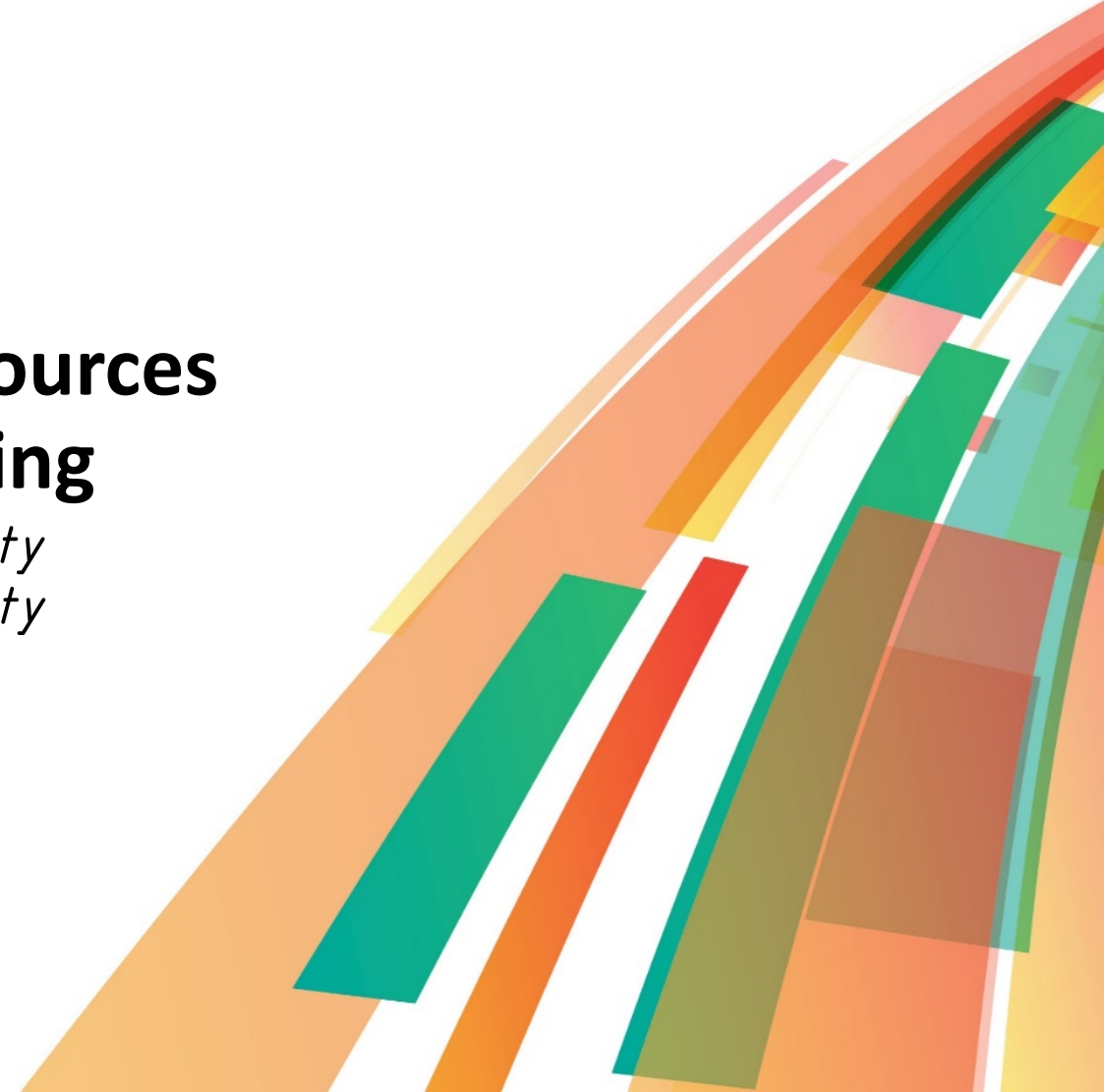# Hidden Curriculum Advocacy and Resources for Graduate Students in Engineering

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Thank you!

The authors of this work are underrepresented women with varied experiences within engineering and education that have at one time been graduate students within an engineering field. They have all acknowledged that hidden curriculum is something that is felt and experienced first-hand and can occur without being consciously aware of it. Awareness of these hidden norms and expectations often occur after the fact when we have been given the adequate words and terms to describe our experiences. Once seen, hidden curriculum becomes more visible.

Introduction

- This study is a small part of a much larger mixed-methods study involving participants across the United States and Latin America

- **Larger goal:** Explain the need for and rationale of the approaches that can more effectively help the engineering education research community to characterize the mechanisms behind hidden curriculum (HC) in engineering
  - Emotions, self-efficacy, and self-advocacy

Purpose

- Explore how engineering graduate students respond to and value hidden curriculum
  - Focusing on how (1) awareness of resources, (2) emotions, and (3) confidence can lead to students helping themselves or others
- Goals:
  - (a) Explore how graduate students react to and value the hidden curriculum presented
  - (b) Determine what graduate students perceive is necessary to take action in regards to the issues presented to them

Background

- **Hidden Curriculum (HC):** Represents the unwritten, unofficial, and often unintended lessons, values, and perspectives made by individuals and found in physical and virtual spaces within an academic environment (Giroux and Penna, 1979; Margolis & Romero, 1998; Portelli, 1993)
  - HC usually enforces the status quo, therefore a lack of knowledge of HC can lead to inequalities (Bourdieu, 1986; Coleman, 1998; Margolis, 2001; Smith, 2014)

- HC is not always negative
- HC messages can be transmitted through personal interactions such as an advising faculty, department, or other graduate students (Margolis & Romero, 2001)
- An awareness of these disciplinary norms, values, and beliefs can better equip students to succeed in their academic and professional paths (Margolis, 2001; Smith, 2014)

Background: Why graduate students?

