Learning to Collaborate: Lessons from the Design Studio

by Jane M. Crudden

Bachelor of Architecture
Cornell University, 1978

Master of Business Administration
Pepperdine University, 1982

Submitted to the Department of Architecture in Partial Fulfillment of the Requirements for the Degree of

Master of Science in Architecture Studies
at the
Massachusetts Institute of Technology
June 1997

© 1997 Jane Crudden. All rights reserved.
The author hereby grants to MIT permission to reproduce and to distribute publicly paper and electronic copies of this thesis document in whole or in part.

Signature of the Author

Jane M. Crudden
Department of Architecture
May 1997

Certified by

William L. Porter
Muriel and Norman Leventhal Professor of Architecture and Planning
Thesis Advisor

Accepted by

Roy Strickland
Associate Professor of Architecture
Chairman, Departmental Committee on Graduate Students
Thesis Readers

Sharon F. Rallis, Ed. D.
Lecturer on Education, Administration, Planning and Social Policy
Graduate School of Education, Harvard University

Donald A. Schönb, Ph.D.
Professor of Urban Studies and Education, Emeritus
Department of Urban Studies and Planning, Massachusetts Institute of Technology
Learning to Collaborate:
Lessons from the Design Studio

by

Jane M. Crudden

Submitted to the Department of Architecture on May 9, 1997 in Partial Fulfillment of the Requirements for the Degree of Master of Science in Architecture Studies

ABSTRACT

This thesis examines the dynamics of collaboration within the architectural design studio by focusing on the basic elements of group interaction (Commitment, Conflict, Communication, the Collaborative Process and the Role of the Critic), as they apply to both the process and products of collaborative design. The theoretical discussion is supported with data collected from observations of two ‘collaborative’ studios organized by the School of Architecture and Planning at MIT.

Effective collaborative skills are considered to be an important issue for practicing architects, yet these skills are often overlooked in the studio. This thesis proposes an educational pedagogy that balances the teaching of collaborative skills with the teaching of traditional design skills.

Thesis Advisor: William L. Porter
Title: Muriel and Norman Leventhal Professor of Architecture and Planning
Dedication

To my father, whose spirit of curiosity and wonder is present on every page.

Many thanks to …

Bill Porter, whose insight and humor will always be welcome.

Sharon Rallis, for her encouragement and support in my new adventures.

Donald Schön, for inspiration.

The students and professors of the two studios for their time and patience.

Avigail Sachs, whose inspiration, encouragement and friendship made these two years special.

Dick Rierdan, who helped me find a path I never knew existed, but that he always knew was inevitable.

Michael, for keeping all the technology running.

And finally, to my family and especially my Mom, for the years and years of faith and support.
# Table of Contents

Abstract 5

I. Introduction 11

II: The Two Studios 15
   The Collaborative Studio 16
   The Barcelona Studio 19
   The Studio Experience 21
   Research Method 22

III: The Elements of Collaboration 23
   Commitment 25
   Conflict 27
   Communication 39
   The Collaborative Process 45
   Role of the Critic 55

IV: An Annotated Protocol 63

List of Illustrations 101

Bibliography 103
I. Introduction

One hears the term ‘collaborative design’ frequently these days. It seems to be everywhere—in the universities, in the profession and in the literature. Effective collaborative skills are considered to be necessary for practicing architects, yet these skills are often overlooked in the studio. Dana Cuff discusses this in her article “The Social Art of Design at the Office and the Academy”:

The social art of design is significant in architectural practice, yet it is so poorly understood that it is hardly considered in architectural education. Practitioners gather the necessary skills only after years of experience in vitally important design negotiations. (Cuff 1989, 189)

This thesis investigates the collaborative design process as experienced by the students and professors of two ‘collaborative’ studios at the School of Architecture and Planning at MIT: The Collaborative Studio during the Spring of 1996 and The Barcelona Studio during the Fall of 1996. In both cases, the faculty and students came to the studio from a variety of different professional backgrounds—architecture, mechanical engineering and civil engineering in The Collaborative Studio and urban design, planning and architecture in The Barcelona Studio. In addition, the students came with different languages (not just English, Spanish and Korean, but also the unique languages of architecture, engineering and planning), different skills, and often different priorities and goals.
The design teams were faced with having to not only solve the design problems given to them, but also to design the process they would use in order to work together and design as a group. The students had to learn very basic group dynamic skills including how to communicate with other designer and how to resolve conflict. The critics in the collaborative studios were also faced with new and unexpected challenges, such as structuring a new kind of studio, modifying a 'desk crit' into a 'group crit' and often having to act as referee.

This thesis focuses on the basic elements of group dynamics (Commitment, Conflict, Communication, the Collaborative Process and the Role of the Critic), as they apply to both the process and products of collaborative design.

**Defining Collaboration.** Collaboration has been described in many ways. Definitions range from 'just working together' to a 'synergistic collaboration of like minds'. They vary with the requirements of the project and the characteristics of the team. There are only two basic requirements for collaboration: a group of people and a shared goal. I also add the stipulation, especially for a design project, that all members of the group participate in the design of the project. Collaboration in the design studio is also unique because there is no imposed hierarchy or 'team leader' as there are in many other collaborative efforts. So, for this study, collaboration is defined as: A group of people, working together, towards a shared goal, where all members of the group are considered equal participants, and where the end product reflects the influence of all members of the group.

**Defining Success.** The definition of success for a team project is very subjective. Many of the students and most of the professors focused on the success of the 'design product'. This is, in my opinion, a limited view of success and does not incorporate the value of 'designing the collaborative process'. I found that the students who were able to creatively design an effective process for themselves were able to achieve what one of the professors in *The Collaborative Studio* called “a high degree of system integration” in their design. The projects on those teams, especially in *The Collaborative Studio*, had a greater level of depth and a higher level of technical competence and integration. Katzenbach and Smith offer this explanation for success:

Several well known phenomena explain why teams perform well. First, they bring together complementary skills and experiences that, by definition, exceed those of any individual on the team ...Second, in
Models of Collaboration. There are many different models of collaboration. No one model is appropriate for every situation and a combination of several models may be necessary, and even likely, over the length of a project. Additional variables, such as group members separated by space or time, are also possible. The models of collaboration listed below are not intended to be all inclusive or ‘pure’ models, and all, if used successfully, can lead to the synergy implied in the definition mentioned above.

1. Independently produced pieces brought together at the end. (You bring the salad; I’ll bring the dessert.)
2. Delegation by specialty—assignment of tasks based on agreed upon or perceived specialties and with clear definition of boundaries. (Another food analogy—the hierarchy of a professional kitchen with its executive chef, sous chef, saucier (sauce chef), poissonier (fish cook), garde manger (pantry chef) and patissier (pastry chef).)
3. Division by area—dividing work into sections so all work on a specific section is done by one person. (You write chapter one; I’ll write chapter two.)
4. Sequentially—each member of the group works on the project independently and then passes it to someone else. (For example, an author and his editor.)
5. Simultaneously—members work together on all aspects of the project. (Kids building a snowman.)

All of these models of collaboration were present, in some form, in both of the studios. The success or failure of a group project did not depend on the type of model selected, it rested with the way the basic elements of collaboration, which are discussed in Chapter Three, were applied to the model. No model can be successful if the team does not have a commitment to the process, can’t resolve conflict or can’t communicate with each other as designers.

Expectations for a Collaborative Studio. If you are contemplating teaching or participating in a collaborative design studio, be forewarned—this is new territory for most people. Here are a few of the things you can expect:
1. Expect resistance!

2. Expect difficulty with basic issues such as courtesy, communication and apathy.

3. Expect conflict—it’s part of the process. In addition to the everyday conflicts within groups, you can expect what can best be described as a ‘no-hole-barred-bitch-session’ at least once during the semester.

4. Expect to spend a lot of time—*a lot of time*—dealing with group dynamic issues, whether you are a student or a critic, and whether you want to or not.

5. If you’re a professor, expect to play the role of referee or group therapist in addition to your role as design critic.

6. And finally, expect your commitment to the concept of collaboration to waver more than once during the semester.

One of the professors in *The Collaborative Studio* summed up his experience:

I had hoped ... that the groups might be fairly successful in figuring out for themselves how to operate effectively as a group. That turned out to be totally wrong! Very wrong!
II. The Two Studios

Two recent studios conducted at the School of Architecture and Planning at MIT provided the settings for my observations of the collaborative design process: The Collaborative Studio and The Barcelona Studio. Both studios were multidisciplinary and based on the traditional design studio format. Don, one of the professors of The Collaborative Studio, describes his overall goals and structure for that studio:

Design projects in general are fundamentally multidisciplinary, except for very small scale things. One of the most important skills of the designer is to be able to operate effectively in a multidisciplinary group context. Typically, we've failed totally to teach that effectively in architecture schools. So the point was to start to address that issue. That was the goal—and to do it in the traditional studio way—project based, product based.

---

1 All of the students and professors in this study have been given pseudonyms.
‘The Collaborative Studio’

The Collaborative Studio brought together students and faculty from the Departments of Architecture, Civil Engineering and Mechanical Engineering within MIT. The studio was originally named The Computational Design Studio and one of the primary goals of the studio was to utilize a variety of design and fabrication tools. The theme for the studio was ‘Architecture and the Soft Machine: Integrated Design, Craft and Production’. The following are excerpts from the studio ‘handout’ provided at the beginning of the semester to students prior to enrollment:

As the primary architectural theme, this studio will explore the relationship of design activity to modes of industrial production, particularly in the light of developments in the integrated computational environment. The studio will seek to examine, through interdisciplinary design projects, the potential for a new interpretation of ‘standardization’ and ‘the industrial product’, one not founded upon notions of repetition but conversely upon the possibilities of variation and adaptation…. A primary component of this process will be understanding the role of computer controlled prototyping and fabrication to the creative act of designing and making form. . . .

The handout continues to summarize the activities of the studios, including a description of the two projects and the issues of ‘design and computation’ and ‘design and communication’. The later noted that ‘groupware’ and video conferencing with the offices of architect Frank Gehry in Los Angeles and structural engineer Ove Arup in New York, would be part of the studio. The last item on the handout read:

Design and interdisciplinary collaboration: the studio will be a synthesis of students from not only architecture but also Civil Engineering and Mechanical Engineering (New Products Program). We will be working in multi-disciplinary teams in order to simulate the condition of advanced design development through close collaborative practice.

Several of the architectural students were nevertheless surprised to find that they would be working in groups.

The Groups. The groups were established by the professors and included, in most cases, two architects, one civil engineer and one mechanical engineer. Initially there were five groups, but
by the end of the semester only three of the original groups were still intact. All of the groups were required to remain together for the completion of the first assignment, the ‘Chair Project’, but were allowed to work independently for the second assignment, the ‘Pavilion Project’.

The ‘Chair Project’. There were two separate and completely independent assignments during the semester. The first was a four week project which called for designing and fabricating a prototype for a chair. The handout for the chair project reads, in part:

The ‘chair’ represents a constant challenge to designers and architects alike—a reflection of architecture in miniature at the levels of sculpture, fabrication and production, ergonomics and comfort. ...

Within your design team structure you are asked to conceptualize, design, test, prototype and fabricate (in part or in whole) a design for a chair.

The ‘Chair Project’ was considered to be an excellent type of project for a collaborative studio by both the students and the professors. The engineers felt they contributed to all aspects of the project, including the design. One of the engineers commented on his role in the ‘Chair Project’, “I really felt I was designing on the ‘Chair Project’ ... I felt comfortable commenting on the design ... it was a familiar object. And the architects needed us because we had to fabricate the prototype ... it had to work when someone sat in it.”

![Two chairs from the ‘Chair Project’](image)

The ‘Pavilion Project’. The second project, the ‘Pavilion Project’, was a design for a movable sports pavilion located near the Mall in Washington, DC. The program required inclusion of active and/or passive solar energy for cooling. Three of the original teams and one newly formed team with one architect and one engineer were the only groups working on the project.
Three of the architects produced independent projects and two of the engineers left the class. All three of the original teams modified their working style, at least to some degree, for the 'Pavilion Project' to a more traditional 'architect/consultant' model. Most of the students said this was done because their teams were having problems with the more collaborative model and the 'group process' was taking too much time.

The professors felt there was a marked difference between the projects produced by groups and the projects produced by individuals. In describing the group projects, one of the professors remarked:

You can begin to see [on the multidisciplinary team projects] ... that there is much more attention to the structure being seriously worked out. This is an important issue and typically you don't see that. This is shocking to say—but it's absolutely true!... Or more subtly and more difficult are things like air flow and the behavior of a building's mechanical system ... What we are seeing is a much higher level of commitment to getting the building technically right, and that's exciting.

About the projects being completed by individuals, the same professor noted:

All of the projects that are being done by individuals are being done by architects. And yes, they are just missing that technical dimension. It just isn't there, it isn't anyway close.... The ones that work individually don't have the overhead [of the group dynamic] ... there's a certain gain in productivity—but they lose a huge intellectual resource and so there are real dimensions missing from their projects.

