sional to educate his or her clients on the realities of the design and construction process and guide them every step of the way. In this instance, it was clear from the start that the school district wanted more program than it had money. Given the budgetary restraints, Capital had a responsibility to bring its client’s expectations back to reality.

Documentation. Unfortunately, on public projects where there is a limited budget, it is not unusual for the public entity to cut items out of the project during design and then add them back during construction. When the school district embarked on its dubious course of postbid negotiation, Capital Architects should have carefully documented every detail. For instance, when Capital recommended that a new gymnasium be omitted as the most obvious step in bringing the project back into budget, the district refused. Instead, the district insisted on a budget-cutting exercise that worried Capital. That worry, however, should have been put in writing—perhaps in a letter that voiced Capital’s objections and documented Capital’s alternative recommendations.

Limitation of Liability. Through little fault of its own, Capital was brought into a costly dispute and ultimately absorbed a loss far in excess of its degree of culpability. One potent way to lessen the impact of that claim would have been a Limitation of Liability clause in Capital’s contract with the district that, at the very least, held Capital’s total liability to its fee.

Postclaim Measures

Claim Notification. Capital Architects notified its insurer of a potential claim as soon as it was learned that the M & E was going to close its doors and walk away from the project—and was proud of its prompt action. But how timely was the notification? In fact, the potential for a claim was evident far earlier than that. The attorney and insurer should have been put on notice as soon as Acropolis announced it would be late with the bid package or, at the latest, when the 100-page addendum was delivered.

Retaining and Coordinating Replacement Subconsultants. Retaining Gergen, the supplementing mechanical and electrical consultant, was the architect’s decision. A highly regarded firm, Gergen was given what amounted to an open checkbook to redesign a Ford Falcon into a Cadillac. It appears there was a lack of coordination between the architect and the subconsultant. Here, it was the responsibility of the architect to keep the changes made by the subconsultant within reasonable budget and program parameters.

Damage Control. In an effort to mitigate the loss, Capital put a full-time architect in the job trailer. That was an admirable measure—but one person was not enough to handle the tidal wave of change orders. There are times when, in order to mitigate a loss, the wisest move is to allocate as many of the best people and resources as necessary to contain the damage.

Documentation. During most of the construction phase, the contractor was spending an incredible amount of money. Since a claim against the design team was a forgone conclusion, it was especially important that Capital stay on top of those expenditures and carefully document any objections. Instead, Capital failed to voice its objections to the district or the contractor over the expenditures.

Assuming Responsibility for Change Orders. In the spirit of cooperation, Capital’s on-site architect and the contractor sat down to allocate change-order causation. They sorted through each of the 700+ change orders and decided on the cause: design error, design omission, owner request, hidden condition, or code requirement. On the face of it, this step made sense. From a loss prevention standpoint, however, it caused a lot of problems later on. By agreeing it had liability for a portion of the associated costs, Capital left its attorney and insurer little or no negotiating room in which to reach a settlement. The architect would have been better served by not allocating responsibility or fault during the change-order approval process.

Is the “right to stay in your pajamas” (i.e., in a virtual office setting) the only significant by-product of new technology and innovative thinking for the future of architectural practice? Not to trivialize sleepwear, but real innovations in both architects’ services and ways in which they are delivered to clients are necessary for the profession to respond to increasing client demands for buildings that are faster to design and construct, less expensive, and higher quality. We must also respond to the volatile economic climate so that there is always satisfying and challenging work available.

So, what are some of these innovations within the context of a broad definition of architectural practice? Thomas Fisher begins this chapter by identifying key practice issues, and proposing new strategies for successful implementation. In subsequent essays, a virtual architectural practice is described and success strategies in design-build partnerships are elaborated. Chuck Thomsen presents a brilliant discussion of the advantages and disadvantages of myriad nontraditional contracting arrangements for design and construction. Tim Castillo concludes the chapter with a case study profiling a digital practice that clearly demonstrates why the application of computers to architecture is not a matter of “easier and more rapid, but rather a case of different.”

