Teaching Distributed Work Practices: the Liquid Campus

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Abstract:
The paper describes an educational project using methods similar to those described as virtual design studios. This term, however, is avoided by the authors as it is used by other educators in projects ranging from relatively simple CAAD courses to those who share files over the internet between separated groups of students. The design studio spanned six universities over an entire semester using both physical and virtual environments. It is named: The Liquid Campus. The focus of the Liquid Campus was to teach distributed work practices to a collection of upper level architecture students using Internet based communication methods. Indeed, the authors contend that these work practices are better trained than taught. In the summer of 2001, forty-three students from six different universities took part in the 3 1/2-month project. The students worked as teams of three (with one group of four) with each member of the team coming from a different university. Furthermore, each student team was assigned a tutor coming from a fourth university. By setting these strict ground rules, the authors were able to truly test the ability of the students to work over the Internet with one another to achieve a design solution. The physical separation of all partners was essential in precluding other communication methods such a face to face meeting. The semester began with a three-day workshop in which all students and tutors took part. This served to introduce the design problem, but more importantly, to allow social interaction between the potential partners. Short research assignments and social time allowed the students and tutors to get to know one another before the groups were set on the last day of the workshop. The entire group met again 15 weeks later for a final review, although individual teams met with their respective tutors halfway through the project. The participants used a co-operation platform developed at one of the partner institutes as a common information and co-ordination centre. Indeed, the platform became the "place" to meet to discuss ideas generated from the design problem. The platform served as a directory of web-based student work, schedules, tutorial sessions as well as a repository of contact and research information for the participants. The individual teams established their own rhythms for meeting and working on their design solution. The design theme itself was somewhat self-referential in nature. The students were to design a place for members of a virtual university (such as the WINDS project currently being funded by the European Commission in the 5th Framework program). Thus, the students worked in, on and within the same set of design parameters. While this overlay of design method and design problem was taxing for the students, it also lead to a wide band of design solutions ranging from completely virtual to mostly physical "places". All 14 teams successfully completed the project. Questionnaires following the final review show an overwhelmingly positive resonance from the students. The paper discusses the results of the project as well as an assessment of the value of the project in relation to its relatively high organisational costs.

Keywords: CSCW, Virtual Design Studio, Distributed Practice

Teaching Distributed Work Practices: the Liquid Campus

The Liquid Campus is a design studio that was run in the summer of 2001 using techniques that are often referred to as a "virtual design studio" [Donat et al, 1999] The authors would like to initially clarify the ontological aspects of the "virtual" aspect. The Liquid Campus is one of many design studio assignments that have run under the banner of the "Netzentwurf" [Elger, Russell 2000]. The Netzentwurf concept does not in any way imply the use of any digital or computer based application (such as 2D Drawing Programs and 3D - Modellers). It simply calls for the use of the Internet in order to foster the type of informal discussions that occur within a typical design project studio as is common in most architectural schools from the first Beaux Art schools to today. Indeed, the term Virtual Design Studio has been used by those swapping CAD files across borders and time zones using the internet [Wojtowicz 1995] or simply having the students produce their work with three dimensional modelling programs [Sellés 1999]. The authors content that what differentiates an architectural education from other university faculties (as opposed to say the education of an engineer or an accountant) is the design studio. The design studio is the place where communication, co-operation (or not) and collaboration take place in order to arrive at a design solution. The Netzentwurf concept seeks to virtualise the interpersonal processes of the design studio as opposed to the production and reproduction processes. Indeed, many of the successful design solutions produced in the Netzentwurf setting were created with cardboard models and hand drawn plans. These were simply digitised and then made accessible through HTML web pages. [Russell et al 1999]

That said, it is not easy to truly test the effectiveness of Internet based collaboration when the participants are living in relatively close proximity to one another. Since 1997, the Institute for Industrial Building Production has undertaken Netzentwurf design studios employing various aspects of the netzentwurf concept. In the summer of 2000, it was possible to offer studio placement to three universities in three different cities. This allowed the first tests where students were then required to use net-based media to convey their ideas. The results published thereafter [Elger, Russell 2001] showed promise, but owing to the varying constellations of students, the results were somewhat watered down and inconclusive. The summer 2000 groupings included groups of four students with two in each city or groups of three with two at one university and a third at the second university. In each case where the students had the chance to communicate with face to face meetings, the net-based communication suffered. This meant that in the three person groups, the third person was rather cut off from the discussions. In the four person groups, the teams tended to split into two smaller teams at each university.

The summer 2000 project was not without some success however. The groups of two, where one student was located at each university (as well as one group of three from three universities) showed a relatively high rate of communication with the Internet and in most cases were able to come to a fruitful and meaningful discussion. The absence of any other method required the students to optimally use the Internet to collaboratively arrive at a common design solution. The results of the summer 2000 Netzentwurf laid the groundwork as well as helped establish the framework for the Liquid Campus experiment.

