Constructing time –

design and development of new media

Joan Greenbaum[a] & Dagny Stuedahl[b]
joanbaum@ix.netcom.com[a] and dagnyst@ifi.uio.no[b]
LaGuardia College/City University of New York[a]
Dept. of informatics/Dept. of cultural studies, University of Oslo[b]

Abstract

New media production and design of ICT (information and communication technology) as web and internet service are characterized by production of commodities that are produced according to whishes and needs of clients, firms, business and media actors. This mass market production highlights the need for new understandings and perspectives on ICT as compared and contrasted with design of traditional information systems (IS). This article describes an ongoing descriptive study in a multimedia production company, illustrating the ways that TIME is constructed as an important actor in the production process.

Keywords: design, development, new media production, actor-networks

BRT Keywords:

1. Introduction

The development of new media products such as internet, intranets and e-commerce capabilities raises issues for new research areas for studying design as an area of social construction of technology. In a brief period of three years the development of world wide web and net-based software has remarkably merged three different professional areas interacting closely in the production processes of mass media products.

In an ongoing study at a larger multimedia company in Norway we are studying the production processes of web services and intranet solutions. The production process is based on interdisciplinary work in teams of programmers and system analysts, graphical or industrial designers and custom account managers. Working from different disciplinary traditions, negotiating with the wishes and needs of the customer organizations, the teams produce new media services in the context of heightened business pressure. The three disciplines are characterized by very different use and understanding of the concept of design. For programmers the concept of design focuses on the issue of functionality and decisions concerning stability of hardware and software solutions. For designers, design is more oriented toward a visual understanding of the graphical presentation. Thus content and style are more important from this perspective. And for the custom account managers design represents strategic planning through contractual documents as agreed on by the new media firm representatives and representatives of the customer organization.

Success in the context of this complex teamwork is driven by the interactive meetings of the products and the receiver or user. In turn, successful internet services, which distribute and exchange information in different internet and intranet settings, is

highly dependent on a good design. Yet the concept of good design is in flux as it encompasses a mix of evolving aesthetics, functionality and the search for a stable technical platform, each of which are shaped through the different professional perspectives of the designers, programmers and customer account managers. The study presented here includes a discussion of the traditional interdependence of culturalist and materialist approaches to media studies (McQuail 1994) since the realm of culture in the communication processes of the internet communication is highly formed by material forces and factors.

New media is generally considered to involve systems that are interactive, reach a mass audience and include communication. Specific products include web sites with functions that include electronic commerce, publishing and broadcast as well as intranet projects that link multiple applications and functions within and between organizations. These types of products and services go beyond traditional information system (IS) design in that they integrate work, leisure, pleasure, learning and communication with information, which was the basis of earlier software development.

In some ways the research analysis presented here is an old story; the retelling of twentieth century tales of divisions of labor and specialization that go back to Taylorism and time-management studies in the early part of the twentieth century (Braverman, 1984). The firm we have studied and the industry it is in, have experienced increased competition, mergers, specialization and new product development in the time span of three years which match that of the first thirty years of software development in the computer field (Greenbaum, 1979). Indeed, some of the dialectical dance between specialization of professions like designers and programmers, and integration of tasks done between the professions, has been witnessed in all office work including the legal profession and insurance processing (see Doorewaard, 87, Greenbaum, 1995). Yet, as will be explained here, these old stories have some new twists. For the speed at which the changes are occurring and the effects the changes have, not only on the professions involved in production, but on the identity of the participants, implies a cultural as well as an economic shift.

1.1 An ongoing study of a new business area

The ongoing pilot study described here is part of a project called TRIM - Translation and Identity in new Media development--and is an exploratory and interdisciplinary project to begin to map the emerging field of new media production and use. This is an intriguing new research area both because the products of new media reach such a wide audience, and because the development of these products is coming about through an emerging mix of the traditions and practices from different professional groups. Our focus is on the three major professional cultures in the production of new media: designers, programmers and business project leaders. And our study looked at the interaction of these groups and will go on to follow the chain of production to customers and on to the users of the media products.