- Socialization process into the social and professional norms of engineering academia (Austin, 2002; Gardner, 2007)
  - Mentoring & advising
  - Reinforces culture

- In another study of women graduate students in science and engineering, we found graduate students use their peers to gage what ethical behavior is normal within their research relationships (Gelles, Villanueva, & DiStefano, 2018)

- There are very few studies explicitly addressing hidden curriculum specifically with engineering graduate students (Erickson, 2007)

Methodology

- Part of a larger survey design used to validate an instrument
  - Exposure to a list of academic resources
  - Exposure to video vignettes that highlight examples of HC in Engineering Education
  - Provided 6 researcher generated HC statements
  - Analyzed graduate student survey responses to 3 qualitative questions relating to advocacy
    - Responses varied from a single word to several paragraphs

Survey Section	Question Name	Question
Confidence	Confidence and Advocacy	How do you think that confidence (self-efficacy) relates to your ability to advocate for unveiling aspects of the hidden curriculum in engineering at your university?
Emotions	Emotions and Advocacy	How do you think that your emotion relates to your ability to advocate for unveiling hidden curriculum in engineering at your university?
Self-Advocacy	Awareness and Advocacy	How do you think your awareness of campus resources can equip you to advocate to unveil hidden curriculum in engineering at your university?

Hidden Curriculum Video Vignette

#	Hidden Curriculum Assumption Statements
1	Senior faculty in engineering (e.g., tenured professor) deserve higher status, voice, and more influence than engineering junior faculty.
2	The ultimate goal of an engineering degree is to get a well-paying job.
3	Engineering education is harder, more time consuming, and expensive because it has a direct impact on safety.
4	Not everyone can be an engineer.
5	To belong to the engineering community, your personality must fit in with everyone else (e.g., technically-driven, efficient, and assertive).
6	Engineering instructors care more about the technical concepts and equations rather than the individual student's success.

(HC Part 2)

Participant Demographics

Masters Students= 30
Ph.D. Students= 20

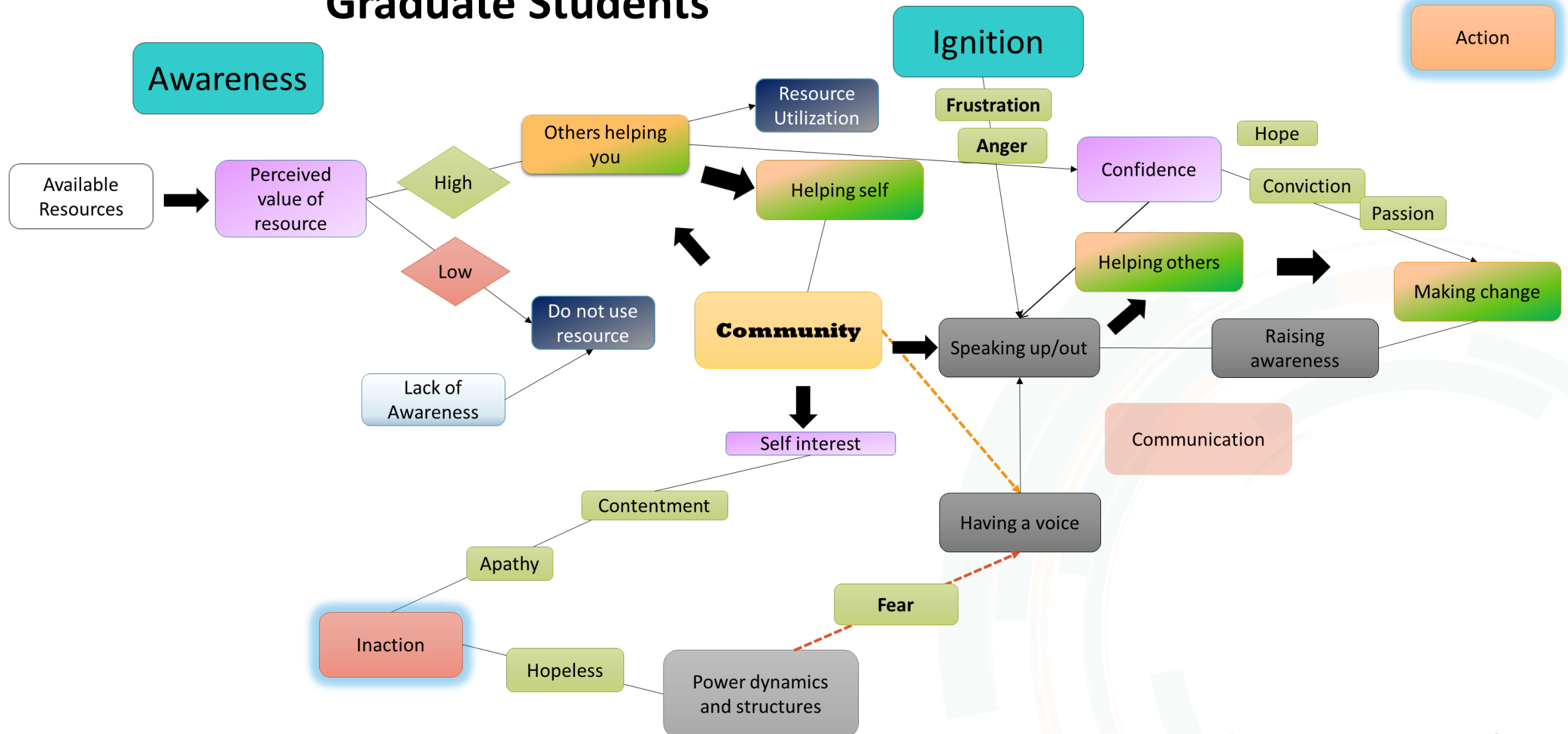Majority Mechanical Engineering (52%)
Electrical & Computer Engineering (22%)

