mental and organizational factors that enhanced or inhibited progress toward goals. The data analysis compared perceived inhibitors and enhancers across units as well as differences in perceptions between managers and staff. For instance, one of the goals was to increase cross-unit collaboration, yet very few examples of increased collaboration were mentioned. In fact, most staff felt that there was no inherent reason for them to work across units. In this case, an organizational solution was needed to develop cross-unit projects that would provide a need for collaboration. The environment alone cannot produce collaborative behaviors.

Data Interpretation

When data analysis is complete, the project reconsiders the design hypotheses and asks: Do the data show support for the hypotheses? Very few scientific research studies show complete support for all hypotheses and predictions. Thus, we would not expect to find perfect alignment in design research. Where misalignments occur, it is important to try to understand why this happened. Data analysis could show one of several patterns:

- ***The hypothesized results occur.***
- ***There is no change pre and post.***
- ***The outcomes are affected, but in the opposite way.***
- ***Mixed results—some support the hypothesis, others do not.***

This stage is one of the more difficult research processes, particularly when some results are positive and others are negative. We want to focus on the positive and ignore the results that don't turn out the way we expect. However, it is often more valuable to understand why things went wrong. First, you don't want to repeat the mistakes. A second value in understanding negative results is that you often learn more because it forces a rethinking of basic assumptions and a search for further links between the environment and the behavioral outcomes.

For instance, the study on team spaces for the Silicon Valley firm, discussed previously, found that many informal spaces located in hallways were not used. The reasoning behind the design was very logical: because people use corridors frequently and because these are often the location for brief greet-

ings and conversations, people who meet by chance should have the opportunity to sit down and talk further, and others passing by or in adjacent offices should be able to join in. Hence, the design included comfortable chairs, visual openness, and white boards for spontaneous work. The spaces, however, were seldom used, and many of those who did use them found the spaces unsatisfactory. A post-occupancy survey revealed these reasons for the low usage and dissatisfaction: the vast majority of work done by the software engineers in this building was individual effort rather than team work, thus they had little reason to meet spontaneously and frequently in groups in the informal spaces. Meetings were held in conference rooms with appropriate technology. Many also complained about the openness because it created noise that was bothersome to people in nearby offices and because it lacked privacy for group discussions, particularly those requiring security. A third reason for the low ratings was the lack of functionality. Chairs were difficult to move and could not be usefully arranged to allow all to have good views of one another and of the white boards. Thus, the spaces were difficult to use for meetings. And they were seldom used for casual relaxation because the intense work pace of the firm left little room for casual social interactions. The research in this case provided important insights that are now being used to redesign group workspaces that are more appropriate to the nature of work in the company.

A couple more examples of negative results show different lessons learned. In the focus groups discussed earlier that were conducted with the financial organization, one of the stated design goals (e.g., hypotheses) was that collaboration between units of the organization would increase if more interaction spaces were provided. The design included a central commons, numerous small and medium-sized conference rooms, and open workspaces with tables and white boards. Members of the focus groups pointed out that while collaboration *within* units had greatly increased, collaboration *between* units had not. The reason was simple: there was no reason for the units to work together. They did not share clients, tasks, work products, or anything else that would naturally bring them together. The head of the center had made cross-unit collaboration an important goal, but no one had thought about how to accomplish this organizationally.

Another example comes from the Herman Miller Green House study mentioned earlier. In addition to assessing the occupant responses in an extensive pre–post survey, the study also assessed organizational-level success