

A Story on “Story Telling” in a Virtual Learn-Work Environment

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1. INTRODUCTION

The Open University of the Netherlands (OUNL) is an institution for higher distance education. At the School of Computer Science 70% of the students already have other degrees and are in paid employment. They want to acquire additional know-how or retrain for a different occupation. In order to meet today's learning needs of the bachelor students in Computer Science and the needs of ICT-industries for employees with up-to-date domain expertise together with academic team competencies, the OUNL has designed and implemented in the year 2001 the course 'Design Project' (400 hours of study). This course has an open learn-work environment 'OTO'², designed as a virtual company (VC). Students in this course (re)design a solution for a real-world company's problem in the domain of computer science. Since 2001 14 teams (about 95 students) have been active in OTO.

Knowledge construction in organizations is crucial for the continuous improvement of products and services. ICT-professionals (should) need to learn to focus on users and consumers, and to regard clients as co-developers of an ICT-product. This article (story) describes OTO, and how internal knowledge management is implemented to enable students to preserve their experiences in an informal and narrative way.

2. THE COURSE DESIGN PROJECT AND THE LEARN-WORK ENVIRONMENT OTO

What students know and understand is grounded in perceived experiences from their interaction in the worlds they live in (Jonassen, 1991 p. 10; Jonassen, 1994 p. 34-35). Their experiences are situated in the interaction world of their study and professional job. In all these worlds they have developed routines and habits.

A learn-work environment as OTO should give students the opportunity for doubting their obvious acting, questioning the behaviour of others and transforming their habits developed through participating in their interaction worlds. However changing 'routine acting' is always very difficult. Routine does not have much presence in a world of interaction and a lot of people, especially computer scientist whose focus is security and nonambiguity, see doubt as a feeling of insecurity. Creating doubt is considered as an unpleasant activity and not as a necessary prerequisite for change (Bitter & Crutzen, 2002; Crutzen, 2005). The culture of Computer Science differs from the culture of the worlds in which their products will be used. The invisibility of 'routine-acting' is precisely the problem of computer scientist designing ICT-representations for actors in other interaction worlds.

The course Design Project is built on notions of social constructivism and critical transformative interactions. It is an example of computer supported collaborative learning and is competence and experience based (Westera, Sloep & Gerrissen, 2000). These premises are expressed in the goals of OTO and in the responsibilities of the students. The business goal of the company OTO is to offer to other organisations a cooperative and participative redesign of the relation between the business processes and their information system. The internal business goal is competence development of each employee, of each team and of OTO itself by means of knowledge and human resource management and by evaluation of the internal business processes, strengthening the changing potential of OTO. Students succeed in this course if they show sufficient involvement, participation and responsibility in designing the learning and working process of themselves, of their team and of OTO. During the project students are temporary employees in OTO and work collaboratively in teams of 5 to 10 members. The workload for students is generally 15 hours a week during half a year. They are guided in

respect to their organizational and social competencies. The OTO-staff members (a director, a human resource manager, a project manager and some coaches) are all members of the OUNL organization. They are responsible for making OTO ready, for the exploitation of OTO and the support of students. The director in cooperation with the project manager is responsible for the contacts with external clients and acquires project proposals from which the student teams can choose. External client organizations must make a commitment that they are willing to give participation time in the project. The team refines the chosen initial project proposal together with the representatives of the external organization to a project draft, a first product idea and later on to an external project planning script and a final contract. This contract symbolises the end of the A(cquisition)-phase (about 1,5 month) and the beginning of the P(roject)-phase (about 4,5 months) of the working process (Figure 1)

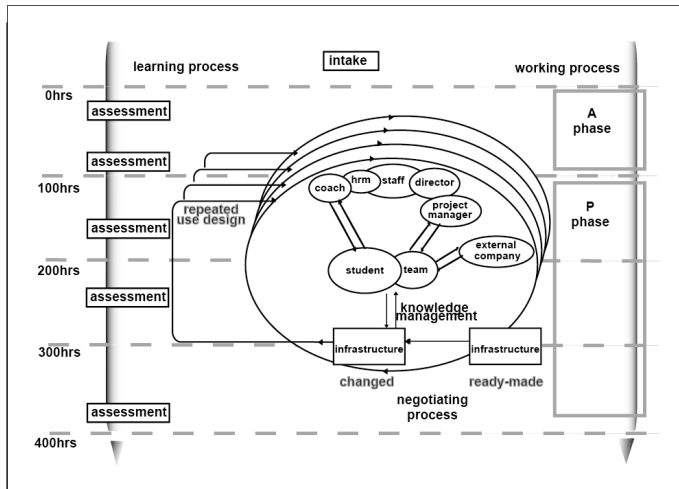
3. THE LEARNING AND WORKING-PROCESS IN THE VC OTO

