Client Need

The ability to ask the right question is more than half the battle of finding the right answer.

- Thomas Watson

Communicating with Clients

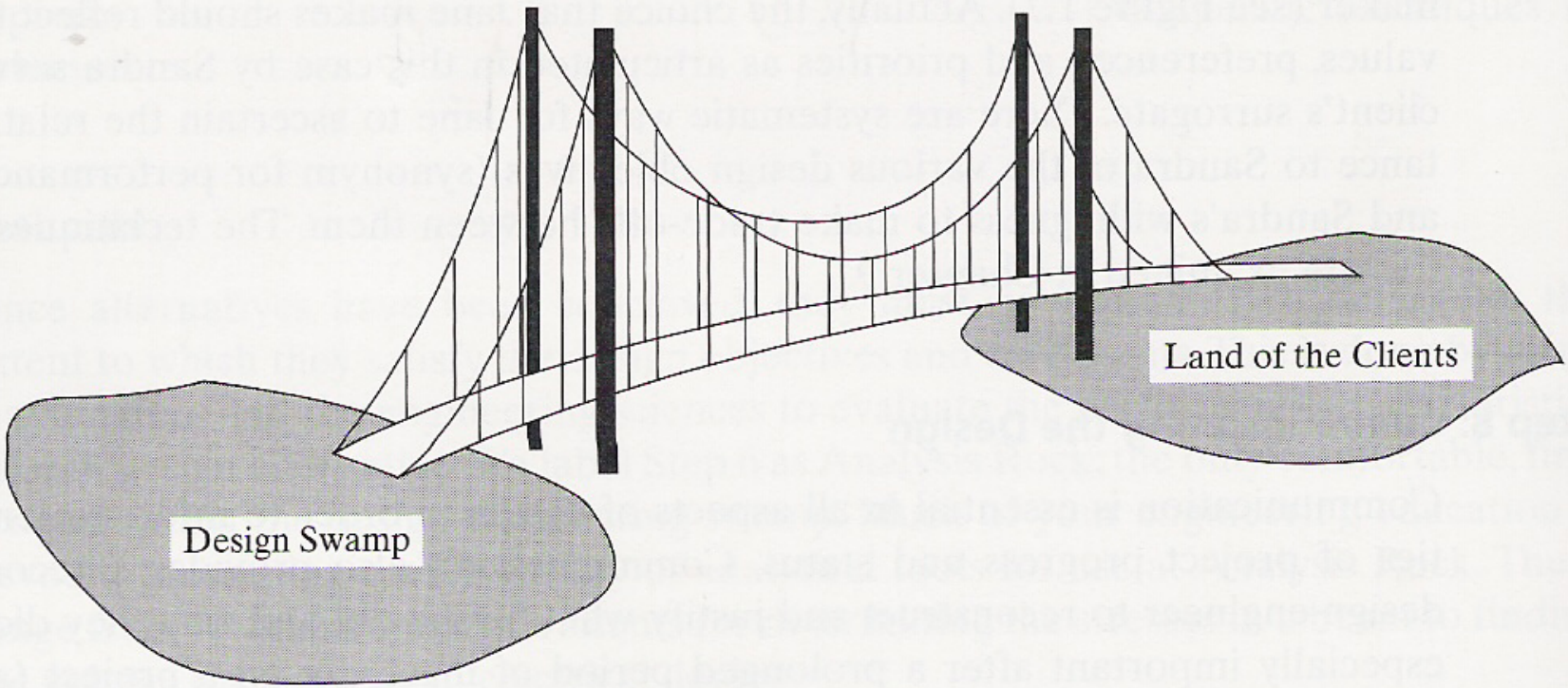

FIGURE 1.8 The Communications Bridge.

Client Need

- Identify the customers:
  - ***Who*** are they?
- Determine the customers' requirements:
  - ***What*** do the customers want?
- Determine relative importance of the requirements:
  - ***Who*** versus ***What***

- ***ASK MANY QUESTIONS!***

Client Need

- What the client says s/he needs may not be what s/he actually needs!
- The client may give you a method of solving the need
- This should be taken into consideration but you should look at ALL options
  - Ignore biases and evaluate assumptions

Problem Statement

The engineer’s first problem in any design situation is to discover what the problem really is.

