**Stage 2:** Conceptual Design

Design Tools:

- Performance specification (Sec. 6.3.1 – 6.3.3)
- House of Quality (Sec. 6.3.4)
- Morphological chart (Sec. 7.1.1)
- Choosing a design (Ch. 8)

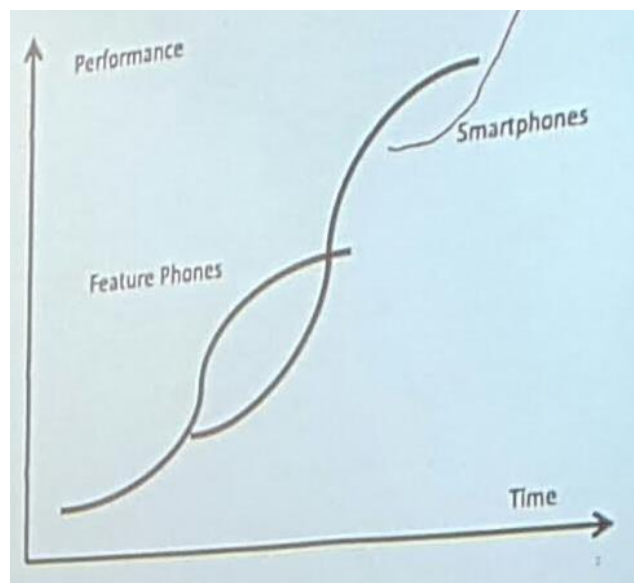Design Specifications (Sec. 6.3.1 through Sec. 6.3.3)

- We have learned that for every objective there must be a metric to measure the achievement of the objective.

- Now for every function we need a specification.

- Specifications, like constraints, must be met in order for a design to be considered to be successful.

- Three forms/types of specifications
    - Prescriptive specifications: specify values for attributes of a design;
      For example, A reusable juice container must be made of 50% recyclable plastic.

    - Procedural specifications: specify procedures for calculating attributes;
      For example, the building design must follow earthquake resistance design as mandated by the seismic provisions in the B.C. Building Code.

    - Performance specifications; specify performance levels that a function must demonstrate to be successful.
      For example, A reusable juice container must contain 100ml.

- A few words regarding performance specifications
    - This is the form of specifications that are often referred to.

    - If the system being designed is required to work with other systems, interface performance specifications re used to specify how the systems interact;
      For example, car remote starters must be compatible with the space, available power and wiring hardness of the car.

    - When dealing with large and complex systems such as an airplane, interface performance specifications are used to clearly define the boundaries of subsystems (such as wings, fuselage, body, landing gear, etc.). Sufficient details must be contained in such specifications so that all involved teams can proceed with their respective design tasks.

