

Knowledge Hyperstories

The Use of ICT Enhanced Storytelling in Organizations

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Abstract

This paper investigates the question and challenge of knowledge enabling and sharing in distributed organizational environments. On the basis of empirical material from action research in two Norwegian companies, one public organization and one EU-project, we describe and reflect on the development and use of IT enhanced storytelling as a means to address the challenges above. As a point of departure we use the learning histories methodology, and extend this approach by means of ICT into the realm of purposeful digital storytelling for organizational change initiatives. On this background we develop the notion of “knowledge hyperstories”, located at the intersection of learning histories proper, cybertext, hypertext and the web medium.

Key words: narrative knowledge, storytelling, hypermedia, knowledge management, learning histories.

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1. Introduction

The use of stories in firms as a means for the identification, collection and sharing of knowledge has the last decade received much attention among both practitioners and academics. Our approach to storytelling is that stories always have been a natural and essential part of knowledge sharing and organizational learning, but have still not received authoritative acclaim in the legitimizing "foilware" discourse of management and leadership. Thus the potential for nurturing and harvesting the natural human ability and social capacity and preference for communicating with stories is profound.

In this paper we use the approach of Learning Histories (Roth and Kleiner 1999) as a point of departure, and will from there explore an extended concept and practice in the same spirit – what we label *Knowledge Hyperstories*, focusing on the use of ICT as a mediator and facilitator for a new type of purposeful, non-linear storytelling for knowledge enabling and sharing in organizations. By arguing for an active and activity based view on knowledge, focusing on the relational, communicative interaction processes, our claim is that knowledge hyperstories form a "rich" identification and representation of the knowledge dynamics of practice in the organization. Knowledge hyperstories position themselves as a link between planning and practice – as an enabler for mobilization and allocation of knowledge resources.

In addition to an EU-project, the paper utilizes broad empirical material from a large, distributed organization in the Norwegian public sector, a large diversified international company and a medium-sized, project based IT consultancy company located in Norway. The research is part of a vastly larger Norwegian research program on "knowledge about knowledge", called KUNNE¹, involving 27 firms in an action research (Greenwood & Levin 1998) methodological approach and co-generative learning mode.

2. From LH to KH (form)

On a question of the possibility of artificial intelligence, the anthropologist and cybernetician Gregory Bateson supposedly answered that if the computer after "thinking" a while, answered a question with "well, that reminds me of a story", then we would be pretty close to AI. We are not dwelling into the possibilities of mind in the machine here, but rather focusing on the amalgamation of the two fundamental axis Bateson referred to: storytelling and ICT, initially because interactive stories are concerned with *choice*, and choice triggers reflection which in turn stimulates learning.

The storytelling approach conveyed here is a development of the Learning Histories (LH) methodology developed at MIT (Roth and Kleiner 1999) and re-used and re-designed at SINTEF (Hatling (ed.) 2001). The specific form exemplified here is that of "extended" learning histories. Basically the expansion of the learning history "generic form", is by means of ICT moving the LH into the realm of "digital storytelling"; with the ideas and tools of *cybertext* (or cyber-media) derived from the works of Norbert Wiener (1948), of *hypertext* as coined by Nelson (1974, 1981), and the *web* interface and

¹ <http://www.kunne.no>

communication channel, as originally designed by Berners Lee (1999). Let us first have a quick peak at the learning history point of departure.

The Learning Histories methodology is described elsewhere, both in its original MIT form (Roth & Kleiner 1999), and its SINTEF derivatives and variants (Hatling (ed.) 2001). Briefly, learning histories is a formalized approach for collecting and presenting learning efforts in organizations. It is a method for sharing knowledge with a focus on giving voice to a multiplicity of perspectives on important events, told by the participants themselves in a “jointly-told tale”. The aim is to stimulate communicative interaction to support developmental processes. The learning histories are produced by a learning history group of insiders (members of the organization) and outsiders (researchers) to illuminate the how, when and why learning takes place in practice in organizational work contexts. Schematically, the format of the learning history looks like this:

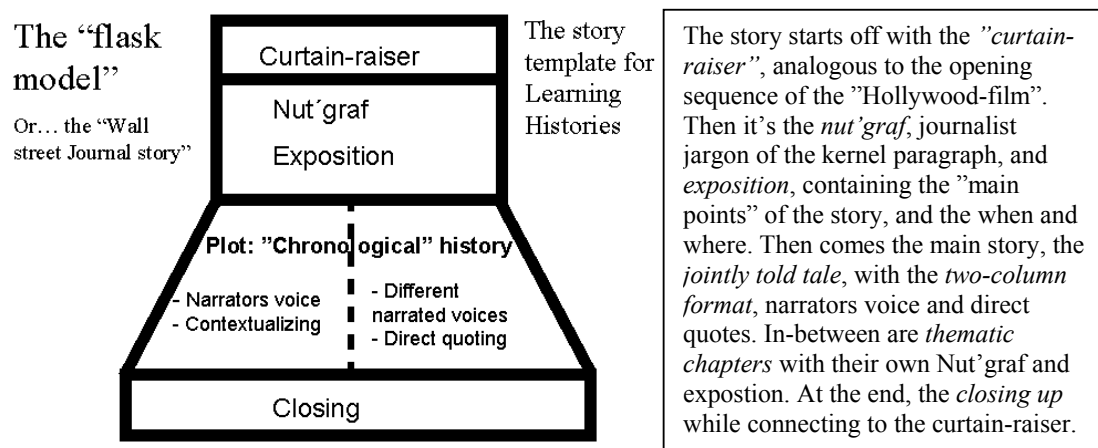


Fig 1. The story template for the “generic” Learning Histories”format.

SINTEF have conducted about a dozen learning histories projects, with a “scandinavian” form and format adapted from MIT, documented in “Fortellingens Forttrylling (2001) and “Learning Histories revisited” (2002). Like at MIT, all of these “first generation” learning histories were solely using the technologies of text (word processing) and paper as mediums of production and presentation. As a distinguishing feature of the second generation learning histories presented here, they are now moving into the area of digital storytelling, taking full advantage of the tools made available through the microelectronic-based revolution of ICT.

Digital storytelling

Broadly, we can position our concept of the “Knowledge Hyperstory” within what is commonly referred to as “digital storytelling”². Digital storytelling is the attempt of a human centered and historically based “take” on stories and storytelling, combined with competence and creative use of the digital tools made available through the invention of

² i. e. Lambert, Joe. and Nina Mullen. *Memory's Voices. A Guide to Digital Storytelling*. Center for Digital Storytelling. <http://www.storycenter.org/cookbook.html>

the computer. More specifically, digital storytelling is a multifaceted endeavor with a lot of different stakeholders, forms, mediums and purposes; from multimedia presentations, small video-clips made in Iphoto or Premiere, to CD-ROMs with fairytales or 3D games, to web-based novels, diaries, soaps and multi-user dungeons – or advanced virtual reality environments like CAVE.