The main processes in OTO, working and learning, cannot be completely planned in advance. Students are responsible for detailed design of the working process. OTO is not supposed to be a working environment in which learning results depend on learning occurring by chance. On the contrary OTO is purposefully designed to facilitate critical transformative learning. OTO offers the students a set of well-defined competencies they can develop. They are regarded as key objectives for learning on the job, and are essential for preparation for professional practice. The personal growth objectives for each OTO professional are laid down in a personal development contract initiated in the intake. The contract will be renewed constantly through peer-, coach- and self-assessments. Each assessment is followed by a coach-student consultation. The personal coach supports the learning process of each student employee.

Together with the external planning script each team composes at the end of the A-phase an internal planning script in which the tasks and the roles of each team member are mentioned. These tasks and roles are linked to the competencies they want to explore. It is the responsibility of the team to combine the working and learning process in the internal planning script. During the P-phase these planning scripts are continuously adjusted to the circumstances in the project interaction. A project manager from the OTO staff supports the working process in each team. A very useful instrument is the personal reflection document in the electronic student portfolio in which coach, project manager and student comment the ongoing activities in relation to the chosen tasks and competencies. This commenting enables the student to reflect on her/his performance and to relate activities in the working process to the chosen objectives of the learning process.

OTO provides in its infrastructure a variety of tools to support electronic communication, collaboration, planning, knowledge management, and tools for assessment, design and development. In the knowledge base are templates, skeleton contracts and a library with relevant articles on methods and theories. Regular face-to-face meetings on the initiative of the students appear to be indispensable for this kind of collaboration. In the electronic course material a global description of the working and learning processes and of the competencies is provided. The infrastructure is offered to students mainly as an open structure with only minimal prescriptive elements. The teams can decide autonomously which tools, methods and theories they want to use for making the product. Client's close involvement is the only constraint. Using this structure, students and teams can negotiate a tailored, personal growth. Due to its critical use by students, teams and staff, OTO is growing into a virtual environment of differences in acting.

Figure 1. The structure of the working and learning process in OTO



So the name 'Design Project' refers to several design-aspects associated with this course. Seen from the outside world, students are designing an ICT-product for an external client. Internally, OTO students are defied to design ('to construct') their own learning and working process on an individual level by critical reflection on their competencies, roles and tasks within this course and, as a spin-off, also in their daily work. Team members negotiate their individual goals and (re)design their learning processes at an early stage on a team level in order to come to the best expectancy on learning and working for the team as a whole. Only a high degree of participation of all team members can lead to mutual responsibility for the learning processes. The design process of the students stretches even further to an organizational level. Each team is responsible to attribute to the design of OTO in the form of a team-reflection on what is learned during the course. This leads to knowledge about used methods, practices and experiences and contributes to the learning organization OTO.

Apart from designing their learning process students design their working process according to the requirements and the hectic of the ICT-project at hand. This is a continuous team process, based on the individual competencies and participation. Here students design e.g. procedures for communication, for decision-making and for their division of labour. Designing participation of clients and future users is an important part of this working process.

4. THE IDEAL INTERNAL KNOWLEDGE MANAGEMENT (KM)

OTO develops solutions in dialogue with its customers and creates ict-products like analyses, design proposals, software, prototypes and working procedures. Quality of products and processes depends primary on making acquired insights and knowledge productive for the actual and future projects. OTO wants to perform as a learning organisation. The arrangements in and the structure of OTO should sustain knowledgebased working and learning as pleasant, successful and efficiently as possible. To turn this into reality, OTO needs a knowledge management process together with according roles. This was originally designed as follows. Each team has an internal knowledge manager. These managers are alert on relevant experiences, turn them into 'lessons learned' for future working and learning in OTO on all levels. They are responsible to store this knowledge within the electronic environment and make it accessible for the actual and future teams. It is their task to question periodically OTO-employees about their important experiences. They stimulate discussion and reflection concerning the good and bad practices, which pitfalls appeared and how these latter can be avoided.