Figure 4: Two of the 'Pavilion Projects'. The one on the left was a group project, the one on the right was done by an individual.
‘The Barcelona Studio’

The Barcelona Studio was officially called the Joint Barcelona Urban Design Studio. It was a joint studio sponsored by the Universitat Politècnica de Catalunya, Escola Tècnica Superior d’Arquitectura de Barcelona and the MIT School of Architecture and Planning. The studio included students and faculty from both universities. The faculty from MIT consisted of three professors—an urban designer, a planner and an architect. Architecture faculty from Barcelona were also present during the interim and final reviews. The course syllabus provides the following description of the studio:

The Joint Barcelona Urban Design Studio for 1996 will look at the development impact of a new high speed train (TGV) station on the outskirts of Barcelona. This studio will build upon the now established MIT tradition of international studios in urban design. This studio is made possible under the terms of an agreement between The Generalitat of Catalunya and MIT which fosters exchange between Catalan universities and the Institute. In this instance the collaborative agreement will allow students and faculty from both the Universitat Politècnica de Catalunya, Escola Tècnica Superior d’Arquitectura de Barcelona and the MIT School of Architecture and Planning to work together for the first time and to benefit from participation in two very different approaches to planning education.

The Groups. The twenty-two students, seven from Barcelona and fifteen from MIT, were divided into six groups. The group selections were made after a two week project that involved the development of ‘individual concepts’. Students with similar concepts, as determined by the professors, we placed in groups. Attention was given to the mix of students on each team. At least one student from Barcelona and one student from each discipline—urban design, planning and architecture—were placed on each team. The students remained in these groups during the entire semester.

In addition to the group work, the studio also included a ‘specialist work’ phase of four weeks in the third quarter of the semester where student could work on individual tasks or work in ‘specialists groups’ like finance or planning.
The Project. The project involved development of an area on the outskirts of Barcelona that would be impacted by the new TGV station. The scope of the project included issues of urban design, architecture, transportation, development and ecology. The course syllabus describes the project this way:

... The station is imagined as the heart of this new center and will be about twenty minutes from the center of Barcelona via a new suburban rail link. Urban design issues are likely to concern the planning of areas associated with the station, the integration of high-speed and local rail systems and other transport modes, the making of high quality edge-city environments, the relationship of the exiting places and landmarks to new development, the implementation of urban design in a different cultural and political setting, and its relationship to the making of architecture and the urban landscape, as well as others that we discover to be important.

The two groups that I have used frequently as examples in this study took two different approaches to the project which can be seen in the drawings below. The project on the left is the 'Loop' project designed by the group that is the focus of the protocol in a later chapter. It is a highly architectural solution that uses buildings, blocks of development and a loop road to create a highly defined and visible center to the region. The project on the right was designed by a group that focused on the ecological issues of the entire region and proposed a land use scheme rather that specific buildings. Alan and Sarah, who's comments are often cited, were members of this team.

![Figure 5: Two projects from the 'Barcelona Studio': the 'Loop' on the left and 'Sustainable Growth' on the right.](image-url)
The Studio Experience

The design studio of today is founded on the model of the Ecole des Beaux Arts and the Bauhaus—jury based and product focused. A design studio is also a unique physical environment. In *A Study of Architectural Schools 1929-1932*, sponsored by the Association of Collegiate Schools of Architecture, there is this oft quoted description: “Go through, of an evening, any university campus containing an architectural school. That school can be spotted without fail. It is the one brilliantly lit attic. It is always an attic, usually in the oldest and least desirable building.” (Quoted in Boyer 1996) Little has changed over the years, as my field notes reflected on my first day visiting *The Barcelona Studio*:

I hear voices. I am drawn to a brightly lit two-story space at the center of the maze. I am struck by the mix of materials. There are handmade wooden structures everywhere that define smaller spaces. As I wander, I see several mezzanines, some beautifully built from heavy lumber with varnished finishes and others obviously built by students from leftover 2x4’s.

As I walk further into the space, I can see where the voices are coming from. A group of students and professors (there appear to be four students and three professors) are gathered around a large 4’ x 10’ table that has a huge site model on it that covers almost the entire table. The students have placed their drawings directly on the model and are talking, drinking Diet Coke and drawing imaginary circles in the air with black pens.

The two studios in this study, as are most architectural and urban design studios, are based on the critique method. Students are given a project to design which is ‘critiqued’ at regular intervals during the semester. There are two main forms of critique—the personal ‘desk crit’ between the student and the professor (who is also called ‘the critic’) and more formal ‘reviews’ where the entire class’ work is reviewed by ‘visiting critics’ (who are also called the ‘jury’).

This basic studio structure was modified slightly in the collaborative studios. In both of the studios the ‘desk crit’ was replaced by a ‘group crit’ where all of the team members discussed the project with one or more of the professors at the same time. Individual desk crits also occurred, but were far less frequent than group crits. In *The Collaborative Studio* additional
critique was included via video conferencing with other architects and engineers. The studio system was familiar to all of the architects and urban designers, including the students from Barcelona. The studio was, however, a new experience for many of the engineering students in The Collaborative Studio and some of the planning students in The Barcelona Studio. (See Simmonds, 1980; Schön, 1985 and Boyer, 1996 for additional descriptions of the studio experience.)

**Research Method**

The research method for this study included observations of desk crits, group crits, interim reviews and final reviews. I also conducted interviews with professors and students from both studios. Many of the ‘crits’ and interviews were tape recorded. I also obtained drawings, sketches and photographs of several of the design projects as well as class ‘handouts’ from both of the studios.

For all of the examples used in this study, the names of the students and professors have been changed. The names of the universities and studios have not been changed.
III. Elements of Collaboration

The Elements of Collaboration included in this section are concepts, skills, and processes that appear to be essential to successful collaborative design. The elements were observed in both The Barcelona Studio and the Collaborative Design Studio. In addition, many, and possibly most, of these elements are applicable to other kinds of collaborative ventures, whether it is a business project or building a snowman in the front yard. The elements are:

- **Commitment.** The first and possibly most important aspect of collaboration is commitment—without it there can be no progress.

- **Conflict.** Conflict is an inevitable part of collaboration, but it can also be healthy and contribute to the creative process.

- **Communication.** In the collaborative design studio, graphic communication is essential. Verbal communication proved to be limiting and the students relied on drawings and models to communicate.

- **The Group Process.** The successful groups learned to balance the needs and functions of the group with those of the individuals within the group.

- **The Role of the Critic.** The professors quickly learned that new skills were required for a collaborative studio.

These ‘elements’ are explored in more detail on the following pages. In addition to tracking these issues as they occur in the studio, it is also necessary to consider the impact these elements have on the actual design product. Because of the ‘noise’ created by some of these issues, it was often difficult to focus on the design itself—not just for the students, but for myself as well. Hopefully, as I have found, a better understanding of the collaborative process, will enable individuals to turn down the volume on the ‘noise’ created by group dynamics and focus, as a group, on the design product.
Commitment

"[A real team] … is a small number of people with complementary skills who are equally committed to a common purpose, goals, and working approach for which they hold themselves mutually accountable.” (Katzenbach and Smith 1993, 92)

The most basic requirement for successful group work is commitment to the concept of collaboration. Without a commitment to even explore the possibilities of collaboration, it is not possible to proceed to the larger group issues of Conflict, Communication and Group Identity. Approximately one quarter of the groups never got beyond these basic levels of commitment. Three specific types of commitment that were observed in the studios are outlined below:

Commitment to Try. The most basic of commitments is the commitment to try. As simple as it sounds, a commitment to even try the collaborative design process was missing in several of the groups. One of the engineers in The Collaborative Studio commented that, “My main issue was people not trying. The architects on my team didn’t even want to make an effort to work together as a group.” Another architecture student protested vehemently that he didn’t need to work on a team, “I can do this myself … this project doesn’t require a group.” All three of these architects ended up working independently on the ‘Pavilion Project’.

Commitment to the Time. It came as a great shock to all of the students and most of the faculty that a huge amount of time is required for a group to function effectively. The students in The Collaborative Studio estimated that 30% to 50% of their time was spent discussing ‘group dynamics’ and this was a constant source of aggravation for many of the students. Many of the groups finally gave up the goal of working collaboratively and opted for the more traditional role of architect and consultant. As one student in The Collaborative Studio remarked:

In the ‘Chair Project’ we tried to live up to the idea of total collaboration—input from everyone. And we all worked equally on different parts. It changed on the ‘Pavilion Project’, but I don’t think it was because it was an architectural project. It changed because at the beginning of the ‘Pavilion Project’ we decided not to commit to the
ideal of total collaboration because we felt it was taking too much time and we could have achieved the same results in less time. Because we spent a lot of time with the engineers that we felt were wasted in discussions. So we split up into a more classical model of consultants.

The group process occupied so much of the students' time that there was often an impact on the quality of the project. One of The Barcelona Studio students describes what happened during the summer session:

People didn’t realize how long they had to invest in group dynamics. And at the end of the summer they said, “OK, what are we going to do to get through this week and finish this project? It’s going to take each of us designing a separate section of the city.” And you ended up with this hodgepodge of different ideas that didn’t come together in any kind of coherent way.

**Commitment to the Product.** Most of the professors and many of the students felt the most important commitment was to the *design product*, as expressed by a professor in *The Collaborative Studio* in response to my question, “What was it that made the successful groups successful?”:

I think one of the things was having someone in the group that has a real passionate commitment to the *product* being terrific and was prepared to do whatever it takes to make that happen. That gets over a lot of things—it gets over the ego. If you have to divide up the work in order to make a terrific product—then you divide up the work. Somebody has to take charge for a while, then somebody else takes charge for a while. I think that level of real passion and commitment on the part of a sufficient number of people in the group was really a critical thing. Others had different values. Some of the groups that didn’t succeed were very nice people, very polite with each other, very respectful of each others feelings, and it sort of never got past that. That was more important to them than the product in the end.

A majority of the students were able to commit, at least partially, to the overall concept of collaboration—at least for one semester. Those students were then faced with the challenges of resolving conflict, learning to communicate and designing a group process.
Conflict

“I like conflict … I think it’s healthy”
[Adam from The Barcelona Studio]

I have come to believe that conflict in group work is inevitable. However, I also believe that it is healthy and creative. It is the avoidance of conflict that is dangerous. As John Syer describes in, *How Teamwork Works: The Dynamics of Effective Team Development*, avoidance of conflict will only increase conflict:

Conflict is not so much something to be resolved as an experience to be explored. Conflicting views on direction and change within a team never totally unrelated and have great value when considered as different parts of one story. Most exercises in conflict resolution aim at compromise, yet real difficulties arise if conflict cannot be expressed. Avoidance of conflict either drains interest, enthusiasm and eventually trust from the team experience or results in concealed tension, political infighting and the impaired performance of certain relationships within the team. Far from diminishing, resistance will then increase. (Syer 1996, 112)

**Early Signs of Conflict**

In *The Collaborative Studio*, which was originally called *The Computational Studio*, many of the architects were surprised to find out they would be working in groups and the engineers were shocked to find out the amount of time and commitment the studio would require. During the first class there was extensive discussion about credit hours and schedules. There was also a general resistance to working in teams. Students asked, “But I work on a team at my office—do I have to be on one here?, or “I usually work alone.”, and “But who’s going to pick the teams?” The response to these questions was usually short, “Arthur will set up the teams,” and “No, you’ll all work on teams.” The response from the professors did not appear to reflect the underlying uneasiness the students seemed to have with the concept of group work. This can
be seen as an early sign of conflict that was left unresolved and that would later become apparent.

For the next few weeks the students appeared to be avoiding open conflict. For example, during a session where the members of one group were working together, I observed that one of the architects was beginning to become frustrated with the group engineer. “But can’t you see …” The other architect quickly signaled for him to calm down, and he did. He did show his frustration by shaking his head and rolling his eyes, but there was no direct confrontation.

As the semester continued, the underlying tension and frustration continued to build and began to be expressed in sarcastic remarks, often made in public. One student explained during the first review that his preferred material had not been selected for the design because another team member “…wanted to assert his authority,” and then he laughed. Students came to me to in private to complain about other members of their team. Yet this animosity was not usually visible during the group sessions. The professors were frustrated as well, as one said to me, “…there’s more emphasis on the process than the product!” But neither was this frustration visible during group crits.

This beginning phase, in which the groups avoided conflict, was observed in both of the studios. It was slightly less evident in The Barcelona Studio, possibly because most of the students had worked together during the summer.

The Cathartic Moment

The early phase of avoiding conflict did not last. In both of the studios the class had what I refer to as ‘The Bitch Session’. The session can be described as a group therapy session that involved the entire class and the professors and was therefore a cathartic moment for the entire class. The following, taken from my field notes, is my description of The Barcelona Studio’s ‘Bitch Session’:

It began quietly enough. I had arrived at the studio around 5:00 PM and had expected to see desk crits. But I was surprised to find the
whole class gathered in the center area with all three professors and
two visiting professors, obviously from Barcelona, quietly reviewing
drawings at the front of the room. The evidence that a review had
been going on for hours was everywhere—students yawning and
shuffling in their chairs, a student asleep while still sitting on the couch
in the back corner, empty coke and orange juice containers and a metal
tray with the remains of some cheese and crackers (always a sure sign
of a review).

The discussion about the last project came to an end and Richard, the
Urban Design professor and leader of the studio, began to discuss the
independent project phase the students would be working on for the
next two weeks. He said that this time of independent work was a
“chance to do exploration in depth for two weeks” and suggested that
the groups “take an hour or so to take stock of where you are” as a
record of their status for when they came together again as groups at
the end of this phase. At this point all hell breaks loose.