The roots of digital storytelling should be traced back to the work of Wiener (1948) who laid important foundations for the development of the computer, and especially through his ideas on information feedback loops the concept of *cybertext* can be derived (Aarseth 1996). The contribution of the conception of cybertext, conceived by Aarseth as “a machine for the production of a variety of expression”, is twofold; first it highlights the mechanical organization of the text by posing the medium as an integral part of the literary exchange, and secondly; it draws stronger attention than response-theorists to the reader or “user” of the “text” as being an important co-creator of the meaning that arises through the interaction with the “text/medium”. In cybertext the user will physically (as well as mentally) interact with the text/medium, and therefore being engaged in *performative acts* (in an extranoematic sense) of physical construction not accounted for in different notions of “reading”. This latter phenomenon Aarseth (1996) refers to as *ergodic*, a term he draws from physics, with its etymological roots in the Greek words *ergon*, meaning “work”, and *hodos*, meaning “path”. Aarseth's point is that through the active, also physical, involvement (work) of traversing texts (path), ergodic literature is about “making sense”.

From the sixties began research on *hypertext*, a word coined by Nelson (1974), referring to the strategy of organizing text in an “informal” and intuitive way using “links” between parts of text, and later also multimedia. It started out as research on citation and references, but led to the development of World Wide Web, a concept originally outlined by Berners-Lee (1999). And today the hypertext and “www” (inter and intranet) are used in variety of digital storytelling efforts. Our cases here, all use the forms of cybertext, hypertext and the intranet (web) as mediums of expression.

Janet Murray (1997) lists four characteristics that make digital environments unique in this respect: they are procedural, spatial, encyclopedic and participatory. The user/producer of interactive texts gives the user/producer the possibility to re-combine and change the plot and presentations. This dramatically changes the relationship between “teller” and the “audience”. The reader or “user” becomes more of a “producer” with power over the story and, according to Murray, this creates more emotional engagement in the users. And emotional engagement spurs learning.

It is in the continuation of these lines of thought we use the notion of “knowledge hyperstories; the pursuit of getting and displaying multiple voices commenting on important issues, from different angles and perspectives, using different mediums like text, pictures and videos (a variety of expression in both senses), for the purpose of active involvement from the “user” side in an iterative movement of “organizational sensemaking”. The iterative movement implying both “interior” to the hyperstory (working out your paths *in it*) and “exterior” to the story, i.e. in face-to-face or online workshops discussing its content and possible implications and actions to be taken. It is in these senses we refer to the hyperstory as “knowing”. As tightly *fit symbolic interactions* (Blumer 1969) for improved mutual understandings and potentials for possible alternative practices.

Thus, a preliminary and initiating summary of the *form* and *function* of the "Knowledge hyperstories" is; It should be conceptualized as a development of the MIT Learning Histories methodology, by the means of ICT, being situated at the intersections of (some) aspects of the transformational ideas and realizations of *cybertext*, *hypertext* and the *web* (intranet versions). Evidently, the Knowledge Hyperstories are in conjunction with Aarseth's (1997) conception of "ergodic literature" – highlighting the intricacies of the *medium* as a part of the meaning exchange, and the *performative* part played by the "user" or "consumer" of the text. That is, by *actively*, in a physical sense³, both with their minds *and* bodies⁴, being involved in the meaning creation. From LH to KH.

Knowledge Hyperstories may thus be seen as a *purposeful* (Snowden 1999) form of, ergodic literature, with the aim of being a method for targeting the development and sustenance of enabling conditions and learning efforts, the mobilization and allocation of knowledge resources, in the context of organizations.

Based on the insight that the formal (medium) aspects of communication are an integral part of its content, let us for now turn to the cases, the practices of "ICT enhanced storytelling". That is, the inside of our proposed conception of "knowledge hyperstories". Each case looks subsequently at the *content*, *form* and *function* of the KH.

3. Inside Knowledge Hyperstories (content)

3.1 The Internal of External – collective action feedback

The first case is a cross-disciplinary EU-project called "Extended Enterprise Resources, Network Architecture and Learning" (EXTERNAL⁵), funded by the IST programme under EU's 5th framework. EXTERNAL addresses the challenges met when forming an extended enterprise (EE), characterised by a dynamic and time-limited collaboration between business partners. The goal of EXTERNAL is to provide solutions that make this collaboration effective and repeatable. The partners in the project are METIS (Norway) (acquired by Computas after the project had started), SINTEF Telecom & Informatics (Norway), DNV (Norway), GMD (Germany), and ZEUS (Greece). The practical vision was to produce and combine the different ICT-solutions the participants in the project already were selling or possessed "in-house" in different "alpha-beta-versions", or were eager to see the realization of – and thus get a whole that was much larger and ambitious than each of them could have achieved alone. The aim was to develop and test in practice through three use-cases, modeling, visualization and work process support for distributed co-operative work. Or as one of the participants said: "To develop in practice some of the functions that the Consultant companies are "boasting about", but if you look closer at their tools, it shows that they are just advanced "invoicing system". The utopian vision of the project, however, was also quite a mouthful, namely to invent a new language representation, no less than what Gutenberg invented: "...a universal visual language to reflect about the world."

³ This goes beyond what the reader-response theorists focusing on reception and meaning construction by the receiver would claim.

⁴ In the knowledge hyperstories, by choosing and clicking their own path through the story(ies).

⁵ See <http://www.informatics.sintef.no/projects/External/External-web/external.htm>

In the project proposal it was defined and integrated activities of self-evaluation or self-assessment of their own achievements during the project period, deviances from promised deliveries, etc. As people participating in R&D projects may have experienced, these activities tend to acquire a kind of “millstone around the neck” status, and the feeling of unproductive time-consumption stealing attention and energy from the value-creating activities, only to satisfy some bureaucratic system. Thus, the idea came up in discussions between members of the project and SINTEF Industrial management, dep. of Knowledge and strategy, as a supplementary to try the learning history form of “assessment”. The reason being that the project itself could benefit in terms of collective learning, for accelerated productive “co-action”. From the SINTEF side it was the first opportunity to develop the learning history methodology into the realms of ICT and digital storytelling. Previously all the learning history projects run at SINTEF, like it has been done at the originator location of MIT, had been written out as plain text in paper format.

The learning historians (first two, later just one) followed the project in its early stages, over a period of seven months, from May to December year 2000, doing participatory observation in workshops and meetings, making interviews and doing document studies. The story was written out in hypertext using the web-interface and was later put on the EXTERNAL intranet. The story is a preliminary and partial story of how the participants themselves experienced important events and themes in the initiation and essential “extended start-up phase” of the project. It was called “*The Internal of EXTERNAL – the preliminary learning hyperstory of the EXTERNAL project*”. On behalf of the material gathered through fieldwork, extraction and feedback⁶, the story evolved around four main themes, labeled; “In the eye of the user”, “Communication & coordination”, “The confusion of concepts”, “The Frank L. experience”, and “The complexity (dis)advantage”. In addition there was an introductory chapter called “The birth of a project”, and three “closing” chapters called “Uppers & downers”, “Challenges ahead” and “What is a result?” The *form* of the story was organized in *two tiers*, paralleling each other, of the generic learning history form. The main tier was called “track” and the secondary tier named “trace”. The track was the primary story, linking comments and fragments both within the track layer itself, but also linking text parts to further elaboration in the trace layer. The trace layer was thus a kind of “shadow” layer with content elaborating on the statements in the track tier. There were no use of pictures, but in addition to text, different powerpoint slides were linked to the story.