In all development projects, a central issue revolves around the process of *translation*. In new media development, as in the development of information systems, there are complex issues in the translation of customer perceived needs into deliverable products and services. But new media production has a far more complex design and development process. This is in part due to uncertainties in technical tools and infrastructure, uncertainties in customer markets, and uncertainties in coordinating the multiple activities involved. Our study sketches the groundwork of the design and

development process for a variety of new media products such as corporate web sites, governmental services, electronic commerce, electronic publishing and broadcasting.

Our approach is an interdisciplinary one combining a study of work organization and system development practice and an analysis of culture and identity in production and use of new media. The interdisciplinary approach is important, we believe, in order to bring together a culture and identity perspective of producers and users with an economic and technical understanding of how software and technical systems are developed.

We have used methods of contextual inquiry (Beyer & Holtzblatt, 1998) and situated design (Greenbaum,1991,1999) in conducting the interviews for the pilot study. As will be explained, our preliminary analysis is based on aspects of Actor Network Theory (Callon 1991, Latour 1991, Cockburn 1992) and focuses on *intermediaries* in the design, development and use processes. Unlike most social studies of science and technology, this project examines ongoing design and development *processes as they are happening*, rather than examining technological development in retrospective. In order to do this we have used in-depth interviews of 1-2 hours as a basis for an ongoing and modified application of actor-network concepts.

In the period of august 1998 – April 1999 we conducted 23 interviews[1] in three different companies; 13 interviews with designers and programmers of the main firm under study, 3 "talk through" observations (see Greenbaum 1999) while working, 3 interviews with key account managers and 6 interviews with representatives of the steering board. For each interview we asked the interviewees to talk about a theme. The interviews were recorded on audio tape, and afterwards transcribed into electronic documents. The need for using video recording for the further studies is though clear to us, new media production is highly visual.

In analyzing the transcripts and the notes of our interviews we have identified a number of intermediaries through which the activities of the different professional groups take place. In describing actor networks, Callon (1991), describes intermediaries this way: "..any entity able to associate texts, humans, non-humans and money". (p. 140). He continues "an actor is an intermediary that puts other intermediaries into circulation…" (p. 141). The significant intermediaries that we have chosen to follow and try to unravel are:

- documents;
- meetings;
- skills;
- architectures (information and systems);
- testing procedures and tests; and
- product objects or modules.

These intermediaries, as actants, both human and constructed, represent points in time and place where actions converge. In addition to the above list, we of course

[1] For five interview subjects we carried out subsequent interviews, with the first interview taking place away from the subject's work and the subsequent interviews being done in the context of their work setting. In addition we were observers in several meetings and one weekend seminar. The in-depth interviews with the designers were recorded and transcribed. The interviews with programmers and key account managers consisted of detailed note-taking, as were the observations.

followed the thread of money, as it appeared as payments, expenses and constraints in various documents, meetings and other manifestations. We selected these intermediaries for further study after extensive cross-referencing of our interview notes and transcripts[2]. We see the convergence's as a crystallization process where the intermediaries such as documents, meetings, and program modules, align, in this case, in rapidly shaping the forthcoming product. As Callon explains: "Convergence measures the extent to which the process of translation and its circulation of intermediaries lead to agreement" (p. 144).

Instead of simply reporting on the incidences of the intermediaries we have chosen to follow their threads and unravel their actions through the themes we present here. Since the themes were the basis for selecting intermediaries, and because the stories they tell are closer to the actual case material, we believe that they provide a better picture of the unfolding events. While previous Actor Network studies identified intermediaries *after* the development of a new technology, we found it useful in our study to stay close to the material through narratives, since our pilot was a study of *current* and actively evolving development. It is important to note that the following narratives present the case material through the eyes of the human participants (actors), while the analysis of the intermediaries, which follows the narratives, analyzes the material by blending the human and non human actors.