- Anonymous

Defining the Problem

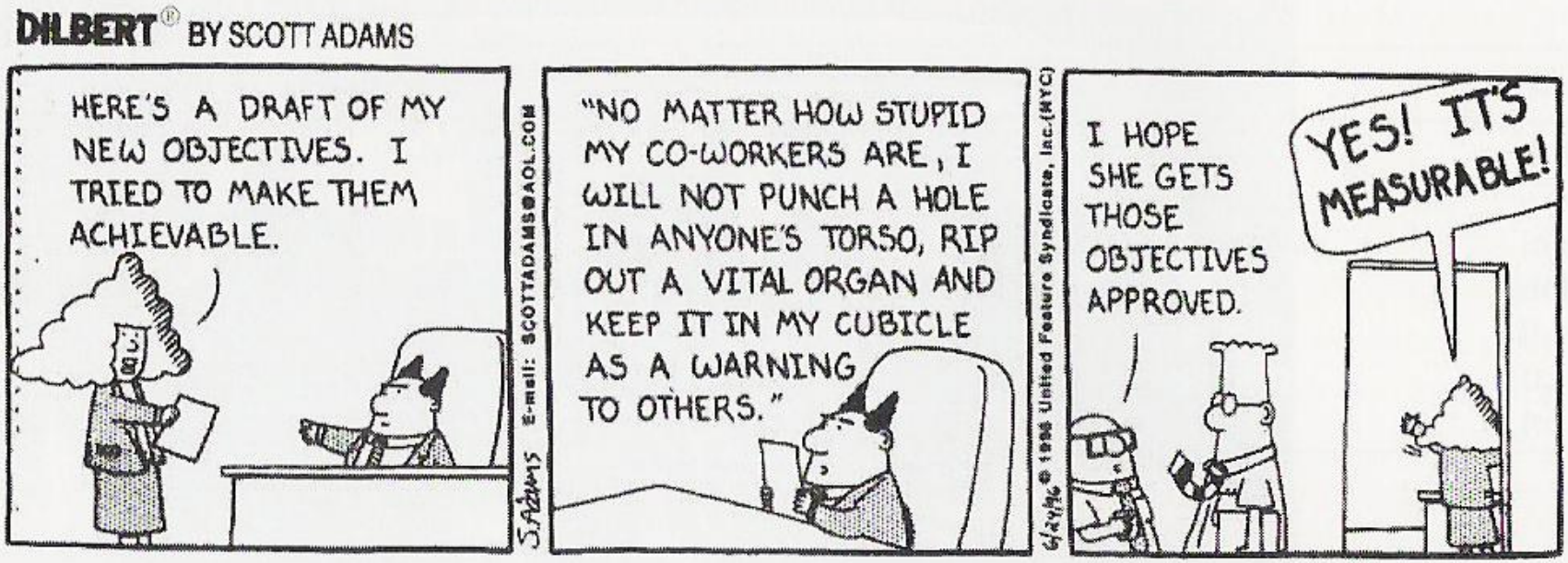

FIGURE 2.4 Objectives Should be Measurable. (DILBERT © UFS *Reprinted by permission.*)

Creating a Problem Statement

- Clarify objectives
  - Research and data gathering
  - Eliminate biases and overcome assumptions
  - Analyze key phrases
- Establish functional requirements
  - e.g. objective trees
- Identify constraints and limitations
  - Use sketches
  - Clarify the problem over time
- Define a schedule and form a team

About Functional Requirements

- Who will use the product?
- What are the needs of the end user?
- What will the product look like?
- Which of its features are critical, and which are only desirable?
- Can the product be manufactured easily?
- How much will it cost?
- What are the safety factors?
- Who will decide how much risk is acceptable?

Engineering Problem Statements

- Open-ended
  - more than 1 solution
- Loosely structured
  - no precise formula
- Viewed in a systems context
  - laws of nature and human environment
- Accompanied by sketches or drawings, as appropriate

Example

- Problem Statement Background
  - Each year 7,800 to 10,000 spinal cord injuries in America resulting in a loss of body function.
  - 51% are classified as quadriplegia which is defined as paralysis of the upper and lower body.
  - Helping these individuals with simple daily routines dictates a need for assistive devices.
  - The use of a feeding device would greatly improve their self-esteem and independence.

Example (cont.)

- The users find existing devices to be bulky and non-portable, and the devices do not have the flexibility to handle different kinds of food.
- The high cost of these devices limits the users to those that are financially well-off. Existing devices cost between $1,750 and $20,000.
- The lower priced devices are feeders only, while the higher priced devices are robotic arms that also assist individuals with other daily needs.

Example (cont.)

- Problem Statement
  - Although feeding devices are available for quadriplegics, they are often bulky, expensive, and non-portable. A need exists for a simple feeding device. It should be electromechanical and operate from its own power source. The design should be economical, have a low profile, be flexible, and be simple to use and maintain.

From Tools and Tactics of Design (Dominick et al, 2001), p. 28.

Exercise

- Form groups of 3-4
- Formulate problem statement for each scenario
- 15 minutes

Quizzes

- Find your delegation style
  - Handout
- Find your personality type:
  - http://www.similarminds.com
  - If you are interested in trying another test on your own, this one is longer, but more complete:
  - http://www.humanmetrics.com/cgi-win/JTypes2.asp