Demystifying Theory-Based Research

Sam Brunhaver
DEL Talk
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Topics

- Theory and how it is used
- Theory in engineering education
- Examples of career-related theories
What is Theory?

A description or explanation of a phenomenon (how or why something happens)

What is it used for?

Quantitative research – To identify hypotheses and select appropriate instruments

Qualitative research – To provide a lens through which findings can be interpreted
Develop vs. Borrow

“While this research-driven focus is welcome progress, one can detect a growing sense of unease and confusion on the matter of theory.”

“Many stakeholders in the field see a dearth of theory-informed research and practice as a grave concern and remind us that theoretical development is paramount for the advancement of the field.”

“On the other hand, several scholars contend that undue emphasis on theory undercuts the pragmatism of education and can hinder a smooth exchange of research outcomes.”
“Often engineering educators are trained in the physical and engineering sciences and have a largely positivist understanding of the world.”

“Meanwhile, scholars trained in the social sciences might be exposed to the positivist tradition but often practice an interpretive approach.”

“This epistemological and ontological gulf is reflected in diverse views about the nature and role of theory in the field, particularly the idea that theorizing is orthogonal to practice.”
At the end of the day, it’s assumed you’ll have a theory

*Journal of Engineering Education Review Criteria*

**Literature:** Does the article identify, synthesize and evaluate the relevant the literature that led the author to propose the research? Is there a specific and persuasive explanation of how the present study will contribute to the literature as well as to practice or policy? What conceptual or theoretical framework informs the study?
Theories for Examining Major and Career Choice

**Career Development Theory**
- Social Cognitive Career Theory
- Holland’s Theory of Vocational Types
- Super’s Developmental Self-Concept
- Krumboltz’s Happenstance Theory
- Theory of Work Adjustment

**Achievement Motivation Theory**
- Expectancy X Value Theory
- Familial Influences Theory
- Fear of Success Theory
- Self-Worth Theory
- Task and Ego Involvement Theory
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What Theory for Major Or Career Choice??
Social Cognitive Career Theory or Expectancy X Value Theory

1. Both are based on young adult populations
2. Both focus on “factors” versus “stages” or “types”

but

They answer the question in different ways
Social Cognitive Career Theory

Robert W. Lent
Professor, Education
University of Maryland

Influenced by Bandura; many studies of engineering students

Social Cognitive Career Theory

Person Inputs
- Predispositions
- Gender
- Race/ethnicity
- Disability/health status

Background Contextual Affordances

Learning Experiences

Self-Efficacy

Outcome Expectations

Contextual Influences Proximal to Choice Behavior

Interest

Choice Goals

Choice Actions

Performance Domains and Attainments
NOTE THAT:
1. Interests are based on “can I do this?” and “will this be worth it?”
2. Goals are based on all of these things, plus supports and barriers
Expectancy X Value Theory

Jacquelynne Eccles
Professor, Education
University of Michigan

Originally developed to study mathematics achievement

Expectancy X Value Theory

Cultural Milieu
1. Gender and other social role systems
2. Stereotypes of activities and the nature of abilities
3. Family demographics

Perception of ...
1. Socializer’s beliefs and behaviors
2. Gender and other social roles
3. Activity characteristics and demands
4. Possible activities
   - What careers are available to me?
   - What skills are required for these careers?

Goals and General Self-Schemas
1. Self-concept of one’s abilities
2. Self-schemas
3. Personal and social identities
4. Short-term goals
5. Long-term goals
   - Do I have the required skills for my preferred career?

Expectancies of Success
Will I succeed in my preferred career?

Subjective Task Values
1. Interest-enjoyment value
2. Attainment value
3. Utility value
4. Relative cost
   - Why pursue my preferred career?

Achievement-Related Choices and performance
Career choice

Socializers’ Beliefs and Behaviors

Person Characteristics
1. Aptitudes
2. Temperaments
3. Sex
4. Ethnic group

Previous Achievement-Related Experiences

Interpretations of Experience

Affective Reactions and Memories

Across Time
NOTE THAT:
1. “Can I do this?” and “Will this be worth it?” are just two facets of interest
2. Goals inform efficacy and outcome beliefs, not vice versa
3. Instead, goals based on what you know, not how you feel