Climate Clash:

Navigating the Dilemma between Carbon-Intensive Study Abroad and Climate Action

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Abstract:

Climate-focused study abroad relying on high-emitting travel poses a dilemma between study abroad and emission reductions. This study employs the three spheres of transformation investigating this dilemma through coding syllabi (n=156,) surveying educators (n=9,) and interviewing (n=14) Climate Action Network for International Educators (CANIE) affiliates considering whether studying climate change abroad is compatible with sustainability transformations for low carbon futures. All syllabi included factual knowledge about climate change, but few included feelings or action-based knowledge for engaging in climate action. I found climate educators negotiate the knowledge-to-action gap through account budget thinking and habituation, prioritizing collective action over individual action. Interviews revealed how CANIE works as an agent of change disrupting business-as-usual practices and influencing the mindsets and behaviors of other institutions in support of emission reductions. My findings suggest educational reform should focus on how personal behaviors and attitudes can influence paradigmatic shifts for sustainable transformations.

Keywords: International climate education, individual vs. collective action, education for transformation, knowledge to action gap, three spheres of transformation

Word count: 10,773

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List of Abbreviations

CANIE-Climate Action Network for International Educators
COIL-Collaborative Online International Learning
CO_2 Carbon Dioxide
FFA-Facts, Feelings, and Actions
IPCC-Intergovernmental Panel on Climate Change
SDG-Sustainable Development Goal
UN-United Nations

1 Introduction

1.1 Sustainability Transformations

It is well understood that an urgent and swift transition to low-carbon futures is needed to limit warming to 1.5℃ and operate within the planetary boundaries (IPCC, 2022). Contrary to this knowledge, people of middle to high socioeconomic status emit more than their fair share of carbon (Nielsen et al., 2021; Oswald et al., 2020). Climate science shows an urgency for behavioral transformation to low carbon futures (O'Brien & Sygna, 2013), but there still exists a massive knowledge-to-action gap to enable effective climate action (Ivanova et al., 2020; Nielsen et al., 2021). Among the reasons for this gap is a disconnect between knowledge, emotion, and action. Emerging literature reveals the importance of incorporating facts and feelings to incite individual action and galvanize change for sustainability (Fraude et al., 2021; Wamsler et al., 2020; Woiwode et al., 2021).

1.2 Education for transformation

Education can be a key enabler of systematic behavioral change through knowledge dissemination, innovation, and social justice (Frick et al., 2021; Hale, 2019; Hindley, 2022). The institution of higher education plays an important role in promoting societal transformation by equipping the next generation of leaders and citizens with the capacity to transform operations and mindsets toward low-carbon futures (Leichenko & O'Brien, 2019; Leichenko & O'Brien, 2020; Shields, 2019; Stephens et al., 2018). However, educational research suggests climate change education falls short of teaching high-impact climate actions such as flying less to reduce personal carbon emissions (Kranz et al., 2022; R. Leichenko et al., 2022). The dilemma between study abroad programs and climate change has been studied in recent years (Campbell et al., 2022.; Feldbacher et al., 2023; Shields, 2019; Zhang & Gibson, 2021). However, less is understood about the potential of *climate-focused* study abroad for equipping students with the knowledge and skills for reducing carbon emissions.

1.3 Study abroad and climate emissions

Climate-focused study abroad courses run under the thematic framing of teaching climate change, and yet there is a dilemma between study abroad and climate mitigation (Shields 2019). Shields calculated the average carbon cost of student mobility is up to 14 megatons of CO_2 per year, which is comparable to the national average of entire countries like Latvia or Jamaica (Shields, 2019). To meet the goals of the Paris Agreement, emissions must not exceed 3-4 tons of carbon per capita by 2030 and 1 ton of carbon by 2050 (Worlrath Söderberg & Wormbs 2019) which is at odds with climate emissions of studying abroad. Over

100,000 university students from the United States go abroad each year (*Trends in U.S. Study Abroad NAFSA*, n.d.) which has complex cultural, political, economic, and environmental impacts on both the home and host countries. SDG target 4.7 grounds my study on how education can be used as a tool for sustainable transformation:

> "By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development" (United Nations [UN], 2015).