Models for the Architectural Profession

My interview with Thomas Fisher, Dean of the College of Architecture and Landscape Architecture at the University of Minnesota and former editorial director of Progressive Architecture, is very much a sociological treatise. Fisher is a keen observer of the great social currents and trends, and he understands how professions respond and adapt to changing times. Specifically, Fisher shares his views on what architects would do well to borrow from other professions, namely law and medicine. In addition, Fisher has really intriguing and important ideas on the continuing evolution of the architectural profession in terms of extending the scope of what we now
call “alternative practice,” not only by widening the horizons of architecture, but also by contributing to a better world. Simultaneously, Fisher takes the pressure off the student to be the solitary heroic form giver, and he proposes an entire new spectrum of roles that are just as significant and with greater likelihood of genuine social and economic impact. The interview follows.

AP: I was intrigued with the three models for the architectural profession that you detailed at Harvard several years ago and in one of the last issues of Progressive Architecture. Could you elaborate on this subject of professional practice, particularly for the student audience?

TF: I think we’re at a point right now where practice issues are some of the most challenging that face the profession. In some sense, the architectural profession, like many of the professions, is in a place where we have to now start thinking about designing a practice. The practice is as much a design problem as doing a building.

What’s interesting is that a lot of professions are going through similar kinds of self-scrutiny. This is in part the result of larger questioning within society about the role of professionals. The medical and legal professions are facing a situation in which they have been turning out too many specialists and are in fact looking at architecture as one of the few professions that has managed to maintain a kind of generalist stance.

As I’ve visited various architecture schools, I’ve heard deans (and Peter Rowe at Harvard has mentioned this to me) say that other departments are now coming to the Graduate School of Design to look at how architects learn. There is a lot of talk now about project-based and studio-based learning in other departments, in business schools, for example. When you begin to hear what they’re talking about, it sounds remarkably like architectural education. So they’re in a situation where other disciplines are starting to look at architecture as a model, and conversely, I think, there is some value in the architectural profession looking at what some of the other professions have done. For example when you look at the history of the medical profession a good book to read is The Social Transformation of Medicine (New York: Basic Books, 1984) by Paul Starr. In this book, he documents how the medical profession in the nineteenth century was in many ways structured similarly to the way architecture is now structured—where there were a lot of general practitioners (GPs) who had a kind of general knowledge but not a lot of specialized knowledge. They were not in fact particularly valued in society. They were turning too many doctors out of school for the demand. Louis Thomas talks about his life as a physician in comparison with his father’s. In his father’s day, doctors could do little more than hold the patients’ hands and make them comfortable—and these patients either lived or died. What happened in the late nineteenth and early twentieth centuries is that medicine transformed itself into a more research-based discipline, allying itself with hospitals.

Implicit in my argument is that medicine, despite some of the problems it is facing with HMOs now, has been rather successful—certainly economically—in the twentieth-century, in part because of a model with a
relatively small number of GPs who have a good deal of involvement with a lot of patients. Those GPs then can call in and put together a virtual team of specialists, depending on the patient’s needs. This is a very effective structure.

**AP:** There will always be illness and accidents and physicians will mend you when you’re torn apart, but in architecture is there a big enough client population?

**TF:** I believe so. Architects have said that their clients need major work (i.e., design a new building or large renovation). If we were to take the model of the medical profession, our clients really should be everybody who owns a building. GPs in medicine are essentially diagnosticians. An equivalent to that would be an architect who would make house calls. For example, an owner would say, “I’ve got some cracks; come and examine my building.” Or, “It’s too hot in one place and too cold in another—is this something I should worry about?” The architect would have enough diagnostics knowledge to say, “These two cracks are not important, but this one is—you’ve got to worry about this one,” or, “You don’t just have overheating and cooling, you’ve got severe indoor air quality problems here; I need to bring in an HVAC specialist.”

I’m not arguing that everything should be a professional-level activity, but I do believe that the diagnostics of buildings has been a fundamental role that architects have let others begin to take over. Building inspectors are the obvious ones. They usually get involved only when there is a transfer, a sale. However, I believe implicit in this activity (and facilities management as well) lies an entire realm of work. What it suggests, for example, is that diagnostics would have to become a much more important aspect of architectural education as it became in medicine. Diagnostics is still the core set of courses early on in medical education. It has very low status in our profession.

