Transparency In Information Architecture

Enabling large scale creative collaboration over Internet in architectural education

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This paper presents some results of a quantitative process analysis of two types of courses in Computer Aided Architectural Design that were taught using database-driven online environments. It focuses on the performance of these online environments as information structures, designed to accommodate the presentation and the peer-to-peer exchange of design information for relatively large groups of between 60 and 150 participants. Using the database records to reconstruct the processes, three different quantitative analyses are described. Their results indicate that for these projects the web-environments were successful in enhancing peer-to-peer learning and that they promoted a more objective assessment of the submitted works. The study also looks at the effect that the environments themselves had on the process. Finally it makes some conclusions about how such environments must be designed to handle the dynamic display of design data in a way that is transparent to the users.

Keywords: *Online Communication and Collaboration; Architecture and Digital Media Theory; Information Access; Web Environments.*

Introduction: Creative Collaboration in Design Education

Collaboration over computer networks is becoming ever more common, replacing traditional ways of working together in many fields. The promise of networked collaboration has often been pointed out: The meeting room is replaced by an information structure, which accommodates the information transfer. Through the network, this information transfer can happen almost independent of time and space. And it can be accessible to far more people than fit into any meeting room.

The early blueprints of the World Wide Web were developed at CERN in the late 1980ies to enable collaboration in scientific research (Berners-Lee 1989). This type of collaboration is the classic networked collaboration: it is based on direct peer-to-peer exchange and is by definition non-hierarchical. It is referred to here as creative collaboration, because the goal of the sharing of insights and data in scientific research is to make progress towards a common goal for which the individual steps cannot (yet) be clearly identified. The process thus resembles a continuous, open-ended testing, rejecting or building on other people's work and ideas. The open source movement has successfully applied this model of networked collaboration in their numerous projects (O'Reilly 1999).

Traditional creative collaboration is also very common in architecture: Design processes typically go through different stages at which preliminary solutions are presented and alternatives and problems are brought up and discussed by groups of people. Because creative collaborations also imply a continuous learning process for everyone involved, they are equally common in architectural education. Therefore it seems obvious that the architectural discipline can benefit from tapping into the collective intelligence (Levy 1997) that can form through computer networks.

But networked collaboration also poses new problems. There is a widespread concern about our growing incapacity to stay "on top" of the immense amounts of data which the Internet contains. At a smaller scale the same happens in collaborative processes. Distributed creative collaboration that takes place over networks is dependent on an adequate information architecture that can enable an efficient, yet unbiased presentation of the shared content. To establish a true equality between the participants and an equal chance for the works they contribute to the collaboration, this information architecture must have a quality that may be best described as transparency. While establishing this transparency is never a simple task, it is particularly difficult when the content is visual in nature or otherwise hard to categorize objectively, as is typically the case in design.

Quantitative Process Analysis of two Case Studies

The teaching projects phase (x) and fake. space are referred to here as case studies. Both were introductory courses in Computer Aided Architectural Design, taught for three consecutive years at the architecture department of ETH Zurich between 1996 and 1999 (Hirschberg 2000, 2001). They are still of interest today, not only because they both established creative collaboration over networks in design education at a unique scale. They are also ideal objects of study, because both projects employed database-driven online environments to support and manage the collaborative processes and offer rich documentation, not only of the results but also of the process by which these results were created. Therefore it is possible to perform quantitative analyses based on their database records that allow an assessment of the collaborative process, not just the final state. This paper presents some results of a quantitative process analysis of these projects.

So what are the questions such a process analysis might be able to answer? In the following paragraphs, three questions, the assumptions they are based on and an interpretation of the results of their quantitative analysis are described.

Did the environments enhance peer-to-peer learning?

To measure the success of learning is difficult, particularly in design. A quantitative analysis of this question is only possible, when it is based on some simplifying assumption. In this case it is assumed that peer-to-peer exchange (of design information) at least potentially equals peer-to-peer learning. Considering how important learning from the work of others is in the traditional studio system in architectural education, this assumption is reasonable.

