versus indirect measures of performance. *Direct* measures include outputs such as sales volume. *Indirect* measures are often correlated with performance or are the building blocks of performance rather than actual performance output. Examples are frequency of use, occupant satisfaction, or absenteeism.

CONTROL GROUPS

Because so many other factors can influence the outcomes you are studying, it is difficult to know whether performance changes are due to the workplace itself or to other factors that may change simultaneously. This is especially true when the design is part of an organizational change effort, which is often the case. Confounding factors may be internal to the organization (changes in policies or markets), or they may be external to the organization but nonetheless can affect business performance (such as economic conditions). The best way to avoid problems of interpreting the success of a design is to use control groups along with pre- and post-studies. An appropriate control group would be a business unit in the same building that does a similar kind of work, but is not going through a workplace change. The control group should be as similar to the design change group as possible.

The control group is studied at the same time as the group experiencing the design changes, with both groups studied during the "pre" and "post" design phases. Although the control group does not experience the design change, they get the same surveys or other measures at the same time. If the design has an impact independent of organizational issues, then the "pre" and "post" responses for those in the design change condition should show greater differences across time than those of the control group. Figure 17-1 illustrates this issue.

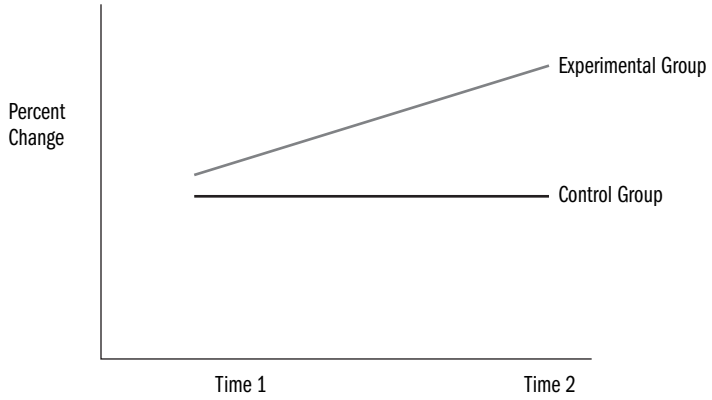

FIGURE 17-1
Degree of Change in Communications after Redesign.

TIMING OF MEASUREMENT

The measurements should be applied before the change and after. The "post" measures should be done six to nine months after project completion, to enable workers to adapt to the new setting. The delay will help to diminish the "settling-in" phase, when problems may be most obvious and the workplace needs to be fine-tuned. It will also reduce the impact of a "halo" effect associated with being in a new or renovated space. After three months the sense of newness usually wears off.

PLANNING AHEAD: HOW WILL MEASURES BE USED?

From a strategic perspective, measurement is a tool to stimulate improvement. Thus, a critical part of the research process is to consider from the outset how the results will be used:

- ***Who will receive the results and in what format?***
- ***How will the results feed into future workplace projects?***
- ***Will there be a central database on design research? If so, who will maintain and update it?***
- ***How will information be captured and shared in the most useful way?***
- ***How will the outcomes be integrated into a coherent whole?***

Specific Methods and Techniques

SOME KEY TERMS

Several terms used in research present a great deal of confusion. These are subjective versus objective measures, and qualitative versus quantitative measures.

Subjective assessment techniques, such as questionnaires, interviews, and focus groups, are used widely in the design profession during the programming phase and after occupancy to assess occupant response to the new environment. These are called "subjective" rather than "objective" techniques because they assess feelings, thoughts, perceptions, and attitudes that exist in the mind of the person. Objective techniques, in contrast, study things that