   Student 1(Female): “I’m just finding out at quarter to six
   on Friday that my group won’t be here
   until next Thursday.”

   [Several more students chime in with similar complaints. It appears
   that the Catalan students are taking a trip to Chicago and the other
students are just finding out about it.]

   Mary: [the architecture professor, tries to explain
   that they tried to reschedule the trip] “…and
   besides” she says, “there was an
   assumption that you were talking to
   each other!”

   Student 1(F): “That’s the point—it’s a surprise!”

   Mary: “Obviously communication is not
   working. I propose that everyone
   write down what you think your group
   is in agreement about, or disagreement
   … write it down now, so you don’t
   forget and bring it to your group on
   Thursday. How does that sound as an
   idea?”

   Student 2 (F): “We can write all we want—it’s not
going to solve the problems!”

The session continued for over and hour at a heightened energy and
noise level—at one point someone had to shout ‘one at a time’.
One of the students I knew from *The Collaborative Studio* was sitting near me during this session. He leaned over to my chair and whispered, “This is just like last semester—even the same tone.” It was strikingly similar—also late on a Friday afternoon, at about the same time in the term and at an energy level rarely found in an architectural studio.

The catharsis was generally agreed, by both the students and professors, to have been necessary and beneficial. Several problems had been revealed and aired publicly, including issues of basic communication and common courtesy—like showing up on time and letting people know where you could be found. Most of the students had been frustrated over the same issues, but had remained silent until this point. The professors later commented that they were surprised by the general level of frustration and anger shown by the students, and realized that they would need to focus more of their attention on group dynamic issues. After this session the overall frustration level of the studio was lower, the students felt more comfortable discussing their frustrations openly and the professors became more involved in facilitating the group process with the students.

**Public Display of Conflict During Reviews**

Other visible signs of conflict were the public displays of bickering and dissent during formal reviews. The second review of the chair project in *The Collaborative Studio* included many examples of this type. Much discussion during the review revolved around the difficulties of group dynamics. The following is an excerpt from one of the group reviews:

Kyle: You go!

Len: No, you go!

Kyle: ...we had difficulties ... most of the time we spent fabricating and arguing.

Critic 1: Why?

Kyle: It was a group dynamics problem ...what I wanted to do was not what the group wanted.

Len: ... the design of the arc was most important ...we couldn’t find the information ... we didn’t get it from the engineer
[who was originally assigned to the group, but left the group and the class early in the semester] ... we couldn’t come up with a rationale for the arc ... 

Critic 2: Where are your differences... I see two schemes...

Critic 1: The form doesn’t reflect where stresses are greater...

Kyle: If we had an engineer who was an engineer and not an architect ... who could use the programs... but we didn’t.

Critic 2: Where are you coming from in terms of technology? Have you made decisions about material and form... the form hasn’t changed from the beginning...

Kyle: There’s a reason it hasn’t changed form since the beginning—it’s the only point we agreed on... the rest was dialog. And I’m the only one who knows how to weld and bend things.

Kyle: [later] We have different work ethics... I tend to work more hours, especially if I’m going to make something.

Critic 1: Work through next week. Try to work together.

Kyle and Len did not stay together after the ‘Chair Project’ and chose to do independent projects for the ‘Pavilion Project’. It appears that this group never had a commitment to work together as a group, which is reflected in their public display of conflict.

**Conflict Over Personal Issues**

There were many instances of personal conflict in both of the studio. This type of conflict usually involved basic differences regarding schedules, goals and working styles. Several of the more common issues are discussed below.

**Conflicting Schedules.** From the first day of *The Collaborative Studio* there was friction between the architects and the engineers regarding their conflicting schedules. The architects, who received 18 credit hours for the course, were scheduled to attend the studio every Tuesday, Thursday and Friday between 2:00 PM and 6:00 PM, which is standard for all graduate level architecture studios at MIT. The engineers, however, received less credit for the course, and were scheduled to attend only on Thursdays and Fridays between 3:00 and 6:00 PM. The
different schedules caused endless conflict and frustration throughout the semester. One of the engineers expressed her frustration:

They can’t assume that just because you’re free from 3 to 6 on Thursday—that you’re also free from 3 to 6 on Tuesday. I have a class then! But Tim [one of the teaching assistants] kept scheduling things then. I missed a lot of the presentation [on the computer software].

**Conflicting Levels of Commitment.** One of the most virulent forms of conflict in both of the studios involved the perception of different levels of commitment to both the studio and the projects. The level of commitment was usually judged by the simple criteria of ‘seat time’ in the studio. In *The Barcelona Studio*, the MIT students cited the Barcelona students’ frequent weekend trips to New York or Chicago as evidence of their lack of commitment to the studio. It was one of these trips that triggered the ‘Bitch Session’ described earlier. The engineers in *The Collaborative Studio* were also accused of a lack of commitment, as one of the architects stated:

Our team was totally dominated by the architects. Maybe it was an age issue—but I think the issue was that the engineers weren’t as committed to the studio. For them it was only one of several courses. The issue that was raised in the very beginning, about credit hours for the course, the engineers took that very seriously—it really mattered to them.

**Conflicting Goals.** Many of the students found their goals conflicted with their other team members or with the overall goals of the studio. Len had conflicting goals with the studio:

We have already agreed to split up for the next project. I want to work alone. My purpose for taking this studio is to observe how I integrate design and the computer. So working in a group doesn’t work for my goals.

Other students had conflicting goals with other members of their group, especially between the different disciplines or different programs within the architecture department. One of the students in *The Collaborative Studio* explained his problem with the other architect in his group, “I’m an MArch (Master of Architecture, a first professional degree) student … he’s already done that … he can spend weeks investigating whatever he finds interesting … I need something to show at the end of the semester … I need something for my portfolio!”
Conflicting Working Styles. Another common source of friction involved different styles of working. This did not appear to be as critical an issue between members of different disciplines—perhaps they expected different working styles—but it was a serious problem between the architects. As one of the architects commented:

I would have started differently. I start with an examination process. I study precedent—what I can learn from the past. And I start immediately on the computer. He never studies precedent. He started with an idea from his head and then built a physical model... We have different ideas ... he is wild and subjective, I am practical and normal.

Conflicting Levels of Previous Group Experience. In addition to different languages and different cultures of criticism, the engineers and architects in The Collaborative Studio came to the studio with different levels of experience with group projects. Although most of the architects had never worked in a group before, all of the engineers had participated in several group projects. As Shelly, a civil engineer, comments:

The benefits [of this studio] were learning about the tools and learning to work in a group. I hadn’t done that before—not with architects. The groups we work in in Civil Engineering are all engineers. We all know each other. Everybody gets along and we know each others strengths and weaknesses.

They [the architects] are not used to working in groups, even with other architects. That was a big problem. The engineers are used to working in groups with other engineers.

Conflict over the Process

Violations of Agreements. One of the most common forms of conflict was over the issue of violating 'agreements'. A group member would become particularly angry when a hard-won agreement was violated by another team member. Len, for example, describes an incident early in the semester:
After talking we agreed to a compromise ... but he went off and developed his own scheme independently. He built a chair—alone! He keeps going off on his own.

During an interview, Adam, from *The Barcelona Studio*, describes in detail the incident where one of his team member violated what he perceived and an ‘agreement’:

Adam: Now, this is something that was contested throughout the semester—what does it mean to say we all understand. Then someone would go off into their individual part and do something different than what we thought was the assumed, understood common gesture.

And that, sometimes, would lead to tremendous amount of cussing and biting and yelling about—“How could you not do this one thing that was so obviously what we all thought!”

Q: Did somebody go off and do something that wasn’t agreed to or was there some ambiguity in the agreement?

Adam: Obviously it was both, we don’t know. If there wasn’t ambiguity then they probably wouldn’t have done it. I don’t think there was malice...

In the end, for example, there was a moment when Joseph started inking his drawings—which is a final production gesture. And I was pretty upset, because we were not at a point where we all agreed on every decision and every line he had put in there. So he was inking and solidifying decisions that hadn’t been agreed upon. He said, “You know, sometimes you have to let me just design.” And my response was, “I’m not going to tell you how to design, you can make your designs, but they are within the constraints of the group. The group will say when each of us are allowed to do our individual things. The final drawings, for the final review are the property of all of us.”

**Sabotaging the Group Process.** Although rare, sabotage was mentioned by one of the professors in *The Barcelona Studio*. He described an incident involving one of the students from Barcelona whose actions, in his opinion, had sabotaged the group effort. She had, at the encouragement of a visiting professors from Barcelona, dissented from the group. At the next review, this student showed drawings and diagrams that her group had never seen. The professor felt that this had sabotaged and undermined the group process.
Resolving Conflict over Design Issues

Most of the conflict in the studios involved disagreements over design issues. There were often strongly held convictions about what constituted a good design or a good ‘place’. Many of these differences were never resolved. One of the primary disagreements in The Barcelona Studio involved the overall concept for the outlying developments and ‘tech parks’ along the highway. Many of the MIT students felt that the ‘Route 128 syndrome’, as they called it, was the antithesis of good urban design and unsound from an ecological standpoint. The students from Barcelona, on the other hand, wanted exactly that sort of development along the highway. When the groups could not reach an agreement over such a basic issue, the project was often divided between the students by geographical area. Each student was able to design a portion of the site to his or her criteria. This was possible on the Barcelona project because of the large scale of the project—portions of the site were several miles apart. This is not possible when the project is a chair. A group can not have severely conflicting concepts of a chair and still get it built.

Compromise. In order to overcome vast differences of concepts and ideas, the groups opted for three basic solutions. The first, and most common solution, was for one or more of the group members to relinquish their concept. Sometimes they were overpowered by stronger and more vocal members of the group, sometimes they gave up because they were uncomfortable with any form of conflict, and occasionally they were convinced of the merits of the other persons ideas.

Another common solution was to compromise with the product—a little bit of this idea, a little bit of that idea—in order to avoid conflict or to move on with the project. The resulting projects often lacked a coherent idea or an underlying concept. There were, of course, everyday occurrences of ‘compromise’ that were required by the project itself and were not the result of an avoidance of conflict. These were, in effect, additional constraints on the project and a natural part of any design process. Adam describes a typical example:

We would say, “Well, yes I agree that theoretically we would like to have 50' on every side of every stream all the way through—but as you see here—Joseph’s development needs to have some sort of continuity
too... somebody's got to give ...and someone would give over here and someone else over there ...that's how it went.

The 'Group Hand'. The third, and rarest occurrence, involved the development of the 'group hand'. This was when the group process itself created options and solutions that were not envisioned by the individual members of the group. In essence, this was the development of an additional 'hand' at the table—the 'group hand'. Alan, one of the architects in The Barcelona Studio, describes his group's experience with the 'group hand':

We had the basic layout for the station area—we had decided on the basic streets, the basic plazas, features, land uses and Joseph was drawing it up. He was going to draw out the parts we knew and sketch out any parts he wanted to suggest.

Joseph had taken one of the roads that we had located—and moved it! In a way that I thought compromised the scheme to a degree I couldn't accept. I wanted to do it the way we had it before. Sarah wasn't sure—she could have gone either way. Joseph and I were really fighting about this. He couldn't understand why the road couldn't be that way and I couldn't understand how the road could be that way. We didn't know what we were going to do about it. It was slowing us down, we had to get the station finished. We were at an impasse. I was ready to say, "There are bigger things we need to get done here—I don't mind if we do it this way, but let it be known that there are other drawings that are going to reflect a different policy—that this policy does not exemplify ... Even if we compromise now, when I draw the transportation map, I'm not going to draw it like that! And when I draw the guidelines for the transportation, I'm not going to reflect this move!"

Sarah came up with the most obvious solution. How about the option that you're both right. There does need to be a high speed road at the edge and there does need to be road at the center. Let's do both! What we ended up doing was creating two roads of different natures.

It showed how these ideas were able to come together and inform each other. I on my own, could never have come up with the two road scheme. I would never have known that it was something that needed to be addressed. Joseph probably wouldn't have had a road at the edge and only the one in the center. By coming up with confrontational schemes, we found that there was something wrong with our schemes. And suddenly the third scheme comes out.

It was the group process that created the design. It wasn't any of us—it was the group. It was the group process—the way we were able to
go off, think about things on our own, come back. That made the
design—it was integral to the design itself. I'm interested in these
generative group moments. Which are not compromises—but
creative. A fourth hand—the group hand. It wasn't my hand or
Joseph's hand or Sarah's hand—the group hand came into play and
created this thing. It was a new idea that none of us had come up with
and satisfied all of us.

In the end, many, but not all, of the students came to a conclusion similar to the one expressed
by Rita, to her teammate Max, at the final review of The Barcelona Studio, “I appreciated during
the presentation how much I learned from you—the conflict was good!”
Communication

“… drawings, which are, after all, supposed to be the chief means of communication in these studios.” (Moore 1981, 475)

One of the primary occupations of a group is communication. Precise, effective communications are a goal of every team, yet this is rarely achieved. Many books have been written on the subject of effective communication and especially communicating within a group. And although these principles are applicable to all groups (speaking skills, questioning skills, listening skills) the design teams I observed were able to overcome any limitations in their verbal skills by communicating graphically.

Communicating with Drawings

They began by drawing, at first on their own pieces of paper. Very shortly the unspoken barrier to drawing on someone else’s drawing was broken and a frenzy of drawing accompanied by talking ensued. If drawing didn’t work—they used cardboard models. If the cardboard models didn’t work—they used clay. Always, while drawing and talking, there was a search for agreement. “Do you see this?” “Is this what you mean?” “Can we put it here?”