The intermediaries reflect both the material and nonmaterial interactions as told through the actions and stories of designers, programmers and customer representatives. They show stages in the development of the complex process of translation from customer ideas through deliverable working products. They also show how the inscription process is shaped by the interaction of the intermediaries and how ambiguity is resolved and re-formed through changing professional identities and the identities of the products. Madeleine Akrich explains inscription of intermediaries as ways designers define actors with specific tastes; "A large part of the work of innovators is that of "inscribing" this vision of (or prediction about) the world in the technical content of the new object" (Akrich 1992). Further research would be needed to follow up on the inscription processes by examining the documents, code, tests and program objects.

2. Three narratives of construction of time

Getting a picture of a web designers' everyday life demands acceptance of the fluidity and apparently accidental activities facing us while observing. In the following sections we unravel the thread of intermediaries through stories of everyday activities the interviewees showed us and told us about. We begin with some examples from a web designer who we here call Eva. Coming from the handcraft of typography Eva was close to autodidactic when she started doing web design in the beginning of the 90s. Eva is one of the older designers in the company, and was highly appreciated by the managers of the company because of her disciplinary integrity and reflected approach to web design. Her responsible approach to the production was confirmed during an observation session of her work, where she pointed out that some of the actions she did, such as trying out the

[2] The process of selecting the intermediaries was a lengthily one based on collaboratively reading and rereading the transcripts and notes and lifting out themes, ideas and repeated phrases of the interviewees. It was also based on the prior experience of one author who had worked previously as a system developer and noted points in time where projects and their products often changed shape and direction.

style sheets used in the design in different browser versions, actually were not her responsibility. But she wanted to verify the design by asking questions of the programmers during her work with the web site in HTML-matrixes.

In an interview about her everyday work in the company, Eva explained that she is involved in 6 different projects at the same time, all of them in different phases, so that the actual creative work is in 2-3 projects at the same time. Every project in which she is involved has one team meeting a week in the production process, depending upon the varying number of meetings with the customers of every project. In addition to this the company is having a weekly “traffic-meeting” where the employees are all meeting to get information from the managers about new projects and strategies planned. Trying to draw a picture of the actors that Eva is dealing with in her everyday life, we can define these actors as:

1. the company, characterized by reorganizations and merging in the markets, trying to find a strategy to protect for the uncertainties of the digital future and of the Norwegian market of new media
2. the different customers with individual and often plural needs and expectations of the internet products Eva and her team are paid to design for them
3. the different teams in which she is involved existing of three disciplinary groups belonging to different traditions, views of practices and disciplinary identities
4. the community of web designers illustrating and defining themselves in national and international competencies awarding the best design of the year
5. her individual disciplinary strength and expertise, which also could be her choice of strategy positioning herself in the company.
6. the time directing the production and work processes, and the cultural processes in the company

The picture of involvement of actors drawn above also gives an impression of the different layers of actors that the individual designer, programmer or customer account managers have to negotiate with. But it gives no impression of the rate of speed that also could be understood as an actor that influences the production process. We will now relate three themes from our interviews which illustrate how time and constraints of time could be considered as influencing both the process and the products of new media. The stories capture specialization, standardization and reuse of modules and codes, issues which will be returned to in section 3 when we analyze the intermediaries.

2. 1 Constructing time to shape identity

In one interview Eva talked about how she responds to the challenge of the company to be on the “cutting edge” of new media production by delivering products that represents “the state of the art” of internet services. The development of net software and technical solutions she says, is so massive and so broad that she has given up keeping updated on the whole specter of the branch. She explains that she is afraid of being burned out creatively if she tries to keep up with all news relating to web production. Therefore she has recently decided to build her expertise and competence by following developments of new fonts, even if she doesn't like specialization of this kind. In her view a good product consists of deep, and more specialized understanding of the medium by all actors that are involved in the process.