This is just an idea—but when I hear architects say there are fewer clients and more architects competing for less work—one of the central questions is how can you expand the pie?

**AP:** Can you extend the analogy to health care even further regarding service delivery and economics? What would you think about an HMO-type organization for conducting a new form of architectural practice?

**TF:** Robert Gutman raises the point that we don’t have an institution like the hospitals for us to ally ourselves with as doctors did in the nineteenth century. Yet it does raise a question—are there other, perhaps market-oriented, ways in which architects could team up in sort of HMO alliances?

**AP:** What about equating building diagnostics to managed care of patients?

**TF:** Exactly. Where, for example, there might be some percentage of graduates from architecture schools who are really oriented toward being generalist diagnosticians. They would be trained to take over or work in these architectural HMOs. And another group of people who would be more research based, specialized, who would be brought in to handle particular problems (i.e., technical, or building-type-related, like retail or hospital spe-
cialists). Such architects might be small, independent practitioners similar to specialist or consulting physicians.

The typical architectural firm—the model—has been more of a corporate one, ever since Daniel Burnham. The firms that get a lot of attention tend to be rather large with a few partners on top on a kind of pyramid of people. Within these firms are many people with specialist knowledge about curtain walls or detailing roofs, and so on, but they tend to be invisible to the client. They tend to be paid less than the generalist partner or principal. Physicians, on the other hand, completely invert this. The medical profession makes the specialists quite visible; physicians have discovered that people will in fact pay more for specialized knowledge than for generalized knowledge. Instead of having large corporate kinds of structures, they broke themselves down into very small operations; the doctor’s office is comprised of one or only a few physicians. Doctors run small, autonomous operations, which can be brought together as a team to solve a patient’s problem. This is in contrast to the large, bureaucratic corporate-type organization with high overhead that many architects have developed.

I think this is changing; I think the computer is rapidly undermining the large corporate architectural office. As Frank Stasiowski said, two people with a good computer system can do almost anything now. So this really creates a crisis for the big firms—how should they operate in this context? The creative big firms are breaking themselves down into smaller units that are entrepreneurial. This is not unlike what the big corporations are doing in this country. The units may even be financially independent; if a particular entrepreneurial group isn’t hacking it, the firm will close it and perhaps open something else.

We’re on the road to this fragmentation and that brings us closer to flexibility and the notion of a virtual team within which physicians have been operating.

**AP:** For young interns just entering the world of practice, as it stands today, how would you reconcile the cliché ivory tower with these economic realities of running a typical architectural firm?

**TF:** Despite all of the veneer of avant garde debate and discourse, the schools are incredibly conservative institutions. And our profession, as in all the professions, particularly in the last decade, they are a drag on change. We’re in a period right now where market forces are changing so dramatically that the real cutting edge is with people out in the trenches who are responding to those radical shifts in the marketplace. The veneer of radicalism in the schools is disguising a very traditional structure of architectural education and traditional assumptions about the practice of architecture. This is why there’s been not nearly enough theoretical debate about practice in the schools. It’s an area that has economic, social, and political implications. This is what I was suggesting when I said that practice is really one of the most interesting design problems right now.

The legal profession offers other interesting parallels for us. They encountered a situation similar to ours, again roughly 75 to 100 years ago, with an educational system that was basically turning out trial lawyers. They
really had too many lawyers for the demand. The history of the legal profession is one of many architecture schools and law schools are now facing a similar challenge. There is talk about too many architecture schools, but we don't need as many as the legal profession is facing. There are so many lawyers. They want to make the best of what they have. They want to do the best they can. They want to attract the best talent. They want to make sure that their clients get the best possible representation. It's a difficult job, but they're doing it. They're doing it well.
AP: Returning to building diagnostics and the analogy to the HMO mode of service delivery, there are people who can’t afford health insurance, so how could they possibly afford architects?