As the story conveys, one of the characteristics of the project was the initial multiplicity of voices in the defining of what the project was about, and the developmental path towards increasing “concertedness” as the project was progressing and several central people left and new ones joined the project. One source of divergence was the range of interests in the group: running from METIS ever on the edge of commercialization, via GMD with representatives interested in prototyping and scientific publication, to Zeus who were academically indifferent and included into the project as a use-case. As on of the themes in story, some took the role of bridge builders, especially SINTEF and GMD, trying to amend the confusions of concepts, exceptionally authoritative and talkative members of the group, keeping direction when people left and

⁶ For descriptions of the general Learning history methodology, see Roth & Kleiner (1999), or “Fortellingens Fortrylling, M, Hatling (red.) (2001).

new ones entered, or trying to untie the “everything is connected to everything else”-syndrome and subsequent feeling of “getting nowhere”. The real challenge was perceived to be in the organization of a distribution of work packages among the participants, in a way that would work towards convergence. In other words, the challenge was to reduce complication while remaining with the complexity of the real world. The problem was not so much knowing *how* to do, but knowing *what* to do and *when* to do it.

Not forgetting the energy and initial positive force the project was endowed with; the initial frustration on the confusion of concepts was subsequently relayed by similar frustrations on the “meaning of meetings”, and some members “totalizing” attitudes. As the project precedes frustrations of “treadwater” is gradually amended through “natural evolution”, incidentals as the acquiring of METIS by Computas, means taken (i.e. the obligatory EU evaluation), and the feedback from the learning history. What happens at some stages in the process, as conveyed by the learning history, it seems like collective actions and understandings are getting “embodied”. The members seem increasingly less interested in “pure” terminology, and more concerned with contents. “Now we basically understand each other. Even if people use different terms, we know what they mean. We have now a better understanding of the holistic view of the enterprise, and we basically seem to agree. We also agree on how to technically approach to integrate the existing tools and extend them to different partners...”

By succeeding to administer “its own” medicine things start to happen. They are enabled to survey when, and under what conditions, and what kind of problems the kind of co-operative technology they themselves are developing may be used. In addition to work packages, “crosswork” package teams were created. Alongside a sharpened sense of *usefulness*, the view of what would count as a success got more and more concerted. “For me personally it would be successful if some of the concepts and codes that we develop would finally end up as part of a product developed by Computas, or by DNV, or as sold and maintained by Zeus. That would be a success – of transferring research into practice.”

The main purpose of the External hyperstory was to improve more or less “real-time” communicative interaction *inside* the cross-disciplinary, cross-sector and international R&D-project. The targets for the learning initiative were actors in the project that itself was used as the case for the story. There were no intentions, as is common in learning history efforts, for learning to occur outside the learning history group – typically in the organization as a whole.

The participants said afterwards that it really did improve communications, like “we could see that, hey, it really wasn’t the first time these issues were discussed”. It helped newcomers into the project by providing a “track record” of the most discussed and “complex” themes. The genealogy of the project (up to that point) illuminated some of the major issues that functioned as barriers of getting really on with the project, and at the same time discussed means of overcoming them. Themes that were difficult to discuss face-to-face, as for instance personal behaviors that were counterproductive in terms of collective co-operation were taken up, and people who seldom spoke in meetings and workshops were given voice. At the same time it illuminated the initiatory premises for the project, and spelled out by subjective voices what they wanted with the project, what would count as results, and what criteria would count as a success.

Thus, the knowledge hyperstory "The Internal of EXTERNAL" may be interpreted as functioning to a large extent as "a viable means for social negotiations"; what Bruner (1986) has pointed out is one of the main features characterizing narrative (knowledge). And due to the distributed and differentiated character of the project group, and its ICT-R&D focus, the use of ICT as a medium (hyperstory) functioned as intended. People were used to ICT beforehand, and the medium was not alienating. We were not, however, satisfied with the difficulty, time-consumption and unfulfilling use of the "two tiers" format of the story. The trace tier didn't seem to give "value for money", that is, value for time spent on producing it. Way too much material were left undiscarded in the process of story production, with the belief that hyperlinking it in different smart ways would "solve the problem", leading instead in the end to a kind of information overload, and not utilizing the medium to its fullest.

3.2 Enabling in Aetat – big pictures & doorways

The second case is derived from an action research project work that SINTEF Industrial Management, dep. Knowledge and strategy, conducted within and in cooperation with "Aetat", the Norwegian public sector employment bureau, with a total of about 3200 employees distributed throughout Norway mainly in 201 local Aetat offices, with the central administration located in Oslo. The transformation of the bureaucratic and to a large extent "top-down" command line organization, with "traditional" forms of leadership, rigid routines and detailed job-descriptions, into a knowledge organization is by now firmly on the agenda. As important parts of the transformation are three major efforts; first, an introduction of "Arena", a new "production tool", the essentially important IT based system of administrative procedure for handling the unemployment cases; second, a careful encouragement to a voluntarily change in the organizing of work processes in the local offices. From organizing it in disciplinary departments towards a "team-organization" that is supposedly more customer oriented and follows the internal work processes rather than the disciplines. The new administrative system of procedure and the team organization are meant to "fit together". The third major effort is the development of a "competence-web" for e-learning, knowledge enabling and experience sharing.

Thus, SINTEF Industrial management were contacted to help with making concepts, tools and methods to confront the challenges of knowledge enabling and experience exchange in the organization, particularly with respect to the in-house development and launching of the "competence-web", called *Athene* after the Greek Goddess of knowledge and wisdom. Athene is regarded as an important part of the emerging strategy for competence development in Aetat. From the research point of view, it was an opportunity to investigate how insights and lessons learned from many years of action research work on knowledge management with KIBS⁷ could be applied, further developed and challenged from the perspective of a big, public sector organization.

Athene consists of two "parts"; one is a more "traditional" e-learning area where employees can take courses and get credits for their own competence development. The other part is a more loosely structured area with intentions of developing more informal

⁷ Knowledge Intensive Business Firms. See <http://www.kunne.no> for an overview of projects and publications.

knowledge sharing, on issues not so easily formalized. It is thus called the “experience web”. The Office for organizational development, which is formally responsible for Athene and the strategies for competence development, had a twofold challenge; First, to get useful and interesting material on the Athene website before its launch. Secondly, to make the initiation for triggering and enabling discussions among colleagues both live (face-to-face), and distributed by the means of Athene, of importantly acute themes for “experience sharing”.

In the joint project-team from Aetat (Office of organizational development) and SINTEF we decided on starting out with making two learning histories, with cases from two local offices. The idea was that the stories would, firstly, initiate and pull out the “big picture” of these quite new areas of attention – of systematic approaches to knowledge sharing and competence development. Subsequently we hoped it would initiate important and sometimes difficult discussions in these areas. Secondly, the learning histories was intended as a “doorway” into the “experience web” of Athene, and thus illustrating and exemplifying both what could be considered *as* knowledge (challenging the legitimate forms hegemonically imposed by “tradition and management”), showing new legitimate ways of *sharing* knowledge, and signaling *other fields or themes* that could be fruitfully considered as areas for knowledge sharing.