Response from the round table discussions at eCAADe 2000 Conference in Weimar, Germany describing an electronic atelier [Russell, Forgber 2000] generated some international and substantial domestic interest in pursuing a joint net-based design studio. Owing to incompatibilities with various semester schedules as well as financial issues, the international partners in eastern europe were not able to contribute. Nonetheless, members from six German universities met together in the fall of 2000 to map out and plan the summer semester 2001. It must be made clear that this lead-time was necessary for the success of the

project. Certain aspects needed adequate time to be organised, however the majority of the planning involved negotiating the terms and rules for the design studio. In this respect, the tutors from all six universities were well versed in the problems and methods needed to come to an agreeable solution and based on this experience, qualified to provide consultation to the students. The Liquid Campus members consisted of the University of Karlsruhe, the Brandenburg Technical University in Cottbus, the Bauhaus University in Weimar, the University of Siegen, the Aachen University of Technology and the University of Kaiserslautern.

The results of the summer 2000 netzentwurf pointed towards completely dispersed student groups. The relatively high number of schools also allowed the groups to be distributed among the schools. A team size of three members was chosen. Additionally, the main tutor for each group was located at a fourth university so as not to favour one of the team members with direct communication. This arrangement allowed the members to truly test the viability of the netzentwurf concept in extending the design studio setting to the Internet.

Another aspect of the netzentwurf concept that has proven necessary is a kick-off workshop. Attempts to initiate group work across the Internet have met with almost no success whatsoever without initial personal contact among the team members being established. Previous semesters where no initial workshop took place (the students "met" only through email, chats and video conferences) showed low levels of communication and little collaborative work. With this experience, the Liquid Campus also started with a three-day workshop where all students and tutors were present.

The workshop involved short group exercises to collectively analyse the design task. In the case of the liquid campus, the 43 students were initially divided into 6 groups for a one-day brainstorming session about various contextual issues of the design assignment. The analysis was then presented to the whole group at the end of the day. A second day involved touring the site of the project and holding group discussion sessions. The third day was effectively oriented around creating the three person groups (one of the groups consisted of four persons). The rules of group building were made known (3 students from different universities with a tutor from a fourth) and the students were left to make their own groupings and then to find a tutor. The differences in student populations among the schools (between 3 and 9 students came from each university) precluded certain combinations and also led to imbalances in the teaching loads. Nonetheless, within 90 minutes, the groups were set. These groups then met for half a day with their tutors in order to work out logistical issues such as on which day of the week they would meet. This half-day also allowed the students and tutors to develop a feel for one other. The workshop introduced the students to the design problem, but really served to mitigate the social engineering aspects of the entire group.

The members all dispersed to their respective universities where the real work began. The tutors agreed that each local tutor was to provide technical and if need be moral support. The design criticism, however, was to be carried out only over the Internet. The groups all used the netzentwurf platform as a collective "place" to meet. [Russell 2001]

Figure 1: The Netzentwurf-Platform / Competencies

The netzentwurf platform provides a place for informal discussions as well as information regarding competencies, timetables and links to the student work itself; the students must document their work and present it using HTML. The platform served as a central meeting place where further discussion could be then directed. Aspects of the platform such as a logbook went unused whereas others such as an informal chat function were essential to the success of the semester's work. The platform also serves as central repository of the student's work. In the four years the netzentwurf, over 700 students have taken part in over 20 projects. The platform is open and free so as to allow a wide public audience.

The students used most every type of communication available including normal telephones and occasionally meeting together for a day. Highway restaurants tend to available at "half-way" points and thus were used my some of the teams as an ideal meeting point. Each group tended to develop their own way of working and communication. Word files, scans, CAD files and the like were traded between discussions on chat forums, videoconferences and instant messenger systems. The tutors regularly used the iVisit videoconference software as a communication medium and although it lacks a whiteboard feature, its price (free) and multi-platform capability (Macintosh + MS-Windows) were convincing. The authors often simply turned their camera towards a blackboard when the need arose to draw.

Figure 2: Communication Difficulties with internet-based conferences

The iVisit sessions proved effective as long as the network had good throughput. Disturbances in network traffic or simple problems like volume settings undermined even the most courageous attempt to generate critical discussion. This must be emphasised as the discussions often got going well and then, after 10 minutes of 3 to 5 people discussing a design, the speaker would suddenly drop out of the conversation or disappear from the screen. The students are certainly to be commended for their perseverance in continuing the experiment. The first four weeks of the project were fraught with technical problems and as a result, the momentum of many projects was negligible by the mid-term review. The technical infrastructure was not even across the six universities which also led to tensions within the groups.

The mid-term review took place as a series of smaller reviews where the student teams travelled to their tutor or to a central location. This allowed more flexibility in scheduling the reviews as well as fostered a more intimate atmosphere. The mid-term reviews were also

important for the teams. The chance to have a day of intensive discussions unencumbered by technology was essential to the success of their designs.

The students then returned to their individual universities for the remainder of the semester. A final review took place in an independent city so that each member of the project was relatively equally distant. The Museum for Communication in Frankfurt am Main provided the venue for the two-day final review. This too was considered an essential part of the virtual design studio in that it provided a strong focus and deadline where the students had to present their work in front of all the tutors and fellow students.