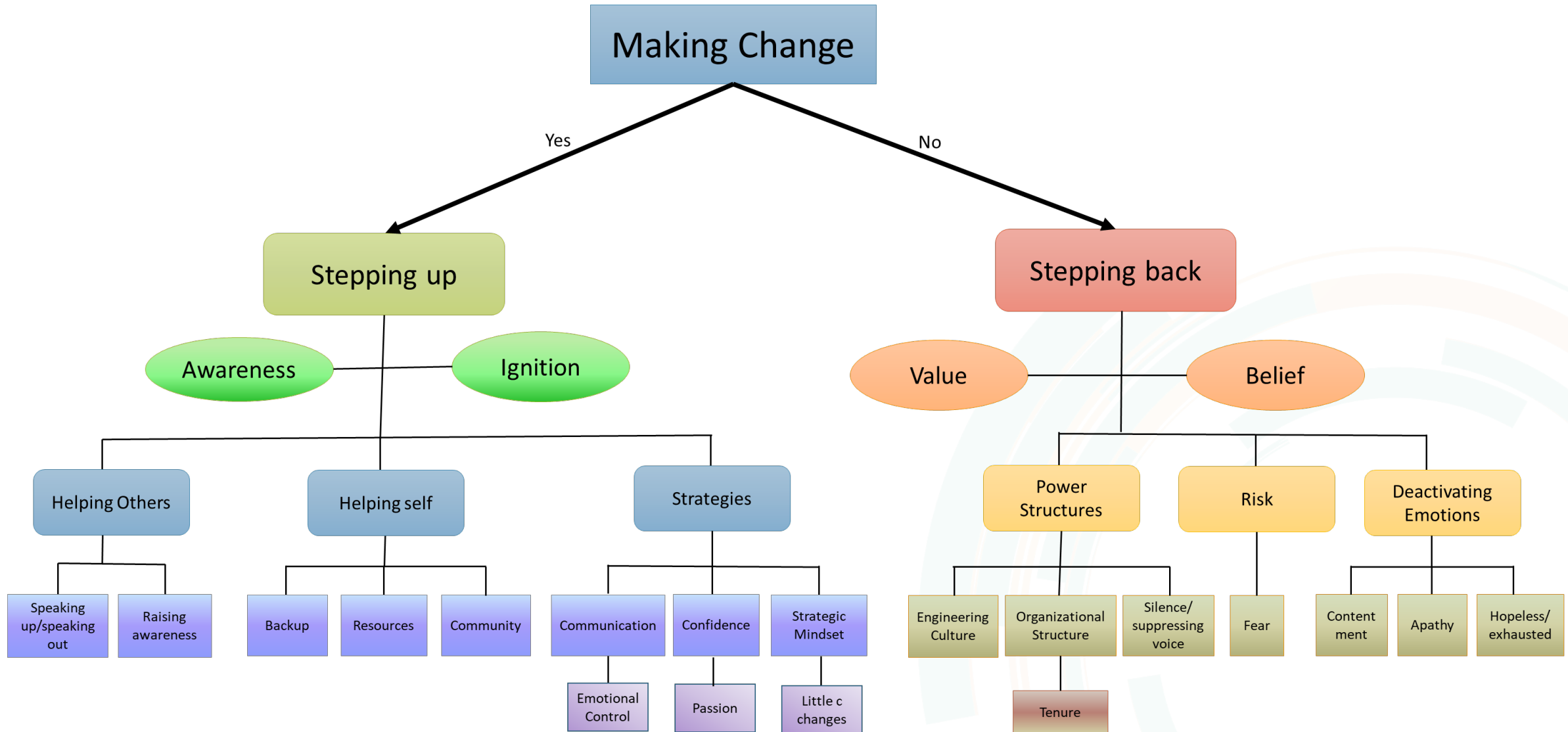| Role		
	M.S. Student	60.0%
	Ph.D. Student	40.0%
Gender	Female	50.0%
	Male	48.0%
	Prefer not to say	2.0%
Citizenship Status	Domestic	62.0%
	International	38.0%
Race/Ethnicity	Asian	20.0%
	Black	4.0%
	Hispanic/ Latinx	6.0%
	More than one	6.0%
	White	62.0%
	Not Indicated	2.0%
First Generation	Yes	42.0%
	No	58.0%

Methodology

- Survey responses were qualitatively coded and thematically analyzed
- Two cycles of Coding and Intercoder Agreement Sessions
  - **First cycle:** In vivo and versus in MAXQDA 2018 (Saldaña, 2016)
  - **Transitional Phase:** Conceptual mapping
  - Initial Codebook
  - **ICA #1** (25% of the data, randomly selected from all participants)
    - Did not reach 80% agreement
    - Broke conceptual map apart and rearranged
  - Codebook Refinement
    - Four separate tiers of codes
  - **ICA #2** (97.2% agreement of codes)
    - Added Emotion and Process coding
  - **Second cycle:** Coding all of the data using the four tiers of codes
    - Co-occurrence of codes in MAXQDA 2018
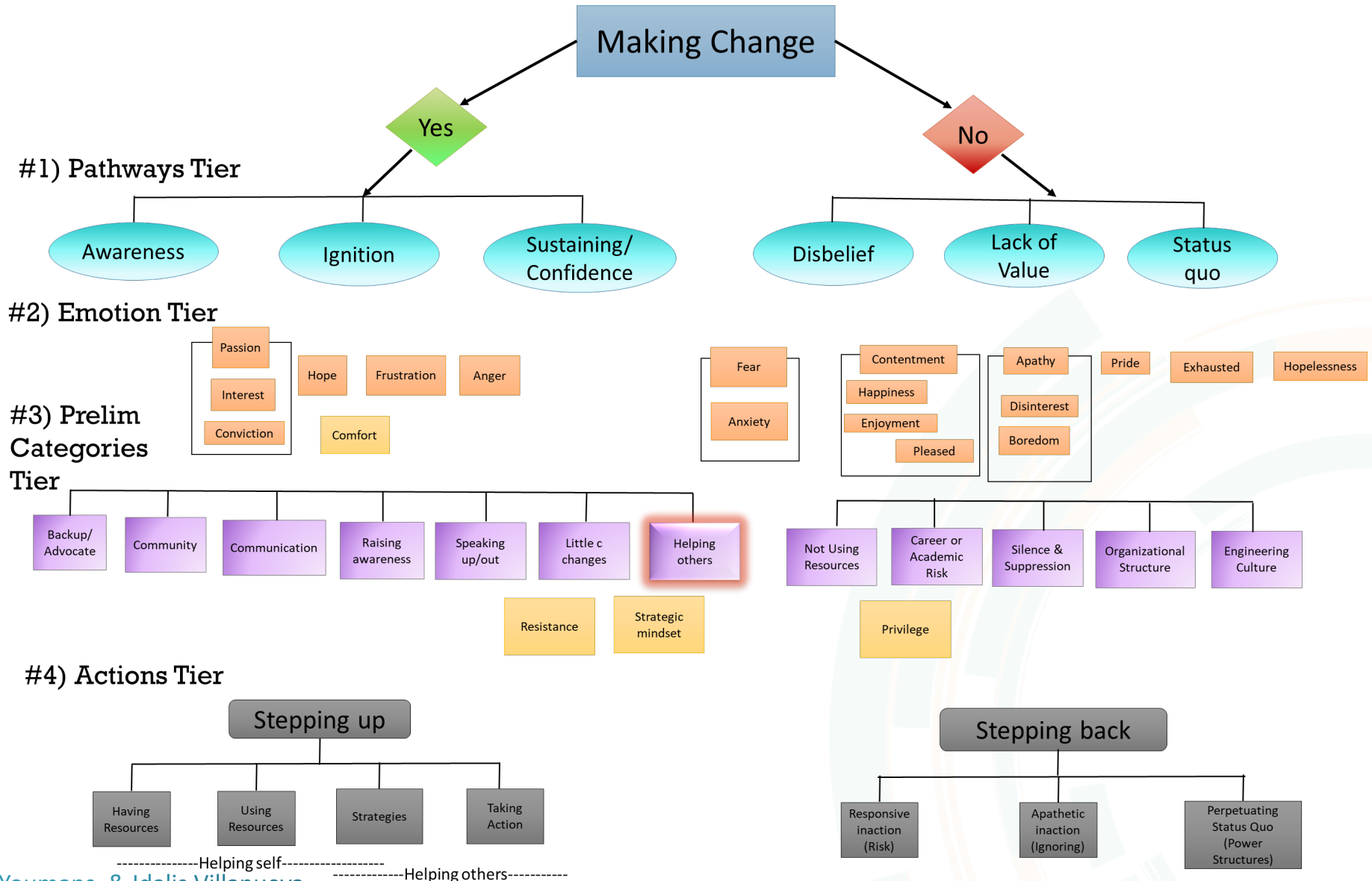   - Used QUAL and QUAN survey data to triangulate qualitative responses