Drawing on the Same Drawing. One of the first and most important barriers that must be broken in order for designers to communicate their ideas effectively, is the barrier to drawing on the same drawing. There is an unspoken rule, especially with the architects, that drawings are private property. If a group was able to overcome this obstacle, and with it the concept of ‘ownership’, design ideas and agreement seemed to follow.

The most dramatic example of a breakthrough facilitated by drawing on the same drawing took place during the second review of the ‘Chair Project’. Group Three was presenting their project. At the end of a very positive review, Warren, an engineering professor, asks how they
worked together as a team, since “...it looks like a coherent idea” and the issue of group
dynamics had not been mentioned by this group during their presentation, in contrast to most
of the other groups.

In response to Warren’s inquiry, the team produced and proudly held up an 8’ long length of
yellow tracing paper with hundreds of small drawings and sketches on it that had been made
with different colored inks. The team explained that all of them (two architects and two
engineers) had drawn on it—each with a different color. They started at one end of the paper
and kept unrolling more as they drew. When asked, all members of the group felt they had
contributed ideas and sketches to the ‘drawing marathon’ equally. The process taught them
how to come together, how to understand each others’ language, how to compromise, how to
agree and how to design together.

**Drawings as Tools of Agreement.** The interactions between Wayne, Peg, Lauren and Henry
which are transcribed at length in the Annotated Protocol are an excellent example of those
tentative first steps at working and drawing together. The protocol shows how the beginning
steps toward an agreement were facilitated by the use of a common drawing which they drew
on together. At first the two architects had to break the barrier against drawing on someone
else’s drawing, but when nudged gently by one of the planners in the group, they began to draw
together. The planner had merely continued to place a number of rough sketches on the table
in front of them until eventually they drew on one. The protocol also shows the almost
magnetic attraction of a drawing placed on a table. Whenever a new drawing was placed on the
table, the previously scattered members of the group would gather around the sketch. The
following is an edited excerpt from the protocol (Peg and Wayne are architects, Lauren and
Henry are planners):

<table>
<thead>
<tr>
<th>Peg</th>
<th>But, do you think that the parking should be along the loop?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I think that the high buildings should be along the loop.</td>
</tr>
<tr>
<td>Wayne</td>
<td>... First of all what are you getting if you put the high</td>
</tr>
<tr>
<td></td>
<td>buildings here? The people have to come in...</td>
</tr>
<tr>
<td>Peg</td>
<td>That’s not the high-rise block...</td>
</tr>
<tr>
<td>Wayne</td>
<td>No, no, no...</td>
</tr>
<tr>
<td>Lauren</td>
<td>We could diagram it...</td>
</tr>
</tbody>
</table>

*Lauren moves to the side to draw a sketch.*

40
Henry continues to draw the radiuses of the loop at the side of the table.

Peg and Wayne continue to talk/argue about the parking for several minutes. Peg

Wayne If you have the people in the high buildings, how do you get those people in?...

Peg I would do another high-rise here...

Wayne ...If you put them on the outside you’re telling them you come by car...

Peg The problem … is that the apartments are along the road and the high-rises behind the parking … I agree with your idea but not how you’re doing it.

Lauren has been listening to the conversation, but at a short distance, for a minute or so. She has a small sketch on white tracing paper in her hand. As Peg and Wayne continue to talk, she lays the sketch on the table in front of them.

Lauren [To Peg] What did you envision?

Peg Well…

Peg begins to draw on Lauren’s sketch. Wayne That’s from Lauren. [Indicating the sketch.]

Peg Oh, I’m sorry!

Peg stops drawing on the sketch. Peg looks at the sketch and points with her pen. She then asks Lauren about the drawing.

Peg This is the loop? And these are the boulevards connecting?

Lauren [Lauren nods in response to Peg’s questions.]

Henry also gets up and moves toward the conversation. All four group members are gathered around this sketch as Peg talks.

Henry The station’s here…

Peg So, the most important relationship for me is from here to the station. And then from the station to the next city…

Henry This becomes a major avenue…region wide…

Peg We should think about the development around it…what approach…we should give some visual signs. And then the connection with the loop…

That exchange shows Lauren trying to facilitate agreement with the use of a sketch as well as the reluctance of the architects to draw on someone else’s drawing. A while later in the session, the barrier is broken when Lauren brings another sketch, this time one of Henry’s, to Wayne and Peg and they begin to draw together on the sketch.
Henry and Lauren move to join Wayne and Peg. Lauren brings one of the 'loop' drawings that Henry has been working on and places it on the table. It is a very simple drawing—only a red oval on a white piece of tracing paper.

Peg and Wayne, for the first time during their discussion, begin to draw. As they continue to talk, Peg and Wayne both draw on the drawing that Lauren has brought to the table.

Peg Which shape do you think is better... the oval?
Wayne It seems regressive to even be discussing this...you weren’t here [referring to the weekend the Catalan students spent in Chicago]...I want to get on with my station...I see you have some ideas...

Peg I will do a drawing of my idea...
Lauren [directly to Peg] We three [referring to Wayne, Henry and herself] feel good about what we have...would you feel comfortable if...

Peg ...we should think with more detail...it’s not all the same...all the space around here would be...
Wayne ... This is more of a business environment...it’s developed so it become rich here and rich here and rich here [drawing on sketch]... We need to move into that kind of scale quickly...

Peg I know that...

Peg’s simple comment, “I know that” is the first sign of agreement between Wayne and Peg during their lengthy discussion. When asked later, Peg said the sketch was an important breakthrough in their eventual agreement, “We had to see it ... I could not convince him—I had to show him.”
Communicating with Clay

When all else failed, the groups in *The Barcelona Studio*, often at the suggestion of the critics, would resort to clay. This very basic substance did not require any verbal or drawing skills. The most vocal members of the group were silenced. The ability of the architect to dominate the design because she was the one who could draw was eliminated. A level, albeit primitive, playing field was established. It was with clay that many of the teams were able to come to agreement about the overall concepts of their schemes, as one of the Barcelona students describes:

> We learned to create a series of tools ... to initiate discussion in the group, to get to a point where we have some gestures on the table. Either through a model we were making as a group—each pushing and pulling on the clay together—or a drawing that we would have some gestural lines on. Gestures is what we would do as a group! And then we would say, “Do we all see the basic gestures here? Do we all agree on them? Yes! Are we all happy with them? Yes!”

Communicating with Computers

Several of the groups, especially in *The Collaborative Studio*, resolved their communication problems by utilizing the computer. As one of the engineers in the group, James, described during a review:
We had management issues about organization. We needed communication—ours was bad. To solve it we used databases. We combined databases and communication so we could make comments on the same drawings. We set up different files with a list of drawings... We are developing a system.
The Collaborative Process

"I think there's a problem with every group I've been in—and I think it's me.” [Student in Barcelona Studio]

Collaborative design teams are similar to Dewey's description of society, “A society is a number of people held together because they are working along common lines, in a common spirit, and with reference to common aims. The common needs and aims demand a growing interchange of thought and growing unity of sympathetic feeling.” (Dewey 1959, 39)

Very few of the groups in this study were able to successfully negotiate the issues of group identity and develop a comfortable balance between the individual and the group. In the groups that were able to reach this delicate balance, the quality level of both the design process and the design product was considered to be successful by both the students and the professors. One of the teams in The Barcelona Studio was able to achieve both a group identity and a balance between the group and the individuals. Excerpts from interviews with members of that group are included in this section.

Development of Group Identity

**Group Identity.** The first identity many of the groups acquired was the one given to them by the professors—Group One or Group Three. Since the students did not form their own groups, they searched for identity in the often random assignments of the studio. “Well, I was the only architect in the group, so I guess that makes me the designer,” one student proclaimed. Others, especially in The Barcelona Studio where students were assigned to groups based on the similarities of their individual projects, attempted a more refined analysis of their role in the group. Adam describes the early moments of his group as they struggled to determine who they were as a group and how each of them fit into the group:
Adam: We each did our own individual projects which were then evaluated [by the professors] for similarities and basic intent. And our group was probably one of the strongest as far as having the same basic design intentions—which were interrelated nodes … interrelated pieces of the city.

Q: They were interrelated by …?

Adam: Each of us had different ideas about that. I was kind of more transit oriented, Joseph was more use oriented and Sarah was more about the landscape around these things....

Q: So, what was the first thing you did as a group?

Adam: We sat down and looked at our individual work. And we said, “obviously they picked us for these bits.” And we decided whether we’re going to go with what we all had been doing together or we should think of something else.... We decided to go with our first inclination and just make it better.

... Our schemes, we realized quickly, were very different—even though they kind of had the same form. I don’t think we ever consciously said the breakdown I just told you [Adam transportation, Joseph use and Sarah environment], until maybe at the end. Or maybe we never said it. Maybe I’m just saying it in retrospect. I don’t think we knew that ... we just knew that they were different ... but they had the same form.

... We didn’t say, “OK, you’re the one who’s going to do this and you’re the one who’s going to do that”. Midway through the term however, we did kind of come up with roles for each other. I think the instructor, especially Mary, ... characterized each of us as having an expertise in a field.... Joseph’s is architecture and use. Mine was not transit so much as conceptualization--a conceptual framework. How things work and how they acted as a unit. And Sarah was the ecology expert. It became most obvious when we started breaking up into production for the mid-term review.... I did the roads and transit, Joseph did land use and phasing and Sarah did ecology and pedestrian paths.

**Group Rituals.** As an aid to forming group identity, many of the groups developed group rituals. Some of the rituals were simple—a trip to the coffee shop before each class meeting or dinner at the Chinese restaurant every Friday night. Others were more gimmicky and used sports references. Adam’s team, at his insistence, practiced one of these, which he calls the ‘hand gesture’.
[After we had reached an agreement about a design issue] we often felt we had to get to the point where we were actually excited about what we had done. And we would have this little hand gesture—that they thought was stupid, but I started—which was like the old baseball thing—you all stick your hands in the middle—and go RAH GROUP! GO! It’s a joke thing we did. We were excited ... we were laughing about how we were one of the only groups that was getting along. And so we made it into a joke, but it actually became a signifying moment where we would say, “We’re happy about this!” It was this physical gesture of us joining together.

It was not unsimilar to the [teams of people who created a human pyramid] we saw when we were in Barcelona. These people all come together—it’s this group project [laughs]. ... It’s a similar gesture we would do by putting our hands together.

Figure 7: Photo of event the students attended during the summer session in Barcelona, to which Adam refers.
Designing the Process

“... the individual is fully functional yet still tied to the whole”
[Student in Barcelona Studio]

One of the tasks facing the students, in addition to the task of designing the project assigned to them, was to design the process they would use to work together as a group. Although very few of the students were aware of it and even fewer able to verbalize it—the collaborative design process is almost identical to the architectural design process itself.

The Design Process. There are many description of the design process. Each architect or designer seems to have his own and I am no exception. I describe the design process as a 'moving back and forth'—each turn informed by the previous one. Moving, for example, between large scale issues and details; between plan and section. The issue on either end can vary, it is the process of moving between two poles that is important. Dimitris Antonakakis, a studio critic of mine, drew it best. When asked if he could describe the design process, and always a man of few words, he took a pencil from his shirt pocket and drew:

![Design Curve](image)

Figure 8: ‘The Design Curve’, which represents the back and forth, iterative nature of the design process.

The ‘Design Curve’ or the ‘Antonakakis Curve’, as I call it, is not a unique concept. In Design Thinking, Peter Rowe explores various theoretical accounts of the design process. In a section entitled ‘Asimow’s Model’ he summarizes the problem solving theories of Morris Asimow, an industrial engineer:
In a text entitled *Introduction to Design*, Asimow distinguished two structures in the design process: a vertical structure involving a sequential phasing of activities, and a horizontal structure in the form of a decision-making cycle common to all phases (Asimow 1962). The chronological sequences of steps, or phases, in the vertical structure proceeded from a definition of need, through feasibility study, preliminary design, detailed design, production planning, and finally production itself. Furthermore, within each design phase there was a sequence: preparation for design, design of subsystems, and so on. Overall, the general process, of sequence of activities, was seen by Asimow to advance from abstract considerations to those that are more concrete and particular. Numerous feedback loops—relationships between phases along which information about the design situation was seen to flow—were incorporated to account for the observable tracing back through the process in order to respond to new information or difficulties. (Rowe 1987, 47)

**The Collaborative Process.** The feedback loops described, albeit in different ways, by both Antonakakis and Asimow are applicable to more than just the architectural design process. The structure of the ‘Antonakakis Curve’ can be applied to the collaboration process. Instead of the process flowing from large scale to small scale and back again as in the design model, the collaboration process flows between the group and the individual. Just as a successful design project incorporates large concepts as well as attention to details, the successful collaborative process allows for the creation of a group mind while maintaining the identity of the individual.
In the model of the 'Collaborative Process Curve' shown above, the left side represents the group and the right side the individual. Moving towards the left is moving towards agreement, towards a group consensus—a group mind. Moving towards the right is the process of reestablishing a sense of individual identity, of utilizing personal expertise but still in service to the group. As one of the students said, “... the individual is fully functional yet still tied to the whole.”