1.4 Facts, feelings, actions

Facts, feelings, and actions (FFA) enable an integrative approach to answering my overarching research question of whether studying abroad is compatible with sustainability transformations for emission reductions. I conceptualized my research questions based on a framework of FFA which is employed by an expert climate scientist Nicholas as a contemporary approach to navigating the climate crisis (2021). Climate scientists and educators alike advocate for the synergistic potential of FFA for effective learning and transformative change (Islam et al., 2022; Landon et al., 2019; Leichenko & O'Brien, 2019; Nicholas, 2021; Tan et al., 2021). Research shows that further knowledge about climate change does not yield behavioral change (Knutti, 2019; Leichenko & O'Brien, 2019; Wolrath Söderberg & Wormbs, 2022). To overcome this, environmental behavioral research shows that overcoming barriers of inaction requires integrating facts and feelings for climate action (Fraude et al., 2021; Woiwode et al., 2021; Wolrath Söderberg & Wormbs 2019). Thus, tapping into feelings and personal beliefs is essential for understanding individual and collective agency for sustainability transformations (Leichenko & O'Brien, 2019)

1.5 Thesis aim and research questions

I aim to further comprehend the dilemma between students traveling long distances to study climate change abroad and emission reductions (Figure 1). I consider themes of climate literacy, individual vs collective responsibility, and behavioral change. For this thesis, I define *sustainability transformation* for study abroad as the capacity to transform the mindset and behaviors of individuals involved in study abroad to align with low-carbon futures. This thesis adds to scholarship in sustainability science, environmental psychology, and international education to support transformation pathways toward low-carbon futures. Contributing to the knowledge base around igniting climate action, this thesis fills a research gap in student travel for climate education by presenting an opportunity to critically examine

pedagogical approaches for holistic climate literacy. Taking a critical realist approach, I aim to understand why practitioners of climate-focused study abroad programs have this knowledge-to-action gap and consider opportunities for strengthening personal capacities to reduce carbon emissions.
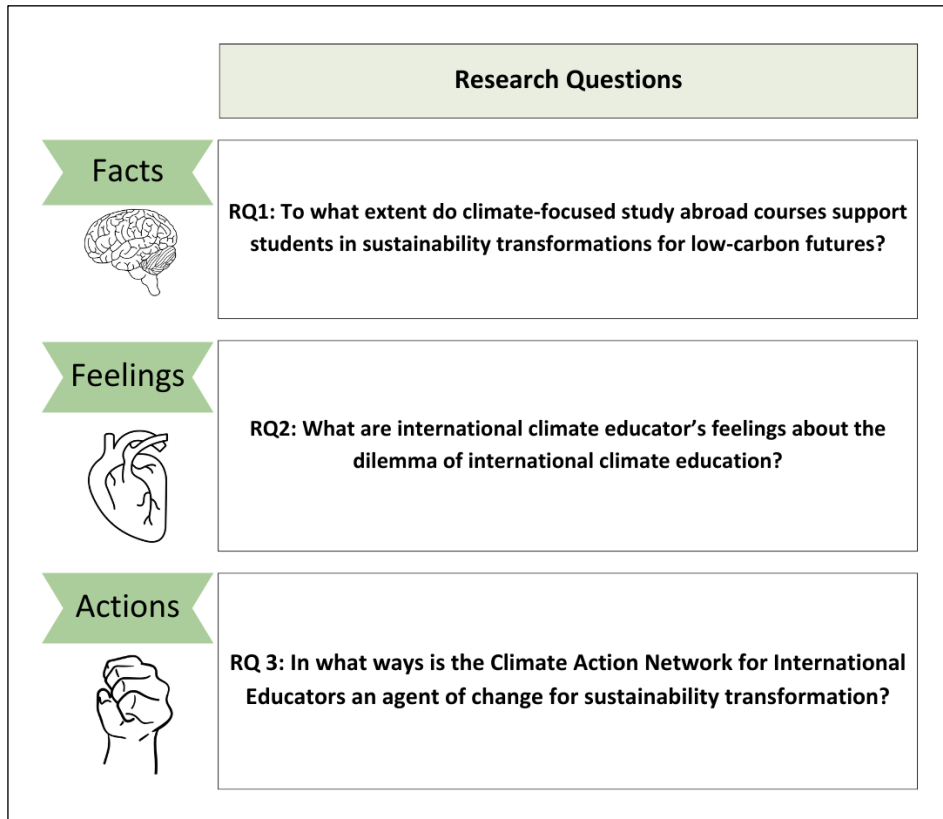
Figure 1. Research Questions (By author, 2024).