Because Aetat had already started the voluntarily transformation into team-organization with some “pilot” local offices, both the challenges attached to these efforts and the overwhelming interest from other local offices, this theme made a welcoming focus for the two learning histories. The joint project group then made the two learning histories from the two local offices, focusing on different challenging aspects of the transformation from disciplinary department structures into a team organization following the work processes.

The stories were co-created by the joint project group, evolved around “fruitful dilemmas” structured in thematic chapters, and was called “How the dinosaurs died – and later reborn” and “On heaps, teams and Vikings”. Let us look at the former. It was divided into six chapters, hyperlinked, with introductory materials explaining the users what kind of “animal” they had before them. The first chapter, called “No dead dinosaur” focused on the spirit, motivation and the reasons the office gave for transforming into team organization. Also, it focused on premises, their work environment and values. The second chapter was called “Surfing the waves or a deep dive”, and faced the challenges and dilemma of focusing on the whole of the work process versus the specialized disciplines and work tasks. The third, “To undo a knot or pursue a line” showed and reflected on how formal structures paradoxically might be perceived as both barriers and as establishing safe zones enabling you to do your work. It also looked at individual versus collective responsibilities and the challenges imposed by “flat” structures. The fourth chapter, named “Belief or doubt” took up the issue of identification between teams and/or the office as a whole, and old versus possible new barriers. The problem previously was the barriers between the departments, and was there now emerging barriers between the teams? The fifth, “To be what you do, to do what you are” discussed the relationships between old and new roles, and formal roles versus real competence. For example there were considerable dispute on the transformation of the department leader role into “team-leader”, a model some of the teams chose. In other teams the former department leader were not team-leader, which caused disruptions, and in yet

other they chose to have no team leader, which was also a very new type of work situation. The last chapter, “To bite your own tail”, took up the reasons for choosing team organization again, as the first chapter started with, but this time mostly from the external point of view. A discussion if the team organization is, or isn’t, a “win-win” deal, with both more customer orientation and better internal processes.

The screenshot shows a web browser window with a blue header bar containing navigation links: "Leserveiledning / Introduksjon", "Ingen død dinosaur", "Surf på belgane...", and "Knuter og tråder". Below the header, the main content area has a title "Hvordan dinosaurerne døde – og gjenoppsto" and a subtitle "Den foreløpige og forunderlige historien om Aetat sin omlegging fra avdelinger til team". On the left, there is a photograph of a person standing on a tall, narrow rock formation. To the right of the photo is a large block of text in Norwegian, which is a metaphorical story about dinosaurs. The text includes a paragraph starting with "Sett dere godt til rette. Dette er den virkelige historien om hvordan dinosaurerne døde ut..." and another starting with "Og det gjorde vi, arme riddere utstyrt med penn og taperecorder fra SINTEF...". At the bottom of the text block, there is a small paragraph starting with "Vi har delt fortellingen inn i 6 kapitler..." and several hyperlinks for further reading.

Fig. 2. Screenshot of the opening window of the Aetat “Dinosaur-hyperstory”.

The stories made use of the intranet Athene, using hypertext linking different chapters and explanatory texts to the website, and also with using illustrative pictures to support the metaphors that the stories utilized. The stories were thus pushed in the direction of multimedia. We departed from the “two tiered” format of the EXTERNAL case, and developed the learning history format into a more “proper” hypertext. The challenge was to tell a continuous story, containing six chapters, while at the same time the chapters was to “stand on their own feet” as autonomous stories. This to allow for the more intuitive user way of “browsing” contents on the web. We suggested a path (hodos) through the story, linked every chapter and weaved everything together with in a “macro” introduction and closing. Each chapter had their “micro” introduction and closing as well. Schematically the learning hyperstory form now looked like this (keeping in mind the curtain raiser, the nut’graf, the two-columns and the closing from the “generic LH form”):

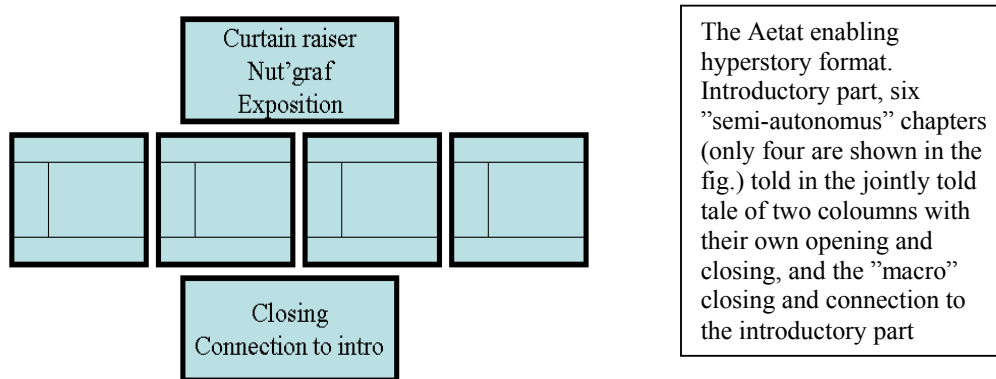


Fig. 3. The format of the "Aetat" enabling hyperstory.

As an indication of the focus on stories for learning and competence development that Aetat presently is adhering to, the marketing director has several times been speaking and writing about stories when he's focusing on the importance of the visibilisation and sharing of the experiences that each local office builds up. This is as the learning hyperstories focus on, directed both internally and externally. Internally towards improving work processes and competence development both at level of the individual, at the local office level, as well as in the network of local offices. Externally, it is for example through mobilizing marginal groups of users so that they don't get expelled from the employment market. As an example the marketing director uses the elder people, the seniors: "If Works are going to succeed in mobilizing the seniors, we have to focus on their contribution to the value creation. We have to find good arguments and good stories to illuminate this reality. If we succeed in this we are able to mobilize more of the people from this group into valuable work relationships. We have to look at the seniors as knowledge conveyors and build on the experiences, attitudes and success stories individuals possess. It is our job to bring these stories out in the society!⁸"

From the point of view of the "Office for organizational development" the learning histories from the two local offices have contributed to the visibilisation and legitimation of the Athene "competence web" internally in the organization, because they represent something other than the e-learning courses that are available there.

In time of writing, without any public fanfare or broad organizational announcements 263 people of the local branches of "Aetat" has been visiting and browsing the learning hyperstories. Keeping in mind, that they were put there in Septemer (the first one) and November (the second one) of 2001, and that the content they are focusing on, "team organization", is a "voluntary" subject until the local office decides they want to go through the transformation. In addition, the effort of integrating Arena (the administrative system of procedure) is by far overshadowing the Athene/team-organization efforts in terms of "organizational acuteness". The local offices have had their hands full trying to cope with day-to-day issues of handling employment-seeking applications, and have also been met with extended media coverage on their difficulties in getting the new procedures on track.

⁸ Quoted in the Aetat internal newspaper, "Forum" nr. 6, 2001, page 2.