**Coming Together/Going Apart**

The successful groups quickly established a rhythm consisting of periods in which they were together as a group and periods they were apart and working as individuals. Adam describes his group’s process of ‘coming together and going apart’:

We would do this gesture [the hand gesture] that we agreed, and then we would go off and do our own work that we assigned to each other. We’d say, “You’re going to do that, you’re going to do this drawing, you’re going to make a model of this, you’re going to come up with these numbers.

And then we would set a date when we would all have a certain amount done, and be able to bring it back to each other. We could talk to each other while we were working on it if we needed to. Then we would come back together and show it to each other. Often there were things that would ... generate the next product.

So it was constantly this moving together and moving out, moving back together and moving out. Giving ourselves breathing room to do our own work, and exercise our own methods, research, materials, whatever we need to do and then coming back together.

We would try to make each of those moments last as long as we felt they needed to be. If coming together took three day to come up with some designs we would take three days. If we could do it in an hour—that would be great. Whatever it took.

Adam’s group was able to describe some ‘shining examples’ that represented both poles of the process. The “shining moment of coming together and agreeing as a group” was called ‘The Clay Model Moment’ and the “shining moment when we’re apart” was called ‘The Computer Moment’.
Coming Together: The Clay Model Moment. Sarah describes the use of clay models to reach agreement:

> It took a while to develop agreement as a group, because Adam and I would go off and develop pieces of it that were consistent with what we had agreed—and Joseph wouldn’t.

> I would say the moment that really nailed it was when we started doing our ‘gestural models’—the clay models. That was the point, about half-way through the semester, when we were able to reach agreement—where we became a group.

The clay models represented more that just a way to enforce compliance with group decisions. It represented consensus on a number of different levels—a conceptual level, a visual level and a communication level. The clay models also became the icons for the group and for their group process. They symbolized how the group worked together and the group mind itself, as Adam describes:

> It was physically manifested consensus. You could see it! We had the model in front of us. If someone didn’t like a piece, they would move it over…. The clay model moment was when we realized that as individual we were coming together and really feeding that whole.

Going Apart: The Computer Moment. At the other pole there were also moments when the concept of “… the individual [being] fully functional yet still tied to the whole” were apparent. One of those moments, dubbed ‘The Computer Moment’, was described by Adam:

> There was this wonderful moment on the computer … unlike I ever expected I would be having…. It was right before the mid-term review. Each of us would work on our separate designs with our own expertise, based on some general assumptions we had made as a group.

> The thing that worked out better than we expected, was the fact that since we were working on a computer—we were able to access the same files! I could do my transit map to its own logic. And then at various moments during my production I could pull up other maps, like Joseph’s or Sarah’s, and check what my set of ideas, that were working themselves out in a vacuum, were doing to her lines. Not that I understood exactly what her lines meant, and what my lines meant compared to hers, but I could get some idea. “Oh, this doesn’t look right” or “something’s intersecting here in a strange way”. Then go talk to her and find out. And she would say, “Yea, there’s a rule about a road going over a stream and it should happen in such a way, you should change that”…. The moment on the computer was the
moment that I realized we had separate things to contribute. That we could interact with each other to make a whole.... It defined our separate identities within that whole.

The individual was fully functioning, but was still tied to the whole. Adam felt he could work on his own design, with his own ‘expertise’ and bring his design to ‘it’s own logic’. With this level of security that his ideas and thus his identity wouldn’t get ‘swallowed up’, as he feared, he was able to comfortably venture over to the group side of the curve.

**Touching Base.** In addition to the scheduled periods of individual work and group work, the group established a daily system of ‘touching base’. During studio time the members of the group would casually visit each others’ desks to ask specific questions and to check out what the other team members were doing. Occasionally this would precipitate the calling of an ‘emergency’ group meeting. Adam describes the ‘touching base’ process:

‘Touching base’, which was usually every class time, was different from the formal group process. It’s when we’re in the individual process and we check up on each other and we give individual feedback. That’s where I might come up to Joseph as say, “That’s nice but can that bridge be bigger?” And then I’d go to Sarah and say, “Did you see what Joseph was doing?” And she would say, “Yes, I saw that and I think the bridge needs to be bigger also.” So, a little one-on-one would happen now and then which would confirm what we said as a group. If it didn’t [conform to the agreement] it would trigger another coming together as a group.

**The Hold-Outs**

It is relatively easy, in a group situation, to keep all of one’s activity on one side of the ‘curve’ or the other depending on where one feels most comfortable. It was a common occurrence to observe students that remained almost entirely on the ‘individual’ side of the diagram. Wayne, who is featured prominently in the Annotated Protocol, was one of these students. There were clues suggesting this behavior from the very beginning. During the famous ‘bitch session’, while the other students were agonizing over their group process, Wayne supported the idea of the independent work period, “I support the issue of individual research … this is a good time to investigate the issue of what we’re trying to create here.” My notes from observations of his
group are filled with comments like: 'Wayne walks away from table' and 'Three members of group are present—Wayne missing’. While I was watching the other three group members work together to resolve a design issue, Wayne appeared and interrupted by saying, “Do you have the loop dimensions—I need them.” After Henry responded, “I’ll have them today,” Wayne walked away. Wayne’s reluctance to enter into the group process did not go unnoticed by the professors, one of whom commented:

Wayne had no patience for conversations about how the studio was going ... And in the end he didn’t learn much about urban design. He just went off and did his architecture thing—he isolated himself.

There were several students like Wayne in both of the studios, students who never really engaged in the group process. Of the students who did try, the results were mixed. Many claimed that the studio was a “waste of time” and that they would “never do a group project again”. Some, like Shelly, found it difficult but rewarding and a few, like Sarah and Adam, were able to gain insight into the process itself, as Adam describes:

I learned that it [the collaborative process] has as much a ‘hand’ in the design as any of the other tools we think we are bringing to it.... We learn how to use color or we learn how to use line weight ... but perhaps even more important are the other factors that go into making the design which are feedback, flexibility and compromise. A lot of it is incredibly generative—it’s creative!
Role of the Critic in a Collaborative Studio

“… caught in the cultural cross fire.” [Prof. in Collaborative Studio]

The goals of a collaborative studio are slightly different from those of a traditional studio, because it includes the added goal of working collaboratively.

“We want to establish a … team structure of learning—with the ability of each team member to have a separate agenda.” [Professor in The Collaborative Design Studio]

This added goal affects the role of the critic. The studio critic is responsible for establishing the structure and tone of the studio, selecting the type of project and teaching and evaluating the students. All of these responsibilities are present in a collaborative studio but are often altered in surprising ways.

Structure of the Studio

The first challenge the critic faces is establishing the structure of the studio—the project, the mix of students, the overall tone. The two architectural professors in The Collaborative Studio had taught a collaborative studio, albeit on a smaller scale, the previous year. The structure of the previous studio was different in ways perceived significant by the professors. The type of project was different (the previous project had been an 'environmental' building in Vermont utilizing natural light) and the number of engineering students, in their opinion, did not constitute a ‘critical mass’. Arthur describes the lessons from the previous studio:

We felt there were problems with the past studio … the engineers input didn't change the form of the architecture … and there were team and consultant issues We didn't get meaningful interactions between the architects and the engineers … the issues of collaboration weren't explored enough.
To attempt to correct these problems, the structure of *The Collaborative Studio* was altered in several ways including the types of projects, the number of engineering students and the relationship between the architects and the engineers.

**Collaboration vs. Consultation.** Possibly the most important difference between the previous studio and *The Collaborative Studio* was the early emphasis on collaboration. All of the students were reminded, on a regular basis, that the engineers were to participate in the process as collaborators and designer and not just consultants. As Arthur clearly stated during the first class session:

>This is *not* the model of an architect working with engineers as consultants—this is a collaborative project!

Working collaboratively was a time consuming and painful process for most of the teams in *The Collaborative Studio* and at least two of the teams resorted to the conventional roles of architect as designer/project manager and engineer as consultant. The ‘consultant’ would be given task to complete and would not be involved in decision making.

**Critical Mass.** Every effort was made in *The Collaborative Studio* to recruit engineering students in order to reach a ‘critical mass’ of engineers. In fact, a special course was offered to the civil engineering students (Special Studies in Civil and Environmental Engineering) as well as to the mechanical engineering students (Advanced Topics in Mechanical Engineering). One of the professors explained that they weren’t going to proceed with the studio as a collaborative studio unless they had this ‘critical mass’ of engineering students. What constituted a ‘critical mass’ was never specified, but when the studio started each group had two architects and two engineers. Although the number of engineering students was satisfactory to the professors, the engineering students themselves found that the number of architects was a problem, “One person from each discipline would be better—two architects was a problem on my team!”

**Type of Project.** The type of project was also considered to be crucial to the development of collaboration as one of the professors from *The Collaborative Studio* explains:

>Something I knew, that has been reinforced, is the strategy of setting a very challenging problem which requires all of the efforts and all of the different skills in the group in order to come up with a good solution. It really does
force the collaboration. Successful collaborative projects work this way out in the world—when you have a big complicated building to do. People don't get together in a team to collaborate because they like each other, they do it because they need each other... The lesson of the chair project reinforces that. Set these projects sufficiently difficult that you really do have to collaborate. It reflects the way the world works.

**Culture of Criticism.** The professors were also responsible for setting the tone for the studio. One of the significant issues in a multidisciplinary studio is the traditional 'culture of criticism' in architecture. The architectural studio is structured around the concept of criticism—after all, the professors are called critics. This is not the culture in other disciplines, especially not in engineering. This difference in cultures was of concern to Don, an architecture professor from *The Collaborative Studio*:

...there is not such a culture of criticism in engineering. I think one has to be careful. Typically the culture is either you get it right or you get it wrong. And if you get criticized it means you got it wrong and you're incompetent or something. Whereas there's a different attitude in architecture where a strong critique very often means that you've gotten on to something interesting. So you have to tone it down a little for the engineering students—at least until they begin to understand how the culture of criticism works. Otherwise they can be very hurt and you don't want to do that.

**New Roles for the Critic**

Just as the student had to adjust to the new conditions that 'group' work brings, so did the professors. The new roles were not always welcomed by the critics. As was frequently mentioned by both the students and the professors, the critics were often required to play the role of 'group therapists'. Although laden with ugly connotations for most architects, the analogy is fitting when one investigates the actual roles of a traditional group therapist. As Irvin Yalom describes in *The Theory and Practice of Group Psychotherapy* there are only two roles available to the therapist:

The therapist can most effectively influence the development of the group culture (the aggregate of norms) early in the life of the group. To accomplish [this] ... the therapist may use a variety of techniques; he has, however, only two basic modes of presentation or roles in the
group: he can be a technical expert and he can be a model-setting participant. (Yalom 1970, 86)

These are in fact the traditional roles of the studio critic—he has technical expertise in design and he often instructs by example. Donald Schöen examined the role the critic plays in teaching by example in *Educating the Reflective Practitioner*:

> ... Petra [the student] presents her preliminary sketches and describes the problems she has encountered. Quist [the critic] reframes the problems in his own terms and proceeds to demonstrate the working out of a design solution.... Quist then sets out the next steps Petra will have to undertake ...(Schon 1987, 46)

**Teaching the Process.** The collaborative studio required that the professors not only teach the *process of design*, a traditional role, but that they also teach the *process of collaboration*. As Sachs says in *Why Are You Stuck? Inquiries in the Design Studio*, “The focus of the studio is, and should be, the design project. However ... an avoidance of other issues is detrimental to the purpose of the studio as an environment for learning ... discussing issues that illuminate the situation in the studio, be it talking about models of design ...’operational knowledge’ ...[or] social relations ... can greatly benefit the students and the instructor who must act within this environment.” (Sachs 1997, 86)

It became obvious from observing several group crits, that most, although not all, of the professors were uncomfortable teaching ‘group’ issues. At first the professors questioned the need for it—“Why can’t they figure this out for themselves,” or “I feel like a baby-sitter,” were common refrains.

Eventually it became clear that the *process of collaboration* would need to be addressed. One of the professors in *The Collaborative Studio* explains:

> I think that all of us [the professors] greatly underestimated the difficulty the groups would have in getting themselves together and being effective....

One of the things we certainly learned is that you really have to give people some guidance and some structure about how to operate in a group. Some pretty well structured instruction ... in things like: setting priorities, organizing you time, dividing up the roles. Very elementary things—not very esoteric. But they didn’t have the capacity to do that, they just got stuck in many cases.
Critic as Referee. The other role implied in the title ‘group counselor’ is the role of ‘marriage counselor’ or referee. There were several instances in *The Barcelona Studio* where the professors, as a group or as individuals, would counsel the students on basic issues of group dynamics, such as how to communicate with each other or how to reach an agreement. Mike, the planning professor, took the lead in this area. There were numerous examples where he stepped into the middle of a group conflict and brought order:

Mike was instrumental—he was like our marriage counselor. He’s very structured and organized. He’s very fair. He would just say, “You, what do you think? OK, now the two of you, do you agree? Now your turn, what do you think?” He was like a professionally trained arbitrator. [Student from *The Barcelona Studio.*]

*The ‘Group Crit’*

In the collaborative studios, the dynamics of the group crits evolved during the course of the semester. Many of the early crits show a strong reluctance on the part of the professors to become involved in the group process. Later in the semester there was less reluctance, but the students usually initiated the conversations about group processes. The following examples are excerpts from two group crits in *The Collaborative Studio* at two different periods in the semester. Both examples involve the same professor and students. The Annotated Protocol also includes an excellent example of a group crit.

