

## **CSNCW: Computer Supported Non-Cooperative Work**

### **Barriers to Successful Virtual Design Studios**

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*Abstract. The Paper describes a design studio jointly undertaken by four Universities. With respect given to the groundbreaking work carried out by [Wojtowicz and Butelski (1998)] and [Donath et al 1999] and some of the problems described therein, the majority of the Studio partners had all had positive, if not exemplary experiences with co-operative studio projects carried out over the internet. The positive experience and development of concepts have been well documented in numerous publications over the last 5 years. A platform developed by one of the partners for this type of collaboration is in its third generation and has had well over 1000 students from 12 different universities in over 40 Projects. With this amount of experience, the four partners entered into the joint studio project with high expectations and little fear of failure. This experimental aspect of the studio, combined with the “well trodden” path of previous virtual design studios, lent an air of exploration in an otherwise well-worn format. Everything looked good, or so we thought. This is not to say that previous experiments were without tribulations, but the problems encountered earlier were usually spread over the studio partners and thus, the levels and distribution of frustration were more or less balanced. This raised a (theoretically) well-founded expectation of success. In execution, it was quite the opposite. In this case, the difficulties tended to be concentrated towards one or two of the partners. The partners spoke the same language, but came from different sets of goals, and hence, interpreted the agreements to suit their goals. This was not done maliciously, however the results were devastating to the project and most importantly, the student groups. The differing pedagogical methods of the various institutes played a strong role in steering the design critique at each school. Alongside these difficulties, the flexibility (or lack thereof) of each university’s calendar as well as national and university level holidays led to additional problems in coordination. And of course, (as if this was all not enough), the technical infrastructure, local capabilities and willingness to tackle technological problems were heterogeneous (to put it lightly).*

*Keywords. CSCW: Virtual Design Studio; Mistakes in Pedagogy.*

## Background

Virtual Design Studios are not new. In fact, the term "Virtual" has been applied to a variety of design studio activities that more or less have something to do with computers. Indeed, as soon as internet connectivity allowed the simplest of file transfers, educators were incorporating the internet into the design studio. The usage of the word "virtual" came later. This usage ranges from the simple use of 3D renderings to fully integrated 3D environments spanning continents. The mainstream usage of the "virtual design studio" moniker implies that the partner studios are physically separated but connected through the internet. The following describes a "virtual" design studio jointly undertaken by four Universities. The methodology used borrowed from work by Wojtowicz and Butelski (1998) and (Donath et al 1999) as well as more recent work carried out by two of the partner institutes. Some of the problems described in the early studios were known to the partner universities. As well, it was also clear (at least to the authors) that these problems implied a need to impart additional energy and time into the studio in order to ensure its success. In retrospect many of these issues were addressed while other important conditions for co-operation (computer-supported or not), were ignored. Important aspects of inter-university co-operation that had been previously published by one of the participants (Russell and Forgber, 2000) were all but forgotten.

This is not to say that the project was unsuccessful because one of the partners forgot a couple of things for the checklist. The initial coordination meetings between the partner institutions signalled a successful project. As well, the previous individual successes signalled a common basis for working together, which in the end, was non-existent. After such a project it is often the case that one does not hear anything more about

it. The authors have undertaken to analyse the shortcomings in the project in order to help prevent other projects from facing a similar fate.

## Previous Experience

Prior to the semester project described, all of the Studio partners had had positive, if not exemplary experiences with co-operative studio projects carried out over the internet. The positive experiences and development of concepts have been well documented in numerous publications over the last 5 years (see Forgber and Russell 1999, Russell et al 1999 and Elger and Russell 2001).

A platform had been developed for such collaboration at the University of Karlsruhe and is currently in its third generation. This is the [Netzentwurf.de](http://Netzentwurf.de) platform which has been well documented and since 1997, has hosted well over 1300 students from 12 different universities in over 40 Projects.

A similar platform was developed by one of the partners and had been tested over two semesters. This partner actively sought partner institutes in order to test their system and out of this group the project team was created. It must be said that this institute was then faced with three partners when in fact, they had only sought two. However, the coordination was carried out together with the group limits set to three students per group (with their students limited to a partnership with two other institutions).

With this amount of experience, the four partners entered into the joint studio project with high expectations and little fear of failure.

## EastJets

The design assignment was for a general aviation terminal at a major European airport. A general aviation terminal is where non-commercial or

„business“ flights are handled. Political figures will often use these facilities as well. It was thought that the various areas of expertise at the four universities (Building Structures, Transportation Design, Industrial Building, and Planning) would allow the students to seek specific field-related assistance at the source. That is, they could obtain first hand information direct from where the expertise lay. In previous net-based studios, the groups had been assigned a "prime" tutor. Local tutors were to defer to this tutor except to offer technical assistance or moral support for their local students. The expertise was considered as an augmentation to the prime tutor.

