A 1-Minute (grin) Guide to "Quantitative Evaluation for Managers"

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"Quality cannot be delegated."
---*Joseph Juran (1904-)*

Introduction

The purpose of this document is to offer student professionals a guide to evaluating the myriad of quantitative (numeric) information so prevalent in the professional life of a manager. This is particularly true in meetings and other synchronous, presentation venues where a manager must assess the value of quantitative data nearly instantaneously. Successful managers follow a plan to critically consider all data provided to them by peer managers. Naturally, you should expect this same environment when *you* are presenting as well.

As used here, the word *critical* means "to logically evaluate data in context"; the word *critical* does not mean to demean or publicly embarrass other managers. Making mistakes is an intrinsic attribute of being human; making *fewer* mistakes is a combination of education and experience. Successful managers learn from education where they *can* ("the easy way") and learn from experience where they *must* ("the hard way"). Recall that "continuous learning" is a key part of your managerial life.

The list below builds upon both your lower-division core course in Probability and Statistics and also text materials in variously entitled "Management Decision-Making."

1. **Validity**
   Is the presenter answering the question? This is similar to the idea of *effectiveness* (aka "doing the right thing"). No amount of sophisticated analysis with any kind of expensive computer fixes any problem related to validity. Invalid presentations and reports are misleading at best and fraudulent at worse.

2. **Reliability**
   If someone else at the different place in time and space were to give the same presentation, would it be approximately similar? What might be different? Why? Would a peer manager ("internal to the organization") reproduce the same the presentation with the same, or similar, findings? Would an outside consultant ("external to the organization") reproduce the same the presentation with the same, or similar, findings?

Ideally, you want both validity and reliability. But if you have to emphasize one over the another in a pinch, choose validity.

3. **Relevance**

Relevance is related to validity, but is more subtle. For example, not only "Is the presenter answering the question?", but moreover, "Is the presenter addressing the *most important* question?" Often, managers will disagree on the relevance of a subject. This is particularly true when ego, incentives, and budgets are at stake.

4. **Rigor**
Did the presenter use generally-accepted quantitative methods to study the question? Are the arithmetic and calculations correct? How you know? How would you verify them? Did the presenter double-check them? Is the raw data available, say, for a second opinion? Almost always, statistical analysis needs to be done on a set of data, if for no other reason than the datasets are usually too large (both in terms of "rows" and "columns") to be understood by managers quickly. But the real purpose of most statistical analysis is *inference*. If you are presenting, then you want other managers to conclude that your findings in your presentation extend to their world. You will spend some part of the rest of your managerial life learning how to do this single task well.

Ideally, you want both relevance and rigor. If you have to choose one in your student professional life, you should probably choose rigor (because the instructor has already determined the "relevance"). If you have to choose one in your managerial life, you will often choose relevance (usually because you don't have the time and resources to study any single problem in great depth). Again, you want to strive for both.

5. **Count-level data vs. Proportional-level data**
Counting rules in some business scenarios can be difficult enough. But often, even accurate, absolute "counts" of something isn't very helpful for managerial decision-making. Often, you will want to generate "proportions" or "ratios," which means that the "count data" (numerator) is divided by some denominator. In some applications, choosing which denominator to use is controversial (That's good! That means you are working on the right question!). In some applications, the denominator isn't known and must be estimated by some technique.

6. **Compare and Contrast**
No management decision, even the most difficult unique management decision, exists in a vacuum. Even the best data with the best analysis need to be compared to something. Not only are comparisons needed to help establish "context," but often they are needed to be able to adequately inform a decision at all.

7. **Data, Information, Knowledge, Wisdom**
Data is raw facts. *Information* is data endowed with meaning. *Knowledge* is explicit information ("on a piece of paper) combined with tacit information ("in your head"). *Wisdom* for managers means deep insight or foresight. For every single number that you have, make sure you know whether that number is related to data, information, knowledge, or wisdom. And most likely, the number can be more than one at the same time and worse, different depending on which of your peer managers is evaluating the number. You have to be conscious of this issue.