The Early Crit. The issues of group dynamics were evident from the beginning of the semester. During his very first crit with this group, the architecture professor wanted to talk about the design issues, but was required to discuss group dynamic problems that were brought up by the students. A small example:

Arthur: ...find a starting point—the material, the sculpture, or how to assemble the materials. By today you should have that ... besides how you’ll work as a team...

Alex: Well, there’s a problem with who’s idea it is.

Arthur: It’s about getting on with it! Again, find a starting point.
A Later Crit. During a later crit with the same group, Arthur realized
that the group is floundering over basic group issues and he offers
[reluctantly, he later admits to me] specific advise to the group by using an
example from his own experience.

Arthur: [After 5-6 minutes of discussing the design concept...] Sometimes
there are too many ideas, sometimes they are incompatible.
Go for one idea—complexity will evolve. You haven't
shown me anything that shows the idea in it's whole.
Everybody needs to bring it together—you want to develop
a consensus. I'd like you to have that discussion yourselves.

Danny: There's been a lot of discussion, but only between the
architects.

Arthur: Find what design means to each of you. Have a discussion.
The future is in understanding the nature of collaboration.
Something fantastic happens—you can push the frontiers.
You couldn't take it there yourself. But you can't do that
until you understand what design means to each of you.
You have different languages. Is it just language? Or is
design different for each of you?

[Arthur uses an example of his collaboration on a recent project] We
had to discover how to work with each other. We started
by trying to delegate—but it was too diverse. How do you
control the team? We needed to be certain to pin down the
design—one plan, one section. Then we could go off and
delegate. So, relative to how your group is working, you
need to pin down the design. It takes time to learn how to
work together.

Commitment to the Collaborative Process

"Teams—that's what the world is moving towards. By working in teams we can achieve
a high degree of system integration." [Arthur, professor in The Collaborative Studio]

Possibly the most important influence the professor can have on the group process, is
maintaining his commitment to the collaborative process. When the early speeches and
pronouncements, like the one above, are finished and the time consuming and often painful
reality of group work sets in, many of the professors found their commitment to collaborative
work wavering.
Commitment to Group Work. Working together became so difficult for some groups in The Collaborative Studio, that after the ‘Chair Project’, the professors made group work optional. Several students, all architects, took advantage of the opportunity to work independently. In addition to showing a lack of commitment to the collaborative process on the part of the critic, this act left a few of the engineers in awkward positions. Shelly, a Civil Engineer, describes her experience:

..the architects didn’t agree with each other. I felt I was working on two different projects. So when Arthur said that whoever wanted to, could work on their own—they split. I worked with Sam because he asked me to. I couldn’t think of a better way to choose.

Evaluation. Another area where it is necessary for the critic to show consistency and commitment to the collaborative process is in the evaluation of students. This was a very touchy subject for some of the professors. A professor in The Collaborative Studio did not feel that it was appropriate to give a group grade for the projects. “No” he said, “I give individual grades—I know who’s working and what their contribution is.” The students in The Collaborative Studio knew, at least by the last quarter of the semester, that they would be given individual grades for individual portions of the work. This caused panic and confusion in some of the groups because they had not known that this was the policy. “I spent a lot of my time trying to make this group function,” said one of the students “what about that contribution—that doesn’t show up on paper!” Another student exclaimed, “I thought this was supposed to be a group project! Why are we being evaluated as individuals? If I knew that I wouldn’t have tried so hard to make it work—I’d have just done my own stuff.” In the end there was a scramble by some of the students to produce independent drawings, anything that would look like a personal contribution. This type of evaluation process weakened the students commitment to collaborative work.

The professors of The Barcelona Studio approached the issue of evaluation differently. They used a two part system. First they assigned each project a grade based on the quality of the overall product. Then, based on other factors, individual students’ grades were adjusted a fraction of grade either up or down. For example, if a group project received a B, the range of individual grades within that group could be B+, B or B-. Higher grades were given for superior
individual contribution to the product or the process. A few of the students were given a lower grade because of interference or lack of contribution to the group process. A student who presented drawings her team had not seen at a review got a lowered grade. "What she did was unforgivable," one of the professors said.
IV. An Annotated Protocol

In the protocol on the following pages, I will ‘track’ three elements of collaboration as they weave their way through the session. Although the three issues chosen are not the only elements evidenced by the protocol—they are the most significant. The three elements that are tracked in this protocol are:

PRODUCT/PROCESS—I have noted occasions where the students and professors are discussing either the products or the process of design. You will see that the professors, especially in the early sections of the crit, are focusing almost entirely on the product—the design. It is the students who ask for and then finally receive guidance on the process of group collaboration.

DRAWINGS—The incidents where drawings are used as a tool for communication are noted in the protocol. Selections from the protocol were used in the earlier section on Communication—this is the context.

TOGETHER/APART—The teams movements between working together as a group and working individually are noted. The configuration of the final group structure, where three of the team members (Peg, Lauren and Henry) worked closely together and Wayne worked independently on the design of the rail station, is also evident.

The Setting. The protocol involves a ‘group crit’ between two of the professors and a four member group in The Barcelona Studio. The session occurred during the middle of the semester, and was approximately one week after the ‘Bitch Session’. The protocol is based on my notes and observations taken during the session. Some of the dialog has been transcribed from tape recordings of the session. However, the quality of the recordings varied and not all members of
the group were equally audible. Thus, only 70% of the actual conversation has been included in the transcript.

**The Group.** There are four students in the group:

<table>
<thead>
<tr>
<th>Name</th>
<th>Role and Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Henry</td>
<td>A planning student from MIT</td>
</tr>
<tr>
<td>Lauren</td>
<td>A planning student from MIT</td>
</tr>
<tr>
<td>Peg</td>
<td>An architecture student from Barcelona</td>
</tr>
<tr>
<td>Wayne</td>
<td>An architecture student from MIT</td>
</tr>
</tbody>
</table>

**The Professors.** Two of the three studio professors are present during the first part of the session. For easier reading, the professors have been identified as Prof(F) and Prof(M) indicating Professor (Female) and Professor (Male). The professors are:

<table>
<thead>
<tr>
<th>Role (Female)</th>
<th>Name</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mary</td>
<td>A professor of architecture at MIT</td>
</tr>
<tr>
<td>Role (Male)</td>
<td>Richard</td>
<td>An urban design professor at MIT</td>
</tr>
<tr>
<td>[Not present]</td>
<td>Mike</td>
<td>A professor of planning MIT</td>
</tr>
</tbody>
</table>

**Format.** The transcript of the protocol is on the right side of the page. Notations and comments on the three elements that are tracked through the protocol are on the left. All of my comments and my observations noted during the session are in *italic*. All of the dialog between the students and professors is in standard typeface.
All four members of the group are gathered around the large table in the central ‘crit’ space of the studio. They are receiving a group crit from two of the three professors, Richard and Mary.

**DRAWING**—The crit begins with and is focused on a discussion of the drawings on the table.

There is a large site model on the table. The group has placed sketches drawn on yellow tracing paper on top of the model. The group and the professors are leaning on the table looking at one of the drawings.

**PRODUCT**—The discussion centers around a design issue—the ‘loop’.

As I join the crit in progress, they are discussing the ‘loop’, an elliptically shaped road which they have designed to encircle and define the center of the town.

Prof(F) So you’re looking at the area around the station and not just the station.

Wayne ..the link is totally crucial. I can see a very open structure...which means that is has to be very comfortable and has to look beyond it's own perimeter.

Prof(F) I see.

Prof(M) What about Peg?

Peg [There is no immediate response from Peg]

Peg Yes, we have to look at the region...
PRODUCT—Professors

continue to focus a design issue—
the clarity of the idea. When
Prof(M) says, “Just do one, just
look at one,” he is not offering a
suggestion about how they should
work, but rather emphasizing that
one strong idea will be a better
design.

ecological issues outside of the ‘loop’ for
a few minutes.]

Henry [interrupts] Let me clarify what Peg
is saying...

Peg [continues]...so first of all we have
the intersection, the levels. I was
thinking about making a linear
development outside the loop...

Prof(M) Just do one, just look at one.

Prof(F) You also need to be clear about
the overall idea. I’m going to
push what I would prefer. And I
think you guys are moving in
another direction. And that’s
fine—but as long as it’s clear. I
think part of the advantage of the
loop is that it’s compact and it
locates all of the new density, all
of the new growth, in one
compact, walkable area. It’s saves
that beautiful land for more
residential purposes, which have a
lower environmental impact. This
is my interpretation of what
you’re doing. The last thing that I
would do—I would not propose
more development—the same kind
of sprawling tech park
development. If allowed would
continue to propagate itself all the
way up the ridge. That seems to
PROCESS/PRODUCT—Peg is discussing the proposed phases for construction of the project, and suggests developing certain areas first. She has determined that some areas have more priority than others but that development will be based on an overall concept. It becomes evident later in the session that she this is also how she views the project itself.

Peg
I would divide it into phases—first from the station to the highway. Begin with that development within the loop. I'm not thinking that all this will be built. The most important, the high density, will be built first…

Lauren [Quiety] We still have our other proposal to make. The nodes…

Wayne We can’t just say we’re going to focus on the loop. In our plans and drawings we need to make strategic considerations…

Prof(M) …make explicit the interchange between the regional highway system and the rail station. Make that your concentration. The regional function, the regional identity, that’s where you’re going to concentrate your design energies.

I would really like to see you get this thing working and not worry for the moment about the second order of priorities. If your team were twice as big you might want to consider those things…

PROCESS—First time prof mentions implications for working in a group—“If your team were twice as big …”
PRODUCT/PROCESS—

This is an example of a 'group crit' that is similar to a one on one ‘desk crit’, but is addressed to the group. Although it is still focused on design issues, the professor has started to explain how the design process works—but not yet the group process. Statements such as, “Once you’ve got that really firmly established…” and “…then figure out how you do that…” are examples of ‘what’ the students should do, but not ‘how’ they could accomplish that as a group.

Prof(M) has been talking directly to Wayne during most of his comments. When he mentions the team he looks around and makes eye contact with everyone at the table.

Prof(F) I would support the overall idea that seems to be based on a certain amount of compactness and a certain amount, whether it’s a pure ellipse or not, there’s a certain formal clarity that I think is really being proposed here. I think it has great strength as a scheme. Once you’ve got that really firmly established—then if you go back and say we envision a few more roads that are connected...how we tie in and connect up with the tech park. It’s almost a landscape strategy. If you do propose that you put residential neighborhoods over there, then figure out how you do that such that it absolutely supports...

[As Prof(F) is talking Prof(M) moves away from the table to pour some orange juice, then returns]
PRODUCT/PROCESS—

Although Wayne appears to be discussing the 'process', he is actually just listing the 'products' of the presentation.

Wayne [interrupts] You are saying...to tie up the whole project, to provide a few diagrams and some written ideas and descriptions of the design conception that we propose...

Prof(F) Uh hum, this is your centerpiece. And I think you've already got a lot. You've got a lot figured out. You guys may go through some further revisions but rather than going out to the edges—make sure you've got this guy more or less resolved.

PROCESS—Peg brings up the issue of group 'process' first, she is confused about how they are going to work together.

All four students struggle amongst themselves about how to handle it before a professor makes a suggestion.

Peg But if all of us work on the loop, we would have to work together all the time...and we have different schedules.

Henry But let's see how it works. The alignment of this loop should be done first...

Lauren We could go off and think about the different systems and then come back and reconcile them.
TOGETHER/APART—
During the middle of this discussion on process, Wayne speaks up to emphasize that he will be working independently in the future. He refers to “my design” and “the zone that you want to create”.

PRODUCT/PROCESS—
Professor offers a suggestion, but again it’s about the artifact—not the group process they are struggling with.

PROCESS—Peg asks again about the process, this time about the division of work.
Prof(F) responds, but with a suggestion about the design.

PROCESS—Henry tries to be helpful by providing a technical solution—a precise drawing of the loop.

Wayne
And I think in order to achieve that, we need to create certain parts that will not affect my design right now. And then maybe we could develop the zone that you want to create and the boulevard. I don’t know, maybe somebody else could develop... So that we create parts ...that where they overlap is a road and that road won’t change...

Prof(M)
Give me something that you don’t have to change over the next three weeks. Get that geometry over the next few days...

Prof(F)
I think that you all have a sense of what to do for your individual end pieces...

Peg
No, I don’t understand the division of work.

Prof(F)
Well, just work on something inside the loop and focus on that and get that to work. And then if there is still time, think of that in relation to some of the other systems...

Henry
[Directly to Peg] If you’re given an exact alignment of the loop and an alignment of that interior boulevard and an approximate
PROCESS—Peg continues to discuss her concerns about the process. She begins by trying to explain how she works as an individual but that she is struggling with how to work in a group.

Peg

Yes, but I can think of some of the things I would like to change. I can’t just think about the buildings—I need to think about what the street will be like. I cannot think just about the shape of the loop. And I need to think too about this space that will go there or maybe there… I prefer to work first on my own and not have to be explaining. Maybe I can’t find you or you can’t find me. I think maybe it’s more disciplined. For me it’s very important to have a very clear vision of work.