Knowledge managers are also responsible for archiving the team documents and making an accessible team archive structure with relevant comments for future use. Although they are finally responsible for ensuring that relevant knowledge and experiences are in an accessible form for renewed consultation or reuse, they

do not have to carry out all these activities themselves. All members of the team actively contribute to the permanent KM process.

To guarantee the KM process quality, it is a fixed item in the team leader's two-weekly report to the project manager. Also at the end of the project the internal knowledge manager must, together with the team, write an evaluation report whose emphasis must lie on the following three aspects: working in a virtual space, working with a virtual team, and working for a design task, containing also recommendations for the following teams; lessons learned how the working and learning culture should be changed. The evaluation text will be discussed in a closing meeting of staff and team. The knowledge manager is also responsible for clarifying the electronic working environment in a final state, reusable and accessible for future teams.

5. ENCOUNTERED PROBLEMS IN KM

However in spite of this ideal KM process an evaluation of OTO of the first five teams in OTO shows a serious problem to solve (Oord, 2004). Students experienced an overload of formal information produced by the staff and previous teams on relevant subjects for performing their tasks. This problem will become larger because the growing amount of information will go together with a decrease of accessibility. Students need more condensed, accessible and reusable information about working in OTO as well as about specific subjects in their working process. The mere existence of electronic facilities and a well-defined structure for storing team documents was no guarantee that new knowledge is meaningful constructed, is accessible and reused by future teams. Formal KM is done by the students only within their own project horizon and is hardly accessible for future teams and focussed only on the production and not on the transfer and reuse of this knowledge. Successful KM in OTO should become a part of the students' habits. However it depends highly on the acceptance by all OTO members. Making KM ready therefore needs strong participation of all involved.

6. STORYTELLING AS A SOLUTION

The expectation of the OTO-staff was that a participatory design project with the students could guarantee meeting the goal of a KM that can create a "critical transformative room" (Crutzen, 2005). At the beginning of the study period 2004-2005 an iterative design and implementation process for renewing KM was started. The knowledge managers of a number of successive and parallel teams adopted the idea of the OTO-staff for storytelling as a form of KM for virtual work-environments with strongly changing teams.

6.1 Why Storytelling

According to Snowden the key of using storytelling as a disclosure technique is having groups of social cohesive communities who will have a sufficient body of common experience to enable a story base to emerge. The OTO teams are communities of practice and in a collective process of individual competence development. The teams share a common interest and task. They have together a time-bounded experience for good and ill. (Snowden, 2000) The aim of storytelling is telling current and future employees of OTO on experiences, tips, failures and successes in an informal, readable way that could be very close to their own experiences. This kind of information was not explicitly present in the course material but the informal character of stories could be a starting point and a pointer to parts of the formal information produced by OTO.

Storytelling can "engage, involve and inspire" staff and students, "using language that is more authentic and a narrative" and "provides the context in which knowledge arises as well as the knowledge itself, and hence can increase the likelihood of accurate and meaningful knowledge transfer." Stories can "communicate ideas holistically" in an "easy-to-understand form". The emotional component of stories can help students to articulate tacit knowledge and to tell implicit knowledge wrapped up in their own interpretation. Stories are open for reinterpretation and can be connected to the own interest. "Stories are memorable and (...) can provide a 'living, breathing' example of how to do something and why it works". The character of formal information has a more descriptive character. On the other hand stories are more concrete and can lead to direct action - they can help to close the 'knowing-doing gap'. Reading and producing stories is learning in an open transformative and amusing way. Slandering incorporates always the challenge to search for the truth, the lies and all interpretations in-between.³