The choice of concentrating on the introduction of new fonts could from the external view seem rather peculiar, since the use of fonts in WebPages is rather predetermined by the inscribed fonts of the application tools used in web production. The

choice is becoming understandable though, because we know that the professional background of Eva is connected to the handcraft of typography and print. In these professions discussions of fonts are central for the handcraftship. By using her knowledge of the past she is constructing both her own role in the web productions, and an individual professional identity.

This construction of belonging to a professional tradition could also be read as construction of historicity, as historicity in Giddens terms orients to the future (Giddens 1990). Construction of historicity and identity can in Eva`s case be understood as strategies for getting control over her everyday life at the company. As both historicity and identity help her to define both her competence and her responsibilities in a web production. Constructing historicity to use the knowledge of the past as a means of breaking with it in the future, could for Eva also be a way to create a path for her own development of competence in web design. In this way, her specialized *skill* becomes an intermediary through which the products she works on are shaped by a newly divided labor process. Instead of remaining a generalist for all design issues, she uses her past experience to intensify her knowledge of fonts; leaving other aspects of design to others in the firm. Unlike the enforced division of labor typical in the industrial period (see Braverman, 1974) and the early computer field (Greenbaum, 1979), Eva's experiences and those of others we interviewed have more elements of choice based, at this point in time, on prior experience and professional identity.

A programmer, who had been with the company for almost three years, yearned for the earlier days. Then he enjoyed the "social part of working in teams of designers, account managers and programmers on small projects". His most pressing wish was to work on one project at a time, but he realized that with the speed at which customers want things, this was no longer possible. Kim (as we will call him here) currently was working on three major projects and hosts of smaller 'patch' and rush jobs which came across his desk. Often each project and job part was done in different languages and applications; he was currently using HTML, ASP, LDAP, MS Visual Studio, Oracle and Cybase.

While he wished that he could continue meeting with customers so that "we could come in earlier in a project and put our foot down", he wanted to be involved in both the information architecture and presentation design which designers and customer account managers did. But he accepted that the role of small teams with programmers as generalists was not the direction the firm was taking. Nor was it a likely option since, as he pointed out, the infrastructure of the systems he was working on had changed and the type of company databases he worked with were embedded in company legacy systems or attached to other functioning systems. He was interested in going deep-down into database programming and saw this as an area of specialization where he could retain his professional knowledge and work on the more isolated parts of development projects which were assigned to him. Like Eva, the specialization of his skills become an intermediary through which the product can be produced more quickly. In addition, this type of specialization through database design is part and parcel of breaking products down into smaller, more manageable objects and modules.

2.2 Constructing time for quick delivery

Another web designer, whom we call Adam, told about a different strategy for building learning into the everyday life of the company. In a critique of the design of the company's products, he used the expression “safe design” to express the emerging

conventionality. The expression “safe” is in Norwegian used to characterize something as predictable, conservative and well known. Adam used the expression “safe” in the meaning of successful in deliveries, as well as the amount of control in both the production process and the ultimate use of the web product by customers. In his view the products are all beginning to look alike.. He then told the reasons he believed that the company chooses these safe methods of web site building.

The “safe design” and the conventional web pages using the same structures of the content, are means to increase the efficiency of the production process. The type of standardizable design Adam spoke about has become a standard for information architecture within the firm and increasingly within the industry. And this type of information architecture, in turn, acts as an intermediary through which other activities take place. In this way the teams are buying time and space for other activities, which for him meant time for updating himself in new web software and application methods. Being aware that competence is the alpha and omega of a future in both the company and in the market, delivering standardized products to one customer, opens for designing more sophisticated products to other customers. The negotiations and the choices of this construction of time and space are not openly spoken about in the firm, and Adam told the story at a point of time when he had made his decision to leave the company.