Prof(F)

I could imagine right now that you guys each go out and you each come up with a version of the loop and how the boulevard comes in. You each do a street layout and you just quickly then present them to each other.

Prof(M)

With one caveat—agree that you don’t know a lot of the geometries.

Lauren

I would like to do that, I would like to…
PRODUCT—Prof(M) starts with another design option—as if he hasn’t understood their struggle about how to work together.

PROCESS—At this point he does offer a suggestion about how long it should take.

PROCESS—Peg continues to ask for more guidance on the group process.

Prof(M) Agree not to agree.

Prof(F) And then go off and then come back to each other…

Lauren And sometimes it will overlap…the development ideas…

Prof(M) Let me pose another option to you. Which is, if you are on a road that comes from here [he points to the drawing] you want to make that place interesting--so it’s just not another road. Where should it be? Where are you going to put it to provide correct development types?

So just take two days…for all the things that would influence the location and character of that road. This is still a question in your team’s mind. I don’t think it’s worth three weeks work--just two days work--just to think about the road.

Peg And for the three weeks…you mean that all of us have to think about the design of the loop?
Finally the professors and students begin to discuss the practical issues of working as a group.

TOGETHER/APART—the process of working together and working apart is discussed by the professor.

No, again, two days maybe over the weekend. If each of you took a pass at it. Or if you want to designate one… Someone needs to sit down and draw this and you guys need to agree. Now whether one person draws it or each of you takes a quick stab. Half an hour! [laughter] Just take a stab!

[Everyone speaks at once for a few seconds.]

We have discussed it, it’s already down to…

OK, we just haven’t seen it!

You [pointing to Henry] could take this edge, you [pointing to Wayne] take the issue of architecture. And come back together in another two days to compare notes. And then one person takes this, one person takes that. In other words their individual work may turn out to be based on individual students facility with an issue.

At this point we need to define the shape of the loop. We’ve kind of decided on a basic scheme. Maybe we can take pieces of it…
PRODUCT—Prof(M) still wants to talk about the design.

PROCESS—Prof(F) suggests possible ‘roles’ or areas of expertise for each of the students.

TOGETHER/APART—Prof(F) makes specific suggestions about how to divide the work and how to work independently and then come back together.

Prof(F) Well maybe you have, but we can’t see it yet. So, if you do know…

Lauren Yes…

Prof(F) Then yes, then you could each sort of take pieces…

Prof(M) You have a scheme, it’s very nice…

Prof(F) …maybe Henry looks at the edge with the high road. Maybe Wayne is looking at this edge and correlating that. And maybe Lauren is looking more at the middle. And Peg is looking more at how that boulevard comes into that middle zone.

Henry The boulevard is a good part of the definition…

Prof(F) That might be what somebody goes to—I mean we’re only talking about two days. And then once you really do have the loop much more established then you [she points to Wayne] continue more on the station. Somebody continues more on the boulevard. Somebody continues more on the [unintelligible]. Somebody continues more on the radial…
PRODUCT—Now it appears that Peg wants to talk about the design of the loop.

Prof(M) reminds her that the 'process' will bring her back to that issue at a later date.

I'm not sure. Maybe the loop does not have to have a strong feel of shape...

Remember that you're going to come back to visit that...

Exactly, you'll have another three weeks to still...

...to come back...to change the shape...to change that...you'll have another chance.

Henry Let's start!

Don't you think that it would be better to think about the loop...

My first proposal was that you do the whole loop in half an hour and then you divide it up...Wayne was saying that he thought you already had a good idea about the overall. That you already knew enough about the overall and were ready to split it up. I don't see the overall in there. Besides the loop...

OK, we'll show it to you ten minutes from now. I'll go get a red marker and be back. [he does not leave immediately]

OK

Is this a fragment of the loop...
Wayne  [interrupts Peg] We can discuss that amongst us.

END OF GROUP CRIT.

The group crit is beginning to wind down. Prof(M) and Lauren have a short conversation about a book she has been searching for in the library. Wayne and Prof(F) quietly discuss the loop for a few minutes.

Both professors leave to talk to another group.

TOGETHER/APART—

Henry begins the process of together/ apart—first he gets agreement that they will be working on the loop and then he moves off to independently prepare a drawing.

Also evident is that there are now separate groups, which will merge and separate during the remainder of the session.

PROCESS—Wayne is concerned about Peg’s “participation”.

Henry  OK, so we work on the loop then. Should I draft one then?

Wayne  Yes, yes, yes.

[Henry and Lauren move to one end of the table and talk quietly. Wayne moves to the other end of the table and speaks directly to Peg.]

Wayne  There’s some friction here…

Peg  Some what? What?

Wayne  There’s some friction of interests. Because essentially you’re being pushed into the loop where you didn’t really want to concentrate your efforts. So essentially, how do you see your participation…

Peg  My work in the loop?

Wayne  No, you’re being pushed into the loop even though your interests were more outside. But now, out of the discussion, it seems that we’re being strongly recommended to really sort this
PRODUCT/PROCESS—Peg is concerned about the regional issues and is concerned that the ‘process’ may only focus on the loop.

Peg
No, I think that it’s the most important part [the overall regional issues]...It should be well done.

Wayne
[Wayne is talking directly to Peg while using his hands to point to a drawing.]

You’re right. But the point is to find a way to do it. A way to do it. A way to configure this whole thing as one unified design and at the same time actually attribute different paths to different people.

But the way...the way we discussed it--and the way I definitely see it--is that yes there is a very strong argument for having almost a mirror image of the loop inside the loop. I can see that and I can see that there is a differentiation between the zone of the parking, the mid-rise and the high-rise. And then the inner loop which does not have to be a car loop in that sense. And an interior urban condition here that provides space for cafes, restaurants...which is in a way...there is this belt of out and not do the outside so much.
commercial and offices. Not commercial or offices completely. And carparks and facilities like gas stations and so on. Where on the outside…

I mean what is the character of that building? In the inside that is a point of interest by the people who are using this town. If they come from the station they are going to walk through this to get into their cars. If they come out to have a lunch sandwich they’re going to go to restaurants--go to sit maybe around the fountain or in the park. And I can see this area very much like the boulevard as being a green area with nice houses of three or four stories with little courtyards and so on. I’d like to see some high urban development around that…in relation to that. But, I can see it separated and at the same time serving very much one design. This zone that takes over the…
PROCESS—Lauren, the facilitator of the group, is monitoring the ‘process’ issues as Wayne and Peg discuss the product.

DRAWING—Henry begins to draw. He has chosen to do it at the table where the other group members are gathered.

Lauren has been observing the conversation between Wayne and Peg. She goes to the write-on board near the table and adds the word ‘design’ next to the word ‘network’ on the list of issues ‘to be resolved’ on the board.

Henry leaves the table and returns with a roll of tracing paper, a ruler, and a red pencil. While Wayne and Peg continue to talk and Lauren to listen, Henry lays some tracing paper over the site model and begins to measure the precise layout and turning radiiues of the ‘loop’.

Peg I don’t see that the loop, uh, must be one road...

Wayne Exactly, but that’s why we were discussing the scheme of Henry on Tuesday and came up with the approach. Because if you’re not fairly comfortable with it and at the same time you’re being pushed to operate with the loop.

So first of all we have to get some consensus as to what approach you want to take and then divide the tasks and then go and get moving.

But what I find you should not do [raising his voice] is definitely not do some work in the next three weeks and then come together and say--hum, but this is actually
TOGETHER/APART—
Wayne is striving for agreement before the group separates.

PROCESS—Peg is still concerned about how the group process works.

TOGETHER/APART—
Lauren’s comments reflect the idea that even when the members of the group are apart, they are still connected to the whole group.

not what we wanted to do and so let's use the last three weeks to do it. Bullshit!
I think we should really get the purpose straightened right now and then we work as far as we can on it. And then essentially use the last three weeks just to pull all the graphic materials together. Because it’s going to take a long time to sort our ideas--and not by changing things that we’ve already worked on three or four weeks.
I think we should really agree on something so on and move forward so we are not going to be thrown back and have to reconsider, have to redraw.
The only thing I wanted was to find which part I will develop and then …
That’s fine, that’s fine.

Peg
Wayne
Lauren
[Who has been listening a short distance away.] I don’t think it’s going to be possible to find a really discrete job that we only work on--because they’re all tied. Like I’m doing a street design--but the buildings facing the street, and all
PRODUCT—Wayne and Peg continue to discuss the design of the loop.

Wayne And the way you get out of the station…

Peg We need to make different parts of the loop. Not just one person…

Wayne No, I think that it was always the approach to have one person do the left side and the right side. I don’t agree with that. I think we have to look at the different systems and our strategy right now. We can see what the strategy…and how the systems can be separated and where they overlap.

[Peg has been saying but… but… but… through most of this conversation.]

Peg But, if you say systems—what systems impact…

Lauren I think it’s OK if you develop something that conflicts with mine. We’ll come back and then we’ll reconcile.

Peg I think that is better. But, the systems have to work.
DRAWING—It appears that no progress can be made until there is agreement about the drawing Henry is working on.

TOGETHER—The group gathers around the drawing—this is the first time all four members of the group have been together since the professors left.

PROCESS—There is disagreement as to what constitutes ‘agreement’.

Lauren Yes, we have to develop all of the different systems very carefully—not areas.

Henry [Still sketching] Let’s get that first step. If you give me ten minutes…you will have the first radius calculated.

All three group members gather around Henry as he sketches.

Wayne But you see…Wait. I don’t think that approach…Henry, I think the approach in order to size the loop must be taken from two sides. It cannot be about the traffic only. The traffic has to be resolved, that’s a primary concern, I agree.

Henry Then we’ll have to make some kind of assumption right now. Even if it’s not the right one, we can change it later…

Wayne But, I think you have to have at least a rough consensus about the layering within this thing. Layering in terms of horizontal layers…whatever. Because we say we’re going to have a parking zone…just have a rough estimate…parking zone with mid-rise and high-rise. Then we’re going to have somewhat of an
PROCESS—Wayne suggests that they agree to a ‘tolerance’. Urban zone here. If we all agree on that. And another part is that high-rise double block on the other side. The question is what are the rough spaces and what do we need to consider at least as a tolerance. And then work within the tolerance area. If we say for all the parking and the high-rises we need at least 70 meters and 70 meters on the other side. And maybe 120...

PRODUCT—Peg wants to discuss the design issues. Peg But, do you think that the parking should be along the loop? I think that the high buildings should be along the loop.

Wayne Well, that's exactly the point we were discussing. That it seems like a very good thing. First of all what are you getting if you put the high buildings here? The people have to come in...

Peg That's not the high-rise block...

Wayne No, no, no...
Lauren We could diagram it…

Lauren moves to the side to draw a sketch.

Henry continues to layout the radiuses of the loop.

Peg and Wayne continue to talk.

Wayne If you have the people in the high buildings, how do you get those people in? If you try to encourage the station…you want to minimize…

Peg I would do another high-rise here…

Wayne You have to minimize the station. If you put the high-rises in the center, you’re bringing them closer to the station. If you put them on the outside you’re telling them you come by car—and that’s not the point we can make. So, I think there is a consideration of how you use the station. That determines the high-rises clearly might be directly at the road—which I don’t necessarily agree with. I think there’s also a matter of how the people use the station…

Peg The problem apart from the station is that the apartments are along the road and the high-rises behind the parking. Because you
will not have two miles of parking, maybe you will have 60 meters of parking…

Wayne Yea, but that probably should bring the buildings in. It pushes other buildings in…

Peg And what happens along the loop?

Wayne Well, that's where you have open parking and parking structures. You might have gas stations, you might have I don’t know… some kind of facilities…

The discussion between Peg and Wayne about the parking goes on for an additional 3 minutes.

Peg …there will be a lot of buildings, and a lot of people will work here. They will come from all over the region.

Wayne …but then you are starting to emphasize the fact that people are coming by car. You’re neglecting the institution of the station…that we are also looking at it at a regional level. How are you treating the station in relation to the loop? Are you saying that the loop is only by car? Whether or not we have a station more or less
doesn’t matter! I think there should be a fusion of both…

Peg Why? The people…

Wayne [Ignoring her comment] …the people who are coming by car and the people who are actually inhabiting the space—that come from the station as well as by cars…

Peg I agree with your idea but not how you’re doing it.

**DRAWDING—Lauren brings a new drawing to the table.**

Lauren has been listening to the conversation, but at a short distance, for a minute or so. She has a small sketch on white tracing paper in her hand. As Peg and Wayne continue to talk, she lays the sketch on the table in front of them.

Peg [To Peg] What did you envision?

Lauren [To Peg] I'm sorry!

**DRAWDING—The unspoken barrier against drawing on someone else’s drawing has not yet been broken.**

Peg begins to draw on Lauren’s sketch.

Wayne That’s from Lauren. [Indicating the sketch.]

Peg Oh, I’m sorry!

Peg stops drawing on the sketch. Peg looks at the sketch and points with her pen. She then asks Lauren about the drawing.

**DRAWDING—Attention is focused on the new drawing, even Henry joins the group.**

Peg This is the loop? And these are the boulevards connecting?

Lauren [Lauren nods in response to Peg’s questions.]
Henry also gets up and moves toward the conversation. All four group members are gathered around this sketch as Peg talks.

Henry The station’s here…

Peg So, the most important relationship for me is from here to the station. And then from the station to the next city…

Henry This becomes a major avenue...region wide…

Peg We should think about the development around it...what approach...we should give some visual signs. And then the connection with the loop…

Wayne You’re creating lots of connections, but what are you creating in here?