First Conceptual Map for Graduate Students

Initial Code Categorization

Codebook Reorganization

Making Change

#1) Pathways Tier

Yes → Awareness, Ignition, Sustaining/Confidence

No → Disbelief, Lack of Value, Status quo

#2) Emotion Tier

#3) Prelim Categories Tier

Yes side emotions: Passion, Interest, Conviction, Hope, Frustration, Anger, Comfort

No side emotions: Fear, Anxiety, Contentment, Happiness, Enjoyment, Pleased, Apathy, Disinterest, Boredom, Pride, Exhausted, Hopelessness

Yes side categories: Backup/Advocate, Community, Communication, Raising awareness, Speaking up/out, Little c changes, Helping others, Resistance, Strategic mindset

No side categories: Not Using Resources, Career or Academic Risk, Silence & Suppression, Organizational Structure, Engineering Culture, Privilege

#4) Actions Tier

Stepping up: Having Resources, Using Resources, Strategies, Taking Action

--------------Helping self------------------   -------------Helping others-----------

Stepping back: Responsive inaction (Risk), Apathetic inaction (Ignoring), Perpetuating Status Quo (Power Structures)

Results

Four Themes: (1) Being Aware; (2) Valuing Action; (3) Igniting Action and (4) Sustaining Action

Theme #1: Being Aware

- Awareness was the **first step** in helping to reveal HC
  - Aware not only that the HC or issue existed, but also the resources needed to address it
  - Awareness used to help self (i.e., self-advocacy) and to help others (i.e., advocacy)
  - Trusting that the resources are useful

Ph.D. #14, Iran, White/Caucasian, Male	M.S. #5, United States, White/Caucasian, Male
"In many cases, we may not know whom to talk to about any things that is important for us. Knowing the resources could definitely help us follow what is important for us and struggle for that to achieve our rights."	"Most importantly, is **trusting that the campus resources have the power, ability, and desire to enact change**. Nothing is more frustrating than reporting an issue and seeing nothing come about of it."

Theme #2: (Not) Valuing Action

- In order to take action, a graduate student had to place value on revealing HC or addressing issues of inequity
    - Expressed that these actions got in the way of real engineering
- Awareness of resources, but no desire to use them
- Barriers to action

MS #30, United States, White/Caucasian, Female	MS #9, United States, White/Caucasian, Male
"It's not my place to say anything, I'm only a student."	"It detracts from the abilities of the educators to teach the material they feel is most central to their own success as engineers - if they have to make sure to include an equal number of technological breakthroughs from men as from women, from blacks as from whites (and Latinos, Asians, Pacific Islanders, and literally every other conceivable race), **how would it ever be possible to even begin teaching rudimentary mathematical and scientific concepts**?"

Theme #3: Igniting Action

- Emotional reaction to seeing or experiencing HC ignites the will to take action
  - Frustration and anger seen as critical for inspiring someone to advocate for themselves or others
  - Positive emotions (e.g., passion and hope) are important
  - Having an emotional reaction helps participants identify HC

MS #29, Dominican Republic, No Hispanic/Latinx, Female	MS #4, United States, No race specified, No gender specified
"It shows that these HC are present and some of them I wouldn't have identified."	"If you are emotionally attached to these issues, you're more likely to speak up and attempt to make a difference."

