268)

Here, the important issue to be considered in the design is:

- how to broaden the scope of coverage without loosing the depth of local engagement.

The way the OL course may be said to have balanced the broader scope of educational experience with local engagement was indirectly, through its formal and structured design, as internationally oriented resources and readings constituted the sources of inspiration for the in-depth OL discussions and knowledge building processes. Also, through its pedagogic–didactic design and delivery, the OL course, in principle, opened up for connection and interaction with other online learning

communities. But only in principle, as the language barrier (the OL course is delivered in Danish) represented a problem to connecting internationally or globally with other online learning COPs. In addition, the OL course was facilitated by 'Virtual-U' software,[3] which is a closed environment requiring both a user ID and a password for access. This did not stimulate integration and interaction with other learning communities.

As for the MIC course, the coupling of broader educational experience with local engagement happened as a result of more informal and authentic needs (O'Murchú, 2003). The MIC course in qualitative research methodologies was originally a face-to-face, teacher-driven experience. The initiative taken to 'virtualize' the course and expand its potential and learning possibilities opened up a whole new world of promise. Students shared their findings from the Internet with each other and the 'self-contained' traditional learning environment of the lecture hall became a globally shared experience which allowed for encounters at the inter- and intra-personal levels (both human and technological). Knowledge and information gathering became vibrant areas of discussion and sharing which, according to the students 'opened up many windows of opportunity' (student A, MIC). In retrospective reflection, the designer would have to admit, based on the responses of the students, that the informal design of the MIC course undoubtedly broadened the scope of coverage and opportunities without losing the depth of local engagement and collaboration.

Identification and negotiability (identities of participation)

The consideration here is that the design must offer new forms of identity and negotiability, i.e. meaningful forms of membership and empowering forms of ownership of meaning. If it fails to do so, then learning will be identical to 'reproduction'. This also means that it will not open up new trajectories of participation and, consequently, only those who already have an identity of participation with respect to the material in other contexts are served. The possible implication is alienation:

> One problem of the traditional classroom is that it is both too disconnected from the world and too uniform to support meaningful forms of identification. It offers unusually little texture to negotiate identities ... . Competence, thus stripped from its social complexity, means pleasing the teacher, raising your hand first, getting good grades. ... What appears to be a lack of interest in learning may therefore not reflect a resistance to learning or an inability to learn. On the contrary, it may reflect a genuine thirst for learning of a kind that engages one's identity on a meaningful trajectory and affords some ownership of meaning. (Wenger, 1998, pp. 269–270)

The core design consideration here is:

• to whom and in which ways does the design represent an opportunity to build an identity of participation.

The primary sources of identification offered by the OL course were inherently represented by the unpredicted flow of knowledge from the diverse group of participants. The students were legitimately (as part of the overall design idea) contributing in a meaningful way their own views, knowledge and competence to the

collaborative knowledge building process and taking ownership, as they themselves had identified the problem to be discussed, in the dialogically developing shared knowledge construction. As a consequence, new opportunities and a new scope for building identities of participation were developed continuously throughout the knowledge building process of negotiation.

Because of the vast differences in the MIC students' experiences of technology (some were technologically virtually illiterate, while others were undertaking a Master's thesis in technology), it was vital from the outset to find a compromise in the design of the online course. This compromise was to ensure that even the technologically 'lowest common denominator' (the student who looked upon technology as 'the enemy'), was capable of entering and negotiating the forum and its environment in a simple, non-complex fashion, through an interface which was student friendly and inviting at all levels of experience. Again, the composition and design had to allow for those with extensive techno know-how to feel challenged and inspired by the design. The key to success here was the team effort to be involved from the outset and discuss every aspect of design to ensure, as far as possible, the creation of a 'comfort zone' for all involved and to build an identity of legitimate participation.

Conclusion and future perspectives

In this paper we have investigated two online courses from two Master's programmes designed in different cultural contexts. Our aim has been to look at the perspectives and motives behind their pedagogical designs and to discuss to what extent the two design approaches align with the features of a learning architecture, as suggested by Wenger (1998) as conducive to learning:

> Once learning communities are truly functional and connected to the world in meaningful ways, teaching events can be designed around them as resources to their practices and as opportunities to open up their learning more broadly. Again, there is a profound difference between viewing educational design as the source or cause of learning and viewing it as a resource to a learning community. (Wenger, 1998, p. 271)

We assert that our analysis of and findings on the design perspectives of the two courses document many features of Wenger's criteria for a design architecture and suggest significant learning values gained by building designs on clear and conscious theoretical underpinnings and ideological values. We have found that a Wengerian learning architecture, promoting the acquisition of basic ideological and democratic values and participant ownership, constitutes a valuable and fruitful approach to design in terms of assuring fundamental human values and democratic qualities in distributed online learning. Moreover, our study illustrates the paradigmatic nature of Wenger's learning architecture and its inherent openness to a variety of pedagogic–didactic strategies which, through their balancing of reificatory and participatory elements in design, give birth to and allow space for student-centred and democratically oriented values and participant ownership.

Although we were not directly investigating cross-cultural issues, we were pre-

pared to find signs and features of the designs dependent on or resulting from cultural diversity. However, we found so many indications of similarity that we may tentatively conclude that Wenger's design architecture applies across cultures. The designs of the two online courses investigated are similar in terms of their underlying ideological and democratic values and visions, but diverse in their concrete manifestations. The fact that the design architecture seems to be spatial enough to capture online course designs which carry similar underlying intentions of educating democratically oriented citizens and at the same time allow for variations in the more tangible, detailed strategies to achieve this goal appears very promising. As long as the main issues needed by students, like places of engagement, materials and experiences with which they can form an image of the world and themselves and ways of exerting a true effect on the world and a feeling that their actions matter, is present, then true learning communities may be formed. Applying Wenger's learning architecture may lead to the future and much needed development of a variety of innovative pedagogic–didactic strategies enhancing online learning and promoting collaborative knowledge building processes online.

> Those who can understand the informal yet structured, experiential yet social, character of learning – and can translate their insight into designs in the service of learning – will be the architects of our tomorrow. (Wenger, 1998, p. 225)

Future challenges of our research will address the development and implementation, including the teacher/designer roles involved, of the more concrete pedagogic–didactic strategies and elements implied in achieving fruitful designs of online collaborative learning, built on fundamental ideological values and democratic qualities.

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Elsebeth Korsgaard Sorensen is Associate Professor in ICT and Learning, Institute of Communication, Aalborg University. For many years she has been engaged in national and international research activities within design, delivery and evaluation of technology-supported open learning processes. The perspective of her research has a main focus on the pedagogical and instructional aspects around the establishment of dialogue, reflection and collaboration in E-learning, as well as on the realization of problem-oriented project pedagogy in virtual learning environments. A list of selected publications may be found at www.kommunikation.aau.dk/ansatte/es/.

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Notes

1. The administration of MIL takes place at Aalborg University, but the curriculum is developed and offered in joint collaboration between selected departments of five Danish universities (Aalborg University, Aarhus University, Copenhagen Business School, the Danish University of Education and Roskilde University). The programme is the result of 10 years of research collaboration between groups of people from these departments.
2. The administration of MEd and MA in Education takes place at Mary Immaculate College, University of Limerick, Ireland. The curriculum is developed and offered by the College Department of Education and awarded by the University of Limerick. The programme is the result of many years of research collaboration between expert groups of people in MIC.
3. The Virtual-U software was originally developed at Simon Frazer University in Vancouver, Canada, in association with the TeleLearning Network of Centres of Excellence (TL*NCE), and is now in use at educational institutions around the world.

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