A senior programmer looked toward the idea of being able to construct “safe” systems as an important step for a new media firm in the midst of a market where the technologies from infrastructure through programming tools were changing every six months. From his perspective, “safety” lay in being able to design, develop and test a system which could be delivered to a customer in the promised time, and importantly for the agreed upon amount. He told a "failure story" about a project, which had been contracted for at a fixed price and which went several months over the delivery date, resulting in the firm "eating the costs of testing and modifying the system". In his position as a senior programmer he worked together with a lead designer, and felt that technically sound systems could be constructed on time and still include innovative functional and user interface design. As an example he showed an electronic commerce system for a supermarket chain, which included some new 'shopping cart' features. From his perspective a sound technical design along with employing programmers with the right competence to develop it, was the cornerstone of good deliverable products.

Customer Account managers are often the first people to meet with prospective customers. For them the important steps in safe design and development are locked into clearly written specifications and contracts. One account manager, whom we shall call Ole worked mainly with a large customer with several different departments. Over the last several years this large financial customer had begun to do some of their own web and intranet development in-house. In addition the customer's organization had also started to contract with other new media, software and design firms for bits and pieces of technical solutions. This made Ole's job much more difficult and he had a shorter time to convince them that staying with this firm was the best option. Given this shorter time constraint, he found it advantageous to sell the customer on known solutions, or projects that could be delivered in a controllable period of time. For Ole the time between proposing something to a customer and the signing of the specifications and contract, had collapsed, putting more pressure on him and on down the line through presentation and technical design.

None of these time constraints are unusual in the software business. Since the early days of software development in the 1960s customers have wanted something delivered "yesterday", and programmers and operational people have had to jump into the

stream of time demands and bend their skills to produce. Yet in new media the time demands have an aura of *re*constructing time. As the above narratives illustrate the reconstruction of time through intermediaries like information and systems architecture, and written documents such as contracts, are reshaping the activities of the firm into very short time slices. This will be returned to in the concluding discussion.

2.3 Constructing time to produce space

Returning to a designer's perspective, Adam pointed out that that in his view the programmers had the most difficult time constraints, since they had the responsibility for finishing the product by programming the whole product ready for delivery. When a delivery is past the delivery time the designers do not get accused in the same way as the programmers, because the designers, working at the front end of a project, have held their deadline. Adam then tells a story about programmers which, in a way, contradicts both the story about identity shaping and competence building. He explains that he can code the same product in Dreamweaver in a day time while it would take a programmer one week to code it according to traditional methods. The code generators like Dreamweaver he says are now getting better and the codes in themselves are not so clumsy and messy as they used to be.

Programmers though prefer to program themselves in order to have better control over the product. But programmers also see the possibility of gaining some time by using Dreamweaver themselves for certain projects. In this way they construct time for other and more complicated battles. This choice Adam points out, is normally not made by the young and inexperienced programmers, who according to him, often have a “hard-core” attitude about the superiority of programmers' knowledge, with respect to reusability and security compared to the code generators. When studying identities and negotiations in a company, the phenomena of programmers using Dreamweaver is very interesting. We see here an example of profound sacrifice of ideal professional identity in exchange for constructing time and space to do other things. In this case to handle the constraints of being the last resort of the production process.

From a junior programmer's perspective time is shaped both by the programming languages that he uses and by the size and complexity of the modules or objectives that he is given to code. Jens, a programmer who has been with the firm for a few months is currently working on six smaller project modules for different organizations and a range of shorter tasks. The modules range in size from two hours work up to a few days and involve tasks like adding functionality to an existing web site, to coding log-on and user ID entry screens. He codes each in whatever language is appropriate to the task; sometimes this has been decided on already when the task is given to him, and sometimes he chooses from the range of languages he feels comfortable with. These includes: Java, ASP, Visual Basic, Perl, and emac, and now he is learning Silver Stream. He has no problem accounting for his hours worked, because, as he explains, the firm has returned to a spreadsheet time management scheme, which he says is "back to basics". For Jens, coding small modules quickly is a matter of re-using code, something that other programmers and the firm also encourage and something that object oriented programming supports. Thus modules that are fairly common to most systems, like user ID entry screens, and templates for ordering information, can be modified and reused in other systems, becoming intermediaries through which the time frame of other activities is collapsed. By speeding up his own production, Jens is able to grab time in between as

increasingly this new found time is quickly noticed through the timesheet documentation, and tasks for learning new applications. But, Jens is reassigned to work on other project modules.