TF: They can’t, as traditionally defined. For example, people’s investments in their buildings are one of the biggest investments they have. This is not only true for individuals and their own houses but for corporations. The ability to forestall a big problem by periodic checkups can lead to amazing savings, but that suggests not only that the profession be able to offer those kinds of services but that we document the savings. It’s true that people have a hard time affording health insurance; however, most people who can afford it are still going to see their doctor every so often because they know that cancer caught early is a lot easier to deal with than cancer not caught early. We as a profession have not really been interested in servicing building owners in a kind of precautionary diagnostics way. It’s just not been part of our culture. I find it interesting that the few diagnostics firms that do exist in this country have been so busy that they’ve been turning work away all during the recession. To me there is a clear demand for this kind of activity in good times and bad.

AP: Do you think that it’s crucial that these new services be performed by architects?

TF: Ideally, yes. I’m architecturally trained; I believe in the culture of architecture. I think we can do a better job if it’s done under the aegis of architecture. There are no education requirements for contractors or building inspectors, for example. This kind of activity is too important to just allow it to be available to anybody who makes the claim that they know something. It would be far better if diagnostics was performed on a research base so that expertise is always linked to research going on today in architecture and engineering schools. In the preservation community, there is a lot of research concerned with how buildings change over time. There is exciting work going on in various related fields for which architecture could serve as a synthesizing and integrating entity.

AP: So what you’re saying is that there’s a place for design excellence even within all these subspecialties.

TF: Absolutely. There’s also an art to diagnostics, as any generalist will tell you in medicine. The art is not just the making of objects; it’s how you deal with people, problem analysis, and so on. It probably means we charge differently, that we charge on an hourly basis and be willing to see a building owner for an hour every six months. Certain buildings might not need a checkup any sooner than every few years.

AP: Or clients could pay an annual premium for services and have easy access to specialists, and so on?

TF: Some firms are working their way into this. Gensler, for example, maintains a three-dimensional model in their computer system when they do a
building, regularly check-in with the building and update their model. So they, in essence, have the virtual building in their computers. They become the "internist" for the building: If any problems arise, the client is going to call his "doctor."

**AP:** I wonder how they get the clients to pay the extra fee for that.

**TF:** They don't charge the clients for the updating. They make themselves indispensable, as doctors have done.

Another thing I've been thinking about is where design stands as a process. There's a lot of questioning going on about scientific method and the limitations of science in many disciplines. When you look at various fields, the hard sciences and also the social sciences, the scientific model and data analysis have served as the foundation on which these disciplines have operated. More people in these fields are recognizing limits to these methods; there are certain kinds of questions that can't be addressed through this traditional model, and this awareness is coming to the fore at a time when universities are having to justify their existence in their communities and state governments. These entities are demanding solutions to the problems of drugs, crime, homelessness, and health in general that specialized departments in universities have not been particularly effective in addressing. To get at those kinds of wicked problems demands an interdisciplinary way of operating, a way of bringing different specialized groups together to analyze problems and develop synthetic solutions. In this regard, I would argue that design is an excellent model; unlike the scientific model, which is very good at analysis, design is very good at synthesizing cross-disciplinary activity. Yet, one of the things I'm finding as I dabble in various disciplines is that looking at design may lead to superior ways of examining global issues. Scientists seem to limit themselves to breaking things down in order to understand the particulars; design methodology helps to look at the overall relationship of all the parts. I think what's most important about what students learn in architecture school isn't necessarily how to design an elegant façade or how to hold a structure up; it's a way of operating, thinking, and looking at the world. And this brings us back to the legal model; just as lawyers recognized that their kind of legal analysis had application to many different disciplines, we're at the cusp of recognizing that design and design thinking also have tremendous implications for many different fields.