- - - Detailed design performance specifications are calculated/predicted at the completion of a design so that the end users will know what levels of performance they can reasonably expect from the product.
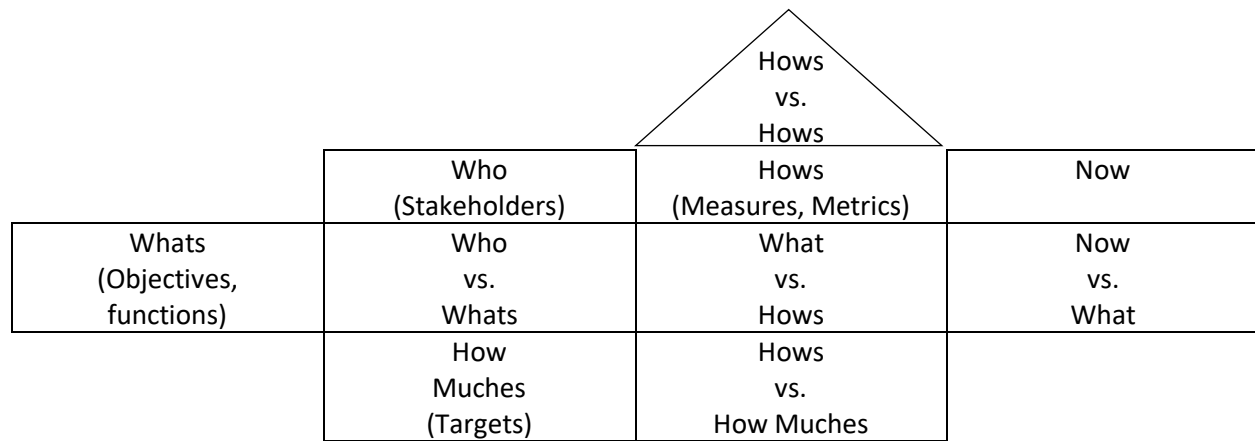
- How to set performance levels
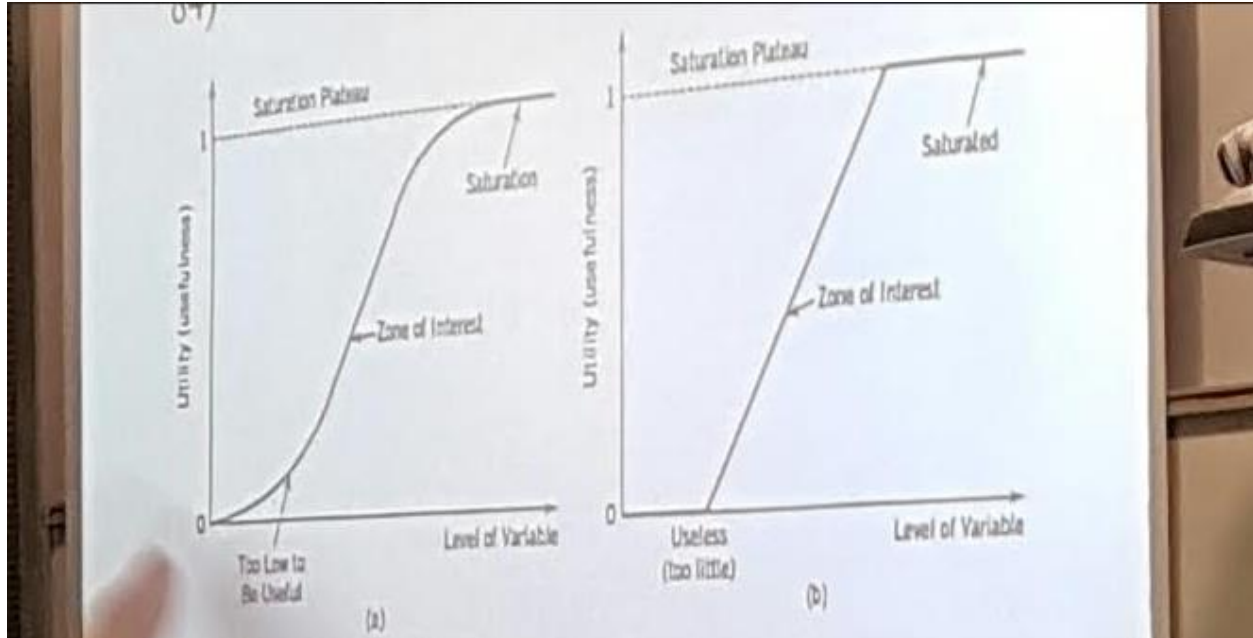
- For example, for the "contain liquid" function of "a reusable juice container", the design variables to consider may include, shape and dimensions of container, and temperature of liquid.

- The S-curve has been applied in many disciplines.

- For example, the innovation/technology S-curve conveys the message that any technology has limits; only new technology can break through the plateau.

Reading Assignment:

S 6.3.1, 6.3.2, 6.3.3

		Hows vs. Hows	
	Who (Stakeholders)	Hows (Measures, Metrics)	Now
Whats (Objectives, functions)	Who vs. Whats	What vs. Hows	Now vs. What
	How Muches (Targets)	Hows vs. How Muches	

House of Quality Example

Rice 1 – meeting Oct. 31st