Similarly customer account managers are able to handle more customers, and process their contracts more quickly when sites, screens and functional objects on those sites mimic other sites and objects. Again, this type of standardization of project parts is not unusual in earlier software development projects for Information Systems. Rather the novelty here is based on the coming together of many standardized routines in a rather unstable market, using remarkably un-interchangeable technical systems, combined with different visions and meanings of what a well designed deliverable product is.

3. Weaving the threads of intermediaries

The speed with which new media products are produced and delivered is remarkable. Initially in our pilot study we had planned to follow a project through a translation process from customer inception through operational media product in use. This approach however, proved infeasible since all of the programmers, designers and account managers were working with many clients and many projects at the same time. It is true that this has been going on in software project development for quite some time (and raises serious issues for software engineering and project management[3]). We found that the number of projects and the speed with which they were crystallized into delivered services, is an issue that raises questions for further research in the development and use of new media work.

The ways that both the identities of the products and identities of the professionals were shaped through the intermediaries, was noticeable in analyzing the interview data from the pilot study. And the extent to which this shaping of identities was influenced by money and time, in the form of contractual demands of the clients and perceived conditions of the market, was, as Callon (1991) points out, significant. First we take up a discussion of the shape or identity of the resulting products highlighting the ways that ambiguity was diminished in order for the translation process to occur more rapidly and follow a more standardized pattern.

As in any system development effort, documents and meetings are important intermediaries through which software products take shape. In the instance of the new media projects we studied, there was an increasing tendency towards development projects involving two, three and up to five other firms which meant increases in documentation and, of course, contractual agreements with the other firms. This put more pressure on customer account managers to continue to be the first people involved with customers and probably played a role in increasing their importance in continually meeting with customers. Similarly the role of documents, meetings and contracts, was influential in highlighting the work of designers, since the presentation and interactive

[3] In further work we plan to discuss the organizational structure and ownership patterns of firms in this field, and relate the direct business considerations to the way new media software is developed. It is noteworthy that current textbooks and methods for IS development offer project management techniques for managing single projects. We see indications in our pilot for suggesting new multiple and layered project management strategies.

designs had to become part of the contracts. Not surprisingly, the effect of more firms involved, and additional contractual agreements to bind and coordinate firm participation, were conditions that leaned toward closing out ambiguity through 'safe' designs from the standpoint of traditional presentation and interactive displays.

Program modules or objects were perhaps the intermediary which had the most influence on aligning and coordinating the activities of different actors. When specifying information and systems architecture, contractual systems were broken down into a large number of small units such as screens, and functions on screens such as log-on and order entry functions. Each of these modules or objects then could become more discrete and standardizable units that could be divided between the different firms and the three professional groups within our pilot firm. And under documentable conditions, each object or module could be tested by the new media firm, and/or its contractual partners and the customer.

The role and functions of information and systems architecture were also rather quickly inscribed in documents through early agreements with other firms. In some cases, other design firms or software companies had already done preliminary specifications, so the role of the actors in this company was to develop according to prior agreements. *Information architecture*, or the structure of the *content* of the site or application, is an evolving newer function being taken up by designers. *Systems architecture*, the specification process traditionally part of programming and systems analysis functions, must now fit with that of information architecture. Sometimes the conflicts between these two perspectives are spelled out in the documentation, but more often the real problems are ironed out in meetings between the groups and depend for resolution very much on the skills of the professionals involved.

Throughout our interviews the role of both informal and formal meetings, was commented on by the participants. Sometimes informal hallway 'meetings' between programmers and designers, shifted a focus and resulted in another way of coding or designing a program module. At other times team meetings were explicitly called to keep up to date with modifications and make decisions about future changes. The firm also had weekly 'traffic' meetings where new projects were presented and decisions about the company's organization were announced. It is common in most project-oriented work (such as engineering or legal cases) that meetings act as the glue that holds the activities together. While it is therefore not remarkable that meetings would be an important intermediary in a new media development process, it is interesting that informal and undocumented meetings seemed to be playing a more important role. This is an observation which would have to be followed in future studies, since it hints at important and shifting alliances of different intermediaries.