Both projects, phase (x) and fake. space are based on the exchange, respectively the linking of individual submissions of the students. As this exchange is recorded in the database, it can be evaluated between which students the exchange took place. The classroom teaching happened in two ways: a common lecture for the whole class (>100 students) and workshops for which the class was split into groups of about 20 students. These workshops in groups were led by different assistant teachers who each developed their own style, their way of presenting the assignments and of discussing the results with the students. These groups were also the units in which students

would get to know each other and learn from each other much like in a traditional studio situation.

To show that the environments indeed enhanced the exchange (and thus the learning) at the peer-to-peer level the quantitative analysis has to prove that the choices of the students which works to develop further or which ones to link to indeed transcended the boundaries of the workshop groups. If that is the case it means that the number of works the students looked at and chose from was not determined by the group, but was expanded by the online environment to include the whole class. Indeed the surprising result in the third phase (x) class is that there was no significant correlation between the groups and the choices. The average of 20.83% of works that were chosen from within the same group (figure 1), in a class with 5 groups suggests that the groups weren't a factor in the choices at all.

Did the environments promote a more objective assessment of the works?

The above finding confirms that the online environments were successful in creating a broader awareness of the work that was going on in the class among the students. Rather than some showcase or control mechanism used by the teachers only, the class websites were an active part of the students' working environments. The finding also suggests that personal reasons, like belonging to the same group, were not relevant factors in the students' choices. This could mean that the way the works are presented, they are perceived as detached from their authors. Such a neutralizing effect could be said to lead to a more objective assessment of the works, objective not in the sense of rational, but in the sense of uninfluenced by factors not directly part of the work, the object itself. Since authorship was always clearly stated with every work, a neutralizing effect of the web-environment, although it was intended, is not at all self-evident.

To support this result quantitatively, the individual linking patterns of the participants were analyzed. The assumption the analysis was based on is that if social and interpersonal forces were not neutralized by the environments, this would lead to patterns of re-linking to the same persons' works, of exchanging work back and forth between two or several people, etc. So the analysis had to prove the absence of significant amounts of such patterns.

The analysis of the phase (x) courses indeed shows that such patterns, although they can be found, are the rare exception rather than the rule and thus support the notion that the criteria for the choice has only to do with the work itself, not with

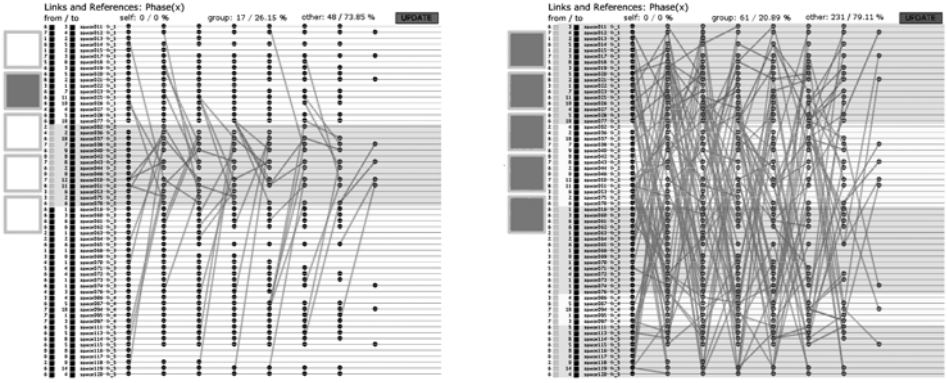

Figure 1. Phase(x)3 analysis: Exchanges of designs between participants through different phases in phase(x). Only 20.89% of exchanges happened within the individual groups, which with five groups indicates that group boundaries were insignificant for the choices.