Theme #4: Sustaining Action

- The role of confidence as a sustaining force especially when "speaking up"
- Confidence is a facilitator of speaking up **AND** a strategy when communicating
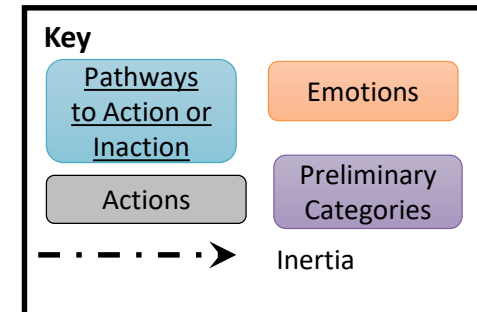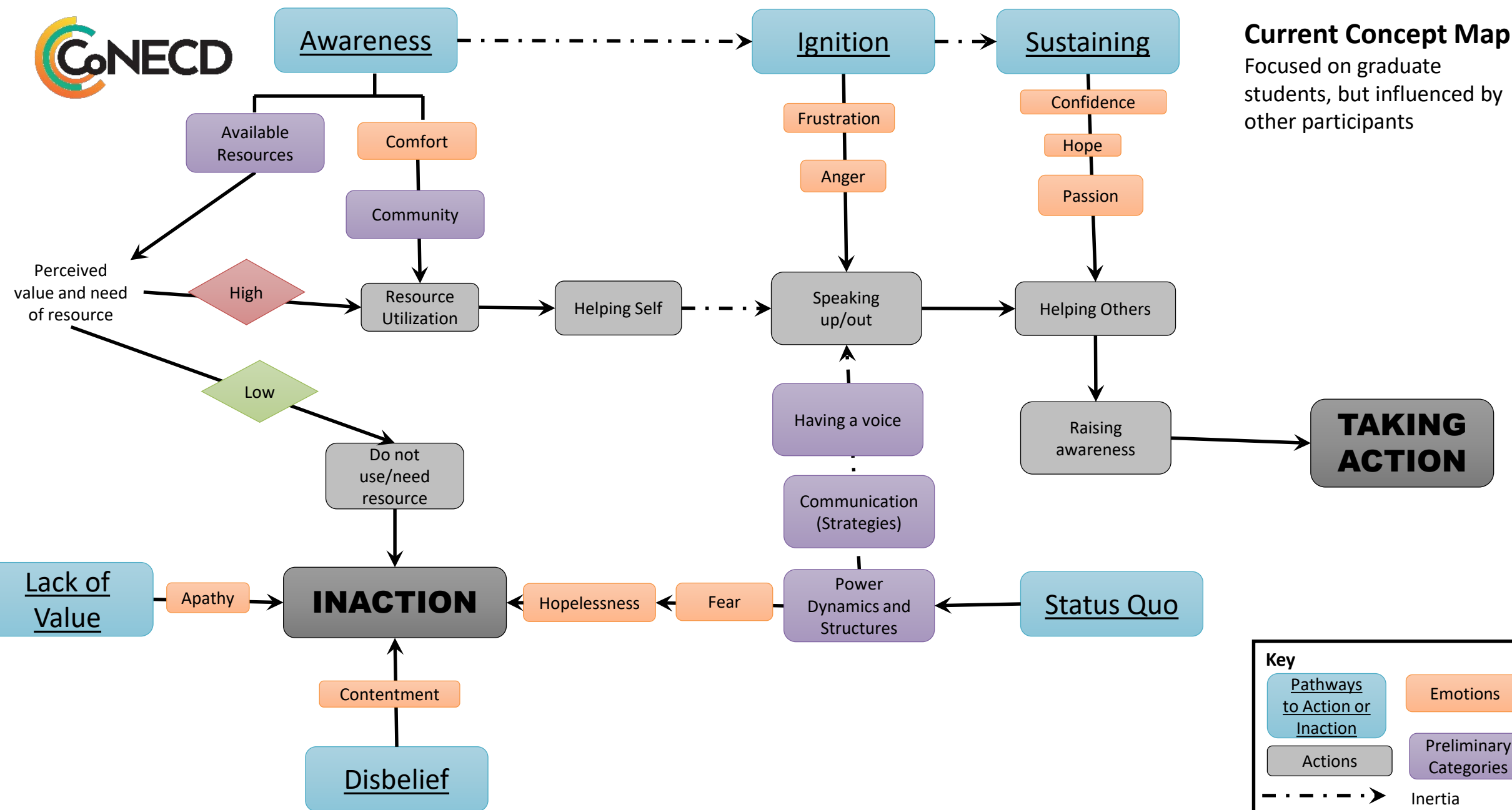 - In order to advocate effectively, you must communicate your ideas confidently