Instead of sleeping through your practice course (which is usually at the end of your formal education), recognize that it may be one of the most important courses. But also, practice courses need to be much better. They should not be just about AIA contracts; they should teach a theory of practice, and practice should be seen as a design problem. At the same level, I would argue that in design studio there should be more articulation of the thought process—so the focus isn't so much on the product (i.e., they should consider what's going on in the minds of students as they design). **Students should be made conscious of the design process in the way that scientists made themselves conscious of the scientific method.**
The Emergence of the Virtual Architectural Practice

In contemplating the establishment of his own firm, architect Craig Applegath was inspired by an early internship experience with O. M. Ungers in Germany. Ungers would set up office and living quarters in each city in which he had a building project and then assemble staff as needed for the particular job. Ungers was running, in a sense, a precursor to the “virtual office”—one that moved along the vehicle highway instead of the information highway.

Applegath was convinced that the only way he could open an office in the context of a severe economic downturn was to reconceptualize traditional small firm methods of practice. This was fundamentally a strategic vision of how maximum utilization of computer technology could support his work and give him the flexibility to expand, downsize, or associate with others as a function of market conditions. Management of his practice, therefore, is almost exclusively project-driven.

While the idea underlying a virtual practice is certainly not new—assembling a team appropriate for a specific project—it is very much relevant as a management strategy. Whether this mode is considered a “networked” practice, a virtual practice, or merely an assemblage of consultants, the firm description in the following essay is illuminating in the context of today’s practice environment.

“Tele-everything” (a cute term coined by Contract) may not always be adequate for conducting practice. On occasion, there is no substitute for the face-to-face meeting—whether it is collaborating with a consultant on a design, discussing a change in the field with a contractor, or educating a client. Be certain not to lose sight of the fact that personal rapport is essential to building and maintaining a trusting alliance, and to unguarded and meaningful communication.

Craig Applegath demonstrates that the dream of owning a successful firm is not only alive and well but may be an ideal model for delivery of services well into this new millennium. William Mitchell, former Dean of MIT’s School of Architecture and Planning, predicts the impact of design and information technology on architecture firms: “In a fast-changing world, the winners are likely to be smaller, more nimble organizations structured to form effective ad hoc alliances with other organizations, to aggre-
gate expertise ‘on-the-fly’ as specific circumstances arise. The virtual design
[office] establishes a new paradigm for CAD.”

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Every organization of today has to
build into its very structure the
management of change. It has to
build in organized abandonment of
everything it does. It has to learn to
ask every few years of every process,
every product, every procedure,
every policy: “If we did not do this already, would we go into it now,
knowing what we now know?” And if the answer is no, the organization
has to ask: “And what do we do now?”—Peter F. Drucker, Post Capitalist
Society, page 59.

As we begin the twenty-first century, we are witnessing the rapid
transformation of the practice of architecture in North America.
Economic pressures and advances in digital information technolo-
gies are combining to force significant changes in the way architects prac-
tice. One such change is the emergence of the “virtual architectural prac-
tice.” In this essay, I examine some of the reasons for the apparent decline
of traditional architectural practice, explore the emergence of virtual ar-
chitectural practice, and comment on how existing architectural practices
can prepare to survive and thrive in the digital information world. As a
practitioner experiencing and participating in these changes, I will also
discuss how our practice has evolved as a virtual practice.

The Demise of the Traditional Architectural Practice

The traditional architectural practice still bears marks of its descent from
the European guild system: a hierarchical structure with few masters and
many apprentices. This type of practice is under significant pressure to re-
shape itself from many sources: The post-cold war recessionary economy,
the baby boom bulge in demographics blocking upward mobility of younger
architects, and now widespread use of the computer and other digital infor-
mation technologies. The computer, digital networks, and other ad-

vances in digital and communication technologies are significantly trans-
forming the way architects design and practice. (See the case study, “Digital
Practice—Rethinking the Design Process, page 313.) In the recent past,
many of these technological changes complemented and in many ways en-
hanced the traditional nature and structure of an architectural practice,
without necessitating radical transformation. The drafting table has now
been replaced by computer stations, the typewriter has given way to the
word processor, and surface mail has to a great extent been supplanted by
e-mail and the fax machine. These new technologies have been successfully

*William Mitchell, in B. J. Novinski, "Designing by Long Distance," Architecture February
incorporated into the management and production structures of architectural practice. But more recently, a new generation of digital networking technologies, combined with the pressures of the marketplace, and the profession's decreasing control over architectural fee rates and membership levels have significantly altered the environment. As a result, the architectural profession is beginning to see the emergence of new forms of practice. One of the more interesting and potentially important new forms of practice is the virtual architectural practice.