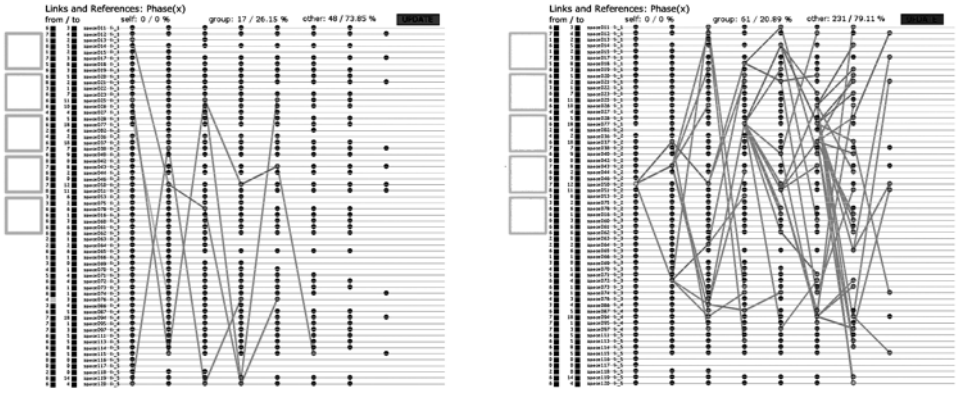

Figure 2. In Phase(x)3 Personal selection patterns that appear to follow social reasons like exchanging works back and forth or repeatedly taking the work of the same person were the rare exception, not the rule (left side). 39 different authors from all groups contributed to the various branches that start from assignment 1 of author space050. Inter-personal dynamics were neutralized by the web-environments.

its author (figure 2). Therefore according to our definition, the assessment of the works, on which the choices are based, can be called more objective.

Did the environments themselves introduce a new bias?

Since the web-environments are said to have had a neutralizing effect on some of the inter-personal dynamics that could normally be expected to influence the choices, the next question is what types of distortions were introduced by the web-environments themselves. Obviously there will be some, as there can be no absolute equality in the display of information. Even the most considerate way of displaying large quantities of information will not be neutral. Inequalities in sequence or positioning due to alphabet, affiliation, time, etc. cannot be avoided, just as differences in legibility due to size, lengths of names, choice of colors, etc. to name just a few. The best a designer of such displays can do is to keep these inherent distortions as small as possible and to make the reader aware of them. But that won't eliminate them.

So the question is not whether the online display of the data introduces any distortion. The question is how severe the effect of this distortion was in the case studies. As the claim was made that choices of works could be done more objectively through the impersonal mediation of the website, it must be ruled out that the bias of the online display is more important for the choice than the personal preference. If the bias inherent in the web environment was a strong factor, this must be considered a problem.

To investigate this question quantitatively, the influence of the default display is assessed. While various possibilities to customize and filter the listings of the works were available, the default listing (showing the most recent additions to the database first) was obviously the one most people got to see and therefore represents the strongest distorting effect of the website. As it gave a preferential treatment to the most recently submitted works, the amount of time that a submission was in this "pole position" (one of the last ten works accessible without clicking or scrolling – the times spent in pole position range from less than an hour to several days or even weeks) can be expected to influence its success more than any other factor inherent in the web-environment.

The analysis shows that in phase (x) there was no significant correlation between the time a work was in pole position and the number of times it was chosen by the peers. In the first fake. space project however, the correlation is significant.

While there are some explanations for this that have to do with the different content of the two classes (in fake. space people were not sharing design information, but collaborating on developing narrative threads, so it often made more sense to add to the most recently submitted end of a story than to create a new branch in the middle), maybe the main reason is that in phase (x) design precedents had to be chosen from the previous phase, while in fake. space participants could link to most any submitted work. Therefore the number of works to choose from was not between 50 and 150 like in phase (x), but towards the end of the semester greater than 1000. While various filtering and search mechanisms available as part of the interface made it easy enough to browse these works, it is not so surprising that the distorting effect of the default display is more noticeable, when the search space is bigger.