The theme the students worked on was a "place" for a virtual university such as the WINDS Project currently being funded as part of the European Commission's Fifth Framework Program. The WINDS project is attempting to create a Virtual European School of Architecture and Construction Engineering using case based courses placed on a web platform. (See the Links List) The hypothesis was put to the students that a virtual university needs a real place for the participants to meet, if only for a short period. The obvious self-referential nature of the assignment, the working methods and the entire Liquid Campus project allowed the students additional insight into the problems of creating a virtual university through their own experiences. At the same time, the multi-layered aspect of the theme allowed many to personalise the problem and thus take a more philosophical approach to the problem. Indeed, questions as to the nature of the virtual university led to questions about the university itself and its role in the society in general. While these questions proved in the end entirely fruitful, it was hard for some students to leave the realm of the general and to start to provide possible design solutions. It is interesting to note that although a site for a potential building for the virtual university was provided, all 12 groups chose solve the problem in other ways and in other places.

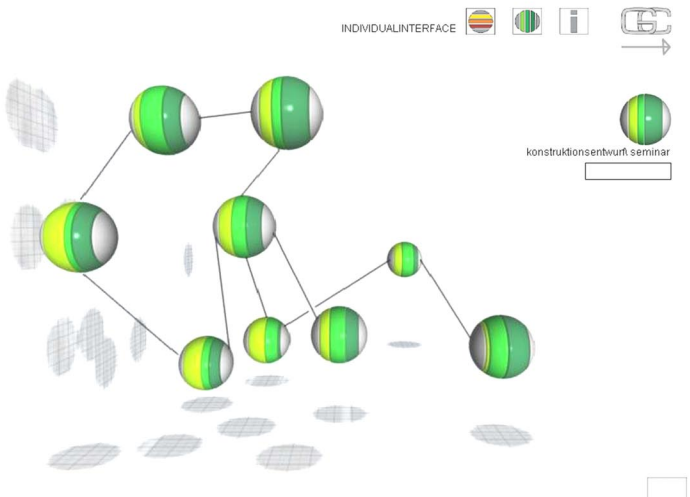

Figure 3: #SCZ / Doerr, Ebert, Ribaudo

The design solutions ranged from the purely virtual where no "architecture" was needed to those that relied heavily on built space to create the virtual university campus. The student's solutions reflected the original hypothesis and their own experiences in terms of creating interpersonal relationships. The chance to meet physically played a dominant role in almost all of the solutions.

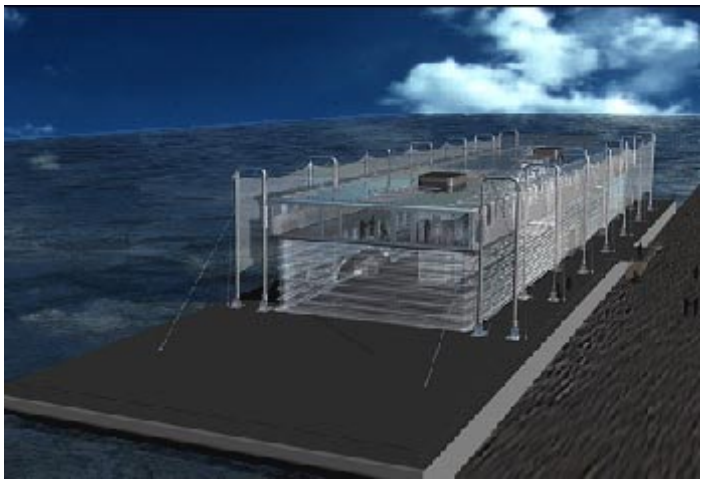

Figure 4: Net-Base.org / Karnott, Meger, Pahle, Walter

All 12 groups remained together for the entire semester in contrast to the experiences of the previous year. Difficulties encountered in some groups were mostly personal in nature, however none of these hindered the critical discussions. To be sure, not all solutions were spectacular, but it must be noted and credited that all of the groups worked with higher than normal levels of effort to complete their solutions in addition to the weight of communicating over the Internet. A larger problem lay with the tutors. It became apparent relatively early in the semester that not all of the tutors were well prepared to criticise work about a "virtual" building. This lead to some frustration on the part of the students. The open nature of the netzentwurf concept allowed the students who wanted to, to seek criticism elsewhere. This did not absolve them of their responsibility to discuss their work with the designated tutor, but allowed them to broaden the scope of responses to their work. While this is obvious to any practitioner, it was helpful to the students to have this formalised as part of the netzentwurf platform.

In conclusion and retrospect, the project can be considered a success. Post-project questionnaires showed an overwhelming positive response from the students. The importance of the physical meetings was verified as was the suspicion that for all members, the amount of effort and time needed for the project exceeded any local design studios carried out to date. Furthermore, the costs of travelling and communicating were not trivial, especially for the students. Nonetheless, over two thirds indicated they would repeat the studio, which speaks for the quality of the students as much as for the value of the project.

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Links:

Netzentwurf	http://www.netzentwurf.de
WINDS	http://www.winds-university.org
iVisit	http://www.ivisit.com
CAAD, Aachen	http://caad.arch.rwth-aachen.de
ifib, Karlsruhe	http://www.ifib.uni-karlsruhe.de