For the offices that choose to go through with the re-organization, like for the ones already gone through, the learning hyperstories is intended to be utilized for learning about complex issues, in a number of different ways on different arenas:

- Web: Informal learning and giving rise to new formalized courses.
- Meetings: As a trigger and point of departure for getting quickly to important discussions. Having “similar” material to compare your situation with.
- In workshops and larger meetings: More effective workshops where you get relevant issues faster “on the table”, it eases the difficulty of taking up “difficult” subjects (my colleagues talk about them in the learning history), and it gives continuity between workshops and meetings (so that we don’t have to start on scratch each time).
- Amending the need that every new office turning to team organization have to make all the same mistakes, and do all the learning “by themselves”, by at least offering the possibility for not starting from scratch.
- As a means for making people in the organization “visible”. Giving voice in “public” to the direct comments and opinions of employees “high and low” in the hierarchy as two main benefits, as pointed out by the employees of Aetat: first, it works as a tool for “glasnost”, openness and democratization of what’s allowed and who’s voices are heard; secondly, it makes people visible, both to themselves (they are seen, giving self-esteem), and to others (a means of connecting people in a distributed organization).

3.3 The MPC Hyperstory – establishing conditions

The Metal Production Corporation (hereafter denoted MPC) is an international growing manufacturer of metal, which serves a worldwide network of suppliers with a variety of different casting alloys and extrusions products. Establishing new cast houses (at various times) are a natural activity for MPC with respect to the ambitions of further growth stated in the strategy. The organization has experience from this all over Europe and North America and will also in the future establish new cast houses in strategically important regions.

MPC has developed a more or less formalized method for how this should be done, but still experiences from earlier start-ups are practically unavailable. The problem is that the carriers of the most valuable experiences are persons who not necessarily longer belong to MPC, and that there at present is no organizational memory representing the broad picture of experiences from the different parties involved. The experiences are not captured in a way that make it possible for others who have not taken part in the projects to get access to the lessons learned, beyond formal documents as plans, budgets, minutes, checklists, presentations etc. in different versions. Of course these kind of documents address relevant issues for future start-ups, but they give relative little insight in what actually happened during the project, how things were solved and the reasoning behind the priorities done. Even if there exist a report from a start-up it is often written by one author (e.g. the project manager) after the project is terminated. These kinds of reports often conclude with a bullet-item list indicating what one should do and not do. The problem is that there are significant differences between each start-up due to for

instance cultural and social differences between countries, legislation, competence of work force available, market situation, production technology to be used etc. The potential for learning from reports and the like, is limited to things like how to plan and budget a start-up, which of course is important, but still account for only a minor part of what it is possible to get out of it.

When SINTEF got in touch with MPC they were planning a new start-up in central Europe and MPC had staffed a project team responsible for this. This created an opportunity for us to develop a new layer on our learning history methodology and approach – building on experiences of the successful format from the “Aetat” case, we now developed the “true” hypermedia story, also incorporating video-clips to the story. The intention and goal with our project was to capture more of the insights and experiences gained during the accomplishment of the specific start-up in Europe, and make them accessible and available for future start-ups.

Our Learning History approach was developed as a method for collecting experiences and subsequently collective reflections and discussions with the aim of stimulating collective learning. The story should not be normative in the sense that it gives a description or “receipt” of how to establish a new cast house, but it represents a multifaceted and sometimes contradictory message containing multiple views and perspectives from the different participants involved. The learning from such a story lies partly in the story itself, but maybe just as important is the learning and reflection processes it initiates in the user/producer of the story, both as an individual and in social settings.

Based on interviews, discussions, and visits at the plant site, and reflections with the persons involved over the start-up project period, we created a “learning hyperstory”. In the MPC case this comprises a story composed of written text, video clips, pictures and presentations, structured and presented like a web. The story is meant to be read in an interactive way where the reader itself determines what issue to focus on and the level of details in the story by clicking on objects (e.g. hyper-links, pictures, movie-clips). A part of the promise is that this also gives the opportunity to expand the story with experiences and insight from future start-ups, as these easily can be linked to the original story. In this way one get a dynamic knowledge networked story pointing to significant content both directly and indirectly, as it indicates persons, groups and units where the knowledge can be found. In addition, one also has the possibility to link the more formal descriptions and documents that were produced during the project. This is so far not accomplished.

The added challenges in this project compared to the previous ones were numerable. Among them was the situation that the story “audience” is a group of highly specialized experts from different disciplines, having different roles and work tasks, and who also are distributed globally. Another big challenge was the development of the hypermedia story form, the incorporation of video-clips into the story format. Apart from a vast number of technical difficulties, the question was which clips that functioned best in video rather than text. And vice versa. Further, how the videos could be smoothly incorporated in the story. We are far from sure if the means to tackle these challenges worked, the story has yet to be evaluated by the corporation large scale. So far it is only the start-up project group of the specific European location that has seen it.

The hyper story is now going to be used in the preplanning for the next cast house, and the purposes of the story is manifold and similar to the ones described in the other cases. It sets an agenda for discussion of relevant issues and it will be used as a initiator and facilitator for discussions on different levels; top- management, project management, as the story is appropriate for collective and individual reflections. The story is a facilitator *not for doing things right* but to do the right things. However it has little use in the development of binary knowledge⁹. It is thus a means to enable and sustain conditions fruitful (collective) double loop learning (Argyris and Schön 1996), in distributed, “glocal” organizational environments. Put differently, it can be labeled the sharing of “glocal” situationally anchored best practices.

To make a multimedia learning history is a rather extensive and work demanding task, it is in many ways a project in itself. Thus, it has its limitations as a knowledge-capturing tool, as it prerequisites projects of a certain size. Furthermore a learning history has limited value for once-in-a-lifetime projects, as it is more like a subtle, active and dynamic variant of “lessons learned” than specific input to the process in question. AS the EXTERNAL case shows, it could also be used as feedback to a single project, but the project should then be of some length. Finally a learning history is not appropriate as a tool for evaluations of projects and individuals. It should be conceived as an opportunity for collective double loop learning and making future practices better.

The making of the Hydro Hyperstories and its further use is thus basically about focusing on and enhancing the attention and practice towards the ”establishment of conditions to cultivate emergent, informal networks” (Seufert, Back and von Krogh 2002). Out of that may come the ”design of intentional, formalized networks for knowledge creation and transfer” (ibid.) as we have seen is the situation in the MPC case: The establishment of proper ownership and legitimacy, at least in the European part of the MPC-network, to an International Reference Center for training and knowledge exchange. How well the different functions will work out in the long-term that remains to be seen.

While the method and different steps in producing a learning history is straightforward and easy to describe it is a rather complex and difficult task to do well. If one fail in making good interviews or make a poor synthesizing and write-up, it will never be a good learning (hyper) story.

3.4 Scheherezade’s Divan on Pantomime – approaching Xanadu?

The ”Pantomime-case” is drawn from the ICT-consultant company Computas, a firm of about 150 employees that SINTEF Industrial management has had a project relationship with since 1997 (as part of *Kunne1* and *Kunne2*¹⁰). Computas is project based and organized in several processes with process “owners” (process organized; sale, deliverance, R&D, resource allocation, etc.), and is delivering custom-made knowledge support systems for knowledge intensive enterprises in the private and public sectors. To this date, Computas has not been a deliverer of ready-made software. They use an interactive and iterative method of workflow analysis to map the needs and structure of

⁹ Blikø, 2000. Verbal communication.