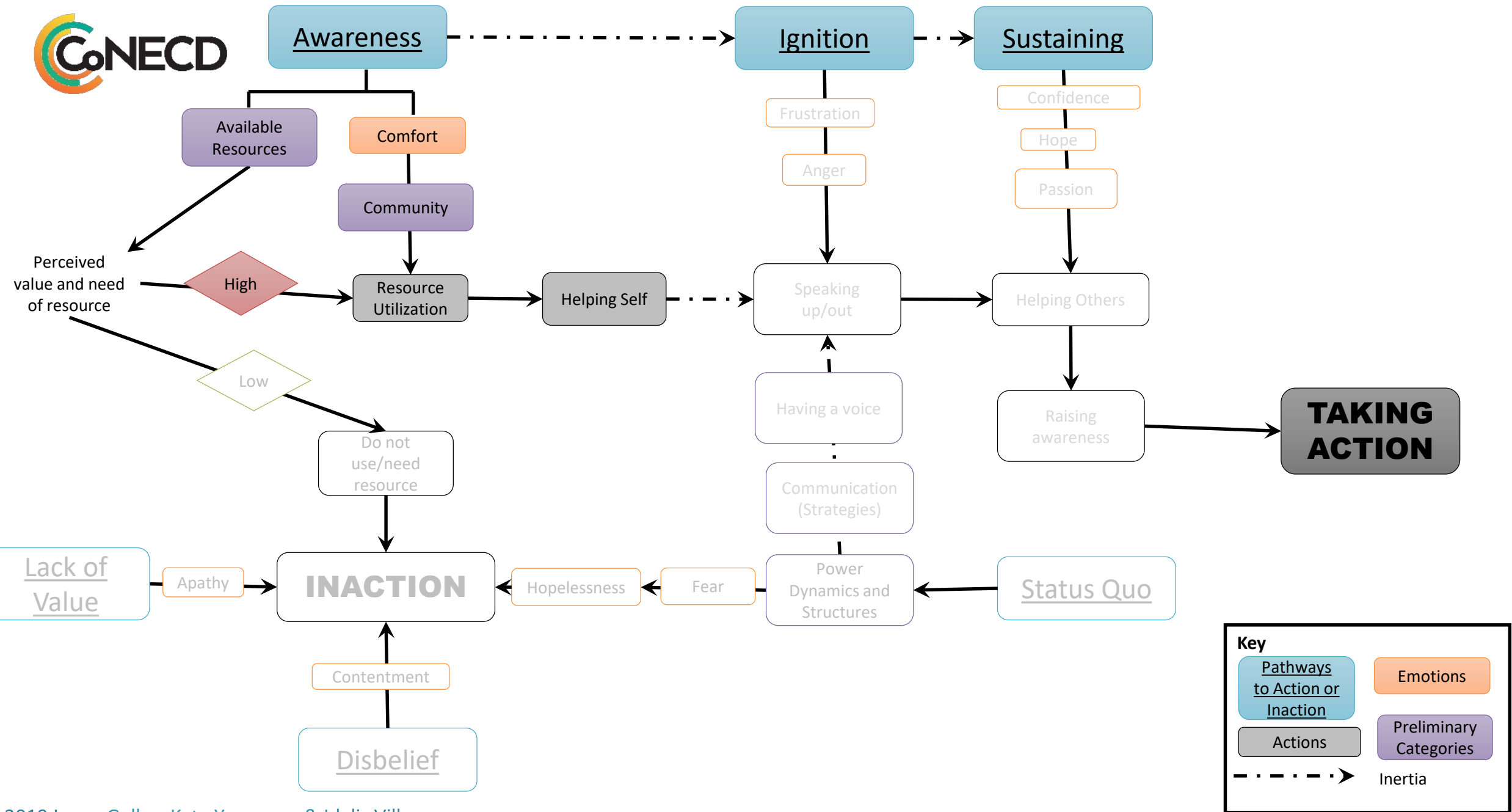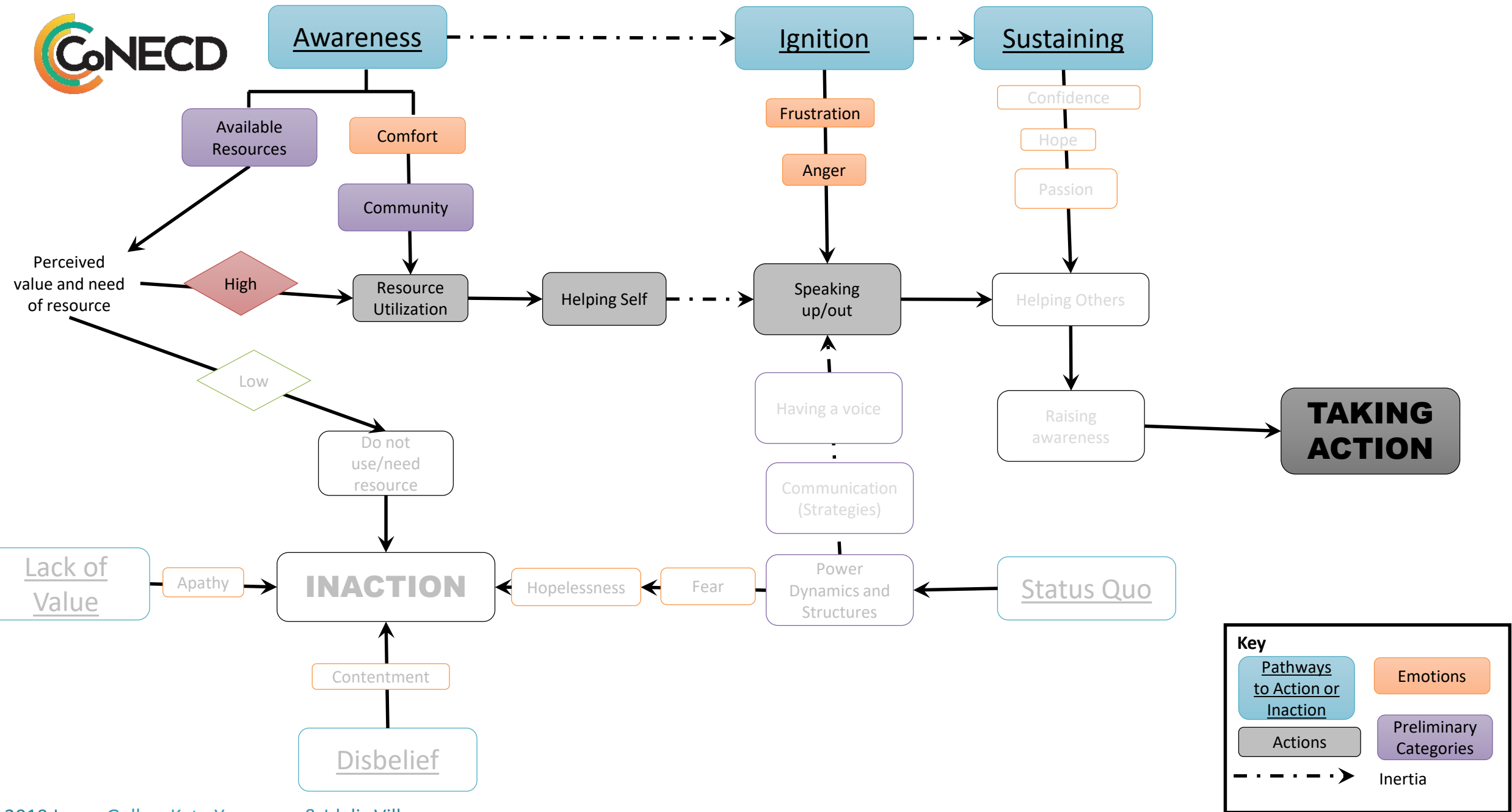| MS #7, United States, Hispanic/Latinx, Male	Ph.D. #16, Iran, White/Caucasian, Female
"…If you are not confident, you will sit back and listen quietly while not saying a word."	"Confidence gives me the courage to raise my voice and wanted to be heard by everyone."