Transparency in Information Architecture

The absence of distorting effects of the web-environment found in phase (x) may be described as transparency (resp. the distortion in fake. space as a lack thereof). To avoid this distortion and to work towards developing information structures that can handle even larger amounts of design information, one may try to define what accounts for this desirable quality.

The term transparency has a tradition in architectural theory. The famous essay by Colin Rowe and Richard Slutzky (Rowe 1997) distinguishes between literal and phenomenal transparency. The literal or "see through" transparency is not really applicable when dealing with bits and bytes. Phenomenal transparency on the other hand is interesting. Slutzky and Rowe adapted a concept from painting and introduced it into the three dimensional world of architecture. The challenge is whether their theory could be further expanded to become meaningful in the multidimensional realm of information architecture. Slutzky and Rowe's definition of transparency as the condition of "clear ambiguity" can be understood as an openness of reading architectural spaces and elements as being part of multiple conceptual configurations. An equivalent of the multiple spatial readings of transparent architecture in the realm of information could be defined as the quality of providing "multiple simultaneous readings of the same information".

Looking at the phase (x) website in these terms, we find that indeed the interface possesses

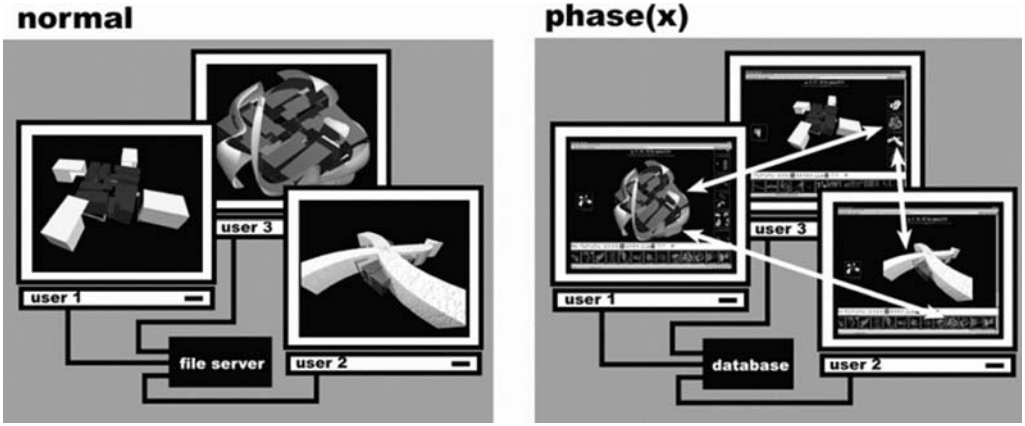

Figure 3. Transparency in information architecture: the web environment provides multiple simultaneous readings of the same information. All works can at the same time be read as part of a phase, offspring of a precedent or works of a particular author.

this quality (figure 3): All works can at the same time be read as part of a phase, offspring of a precedent or works of a particular author. As, according to the quantitative tests described in this paper, phase (x) did display transparent characteristics, the simple formula of "multiple simultaneous readings of the same information" can be seen as providing a key to an organizational strategy to achieve transparency in information architecture. In itself this formula is hardly concrete enough, though. Phase (x) also supports abstract overviews that allow to visually analyze relationships between data, it states authorship or source of any data, and it allows custom filtering of information, all in an attempt to minimize centralized editorial control.

An extensive discussion of the analysis of the case studies and the implications of its findings is under development, but cannot be done in this paper. Presenting some tentative results of the more extensive study, the point made here is first of all that the Internet can be an environment that changes the nature of collaboration in design, among other things by providing new ways these collaborations can be assessed and evaluated. Making the case for the application of architectural theories to the emerging field of information architecture, it also suggests that architects should be the designers of those new types of environments to design in.

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