The Virtual Architectural Practice

The virtual architectural practice is based on alliances of experts and specialists coming together for individual projects or groups of projects, who are linked together by computers and online network systems. At its core, the virtual office is held together by both the common sense of purpose and the mutual trust and competence of its members. Common purpose and trust, more than any other qualities, serve to establish and maintain the bonds that will keep the virtual practice operating as a cohesive enterprise when the other physical realities of the typical practice are absent.

This new form of organization is, of course, not conceptually new or foreign to architects. Architects have always acted as prime consultants and put together teams of engineers, landscape architects, and numerous other consultants to carry out the requirements of the project brief. And generally this team continues on for the life of the project and is then disbanded when the project ends. As well, joint venture partnerships between architectural practices are not uncommon when projects call for expertise or staff size that cannot otherwise be accommodated by one firm on its own. Most of the architectural production, however, is done within and by mem-

Figure 9-1 Cartoon by Peter Kutner, FAIA, of Cambridge Seven Associates, Inc.
bers of the architecture practice itself and within the confines of the traditional place of practice.

It is becoming evident, however, that pressures of the marketplace, coupled with advances in information technologies, are providing the opportunity for low-overhead virtual practices formed from expert alliances and joint venture partnering to compete with traditionally structured practices. Moreover, medium and larger sized traditional practices, weighted down with heavy real estate and employee overheads, are being forced to seriously examine their mode of practice or face possible decline as virtual and other new forms of digital practices emerge as viable competitors.

Virtual practices by their very nature are not constrained by physical, national, or geographic boundaries (although they do have to operate within the regulatory structures imposed by local authorities). A virtual practice exists by virtue of its phone, fax, modem, and video connections. A designer and project architect may be based in New York, the specifications writer in Chicago, and the contract documents production team in Kansas City. For that matter, team members can be located any place in the world so long as there is good access to phone lines, and team members have expertise relevant to the project at hand. Given the portability of digital information, a project is as accessible to the virtual practice team members scattered across the city or continent as it would be to the members of a traditional practice operating within the confines of one office space. Indeed, the selection of the virtual practice team members should be based more on the appropriateness of, and expertise of individual team members, then on their physical location. But there is also no reason why a successful virtual practice need be international or regional in scope, and virtual practices with participants located in the same geographic area have the advantage of meeting face-to-face on a regular basis. The need for good personal communication on both a professional and personal level is just as important in the virtual practice as in the traditional practice, if not more so.

Probably the most important force driving the formation of virtual practices is economic, and of the economic forces, the boom-bust pattern of the construction cycle plays a crucial role in defining the economic logic of the virtual practice. Because of their relatively low overhead in comparison with traditional practices, and more important, because of their ability to transform fixed overhead costs into variable costs, virtual practices are able to provide equivalent professional services for a lower fee, and most important, have a greater chance of riding out the ups and downs of the construction cycle. As virtual practices become more common, the traditional practice, burdened with proportionately higher fixed overheads and a higher ratio of fixed costs to variable costs, will find it more difficult to compete against the more nimble and expert virtual practice, and much more difficult to survive extended recession cycles.

Perhaps one of the most important aspects of the virtual practice is its ability to pair costs with revenue, and in effect change otherwise fixed costs into variable costs. Each member of the team forming the virtual office brings to the team some portion of both revenue generating potential and overhead costs of the project. In the traditional practice, however, overhead is for the most part independent of revenue production. For example, in
the traditional practice, office space leasing costs, utility costs, and property taxes are independent of the amount of revenue produced by project consulting and production. The manager of a traditional practice has always had to rely on having enough cash flow to cover the costs of overhead or, at least, cover the financing costs of a line of credit used to cover overhead during slump periods. Covering the servicing costs of a line of credit in a slump period and then taking profits in a boom period is the typical mode for medium- to large-scale traditional firms. But in protracted recessionary periods, this strategy puts a practice under severe stress, and in many cases is the key reason for its failure when the period of downturn is extended beyond the capacity of the firm’s savings or line of credit.