Discussion

- Graduate students must first become **aware** of the issues and the resources that could be utilized to ameliorate those issues

- Graduate students must care about and **value** the issues or else they do not think any action is necessary

- An **igniting** emotion is needed to spark action

- Awareness + Value + Ignition will spark an initial action, but this is not enough to make change in the face of many challenges

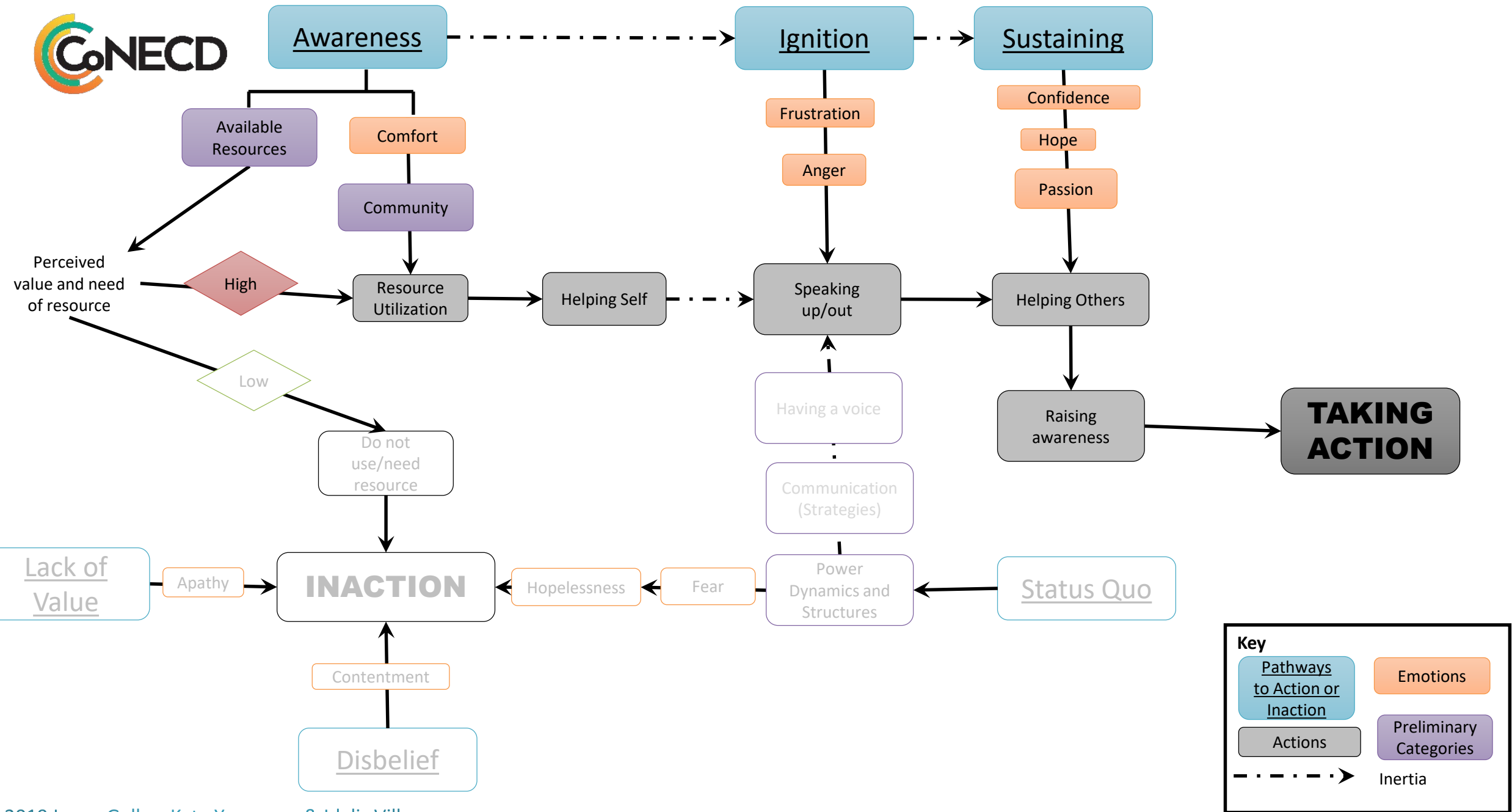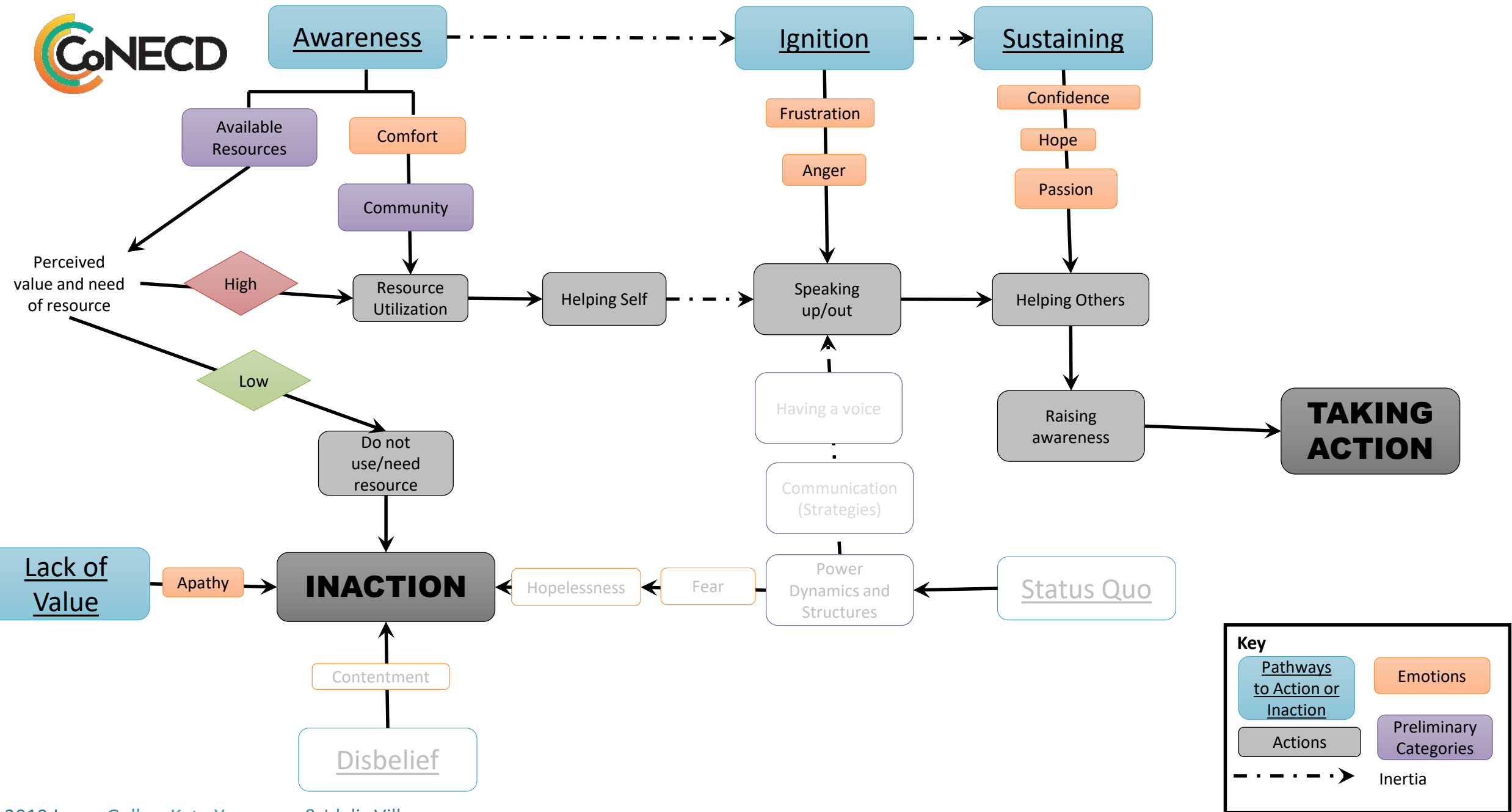- A **sustaining** force like confidence is needed

