

# **Will I Succeed in Engineering?**

Using Expectancy-Value Theory in a  
Longitudinal Investigation of Students' Beliefs

Center for the Advancement  
of Engineering Education

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# Overview

- Thought Questions
- Motivation Framework
- Approach
- What did the students say?
- What does it mean?

# What is Motivation?

- “Motivation is the process whereby **goal-directed** activity is instigated and sustained.”  
(Schunk, Pintrich and Meece, 2007, p. 4)
- “The Latin root of the word “motivation” means “to move”; hence, in this basic sense the study of motivation is the study of action. Modern theories of motivation focus more specifically on **the relation of beliefs, values, and goals with action.**” (Eccles and Wigfield, 2002, p. 110)

# Expectancy-Value Theory

## Expectancy of Success

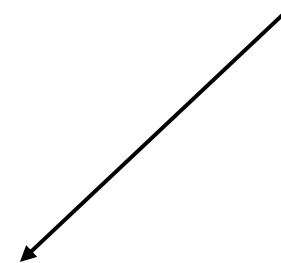
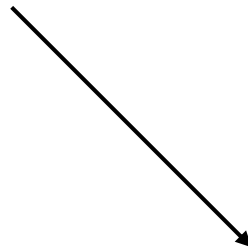
How difficult is this task?

Can I do this task?

## Value Choices

How important is this task?

Do I want to do this task?



**Pursue this activity?**

# Why This Model?

- Higher success beliefs → better performance (Bong, 2001; Eccles et al., 1983)
- Success beliefs predict career aspirations (Correll, 2001; Eccles et al., 1999)
- Task values → future task engagement
  - taking advanced math courses (Eccles et al., 1983; Eccles et al., 1999)
  - occupational choices (Eccles et al., 1999)

# Approach

- 4 Semi-structured interviews (TPub)
  - 2 male, 2 female
- Multi-case study
  - Within- and cross-case analysis
- Coding
  - Miles and Huberman (1994)
  - Mixed Approach -- case and variable-centered

# Research Questions



- How do students **characterize success** in their given engineering field?
- Do students **believe they have these characteristics** that they define as important to success?
- How do these characterizations and beliefs **change with time**?

# Meet Two Students

- **Max**
  - Desires a high paying job
  - Leaves campus nearly every weekend
  - Many internships
- **Anna**
  - Changes majors her second year
  - Unsure about future career plans
  - No internship experiences



# Max (first year)

"...being able to w-, **work with people** and **understand other people**. Being **well-rounded**."

"I think I'm **really, really good at it** ((laughs)) Yeah...I think I'm really good at it, **I've had so many jobs** for someone my age"

"I was a **waiter**. I worked as a **greeter** at a Quick Lube, and then I worked as a **[mechanic]** at a Quick Lube, and then I worked as a **manager** at a Quick Lube, I was part of a **hot air balloon chase crew** ((laughs))...I ((laughs)) **detailed boats** at a Marina, and then I **sold jet skis and boats** at a marina. I've done a lot of stuff."

# Max (third year)

"You gotta' **know your stuff**, and you gotta' be **business oriented**. And, you gotta' be willing to **take phone calls in the middle of the night.**"

"There's tons of stuff I need to work on. I don't, I don't know half the technical stuff that I need to. But it'll get there."

"Experience."

# Max (fourth year)

“...being **somebody that you would respect**. A fair, like **a fair engineer**. Because we deal so much with big money contracts and service companies, and picking work because of the work, not because of the benefits on the side...”

“Don't give [company] – don't give the job to [company] because they take you golfing all the time. Give it to [company], if you give it to [company] give it to 'em because they are the best in that area, and they you know the best price, and because they're on time, and they have good equipment, stuff like that.”

# Anna (first year)

"...perseverance is one, and then having the will and drive to se-, to, to study, things even if you're tired or if you're kind of just worn out like, just uh a good quality I guess would be, and you can't, you can't teach **passion**. You can't, I think that's something an individual has for something and I think an engineer who has passion about what they're doing, or anybody who has passion about what they're doing, that's a good quality to have."

## Anna (third year)

“I think I, I have like I said, I have more confidence in being able to learn something that I need to learn. So, I think I’ll be okay. Uh, like I say, I don’t really know what to expect, so it’s hard to say for sure, like, ‘Yeah, I’ll be great.’ ”

# Anna (fourth year)

“...I can study material for an exam a couple of days before, and read the book, and go through the notes, and take the exam and do well. **So, I think academically that’s why I’ve succeeded because I can take tests.** In the lab it’s a little different. It’s more of a common sense thing...**And so, I think that’s where I lack in the lab with, with that kind of by your seat, on the fly kinda’ stuff.** Because it isn’t that linear thought that you needed for turning in the exam of the principles, it’s twisting those. And, once you twist’em, the map, the mental map of everything in my mind of where, of what leads to what, kinda’ disintegrates...”

## Anna (fourth year)

"I haven't really gone and looked at industry quite yet. I think that I know I can get a job somewhere. And so, that's not as much of the challenge as I'd be getting into like a national lab because those are crazy competitive and a lot of people wanna' go there."

# What the Data Show

How do students **characterize success** in their given engineering field and how do these characterizations **change with time**?

- *based on experiences*
- *change with experiences- classroom, campus and internship*
- *experiences help students assess their skills*

Do students **believe they have these characteristics** that they define as important to success?

- *yes and no*
- *regardless, they have expectancy of success*



# What Does This Mean?

- Need authentic exposure to variety of engineering career possibilities
- Develop accurate perceptions of:
  - what engineers do
  - the skills needed
  - own abilities
- Need help bridging classroom learning and career activities

# Thought Questions

- What **careers** do your students choose?
- What **skills** do they think are important to being successful in these careers?



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# Eccles' Expectancy-Value Model