¹⁰ See <http://www.kunne.no> for more information.

work in customer organizations, and adheres to the self-made principle of “just in time knowledge support” (Dehli & Coll 2000).

The focus on storytelling came up in a project in 1999, doing a learning history on the development and use of the system WoX (Well of Experience); one of several integrated systems on the highly sophisticated and thoroughly used intranet *Mimesis*, allowing them to harness, represent, seek out and employ the collective knowledge resources of the organization. *Mimesis* was developed after Computas joined Kunne2 with the challenge from SINTEF; could Computas “administer their own medicine”?

From 2000-2001 the major focus on the Computas-project arena (under Kunne2) were on “narrative knowledge” – the identification, use and dissemination of storytelling as a tool and stories as knowledge carriers for experience sharing. Through numerous interviews conducted and participatory observation (a part of SINTEF is located in the same building), methodologies, tools and stories from organizational *practice*, *identification* and *strategy* has been identified, produced, disseminated and used in the company. Through the project a methodology called “*Fable-Forum*” (Mæhle and Røyrvik 2001), for organizational “story harvesting” was developed, with a peak of experience happening when the whole company gathered for a full day seminar in a mountain resort doing story exchanges from work practice, and producing and presenting a number of stories of different forms and on different formats (video, web, powerpoint, cartoons, role play, Metis-modelling). Later these and other stories were put one the *Mimesis* (intranet) site *Scheherazade’s Divan*, after Scheherazade of Arabian Nights telling stories to stay alive, a storytelling portal that was developing also through the project (Barth and Bang 2001).



The initiating idea behind Scheherazade’s Divan was that it ought to be a portal supporting the development of stories as *knowledge enablers*. It was not to be a story database. The primary focus was on *use*, and developing a tool was not an end in itself. Scheherazade’s Divan may be described as a tool of “selective mediation” (cybertext) giving an introduction and an environment to storymaking and storytelling as a dynamic and ever (re)emerging phenomenon tightly fit to organizational practices, supported by a *collaborative technology* called *Pantomime*.

Fig 4. The storymaking and telling web-portal Scheherazade’s Divan at Computas.

Storytelling and making is introduced to the user/producer of the Divan as an invitation to content *exploration*, *organization* and with guidelines for *production*, supported by *Pantomime*, allowing the user/producer to actively re-combine the available information by the present *need* of the user/producer. By means of an *editor* function the user/producer can create first; *tags* of their own choice, allowing users to recombine the

content of the Scheherazade “pool of content” any way they may find useful for different purposes decided in real time; secondly, to allow a *situational* and *contextual* view of the distribution of competencies, and thirdly; the stories may initiate employees to seek out colleagues for face-to-face discussions and co-operation.

The Divan is constructed within a frameset that look at *story making* as preceding *story telling*. Story making is conceived of as evolving out of organizational practices, and not (as some of the organizational storytelling literature seems to contend) as some kind of a “more serious” form of “the whispering game” (“Chinese whispers”). Stories without resonance in practice functions rather opposite of its intention, as producing barriers to knowledge sharing. Stories evolving form practice, on the contrary, could be sued as powerful knowledge enablers.

The Divan is by now not a fully integrated part of the Computas daily work life. It is rather in its “testing stage” to see if it can be a tool for tackling some of the challenges that a growing company is facing, i.e. the challenge of staying” flat and “process-organized”. And as is argued here, the process-knowledge carrier above any is the narrative. Especially when depicted as in the Divan, as a *learning process* were employees successfully passes from browsing passive content to organizing and producing active content. The passage from a passive story browser portal to an active user/producer cybertext (cybermedia) portal is made possible by the collaborative technology Pantomime. Schematically, this is how Pantomime works:

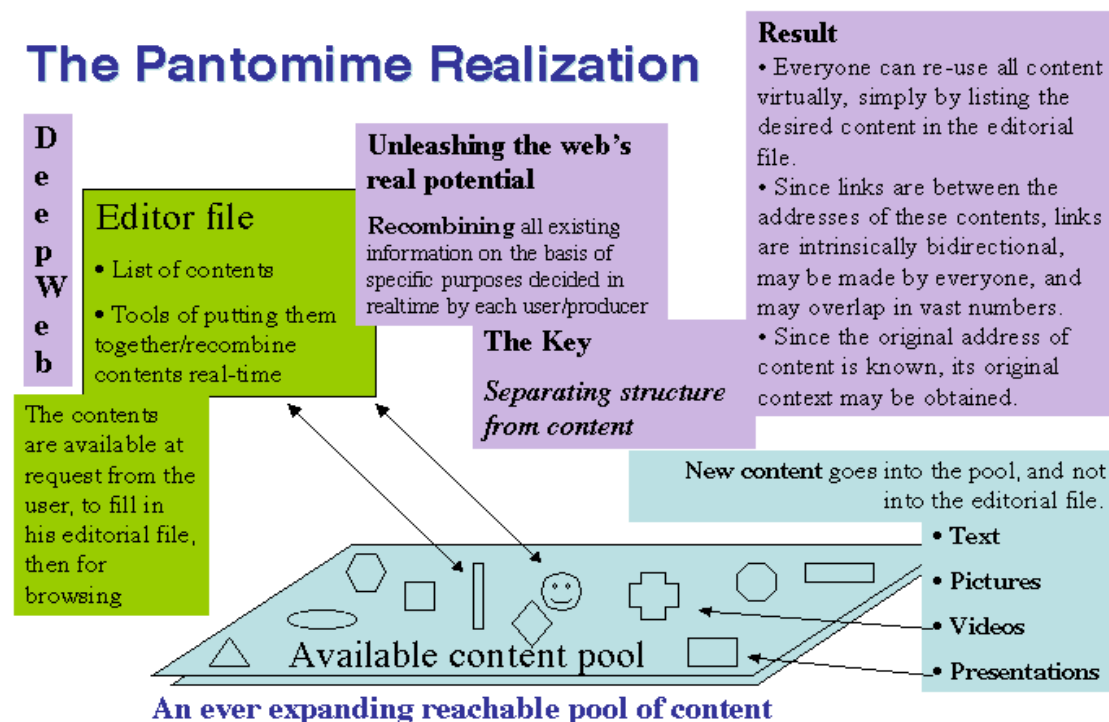


Fig 5. The Pantomime technology's simple principles makes active use possible.

Let us now exemplify the workings of the Divan on Pantomime. One of the stories told, constructed and produced on the Fable-Forum mountain trip and later put on the Divan is called “Broken coffee cup or golden prize”. It is a non-linear story utilizing

the hypertext and web possibilities; with several different paths the user could choose to traverse the text and with different possible outcomes dependent on which path the reader chooses.

The content of the story comprises real project situations from Computas work practice, while the characters are “fictionalized” and show archetypes or stereotypical displays of common roles and statuses in project work. The story contains different situations of *choice*, regarding for example a project delivery, the implementation of the system as well as different kinds of dialogues with the customer. The project situations are thus knit together by their common gallery of persons and with the dramaturgical technique that different types of coffee-cups showed up in all of the situations. In addition to the incorporated possible readings, the story allows unexpected interpretations depending on the readers’ context, frame of reference and chosen path (hodos) of traversing (ergon) the text (and pictures). In sum, the story is a sophisticated utilization of the possibilities given by cybertext (feedback), hypertext and the web medium. In addition, with its focus on choices and multiplicity of interpretations (hodos/ergon) it thoroughly conforms to the ideal standards of ergodic literature, as described in the introduction (Aarseth 1997).