The process that we observed of breaking each project down into manageable and controllable modules or objects is one that many industries from McDonalds through software manufacture have tried. In practice however, the translation process of complex projects into standardized or replicable object parts, is one which often takes place 'on the fly' through accidental alliances of different intermediaries. Again depending on the skills of the people involved, or depending on meetings with the client and the client's IT staff, or through tests which indicate problems with system parts, new modules and objects can get broken out and isolated. In this way the inscription process in the delivered product is an ongoing one.

It is important to keep in mind that money, and its corollary, time, are dominant actors in shaping program objects and ultimately products. Success and failure stories told by participants in the firm highlight the ways that projects met or didn't meet their

deadlines and thus their cost constraints. Failure stories, rather common in the industry in general, usually revolved around products that missed their 'launch' dates, or were launched with objects or modules which were not as yet fully functional. One of the ways, common in IS development, to diminish the failure stories is to break each project down into different functional modules so that separate 'pieces' can be delivered on time and for an agreed upon cost. Object-oriented programming and analysis is a tool through which this process of standardizing and separating project parts can be more easily accomplished.

In *The Culture of Time and Space 1880-1918* , Stephen Kern (1983) documents the way that time and space were standardized and measured at the end of the last century and the beginning of the twentieth. He discusses three modes of time: *past*, *present* and *future*; and three aspects of space; *form, distance*, and *direction*. He shows that the introduction of railroad schedules, for example played an important role in regulating and standardizing time. For Kern, it is *speed* which is the linking factor between time and space, for the speed with which actions took place and the distances they covered changed remarkably during the time period he studied.

Similarly we find that speed is an important link between the time and space dimensions of new media development. Everything from the number of projects to the number of firms participating in each project has changed in the short period of time during which we conducted our pilot study. As each project object, and each contract document became more modularized, the finished products tended to become safer and more standardized. Just like the railroad timetables in the earlier period, web pages and e-commerce functions are taking on design and production characteristics which affect both private and public use of time and space.

In our study we recognize this by the way standardized web sites are trying both to capture the expectations of specific users, and to keep them on the site by personalizing services and entertainment. The ideal web site for the designers we spoke to is efficient in use by serving information that is quickly found, and by a navigation that is entertaining and stimulates reuse of the site. In addition the user should be able to get all the information she/he needs within a short time, and without navigating too much. Ideally in the designers view, information content of one subject should be linked *across* the different customers sites. But in reality, economic interests of the web informs standards that offer navigation not in cyberspace, but inside the same web site, or navigation inside a “personal space” in personalized offerings and push-services. The standardized, “safe” web design, could in this way be understood as decided and shaped by time and money, and is basically connected to compromises with professional identity of the people involved in production, and negotiations with the users identity. An illustration of how this is culturally shaping, is the use and understanding of metaphors (Bolter 1996) in has changed in web production. Metaphors have a basic function for the concepts on which the design is built. The conceptual understanding of cyberspace has changed its meaning radically in the short time of World Wide Web, from being a metaphor with an orientation towards the outside world, to a focus and concentration on the local. In use we are now understanding cyberspace as an inside place where the intention of use is to explore the already visible and existing (Sørensen 1997:52).

New Media development is a field that is growing and evolving at a pace that matches the first thirty years of software development compressed into a little over a three year time plan. The speed and intensity of rapid production of small project objects through a complex division of labor is remarkable as compared to the changes Kern (1983) studied in the early part of the century, as well as those in the second half of the

century. While some of the complexity of development resembles that of Information Systems development, the emphasis on products that affect mass or potentially mass audiences, and the involvement of multiple partner firms and professions, marks new media development as a new area to be studied.