Peg I would do a development here along this road…

While Peg continues, Henry returns to the side of the table to work on his drawing.

Lauren What we agreed with Richard (Prof-M)... [she is interrupted as Peg continues to talk]

Peg ...and a development outside the loop. And then maybe this kind of development along the loop and another kind of development
PROCESS—Lauren tries to refocus the discussion on the process, she believes there is already an agreement.

Henry That's because of the [unintelligible] or because the interior should not have...

Peg Because this should be connected with a lot of buildings.

Lauren [Arms folded—asks Wayne directly] Weren't we going to go off on our own to develop this? [Wayne does not respond.]

Peg [Continues to talk] ...outside the loop you have green space here. You have the fields, you have the mountains, you have a lot of open space...

Wayne But this is irrelevant! What is the uses...the access to parking lots...

Wayne and Peg continue to talk loudly at one end of the table.

TOGETHER/APART—The group members, especially Lauren, move back and forth creating different ‘groups’ within the group.

Lauren moves to the other side of the table and talks quietly with Henry about the drawing he is working on. Lauren occasionally glances over at Wayne and Peg as they argue. There are now two separate conversations which continue for several minutes.

After a few minutes, Lauren leaves the table to throw something away on the other side of the room. When she returns, she joins Wayne and Peg as they continue...
DRAWING—Lauren tries to focus attention on one of the drawings.

DRAWING—Lauren begins to draw another sketch, apparently based on the conversation she has been listening to between Wayne and Peg.

DRAWINGS—Lauren tries another visual medium—a book with photographs.

to discuss where the high-rise buildings and parking are to be located.

Lauren attempts to make a comment as she points to and then touches the drawing on the table. Peg and Wayne continue without noticing. Their voices are getting louder. Wayne and Peg continue to talk and only glance briefly at the sketch.

Lauren moves to the side again to prepare another sketch. Lauren is drawing a freehand sketch of a street while Henry continues to prepare a diagram of the turning radiiuses with a ruler and a red pencil. Henry appears to be partially listening to Peg and Wayne's conversation.

Henry Can I offer something? [Peg continues to talk.]

Henry returns to working on his drawing of the loop.

Lauren has gone to the other side of the studio and returned with a large book with several drawings in it. She stands next to Henry as he draws.

Henry [still seated at the side of the table, he speaks to Peg and Wayne at the other end of the table] We have to look at the hill...[Henry continues to talk about the 'hill' with Peg and Wayne for several minutes.]

Henry finishes the discussion about the hill with Peg and Wayne and begins to explain his entrance sequence. Lauren is looking on with skepticism and amusement as Henry explains his logic.
TOGETHER/APART—The group has separated again into smaller groups.
A few minutes later, they move together as one group.

DRAWING—Lauren brings the ‘breakthrough’ drawing to the table—It’s one of Henry’s sketches of the loop.
Wayne and Peg break the barrier about drawing on someone else’s drawing. The also begin to draw for the first time during the session.

Henry...it needs to be A, B, C, D and then D, C, B, A...you can’t have A, A, C, B...do you see...
Wayne...yes, I agree with the need for a symmetrical sequence...

Henry and Lauren move to join Wayne and Peg.
Lauren brings one of the ‘loop’ drawings that Henry has been working on and places it on the table. It is a very simple drawing—only a red oval on a white piece of tracing paper.

Peg and Wayne, for the first time during their discussion, begin to draw. As they continue to talk, Peg and Wayne both draw on the drawing that Lauren has brought to the table.

Peg Which shape do you think is better... the oval?
Peg What will we do now...
Wayne is not interested in discussing what he believes has already been agreed upon—he want to move apart and work on ‘his’ station.

Peg offers to prepare a drawing of her ideas—she believes she has not been able to communicate her ideas verbally.

Wayne It seems regressive to even be discussing this...you weren’t here [referring to the weekend the Catalan students spent in Chicago]...I want to get on with my station...I see you have some ideas...

Peg I will do a drawing of my idea...

Lauren [directly to Peg] We three [referring to Wayne, Henry and herself] feel good about what we have...would you feel comfortable if...

Peg ...we should think with more detail...it’s not all the same...all the space around here would be...

Wayne We’re not saying that. What we’re saying is that there is some kind of system—that’s what we agreed on. They are somewhat different from one another...and there is an internal road and some kind of entertainment architecture...with restaurants and mid-rise building. This is more of a business environment. But there are two systems here...we’re not saying every building is the same...it’s developed so it become rich here and rich here and rich here [drawing on sketch] and that all of it can come together.
We need to move into that kind of scale quickly…

Peg

I know that…

Wayne

If we can agree upon basic strategic moves right now…then we can get into the detail level much more quickly. So if we go back two days and we all think about this as a general problem, then a week has gone and what do we have? How much time do we have to really develop it? [Peg has been saying but...but...]

Peg

But what I mean when I say that I would like to see some drawings that are done...with some detail…

Lauren has been listening to Wayne and Peg with her arms crossed, she seems frustrated with Peg.

Lauren

I think this gives you detail! It gives you an idea…

Peg

...well I can wait…

Lauren

...this ring…

Henry

Let's not think of it as a ‘ring’. Look, if I say I have something here, is that a ring? No.

Lauren takes a pen and draws on the tracing paper—but Wayne and Henry talk over her.

Peg

...you have these blocks...or are we talking about big companies?
Wayne No, we’re talking...

Peg [interrupts] Are these building inside the loop? Because we don’t have enough space for that.

Henry returns to the side of the table and continues working on his drawing.

Lauren is standing to the side, with her arms folded watching Wayne and Peg. Prof(M) comes back to the table and motions to Lauren that he wants to talk to her. She leaves the room with him.

Wayne [Drawing as he talks] Well that’s part of the consideration why we have to think about strategy first. And then start thinking—how much space do we actually need? That’s our strategy...we shouldn’t mix the development...Yes, this is corporate, if we call it that. But this is the hundred by hundred three to four story buildings with maybe a penthouse that somebody lives in...restaurants, maybe small design companies, something with one or two or three offices...this kind of structure is in there.

And then we have the connector—that’s the loop part. It’s pedestrian or maybe just cars along one side and maybe this is a

---

Figure 10: The sketch Peg and Wayne drew on. Henry’s original drawing only included the large red oval indicating the ‘loop’.
pedestrian zone. And what happens if it's a pedestrian zone? You want a little park here with a fountain.

In order to get it to that level we have to start moving in. And in order to move in I think we just have to agree on a basic approach. And if the approach is— something happening here, and something happening here [he is drawing rapidly on the sketch].

Peg And we could take advantage of all this overlap...

Wayne Why can’t...

Peg Do you remember...that the university...

Henry [interjects from across the table] The university did this...it’s their land...

Wayne That could work...we could keep it and just close it here.

Peg OK

TOGETHER—Henry joins the group again.

Henry [gets up from table and stands near Wayne and Peg.] Can I just ask one question about this? Why can’t this lineal, small, not very large road act as the boulevard and one of the intersections. It does not loop back around in here...why can’t it just continue...it would be
a very important path. It can connect the university, but I would think you could create a space in here, a heart, a gut of the loop. But it doesn’t have to have a ‘road’ around it to work. Part of the reason that the loop has been reduced is so that one development…where everybody can have a place...

Wayne What could be done in order to create some interior sense...I could imagine something happening right here that does not have to be a road at all. It can be pedestrian...this is a path that the people can walk across...they walk here...and there is some urban development here...

[Henry has been trying to interject]

…and then we have the pattern that in plan looks like a reflection but at the same time it does not have to be the same monolithic kind of construction.

I’m going to move back to the station.

Peg I will try to make a plan of the loop… trying to define the buildings.

APART—Wayne signals that he will be working independently on the station.

DRAWING—Peg will prepare a drawing that expresses her concerns about the buildings.
PROCESS—Wayne, Peg and Henry discuss their schedules for the weekend and arrange a meeting time.

Wayne: You’re not going to be here over the weekend... when do you think you can get it done so you can move into the actual design much faster. I’m going to be here over the weekend. Because this is like a general discussion, and I think we should get this general discussion out of the way and really get cracking on what we are creating. Exactly what you say—make the buildings...

Peg: [Peg has been trying to interject for some time] What I will do this weekend...

Wayne: Do you want to move it to Tuesday?

Peg: No, I will work...

Wayne: I think that before you get into all kinds of detail and maybe feel very strong about defending your scheme...

DRAWING—Agreement has been reached during the ‘drawing process’ between Wayne and Peg.

Peg: No, no, no... that’s the scheme [points to the drawing they have been drawing on]

Wayne: But that’s why I think...

Peg: ...but it wouldn’t matter...
APART—Wayne is still more concerned about the work they will do separately.

Wayne ...but that’s why I’m thinking that if it’s done Sunday, the schematic part—then we can really move into a more profound...

Peg So you will be here this weekend?

Wayne I’m going to be here.

Peg And Henry? [directed at Henry]

Henry Sunday at 5 o’clock. I’ll be here after 5 o’clock on Sunday.

Wayne OK, I’ll be here too. I have a meeting at 4:30, so I’ll be able to come around 5:30 on Sunday.

Peg So, we will agree to everything Sunday at 5:00.

Wayne Yea. From 5:30 till 8:00. After that time I’m going to be out. So that’s something.

Wayne begins to collect his things and leave the table. As he walks back to his drafting table he pats Henry on the shoulder and says ‘out of here’.

TOGETHER—Peg and Henry talk privately for the first time in the session. This interaction is less confrontational that the one with Wayne. It is also the beginning of the group of three that will work together for the rest of the project—Peg, Henry and Lauren.

Only Peg and Henry are left in the room. Peg walks over to where Henry is working on his drawings. He has prepared drawings of three possible loop configurations. He and Peg discuss the drawings briefly.

Henry ...here are two of them—so take one before you go...comment on it...and you’re about to get one more from me.
DRAWING—Peg, an architect, and Henry, a traffic engineer, attempt to communicate graphically.

[As Peg looks at one of the sketches]
That one may be a little too extreme... a little too wide...

Peg

[Drawing on the sketch]
I'd like to see something like that... you see?

Henry

... I don’t see it...

Peg

You need to have a strong—not a strong—a clear access to the inside of the loop. Not a lot...

[Henry draws]

Yes, like that.

Henry

Do you want cars to be let on this road? I think you do want some cars to be there. But do want a lot of cars to be going through here.

Peg

No, not a lot.

Henry

It seems to me that what you want, in general... those that come by train we already know—they come, they come through this plaza, whatever, they go to work. Those who come by car park somewhere, maybe right here or maybe under the highway. But the prime places to park, that are close enough to where they work and then they come in on foot. Right? They park somehow and
then they come in on foot. And
they work here. Right?

Wayne returns to the table with his jacket on and
joins the conversation.

Wayne That’s the heart of the loop.

Henry They don’t work at the heart, but
they go through it, eat lunch
there…

Wayne They meet. That’s the
communication center…

Peg Yea

Wayne Quick thing—

Henry Can you sit down for five
minutes?

Wayne I have to leave. I actually have to
meet with somebody…

Henry I’m going to have three route
alignments.

Wayne Three, that’s a lot…

Henry Well…

Wayne Just go ahead. If you have a copy
you can just leave it on my
desk...for the weekend.

Wayne leaves the studio.

Peg returns to her drafting table.

Henry continues to draw at the table.

End of session.
## List of Illustrations

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1</td>
<td>Student drawing from ‘The Collaborative Studio’ entitled ‘what.team’.</td>
<td>11</td>
</tr>
<tr>
<td>Figure 2</td>
<td>View of studio space for ‘The Barcelona Studio’. [Photograph by A. Sachs]</td>
<td>15</td>
</tr>
<tr>
<td>Figure 3</td>
<td>Two chairs from the ‘Chair Project’. [Photographs by A. Sachs]</td>
<td>17</td>
</tr>
<tr>
<td>Figure 4</td>
<td>Two of the ‘Pavilion Projects’. The one on the left was a group project, the one on the right was done by an individual. [Student work]</td>
<td>18</td>
</tr>
<tr>
<td>Figure 5</td>
<td>Two projects from ‘The Barcelona Studio’: the ‘Loop’ on the left and ‘Sustainable Growth’ on the right. [Student work]</td>
<td>20</td>
</tr>
<tr>
<td>Figure 6</td>
<td>Student photo of clay model in ‘The Barcelona Studio’. [Student photo]</td>
<td>43</td>
</tr>
<tr>
<td>Figure 7</td>
<td>Photo of event the students attended during the summer session in Barcelona, to which Adam refers. [Student clipping from brochure]</td>
<td>47</td>
</tr>
<tr>
<td>Figure 8</td>
<td>‘The Design Curve’, which represents the back and forth, iterative nature of the design process.</td>
<td>48</td>
</tr>
<tr>
<td>Figure 9</td>
<td>‘The Collaborative Process Curve’, representing the process of ‘coming together and going apart’.</td>
<td>49</td>
</tr>
<tr>
<td>Figure 10</td>
<td>The sketch Peg and Wayne drew on. Henry’s original drawing only included the large red oval indicating the ‘loop’. [Student work]</td>
<td>93</td>
</tr>
</tbody>
</table>
Bibliography

* Asterisk indicates works cited.