The students were divided into teams of three with one at each university. The partners each agreed to accept up to 8 students each. Some of the partners had to acquire their students through in-house advertising while other partners had their contingent stipulated by their specific internal faculty methods of distributing faculty teaching capacity. As a result, each partner institution brought to the project an unexpected number of students. Because of the large discrepancy in the number of students at each institution, (3 at one, 7 at the second, 11 at the third and 33 at the fourth), the group makeup was not as easy as in previous studios and had a large number of students left without distributed (or local) partners.

A mixture of three, two and one-person groups was created. The students from the original "seeking" institution were paired with two other students until the first three groups were filled. Further three-person groups were created so long the three students were from different institutions. The rest were blended into dispersed two person groups and the remaining students at the last institution. Some of these students formed local two-person groups. The entire student population was mixed to say the least.

Sadly, the criticism started from the first rather badly and continued so. Agreements about the

type and number of crits between the partners were not adhered to and it was often the case, that the different members of the student groups received conflicting information. This is to be expected when the discussion revolves around architecture and the content of a design proposal. However, the conflicting information had to do with procedural information (times and dates) as well as syllabus requirements (that the authors had heretofore considered as agreed upon and therefore non-negotiable).

#### **New Tools**

A new aspect for the group was the implementation of a web-based whiteboard system, which eliminated the need for non-"Port 80" communication channels to be used. This was looked upon with great expectation. Previous attempts to use whiteboard systems have often been hindered by firewalls. The firewalls filter out all unauthorised traffic, often over non-standard ports. Programs such as Netmeeting use non-standard ports (5 of them) and use them dynamically! This means that it is not possible to reserve certain ports in advance. In the past, it has proved to involve a major effort to convince those that are responsible for port closure and openings at each university to allow these whiteboard sessions to be allowed through. The ability to channel these sessions through a web page alleviated the firewall problem. The authors thought that the students could, at last, begin to draw together.

In reality, the whiteboard system was technically well thought out, but difficult to use. As well, the information about the other participants who were simultaneously using the system was scant at best. As a result, a lot of time was used trying to establish ways to use the tool rather than to criticise the student's work. Nonetheless, all of the groups persevered with the system. This can be partly attributed to the second set of desk crits that some students received (unbeknownst to the

other partners). A good deal of goodwill was also brought to the project so that despite the setbacks, the tutors and the students all sought to truly test this experimental type of studio.

This experimental aspect, combined with the "well trodden" path of previous virtual design studios, lent an air of exploration to an otherwise well-worn format. Everything looked good, or so we thought. This is not to say that previous experiments were without tribulations, but the problems encountered were usually spread over the studio partners and thus, the levels and location of frustration and problems were more or less balanced. This raised a (theoretically) well-founded expectation of success.

## Execution

In execution, it was quite the opposite. In this case, the difficulties tended to be concentrated towards one or two of the partners. The project was not initiated blindly, but was developed over 8 months of discussions and meetings. All of the partners had conducted at least one virtual design studio with one of the other partners prior to the planned semester. Thus, the expectation was that we all understood one another and all knew what to expect.

However, it became apparent at the mid-term reviews, that details agreed to previously were interpreted quite differently from partner to partner. In the past, projects between different universities have involved different languages and hence, additional chances for misinterpretation. In this case, the partners spoke the same language, but came from different sets of goals, and hence, interpreted the agreements to suit their goals. This was not done maliciously, however the results were nonetheless devastating to the project and most importantly, catastrophic to the student groups.

The differing pedagogical methods at the var-

ious institutes played a strong role in steering the design critique at each school. This in itself should not be a big problem as different team members in practice are faced with this problem each day and still produce fine architecture. However, certain prejudices were brought to the project which, like all good prejudices, were not divulged at the beginning of the semester.

Specifically, the role of the internet in the design studio differed greatly. For some, the internet provided the key link between the dispersed partners. The group discussions over the internet were, for these partners, the desk crits. For other institutions, the internet sessions were "nice to have", but not critical to the design studio. Indeed, it only became apparent midway through the term that some of the groups were receiving a second set of crits from their local tutor.

Alongside these difficulties, the flexibility (or lack thereof) of each university's calendar as well as national (and university level) holidays led to additional problems in coordination. Adding to ALL of this, the pedagogical independence the tutors enjoyed with respect to their faculties differed widely, which made any sort of compromise during the project all but impossible to achieve. And of course, (as if this was all not enough), the technical infrastructure, local capabilities and willingness to tackle technological problems were heterogeneous (to put it lightly).

When all of these problems were combined, the result was a large level of frustration on the part of the authors. However, it was not the series of problems which caused the frustration. Rather, the inability and inflexibility on the part of some of the partners meant that, in effect, the project was given no chance of success even after the problems were discovered.