6.2 The Process of Design and Implementation of Storytelling in OTO

At first the knowledge managers of the teams SideFlux and PreMath (2004-2005)⁴, have designed a procedure for storytelling which was workable for their own OTO-teams on the basis of the existing situation at OTO. The target group for the design was the actual active employees and also the future employees. The fellow-team members of the knowledge managers have participated in the design process. The knowledge managers, responsible for the introduction of the process of storytelling in their own team, discussed the procedure and the way in which it should be carried out within that team. The result of these efforts was that each team member of SideFlux and PreMath wrote a number of stories, where upon the managers wrote the cover stories to indicate the interrelationships between the stories. These products are transferred to the managers of the teams KryptosLogos, Meta/Z and UseIt⁵ (2005-2006). They have refined the procedure and made the functional specifications for an electronic environment that could support the story-telling procedure. On that basis they have searched for a suitable web-based open source application and choose Plone⁶. This choice was particularly based on the feature of redefining a workflow for the story-telling procedure. Also the possibility of commenting already placed stories was an important requirement. In their first prototype they have implemented the agreed workflow and they have shown that the system meets largely the requirements. At present at the start of two new teams the prototype is turned into a more final product, with available stories for these teams and the staff. They can read them, comment them and tell new stories. The commenting is important: future students can make their own interpretations visible and add useful pointers to the formal, general or specific team documents of OTO.

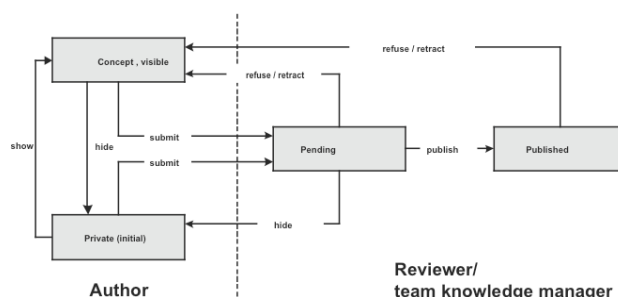
6.3 The Workflow of a Story

In this new system a story is initially created in a strictly personal folder with the state “Private (initial)” (Figure 2). Stories in this state are only accessible by the author: the author can change the content of the story and it’s “properties” such as keywords, publication dates, and extended author-information. The author can also determine which other stories (content) are related.

The author can change the story to the state “Visible/concept”. The story then is visible to all other users but might be filtered from search-folders, depending on the search-criteria. It stays visible after submitting the story to the reviewer, a role defined by the system but in OTO performed by the knowledge manager. Only if the author chooses for a submission out of the “Private (initial)” then the story is only visible for a reviewer. The contents of stories with status “Published” or “Pending” cannot be changed anymore by the author. In all states it is possible for the author to change the sharing property, important for co-authoring and reviewing. In all states the author can remove the story.

Upon entering the system, the reviewer’s attention is drawn to the ‘Revision list’ where the entries to be reviewed are listed. ‘Reviewing’ here means changing the contents and the properties of the stories. These options are useful to make the stories ‘fit’ in the story-hierarchy, by classifying the story by adding or removing content, keywords or links to related content. The reviewer alone is responsible for these actions. Both the author and the reviewer can retract a story from the state “Published”.

Figure 2. The state transition diagram of a story



6.4 The Structure of the “Unstructured” Story Base

The stories do not have a predefined structure, and are not restricted to certain subjects. A story is just a piece of free text, sometimes some illustrations are added, and contain meta-information about author, publication-date, state and keywords. Searching in these stories is supported by different techniques:

- **Using keywords**
Using keywords is a means to classify stories along more dimensions, for example in time (periods), in working-categories, in activities and so on. This implies that every storyteller and reviewer must add the appropriate keywords to every story. In a two-dimensional classification in relative time and process at least two keywords must be added to every story (Table 1). There is an extended list of keywords, maintained by the reviewers to enable a precise tagging of the stories.
Classification of stories by means of keywords is visible in the form of ‘Related subjects’. While reading a story, a list is presented of other stories that use the same keywords. Jumping back and forth between related stories is easy as long as the used keywords are significant and the list of related stories is not too long.
- **Full text searching**
Full text searching is based on all words in the stories. Extended search enables searching on text, title, keywords, publication date, author and status.
- **Search folders**
A third technique is the use of search folders whose contents are dynamically determined by a set of criteria. These search folders can e.g. be used to filter stories from certain authors or teams, and/or on certain subjects. The content of these folders is refreshed every time it is accessed.