Our Experience as a Virtual Practice

Since the early 1990s our firm has operated as both a digital and a virtual practice—“digital” to the extent that all design, design development, construction documents, project administration, and office administration has been mediated by computers; and “virtual” to the extent that team members and project consultants have been linked by computers over phone lines using modem connections. Design and construction documents are done using CAD (computer-aided drawing programs); project administration is handled using software designed specifically for the purpose; and all office and client information is tracked and managed within a number of linked databases. From the outset, our firm has made an effort to explore various methods of bringing project team members together using digital communications techniques.

Ironically, the decision to go virtual was more evolutionary than revolutionary. It was influenced by both the restrictive nature of the economy at the time, such that we could not be sure of the frequency or size of commissions we would be dealing with in the first few years of practice, and also by the fact that developments in telecommunications networking technology made sharing project information over phone lines feasible. Thus we realized it was possible to handle almost any size of project—expanding or shrinking as required—and that we would not have to commit to real estate overhead, freeing us from the concern of whether the size or number of commissions were sufficient to cover a fixed real-estate overhead. More important, as a design-oriented practice, we were not overly fond of any organizational structure that was based on hierarchy and top-down control. So the move to a virtual practice seemed to be a way to gain greater size without giving up the spontaneity and character of the small design office.

Management Issues

Team Mission. If any one factor stands out as having been most critical in the overall success of our virtual teams to date, it is that our teams always had a clear idea of why we were doing a particular project and how we should accomplish it. The “why,” a question of mission, took the form of a search for thoughtful and meaningful design, carefully thought out and
skillfully executed. Part of the question of “how” was informed in many ways by our decision to practice as a virtual practice. Thus the virtual team was not simply just a means of survival in a tough and competitive market. It was a means to accomplish our mission of good design in a tough and competitive market. However, there was another mission operating in the background that was always implicit at the time of team formation and then during the course of the project: Team members had to respect and care about the other team members. A common sense of commitment to both the project and each other was implicit in all of the actions of the team.

Communication. It was apparent from the outset that the success of our virtual teams, and thus the success of any project, was very much dependent on the ability of the “virtual team” to function as well or better than a traditional project team. Coordination of information and individuals became a much more demanding and critical aspect of the project. Because there was no one office space where day-to-day interaction of team members could happen as a matter of course, communication between virtual teammates was something that had to happen through our server, complemented by many phone calls. There seemed to be no more or less order to communication than in the traditional practice. However, the communication that involved messages sent over the server created an instant record and history of the evolution of the project. This came in handy when trying to dig out information from earlier stages of the project that might otherwise have been consigned to memory.

Leadership. In our virtual practice, the team leader has the responsibility to ensure that the team and project is coordinated and running close to schedule, but otherwise the team members are solely responsible for their own work. The team leader for the most part is responsible for making sure that everyone has the resources they need to carry out their tasks and finding solutions to coordination and scheduling problems. Probably one of the most important responsibilities of the virtual team leader, one that is critical to the success of the virtual team, is his or her ability to maintain team morale, which in many cases means keeping the team members feeling like they are part of a team. One of the great dangers that individual team members face is the feeling that they are isolated from the project and the decision-making process. This is the virtual team’s Achilles’ heel. Daily phone calls and regular pep talks seem to be as important a part of the team leader’s responsibilities as the actual tracking and coordination of project information.

Proximity. In our experience as a virtual practice, most of the members of project teams have been located within the same city, which has facilitated face-to-face meetings and personal interaction as needed. Actual face-to-face meetings in the virtual practice do not happen as casually as they might in a traditional office setting so they tend to be more focused and energized. Conversely, the more casual chatting and brainstorming tends to happen over the phone on quite a regular basis. But ultimately the nature and quality of meetings and exchanges between members is determined as much by the chemistry of the team as by the setting or timing of the meeting. The
nature of proximity and team interaction seems to vary depending on the team members involved and also the stage of the project.