In complementary opposition to the “just in time knowledge support” principle and systems that Computas adheres to, a possible labeling principle of the Divan/Pantomime model and potential use could be “when time is just knowledge support”. You can enter the Divan when the time is “right” and use/produce active contents and interpretations that are useful for some specific purpose, there and then or and some later juncture. The Divan will not provide you with clear-cut, yes or no, binary type of knowledge or guidelines, but rather support you with a repertoire of experience for future improvisation in new situations that you face.

An example of this is one of the uses of the Divan/Pantomime that so far has been tried. One of the stories was used in a customer meeting in a project. At one point in the project, the joint (customer and Computas) project group was stuck on problems no one seemed to see the way out of. The situation reminded one of the Computas employees about one of the stories available at the Divan. In the next meeting he showed/told the story as an illustration. Having an “external” analogous view of the situation they were stuck in provided a mediatory tool that negotiated and resolved the situation, and made it possible to move on.

As mentioned above, the Divan is so far still in a somewhat developmental stage and is far from being used throughout the organization in everyday project work. But, and also due to the Fable-forum, most employees know at least some of the stories presently available on the Divan. Today some 40 stories in different forms and formats are available. An interesting trait by most of the finished stories told and produced on the Fable-forum is that they are all both “real” and “fictional”. The procedure in most of the storymaking efforts has been to take real anecdotes from real project work situations and mold and refine them with use of archetypes and dramaturgical tools into “fictional”, or rather “factional” (Snowden 1999), stories. As the case with the “Broken coffee cup...” story shows. Through real-life story making, like the Fable-forum, and subsequent re-combining through the Divan/Pantomime, and re-telling in other social forums, the employees are activating and mobilizing each others experiences in ways that make other people than the one with the primary experience able to take them *into possession*.

Through the history identification, production, use, re-combination and re-telling, the employees makes their experiences *comparable*, and thereby *transferable* to the extent that they can be mobilised in each others knowledge work.

A possible interpretation of the use of the Divan/Pantomime up to now, as well as future Divan/Pantomime is that the merging stories are becoming a part of the organizational collective memory, and thus background and potential for possible improvisations in practice. They are becoming a part of the *cultural* heritage, and transformed from being only in possession by some individual's private repertoire. Experiences that support this interpretation is that Computas recently have used the stories in different "organized settings"; they used four of the stories in a gathering for new employees, with the purpose of drawing attention to, and reflecting on the Computas corporate culture. Also, they used two histories from the Divan/Pantomime, and one "live-story" in course on methodology in february 2002.

Introducing new stories to the Divan/Pantomime are crucial for Scheherezade and the collective purposeful storytelling initiatives to stay alive. Many employees may depict producing stories as a barrier to overcome. This is understandable. However, with the view of stories as evolving form organizational practice, one does not have to be Stephen King to contribute in producing stories. Employees are already doing that every day. What the support environment of the Divan/Pantomime is purporting to do is to help see and enable the interconnectedness of narrative and practice, use and production in everyday project (and process) work life. And the Divan/Pantomime is being used to some extents. Stories have been submitted to the Divan/Pantomime also after the Fableforum. And the latter was an important initiating experience to put "narrative knowledge" on the corporate agenda, and thereby lowering the threshold of entering the field of "storytelling", which unfortunately has a too strong aura of "Hollywoodesque" attached to it. Another major point, both concerning "the well being of Scheherezade", but more importantly, to the success of storytelling initiatives, is the active real-life use of the stories for certain purposes. At Computas this is being done and intending to be done in several "fields of use"; as part of the introducing of new employees to the process organization and to different project practices stories are being used; as a basis for discussions in methodology courses, for example on issues concerning customer contact. A future concrete intended use is an integration of practice story archetypes with the present (hard) skills manager, to allow for better resource allocation, supporting also "soft skills". In addition the Divan has caused considerable discussions of identification issues, of "who we are". If this is constructive or not, is not to be said here, but arguing that present practice, identificational issues and strategic development ideally should be tightly integrated, these discussions may have strategic implications.

To the general implications of the Divan/Pantomime system and the other cases of Knowledge hyperstories we now turn.

4. From KM to KH (function)

Catching on to the introductory discussion in chapter two, and because it is the most fully realized conception of "Knowledge Hyperstories", let us start out by fitting the Divan/Pantomime realization into the broader picture of the "information age" (Castells 2000) and the microelectronic-based revolution. According to Castells the new

information technological paradigm have a strong historical influence based on three major, distinctive features (in Himanen 2001: 160):

1. their self-expanding processing capacities in terms of volume, complexity, and speed.
2. their recombining ability, and
3. their distributional flexibility

Especially concerning one and two, the Divan/Pantomime system tackles head on the original design of hypertext and the World Wide Web, as it was conceived of by Nelson's Xanadu model (1981) through Berners-Lee "www" design (1999), the ability to recombine information in any possible way. As Castells (2001) discussion of Berners-Lee, the real value of the web will, however, first be realized when Berners-Lee's original idea of the web with *two* functions, a browser *and* an editor, are restored. As we all know, today only one half of the web-design is realized; the browser with attachments of different other tools like e-mail applications. In the Divan/Pantomime the editor function is already restored, by now only in the intranet versions and a password-protected prototype "internet". As described above, the development of the Divan/Pantomime system is in some important aspects an actual realization of Berners-Lee editorial additional function. Also, to some extent, it is realizing Nelson's visionary, and by many regarded as utopian, *Xanadu model* (1981). The Divan/Pantomime separates structure/interface from contents, it utilizes the editor (or editor file), the list of contents, as an enabler for recombining all the existing informational and communicational material in the pool of contents – on the basis of specific purposes decided in real-time situations of need, by each user/producer of the hypertext.

Now compare this to how Nelson, the man who coined the word "hypertext", describes the idea behind his Xanadu model:

"The Xanadu model has always been very simple: make content available with certain permissions; then distribute and maintain documents simply as lists of these contents, to be filled in by the browser (in the same way that browsers now fill in GIFs). Since the advent of the Web, our last several years have been concerned with figuring out how to move these concepts to the very different standards environment that the Web has imposed."¹¹

He states further, "... separating structure from content has many other benefits. Data may be used in place. All content is additive. All structure is additive and applicative, rather than tangled inside (as in the SGML model). This permits many structural variations on the same particular documents and their contents-- variations whose cross-connections may in turn be viewed. If the list of content is made the fundamental unit, many things become possible and principled: nondestructive, additive editing; branching versions, all accessible and re-branchable; profuse unbreaking links; principled and visible re-use (transclusion); deep intercomparison along both links and transclusions; and transpublishing under transcopyright¹²".