6.5 The Content of the Story Base

After the engagement of 5 teams the story base is filled with 92 stories. In Table 1 an overview of all the themes are given. In one story on “story telling” a student gave an overview on possible subjects:

- “Our project” (stories which concern your project)
- “Tutorials” (stories with tips and/or best practice concerning a certain subject)
- “Complain & critical department” (basic idea: I find it this way heavy/difficult/not nice/why I must this or that?)
- “Nonsense” (humour, ironic, stupid subjects)

He did also give the advice that stories should not be just the channel for one’s frustrations but should be a positive support for future employees. A lot of stories have links to relevant formal knowledge. Mostly individual good and bad experiences in OTO are reported, accompanied with advices. Not all stories are just positive: a lot of critical remarks are made on the concept VC as a learn/work environment for distance education. The most popular themes are “competencies” and “assessment”, because that is the part of the learning process that most students are not familiar with. For the working process a lot of stories are related to planning. Students are frustrated that many activities consume more time as planned, especially when the client interactions are not always going very smoothly.

One of the difficult issues for every team is building up a communication structure, students live in the Netherlands and in Belgium and their geographical distance could be up to 400 km. They have to create an effective combination of several means of meeting and contacting in a regular time schedule.

The story base reflects the communication problems. A lot of advices, technical and organisational are given. This kind of stories might prepare future students by helping them to build alternatives and flexibility in their internal and client contacts.

7. CONCLUSIONS

So far story telling was a successful internal project with engaged participation of students and staff. But it can only be called successful if a next generation of students use the story base and add their comments to the stories. The amount and content of the comments will indicate whether story telling is successful for transferring knowledge.

With the process of implementing storytelling and the storytelling process the prerequisites of a constructive learning environment are enhanced because knowledge and skills are best acquired in the context of a real life experience, preserving the

Table 1. The story themes and keywords

<div>Relative Time</div> <div>Process</div>	1st Period (0-100)	2nd Period (100-200)	3rd Period (200-300)	4th Period (300-400)
Working process	A-phase, general	P-phase, interim		P-phase end Project roundup
	Writing rough project outline			Product presentations
	Writing Internal project plan External project plan			Final product deliveries
		P-phase, general		
	Analyses, design, implementation, software developments, software development tools			
	Use of templates,			
	Planning, project management			
	The role team leader,			
Learning process	Determination of individual competencies	Development of individual competencies		Qualification
	Competence descriptions in general			
	Assessments, coaching, self-reflection			
Communication	Meetings, face-2-face, virtual, mobile groupware tools			
	Team communication			
Knowledge management	Knowledge management, general			
	The role knowledge manager			
	Management of the virtual workspace			
	Storytelling			
Life outside OTO	Relation between working in OTO and the regular job			
	The combination of working in OTO and family life			

complexities and uncertainties of real life. Storytelling enables team members to be connected over time and allow negotiating the constructed meaning on the VC OTO intensively and differentiated. The stories of the student represent the work they are doing. The students are the persons who are “making the show happen”. Their stories and the formal information of the staff “fashions a web of stories” in which the tension of a constructive learning process can be perceived (Boje, 2001, p. 8, 61). The stories express the fragile balance between the prescriptive elements and the variety of free choices in the course “Design project”.

10. ACKNOWLEDGMENT

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ENDNOTES

- ¹ Faculty Computer Science, Open University of the Netherlands (<http://www.ou.nl>).
- ² OTO is the acronym for “Ontwerp Transfer Open Universiteit Nederland” (Design Transfer Open University of the Netherlands) (<http://www.open.ou.nl/otonet/>).
- ³ See the chapter “Storytelling” of the publication “KM toolbox: inventory of tools and techniques of the National Electronic Library for Health”, http://www.nelh.nhs.uk/knowledge_management/km2/storytelling_toolkit.asp, retrieved august 2006.
- ⁴ SideFlux has produced a social browser for an organisation involved in teacher education. PreMath has made a product for a digital university that can link assessments with electronic content for students with gaps in mathematics.
- ⁵ KryptosLogos has made an interactive educational tool for explaining coding and decoding methods. Meta/Z has built a search application that made the different applications of an organisation accessible. UseIt has made for a “testing institute” an application for interface evaluation.
- ⁶ <http://plone.org>.

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