2 Background

2.1 Student mobility and internationalization of higher education

Substantial literature supports the benefits of international education and study abroad for social, cultural, and economic development. Notably, studying abroad is shown to increase the career preparedness and employability of returnees (Mohajeri Norris & Gillespie, 2009; Paige et al., 2009). Individuals can develop intercultural proficiency (Crossman & Clarke, 2010) and a higher propensity to engage in global issues (Paige et al. 2009). Literature also supports the intercultural development of hosting communities, economies, and institutions (Gribble, 2008; Luo & Jamieson-Drake, 2013; Perna et al., 2014). Higher education institutions and governing bodies across the world incentivize the internationalization of education to strengthen global connections, exchange knowledge, and promote equity and inclusion (Gribble, 2008; Luo & Jamieson-Drake, 2013; Perna et al., 2014; Wang et al., 2024). Students returning to their home countries with new knowledge, skills, and worldviews have enhanced capacity to engage in pro-environmental behavior (Kolenatý et al., 2022) and civic engagement (Wang et al., 2024).

On the other hand, the internationalization of education comes at a high environmental cost. Between international academic conferences, student recruiting, and study abroad there are high emission costs associated with internationalization (Shields, 2,19, 2023; Tseng et al., 2022). The international education community has a sizable impact on the climate crisis because of the carbon-intensive travel associated with student mobility (Shields 2019), which motivated the proceeding study. Investigating the dilemma between study abroad programs and climate action is a useful case for better understanding leverage points, knowledge-to-action gaps, and opportunities for meaningful climate action at broader scales.

2.2 Research ethics of transformations and reflexivity

In studying sustainability transformations, it is critical to examine the interconnected challenges posed by climate change. Specifically, the unequal distribution of its impacts across different communities and regions requires a dual imperative of addressing climate change and social justice (Chancel & Piketty, 2015; Oswald et al., 2020). Studying abroad can be an opportunity for students fleeing places of conflict, and ironically climate migration—a reality that adds to the complexity of the dilemma and an understanding that "transformations are not always perceived as desirable or positive" (Leichenko & O'Brien, 2019, p.178) . I acknowledge the normativity of the intent behind reducing carbon emissions in study abroad in the interest of sustainability and the disruptive nature of transformation (Rutting et al., 2023). Furthermore, given the disproportionate effects of climate change on low-income countries and high

emissions from high-income countries (Calvin et al., 2023), the socioeconomic divide between incoming and outgoing students adds a relevant layer of complexity to the normativity of sustainability transformations. One must question "to whom the transformation benefits". I find it important to state my positionality in this qualitative research and production of knowledge (Lu & Hodge, 2019). I am a current international student in a sustainability-focused program and my former professional role as an international educator has shaped my perspective on this topic. It has led me to larger questions of justice in student mobility, agency, and power.

3. Theoretical entry points

This study integrates the *three spheres of transformations*, which I will now refer to as the three spheres framework (O'Brien & Sygna, 2013) and leverage points (Meadows, 2009) for understanding sustainability transformations (Figure 2).