Our pilot study has identified a group of intermediaries which we feel will be useful in further studies that examine the shaping of identities of the products and the professions involved. The use of narratives and the analysis through intermediaries has been fruitful in focusing on the multifaceted meanings of design as seen through the eyes of designers, programmers and account managers. We believe that our pilot has also demonstrated that a modified application of Actor Network theory could be used in studying technological development as it happens, rather than as an historical phenomena.

In addition, we feel that the combination of a cultural perspective on identity of human actors, and an economic and technical analysis of the shaping of products and procedures, will be useful in further work. It has not been easy to blend these two research perspectives, but we believe that the cultural perspective of individual identity as seen in the narratives, and the more abstract technical and economic perspective as applied through an analysis of the intermediaries, has yielded some new insights. In particular, an important insight for further study lies in the intersection between individual identity and the production process, and their mutual shaping which appears to be happening at a faster pace. And as Kern pointed out *in The Culture of Time and Space* (1983), speed is the linking factor between time and space. Just as his study documented the turn of the last century through technological artifacts like railroad schedules, interdisciplinary studies of web site production and use could trace the culture and economics of the early part of the new century.

Further studies would also need to look at the way public and private time of both users and producers is being changed as the speed of collapsing time and space intensifies. For systems developers it could also be important to follow the thread of intermediaries in order to identify the parts of the development process that differ from IS development and thus the need for new methods and procedures. Reconstructing the time dimension in production affects all aspects of development and use. It also effects our identities as producers and consumers.

References

Akrich, M. (1992). “The De-Scription of technical objects”. In Bijker/Law (eds*) Shaping technology, Building society*: Studies in sociotechnical change. MIT Press. Cambridge, Mass

Beyer, H. & Holtzblatt, 1998 *Contextual Design*. Defining customer-centered systems.Morgan Kaufmann Publishers,Inc. San Francisco California

Bolter, Jay David 1996:*Electronic Technology and the metaphor of the city. Telepolis* (http://www.ix.de/TP/issue196/nfnavsp.htm)

Braverman, Harry (1974). *Labor and Monopoly Capital*, The Degradation of Work in the Twentieth Century. NY: Monthly Review Press,.

Callon, M. (1991). "Techno-economic networks and irreversibility", in J. Law, (ed) *Sociology of Monsters.* Essays on power, technology and domination. Routledge, London.

Cockburn, C. (1992). "The circuit of technology: gender, identity and power” in R. Silverstone, E. Hirsch, *Consuming technologies*. Routledge, London.

Doorewaard, H./ Martens, W./ Regtering, H/ Riesewijk, B. 1987 "Dance macabre: The fortunes of integration and segments".In Bjerknes, et al, *Computers and Democracy*. . Avebury

Featherstone, Mike 1995: ”*Undoing culture - globalization, postmodernism and identity*”.

London, Sage Publ.
Giddens, A. (1990). *The Consequences of Modernity*. Cambridge :Polity in association with Blackwell
Greenbaum, J. (1979). *In the Name of Efficiency*. Management theory and shopfloor practice in data-processing work. Temple University press, Philadelphia
Greenbaum, J with M. Kyng (eds) (1991) *Design at work*. Cooperative design of computersystems. Hillsdale N.J Lawrence Erlbaum.
Greenbaum, J (1995). *Windows on the workplace*. Computers, Jobs, and the organization of office work in the late twentieth century. Monthly review press, New York
Greenbaum, J (1999). *Situated Fieldwork guide*, in progress.
Stuedahl, (1996). *Kyberlore og Kyberidentitet om identitisskaping paa internettet. Master thesis University of Oslo.* http://www.ifi.uio.no/¨dagnyst
Kern, S. (1983). *The Culture of Time and Space 1880-1918*, Harvard Univ Press.
Latour, B. (1991). "Technology is society made durable", in J. Law, op. cit.
Soerensen, Bjørn (1997). “Let your finger do the walking. Rom/sted metaforen i on-line datakommunikasjon” *Medie Kultur*. Aarhus 1997:27 p