Using Visual Data Sources to Explore Students’ Perceptions of Disciplines

CHEP 2019: Homero Murzi & Matthew James
Department of Engineering Education, Virginia Tech
Our Plan Today

- Introduce yourselves
- How do students talk about their perceptions?
- Drawing activity
- Our approach in Foundations of Engineering
- Q&A
Introductions

- About us
- Tell us about yourselves
  - Department?
  - Main role?
  - Something interesting about you
Student Perceptions

- What have you done in your classrooms when you needed to share their thoughts about a “big picture” piece of the course material?
  - For example, for us, a big picture question is to ask them “what is engineering?” because understanding their perceptions of the field is really important for our class.
Time to Draw

- What is your discipline?
- Draw it.
Methodology

- Arts-informed methods are usually approached as traditional forms of qualitative data (i.e., qualitative coding) (Shannon-Baker & Edwards, 2018).
- Visual methods used to complement, expand, and explain complex phenomenon
  - Communicate components of a phenomenon that are not easily verbalized
  - Participants might be more comfortable
- Concerns for rigor
Methodology

● **Stage 1: Initial coding**

Research Question: Draw a picture that conveys your experiences and feelings about the after-school program (ASP).

- Bright sun
- Blue clouds
- Small green trees

Initial codes

Focus codes

- Emphasizing natural surroundings

Methodology

- **Stage 3: Separate / integrate coding**

  Think aloud/reflect

  - Group codes that have a common theme
  - Separate codes that don’t go together
  - Provides patterns and an understanding of the phenomenon to generate knowledge

Trade with your neighbor

- Let’s go through the process together--what do you see?
- Look for initial themes
Overview of ENGE 1215

- Required course for all first-year engineering students at Virginia Tech
- Covers a variety of outcomes:
  - Investigating specific engineering majors
  - Problem Solving
  - Teamwork, etc.
Examples

● Let’s look at a few examples of how students responded to this exercise in ENGE 1215
Example 1

Beginning of Course

End of Course
Example 2

Beginning of Course

End of Course
Example 3

Beginning of Course

End of Course
Example 4

Beginning of Course

End of Course
Example 5

Beginning of Course

End of Course
Helpful materials you can use


Acknowledgements

- Cherie Edwards (Postdoctoral Associate, Department of Engineering Education, Virginia Tech)
- Tamara Knott (Academic Programs Manager, Department of Engineering Education, Virginia Tech)
- Jason Forsyth (Assistant Professor of Engineering, Department of Engineering, James Madison University)