## Non-Co-operation

Naturally, for the partners with experience in

conducting virtual design studios, the results came as a shock. Upon reflection, it appears that the success of previous studios was based on a set of unwritten rules or guidelines, which seem to have been understood by all partners and hence, ensured the success of the projects. The authors divert the latter part of the paper away from describing the faults of an ill-fated semester and instead, attempt to describe a set of „best practices“ for internet-based collaboration. The authors are still overwhelmingly convinced of the value of these types of exercises and provide these „secrets of the virtual design studio“ as a primer for others (and themselves) who wish to conduct internet-based cooperative work in the future.

#### **Computer Supported Non-Co-operation**

Part of the excitement about the semester was based on the chance to use a whiteboard tool developed at one of the partner institutions. During the preparations, the partners discussed how to best integrate this tool into the curriculum and the group discussions. For partners who had used the *Netzentwurf.de* platform, the whiteboard came as a great leap forward. Issues about integrating the two platforms were papered over with promises to link the two systems.

It was then yet another surprise when the whiteboard developer partner informed the other partners that groups, which did not include students who were from their institute would have to pay to use the system. Seeing that this was the institute that brought only three students to the project, this meant that the overwhelming majority of group were faced with the decision: pay or play somewhere else. These students played somewhere else.

#### **Lessons**

The plethora of negative experiences need

not be a complete dissuasion from undertaking further such studios. The semester can serve as a valuable reminder of the need for preparation in general as well as specific aspects that need to be discussed among the partner institutions.

#### **Student Loads and Numbers:**

The partners need to make it clear to each other what is the acceptable minimum number of students they can or will bring to the studio. A realistic estimate can also help. It must be also made clear as to how imbalances in student numbers will be distributed if at all. Cut-off numbers for maximum and minimum numbers are best agreed upon before the numbers are truly known.

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An additional aspect not mentioned above, but one that has caused consternation in the past, is the issue of student experience. In the *EastJets Project*, all of the students were in their 3rd or fourth year. It is important to have this kind of parity otherwise on member of the group end up being the mentor

#### **Prime Tutors:**

The groups are usually made up students from separate universities. This can lead to problems when it comes to tutoring or criticising the work. Each group should have a tutor assigned to provide criticism about the content of the design assignment. This person will possibly be at the same university as one of the group members, but it is essential that this local-loop does not overwhelm the ability of the other students to follow the criticism and arguments.

In contrast, the students at other universities

will also have local tutors who will have to provide technical assistance as well as moral support (it is easier to receive this face to face). For these local tutors, there is a large urge to criticise the work. Unless the group is specifically assigned to these tutors, they should bite their lips before offering any architectural advice to their students [Author's Note: and draw blood if necessary]. Generally, the rule should be that technical assistance is local and architectural assistance is internet based.

#### **Net-Based or Nothing**

The virtual design studio has as its main strength the use of internet based communication technologies to bridge physical and temporal distances. The internet is also the main weakness of these studios insofar as any other easier communication technology is available, most importantly: face to face communication. The speed with which people can converse with one another in person outdistances any internet-based technology. For this reason, it is necessary that group crits take place on an equal footing; the tutor must converse with all group members equally, even if one of the members is only a few meters physically separated from the tutor.

#### **Equal Footings**

As was described in (Russell and Forgber 2000), it is essential that all partners are treated equally. This means that issues of reciprocity and accreditation, at least for the design studio, are resolved ahead of time. The requirements for the mid-term and final reviews should be commonly agreed to and then set for the semester.

It is clear that different partner institutions have different obligations and requirements they must answer to. These specific "non-negotiable" requirements must be made known to the group ahead of time. This means that in the worst case, a partner may not be able to participate. However,

this is much more desirable than a partner having to leave a project midway through a term. For the partners this is perhaps not so catastrophic, but for the students it can be and is in any case certainly less than the exemplary education that we often pertain to offer them.

It must also be made clear, that without trust, the system will not work. At one end of the scale, there must be a trust that the marks set by a group's assigned tutor will be passed on to the student. At the other end of the scale, there must be a trust that all partners are working towards the success of the project as a whole. Trust must be earned.

#### **To Do:**

As architects, it is difficult to admit to grave problems in planning. Planning is our metier, be it planning education or planning buildings. However, in the organisational chaos of the university, we often forget the hard fast rules we use in practice. For example: the age old method of transcribing a protocol and then providing a copy of this protocol for all the attendees is best not forgotten when potential educational partners meet. However, it is rare that an educator carries out a protocol when meeting with friendly and good-meaning colleagues. However, we must remember that the students look to the tutors for guidance and in some cases as role models. This entails being at least as organised and communicative as we would expect of them.

It is telling, that from questionnaires distributed after the final review, a significant number of students declined to even fill out the form. Of the seven who did submit their form, four said they would undertake a virtual design studio again. In previous studios, the number has been more like 90%. However sobering the result of this question itself are, it is perhaps important to note that all seven said they would recommend the virtual design studio to their fellow students.

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