



Stronger Reasoning & Decision Skills: Training Tools & Techniques

Designing a Study of Workplace Productivity

Question: What working conditions are best for productivity?

Use this tool to infuse strong reasoning and decision making into studies of workplace conditions or as an example of how strong thinking and decision skills are embedded in each step of an a well-designed investigation. Well-designed studies provide trustable information; poorly designed studies do not. This example examines factors that are believed to impact productivity. The same process could be used to study the variables that influence innovation.

Workplace Improvements: Steps in a Scientific Investigation

The Steps in the Investigation	The Group Office Study	The Investigator's responsibility - Providing the Argument for why the study should be done and how it will be done well
Identify a problem of significance in the workplace.	(1) How does the office environment affect the productivity and job motivation of employees working in a group office setting?	Explain to management why this problem is important, and why resources should be used to study this question.
Form a hypothesis that describes what we can expect to happen under certain conditions.	(2) Suppose we currently believe: The more noise and distractions, the more confined and the less personal the workspace, the lower the productivity and motivation of workers will be. This is a hypothesis that can be studied. Notice that this is a correlational hypothesis at this point, not a causal hypothesis.	Explain what all the terms in the hypothesis mean ('noise' 'workspace' 'productivity' 'distractions', 'motivation' etc.) Explain what the hypothesis asserts.
Review the scientific literature to see what can be learned from the work of others about this hypothesis or similar hypotheses.	(3) The lit review is for the purpose of informing our investigation. It can help with many practical problems in future steps (e.g., we may learn how those investigators measured "noise," "distractions," "productivity," and "motivation"). The lit review is not for the purpose of proving we are right.	Before accepting the published conclusions, evaluate the scientific merit of each study. Were the premises true? Are the arguments logically strong? Were all the relevant factors considered?
Identify all the factors related to the hypothesis and the phenomenon of interest that it will be important to measure, control, or monitor.	(4) We will measure noise, distractions, personalization of the workstation, window view, productivity, privacy and motivation. And we will measure things about the workers that might also affect motivation and productivity (e.g., years of experience, knowledge of the job, the importance the worker attaches to his or her assignments).	Explain why each of the factors is potentially relevant to the hypothesis (e.g., People with more experience may be more productive. People who are new to the job may be more motivated. People who think their assignments are "unimportant" may be less motivated.).

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<p>PAGE 2</p> <p>Make each factor measurable.</p>	<p>(5) <u>Noise</u> - decibel recorder - average of four measures daily <u>Personalization of the workstation</u> - number of personal Items on display on desktop and in cubicle; <u>Traffic</u> - number of persons passing within 3 feet of the person's chair daily; <u>Window views</u> - presence or absence of unobstructed view out an exterior window located within 7 feet of the employee's chair; <u>Productivity</u> - number of phone calls and e-mail messages sent and received in a randomly selected 1-hour period daily <u>Motivation</u> - number of statements affirming desire to work recorded during a personal interview. <u>Experience</u> - years in the job. <u>Job Knowledge</u> and <u>Job Importance</u> - measured by scales assessing these variables in an employee survey.</p>	<p>You are ready to write the proposal for the resources to conduct this study.</p> <p>Justify the chosen measure of each factor. For example, why use an interview, instead of a survey questionnaire, to gather data about motivation?</p> <p>Explain and justify the costs of this project. You will need to consider all costs for carrying out data collection.</p>
<p>Ensure that the experimental conditions can be met.</p>	<p>(6) We will determine that there will be a sufficient number of office workers for the study, that their supervisors have authorized the research, that the research has been reviewed and approved by relevant human subjects review boards, that the provision has been made to secure the informed consent of the persons who will be the experimental subjects. We will decide how we will gather the measurable data, including the information on work experience, who will conduct the interviews, who will count the personal items in each workstation, who will count the phone calls and e-mails, etc.</p>	<p>In your proposal, answer 'why' and 'how' questions for every decision made about setting up these experimental conditions.</p>
<p>Design a procedure to ensure that the data gathered will reveal the full range of possible observations.</p>	<p>(7) We will study a enough workers in their usual workplace to assure that we have a range of conditions for each important variable: enough people in both quiet and noisy conditions, enough in solitary and well visited areas, enough in range of a window view and not.</p> <p>We need to determine how we will observe working conditions for these employees without our behavior influencing productivity as a result of our study. We decide to use data from our security cameras to measure Traffic.</p>	<p>Demonstrate that there are enough employees in enough varying conditions to make the needed observations.</p> <p>Explain why there will be no problem observing employees while they work, and that the study itself will not influence productivity</p>
<p>If possible, run a pilot of at least some portion of the study to test the feasibility of your design plan.</p>	<p>(8) From the pilot, we learned that we need to assure that there are enough employees in our study sample who have more years on the job. We will widen our participant group to include more office workers.</p> <p>We learned that the work associated with email is variable. We will count E-mails with an automated count of messages opened and messages sent from each person's desktop PC through the network servers. Messages greater than 100 words will be counted as 1.5 messages. Interviews will follow a protocol of questions to be asked. Etc.</p>	<p>Demonstrate that the study is feasible and that whatever amounts of error the measurement tools themselves might introduce is an acceptably small amount.</p> <p>Anticipate practical problems and justify the decisions about those problems. Finalize the budget for the study, and consider what you will do when you receive fewer resources that you have requested.</p>

