students' changing images of engineering & engineers

andrew jocuns, PhD

reed stevens, PhD

daniel amos, PhD

lari garrison

university of washington
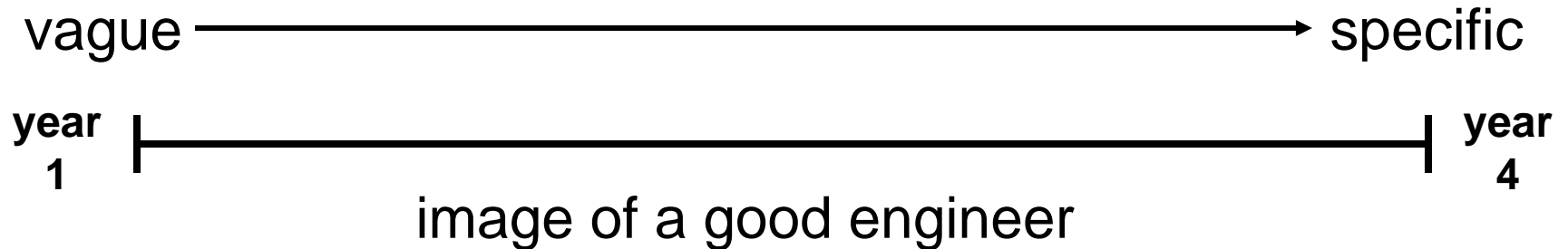
college of education

program in learning sciences

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engineering images

- images - narrative representations that students develop of engineering

- engineering as a science
  - (e.g., mathematics, engineering design processes)

- engineering as an occupation
  - (e.g., good communication skills, teamwork)

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image of a good engineer

vague ⟶ specific

**year 1** ├─────────────────────────────────┤ **year 4**

image of a good engineer

- later year responses take on a more realistic understanding

- not just engineering as a science, but engineering as an occupation

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image of a good engineer cont'd

and there are a lot of qualities that are not necessarily, um, not necessarily emphasized in engineering curriculum that I think are becoming more emphasized as you see curriculums changing, which are your, you know, your **non-engineering** type of things. You know, not your problem-solving but your **presentation**. You know, not your mathematical ability but **your ability to work as part of a team**. (Darrell, SPRI, Year 3)

images of engineering work & the engineering workplace

idealistic ———————————————→ realistic

year 1 |————————————————————————————————————| **year 4**

images of engineering work & the engineering workplace
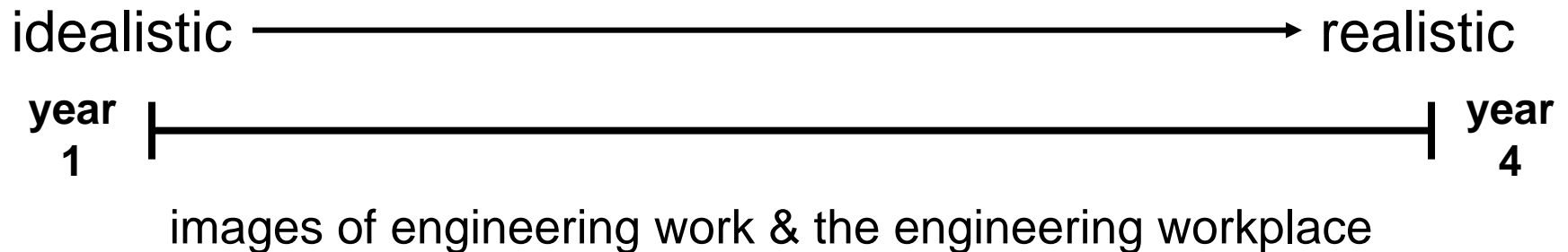
- *Um, I could also see myself working in a lab trying to, you know,invent the best catalyst for whatever.* (Erica, LPUB, Year 2).

- students evaluated the work they do in classes and internships.

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images of engineering work & the engineering workplace cont′d

At first, probably, you know, **some drafting**,some **busy work**. **Hopefully** as time goes on, more designing and more decision-making, um, kind of overall planning stuff, because that's what I really like doing, the planning and problem-solving rather than the actual, you know, implementation. (Steve, SPRI, Year 3)

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institution specific images

- Large Public University (LPUB)
  - creativity & efficiency in design
- Technical Public University (TPUB)
  - ethics and teamwork
- Suburban Private University (SPRI)
  - great expectations
- Urban Private University (UPRI)
  - engineering for the social good

reconciliation work

- reconciliation work
  - narrative repair where some students augmented their narrative identity
- Adam at LPUB and mathematics in design
- Gabrielle at TPUB and group work

discussion & implications

- images are both a hindrance and an aid
  - do not reflect reality and can have a negative impact on identity
  - offer something to aspire to (e.g., to be efficient and ethical in design, do engineering for the social good) and when positive impact the field
  - not all students will work in design
  - great expectations
- How do we help students be advocates for change in the profession?

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