Discussion

- Graduate student advocacy actions can be achieved through:
  - Seeking out and utilizing resources for themselves (i.e. self-advocacy),
  - Speaking up for themselves or speaking out for others about issues of HC (i.e., self-advocacy or advocacy for others)
  - Raising awareness of HC issues (i.e., advocacy for others)
- Connection between communication and the ability to advocate
  - Self-advocacy (Astromovich & Harris, 2007; Test et al., 2005)
- Lack of value for having or utilizing resources for addressing HC
  - Could not connect with personal experiences
  - Perception of what engineering is and is not

Current Concept Map
Focused on graduate students, but influenced by other participants

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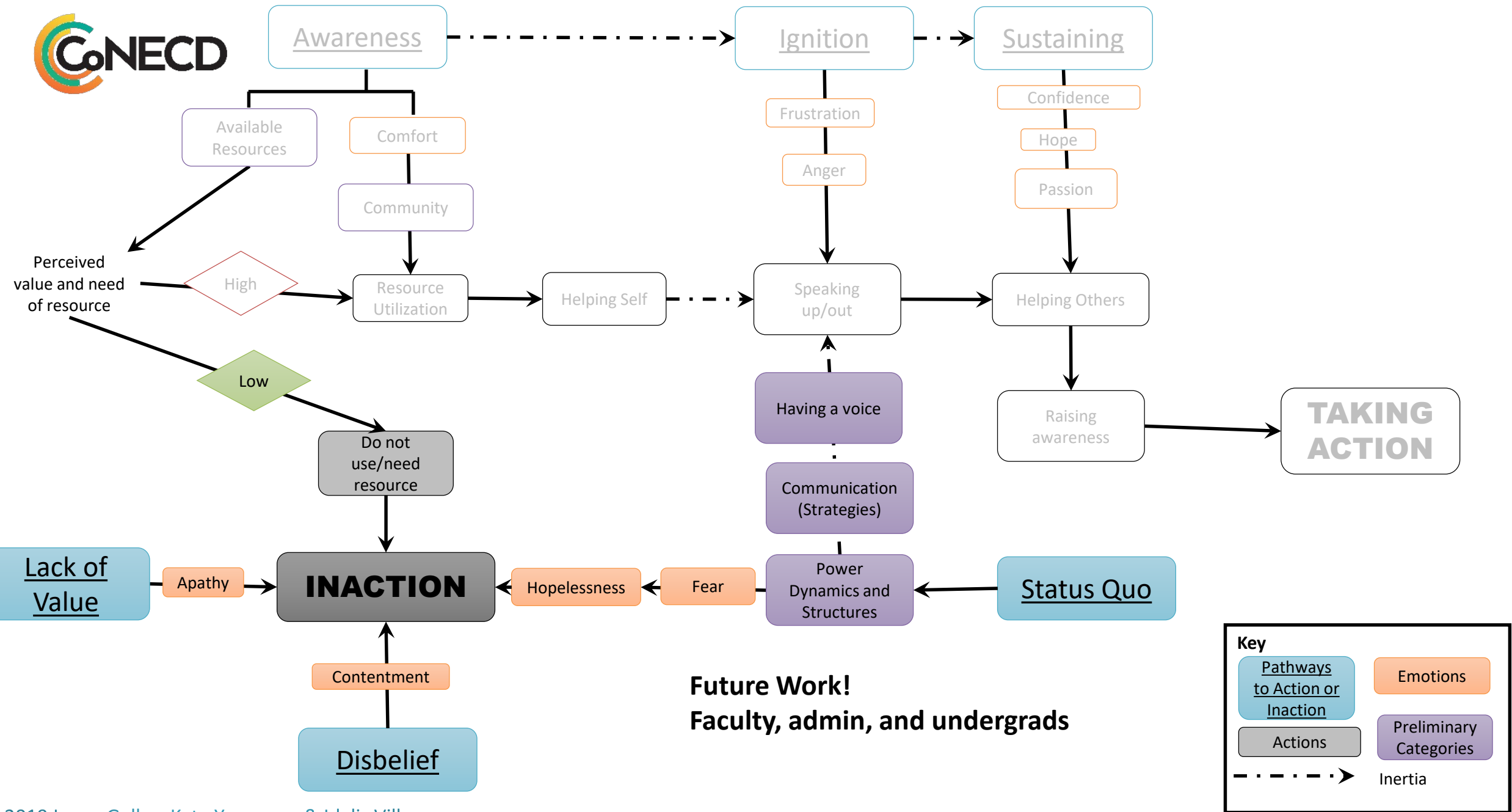Future Work!
Faculty, admin, and undergrads

Implications for Practice

- Graduate students exist in a liminal space where they are not quite a student but not a full professional such as an academic (Dutta, 2015)
    - Socialization process

- Those students who are aware of HC, have had an igniting emotion reaction (e.g., frustration), and want to take action may perceive they do not have the departmental support or resources to do so.

- If departments explicitly show they also value revealing HC or challenging the status quo, graduate students will likely begin to internalize those values as well.

Limitations

- Wording of the qualitative questions
  - Terminology: advocacy, hidden-curriculum
  - Difficult for domestic and especially international students
  - Non-responses
- Video vignettes did not show a scenario specific to graduate students
  - Research-advising relationships

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