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<p>Page 3: Conduct the study/experiment and gather the data.</p>	<p>(9) Make all the measurements and conduct the interviews. Record all the data for analysis.</p>	<p>Provide focused effort to assure that the research is completed.</p>
<p>Conduct appropriate analyses of the data.</p>	<p>(10) Statistical analysis shows that productivity is statistically significantly higher in quieter working environments. Traffic by the desk and noise together accounted for 31 percent of the variance in productivity. Differences in motivation were not statistically significant. Etc.</p>	<p>Demonstrate that the experimental conditions were satisfied, that the data were recorded correctly, that the correct analyses were used, and that the math is right.</p>
<p>Interpret the findings and discuss their significance.</p>	<p>(11) If workplace distractions are limited, noise is reduced, and Traffic is minimized, then one can expect modest increases in productivity. These findings may be of interest to interior design architects and supervisors who configure group workplace settings.</p>	<p>Demonstrate that the interpretations being made are reasonable and justifiable, given the data.</p> <p>The claims must not exaggerate the findings.</p>
<p>Critique the findings.</p>	<p>(12) When we carefully evaluate how well we conducted the study we discover that some employees asked why we were interested in tracking the number of telephone calls, and others said that they felt uncomfortable when unfamiliar persons walked through their departments. We were not aware of these concerns so we are not completely certain whether they affected our results. Still there are no large concerns and the study was done well.</p>	<p>Identify and describe any limitations of the completed study. Describe how these might be handled in a future study. If you propose more research, explain why the additional research would be valuable in its own right or because of its potential to refine applications of the current findings.</p>
<p>Publish the research. Contribute to our better understanding of the workplace environment.</p>	<p>(13) We will submit a paper reporting this investigation for possible publication in the <i>XYZ Journal of Office Productivity</i>. Our paper will describe each step of our study and our interpretation of the results.</p>	<p>The investigator must reason through questions such as “Who may need to see the results of this investigation?” in order to decide on an appropriate scientific or professional journal in which to seek publication.</p>
<p>Design a follow up study.</p>	<p>(14) Some believe open space work areas, where groups are in relatively constant communication are most productive of innovative ideas. (Hypothesis) How does this relate to our study of noise and traffic negatively impacting productivity? What questions will we need to ask and answer to determine whether this belief about innovation is anything more than a myth?</p>	<p>Begin again from the beginning, using the same process, but with the aim of developing a different and most appropriate plan for this new and different study.</p>



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