¹¹ <http://xanadu.com/nxu/>

¹² <http://www.sfc.keio.ac.jp/~ted/XUsurvey/xuDation.html>

There are of course very many features of the Xanadu model not realized in the Divan/Pantomime, but the basic simple principles are the same. The most obvious difference is of course that the Xanadu model should apply to the whole of the Internet, and the Divan/Pantomime is a local intranet (with internet extensions) based system. But the same simple, basic principles are applied, and they may have astonishing effects. The Xanadu model "proposes a vision of a very different world of media: a network literature of a totally different form and nature from anything that can now be seen. It will allow completely new ways of organizing material..." Will his "utopia" see the daylight? Nelson asks and answers: "This is an entirely feasible approach-- and, once you understand it, obvious. And I think it is altogether possible that many people will want to visit and work in, and help build, such a subuniverse. Is it too late? Would it mean just too much overhead? We believe that like the hidden overhead of the Internet itself, this will pay for itself manyfold. We can see no other important agenda for hypertext¹³".

In Computas, thus, many of the visions of Nelson, and clearly some of the ideas of the original design of Berners-Lee's (1999) World Wide Web, with the two functions of browser *and* editor is being restored and realized. The Divan/Pantomime may thus be considered a "deep web", with the possibility of active recombination in real-time of information needed for specific purposes. That is, the *use* of the editor function (form) for the construction, through recombination, of *situationally tailored* information (content), for achieving certain desired needs or goals (function). It is in the advent of this interweaving and integrative approach to medium, contents on story form, and of functions of practical use we propose the full realization of the concept of the "*knowledge hyperstories*".

As we have seen in the cases, the functions of the knowledge hyperstories are manifold; ranging from the intra-project feedback on collective actions and understandings in a distributed project group, via Aetat; the enabling support provided by the stories in the transition to team organization following the work processes, as well as in the case of "MPC"; were the story(ies) at least are seen as facilitating the establishment of conditions to cultivate emergent, informal and formal "glocal" networks (i.e. the International reference center), to the Computas case; were the potential usefulness of the knowledge hyperstory (ICT enhanced knowledge narratives) are reaching its full potential and realization, as an expanding and ever emerging, *situational support environment* provided by the Divan/Pantomime framework, were stories are the primary knowledge carriers for storytelling practices and practical storytelling. The several goals and functions of the knowledge hyperstories could schematically be illustrated like this:

¹³ <http://www.sfc.keio.ac.jp/~ted/XUsurvey/xuDation.html>

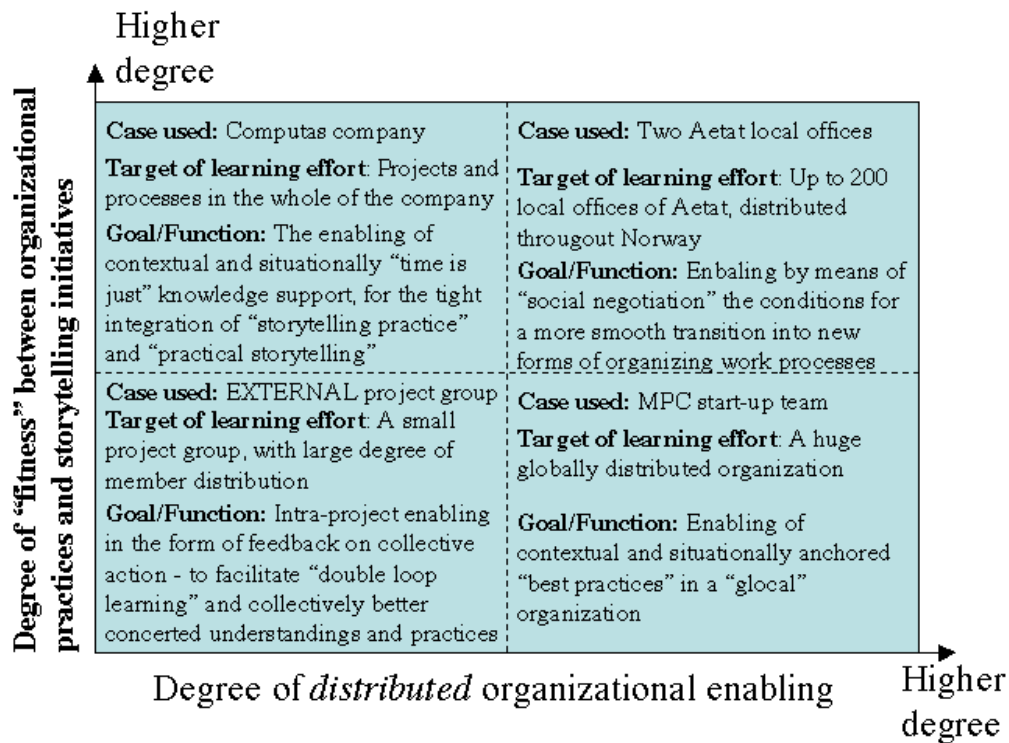


Fig 6. Goals and functions of the knowledge hyperstories, matching the cases with different functions according to the organizations degree of “distributedness” and degree of fitness between organizational practices and storytelling initiatives.

One of the weaknesses of our approach is, of course, that many of its features could only be interpretatively validated. That is, it is difficult or sometimes impossible to measure the effects of the initiatives, beyond the (inter)subjective accounts from the participants in the organizations. Following anthropological methodological practices, the most important source of validation is, a part from the research community, not the mapping towards a supposedly objective external environment, but the feedback given by the members of the organizations that have taken part, both in the projects themselves and employees outside the project groups.

5. Outlook

We argue on behalf of the material exposed above, that “knowledge hyperstories” offers *situated* and “long-term” knowledge support and enabling – through ICT enhanced knowledge narratives, or storytelling. As by now quite firmly established, you cannot *manage* knowledge resources (Krogh, Ichijo and Nonaka 2000) in the sense you manage other kinds of resources. What you can do, however, is support and facilitate enabling conditions for knowledge sharing and creation. As argued by SINTEF (Hatling (ed.) 2001), storytelling as a natural human and social capacity and practice, offers powerful means of *context sensitive* knowledge enabling in organization, both with regards to tearing down barriers and triggering enabling factors. On the other hand, the impact of the ICT integration into more and more aspects of work life is beyond dispute. In several

projects, some of them documented here, we have over time tried to focus on the potentiality of a powerful amalgamation between ICT and storytelling, for purposes of organizational development. We have thus displayed examples of such efforts, tried to show some of the challenges concerning *contents, forms and functions*, and argued for the possible constructive uses of ICT enhanced storytelling for knowledge enabling – what we have conceptualized as “knowledge hyperstories”. From knowledge management (KM) to knowledge narratives (KN) and knowledge hyperstories (KH).

Common to all the cases is the merger of storytelling and ICT as an enabler for knowledge “travels” and creation in practical work contexts. *Knowledge Hyperstories*, thus, comprises the focus on the use of ICT as a mediator and facilitator for a new type of purposeful, non-linear storytelling in organizations. By arguing for an active and activity based view on knowledge, focusing on the relational, communicative interaction processes, our claim is that knowledge hyperstories form a “rich” identification and representation of the knowledge dynamics of practice in the organization. Knowledge hyperstories position themselves as a link between “planning and practices”, in the intersections of *learning histories proper, cyber-, and hypertext* – as an enabler both from an interior and exterior perspective, as exemplified for instance in the Aetat case, for mobilization and allocation of knowledge resources for collective action purposes in the face of distributed organizational environments.

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