**Trust, Competence, and Responsibility.** As in the traditional practice, the success of the virtual practice is determined by the abilities and competence of its members. However, because the virtual practice is always changing in composition, forming and reforming with new projects, the competence and abilities of team members are crucial to both its immediate and long-term success. Given that team members will be working with little direct supervision, the expectation for competence and individual responsibility is significantly higher than in the traditional practice. Concomitantly, the requirement for individual team members to trust one another becomes much greater as well. We have found that this mutual combination of trust and responsibility is a very powerful motivating force for team members. It is also very apparent to all involved that their participation in future teams is always contingent on successful participation in an ongoing project.

**Core Skills and Knowledge.** One of the requirements for the successful continuance of a virtual practice is its ability to put together teams of skilled and expert team members. This assumes that there are such individuals and that they are willing to be a part of the team. We have found that one of the most difficult aspects of running a virtual practice is finding team members who are both technically or professionally skilled and also capable of (and interested in) working in a virtual environment. One of the associated problems with the emergence of virtual practices is, of course, the competition for skilled team members by competing virtual (and traditional) practices.

**Perception of the Virtual Practice by Potential Clients.** One of the greatest hurdles for the virtual practice to overcome at each new request for proposal or project interview is the perception by potential clients that such a practice is not able to accomplish what a larger and more traditional practice can accomplish. Such perceptions are very difficult—in many cases, impossible—to change even when the logical arguments of services for fees and qualifications of the team are advanced. There is no way around this problem except to say that a practice must do what it believes in or it will not survive at all.

**The Future**

There is, of course, much room for debate on the relative merits of traditional versus the virtual architectural practice, and no doubt, as in all human activities, change is anathema. As times and technologies change, however, it is incumbent on the profession to examine and evolve new modes of practice that embody the goals of the profession and allow architects to prosper in the quickly evolving information economy. If the architecture profession is not proactive in ensuring that current and future transformations of the modes of practice reflect our aspirations and ideals, then these changes will be imposed from outside, and reflect goals and interests of others.
To conclude, listed below are steps architects should consider taking to make the most of the brave new worlds of the digital and virtual practice:

1. Every key person in the architectural practice—starting at the top (and this almost goes without saying)—should be comfortable using a computer for designing, drawing, word processing, and project management. These key people should not need any intermediaries, assistants, or juniors to help them use the various necessary technologies to do the job they are specialists in; it just adds to the overhead and reduces efficiency and flexibility. And in the end, your office should be made up of only key persons.

2. Determine the unique strengths of the best people in your practice and form a plan for the development and marketing of those strengths. Every person in your practice must be regarded as a consultant and potential profit center and be able to be a possible player in a transient alliance with other practices. Remember, the virtual architectural practice is a team of specialists, and your practice should be a stable of those specialists, whatever its size.

3. Look around at your peers and competitors. These people will be your new partners in the creation of the virtual architectural practice. Start thinking about strategic alliances with them. And remember, play fairly. Today’s competitor is tomorrow’s partner!

4. Map out one-, five-, and ten-year plans that outline the road your practice will take in transforming part or all of itself into a virtual practice.

5. Once the planning has been done and is being implemented, realize that the structures you implement and the new methods of practice that you embrace may themselves be only transitional and temporary. As Peter Drucker points out, you should be asking the question, “And what do we do now?”

Computers and Practice: The Digital Guerrilla

In 1992, Peter Rowe, then Dean of the Harvard University Graduate School of Design, stated that the “rapid deployment of new information technology within the realm of design fundamentally promises to alter the very way in which we perceive and therefore make physical environments. It is clearly not a matter of ‘the same way but easier and more rapid,’ but rather a case of ‘different.’” 3 Dean Rowe could not have been more prophetic in describing the way in which architectural firms must function to survive and prosper in today’s economic climate.

Geoffrey Adams describes below the application of these new technologies and concomitant ways of thinking about design. Equally important, he sets forth the context in which design and information technology

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3Peter G. Rowe, The Harvard Graduate School of Design: Directions for the Near Future, Harvard University Graduate School of Design, October 24, 1992.