Industrial Design at the Service of Teaching Economics: 3D-Printed Prototypes and Materialized Demonstrations of Utility and Production Functions
(An Innovative, Pedagogical Tool to Teach Microeconomics)

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Abstract:
Many economics students, even at the graduate level, have difficulty in deeply understanding the complex nature of utility and production functions.

As these functions are somehow fundamental building blocks of economics as a science, it is crucial for economic students to completely learn the nature and essence of these functions.

Therefore, effectively teaching and completely learning the essence, nature, forms, and properties of these functions are crucial for economics students to thrive academically and professionally in the discipline.

A novel, innovative way to teach utility functions is to use "materialized demonstrations" of utility and production functions, enabling students to actually “touch” the functions, and get a hands-on experience with utility and production functions. These innovative pedagogical tools can highly enhance the quality of teaching and level of learning.

Different applications of these innovative instructional tools:

- Demonstrating various types of utility and production functions that exhibit desired mathematical, technical, and theoretical properties
- Introducing three major types of utility and production functions, two polar cases, namely perfect substitutes and perfect complements, and an intermediate one, i.e. Cobb-Douglas utility and production function
- Clarifying the concept of isoquants, indifference map, and the existence of infinite number of indifference curves
- Illustrating the convexity of indifference curves and the diminishing marginal rate of substitution
- Exhibiting the quasi-concavity of utility and production function
- Clarifying the distinction between quasi-concavity and concavity
- Illustrating the relationship between indifference curves and a utility function
- Demonstrating the concepts of budget constraint, budget line, and budget set
- Interpreting the concept of constrained maximization in a geometric fashion

One Cool Way to Teach Constrained Utility Maximization!

Prototypes for Three Main Types of Preferences:

- Relative Substitutes
- Perfect Substitutes
- Perfect Complements

Not just Micro, but also Macro!

- A Recently Published Textbook: Modern Macroeconomics
- By Sanjay Chugh, MIT Press
- The first chapter of the textbook is devoted to visually explain utility functions.