3.1 Three spheres of transformation

The three spheres framework was created by O'Brien and Sygna (2013), based on foundations by Sharma (2007), and is a practical tool for understanding "how," "why" and "where transformations toward sustainability take place" (O'Brien & Sygna, 2013 p.1). The figure below represents the three spheres of transformation (Figure 2).
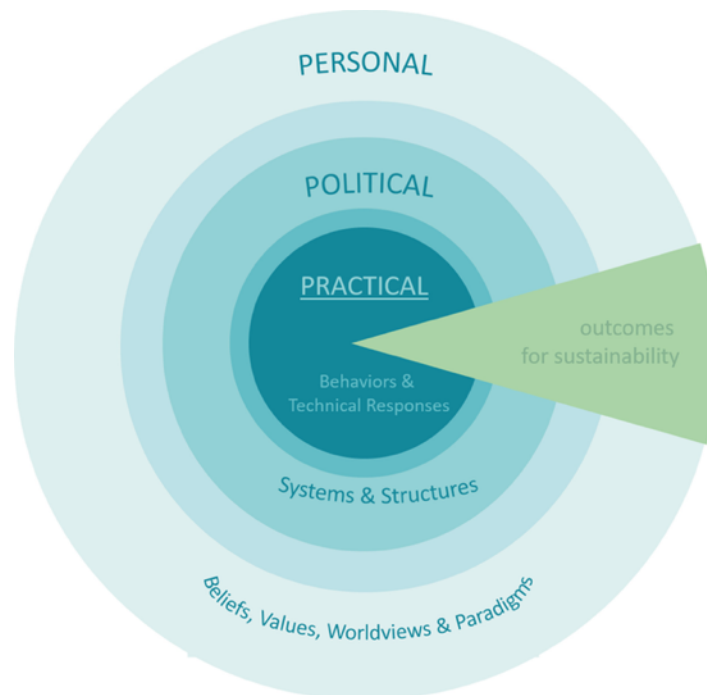
Figure 2. Three Spheres of Transformation. (Reprinted from O'Brien, 2018 p. 155).

Note. Illustrating the relationship between the personal, (beliefs, values, worldviews, & paradigms), political (systems & structures), and practical (behaviors & technical responses) for sustainability outcomes.

3.1.1 Personal sphere
The *personal sphere* reflects individual and shared beliefs, values, and worldviews that constitute how people make sense of the world (O'Brien & Sygna, 2013). RQ2 interrogates educators' feelings, perspectives, and moral rationales for engaging in international climate education despite the high climate impact. "While beliefs, identities, values, and norms influence how we cognitively engage with climate change, our connection to the issue is also emotional" (Leichenko & O'Brien, 2019 p.70). The personal

sphere is oftentimes overlooked, but is crucial for understanding sustainability transformations (O'Brien and Sygna, 2013; Wamsler et al., 2021).

3.1.3 Political sphere

The *political sphere* represents institutions and structures that can enable or hinder the capacity for transformations (O'Brien 2018). In the context of this study, higher education institutions, education collectives, and governing bodies are key constituents of the political sphere. According to O'Brien, there is value in involving individuals and collectives for fostering systematic change across the three spheres (2018). The primary governing body for climate action in the international education space is CANIE and RQ3 closely examines the role of CANIE within and across all three spheres.

3.1.2 Practical sphere

At the core of the three spheres framework is the *practical sphere*, which consists of the behaviors and technological responses of sustainability transformations (O'Brien & Sygna, 2013). Embedded in the practical sphere are things like "more solar installations, reduced meat consumption, upgrading infrastructure, developing new educational tools, promoting bicycle riding, building sea walls, and so on" (O'Brien 2018 p.153). RQ1 closely examines climate literacy and the capacity of study abroad courses to support students in sustainability transformations for low-carbon futures.

3.2 Linking the three spheres of transformation with facts, feelings, and actions

Emerging bodies of research state the importance of understanding personal beliefs, worldviews, and moral philosophies for engaging in sustainability transformations for emission reductions (Nicholas, 2021; Wamsler et al., 2020; Woiwode et al., 2021), which signifies the compatibility of the three spheres framework and considering facts and feelings for climate action. FFA is a widely employed pedagogical approach in teaching (more commonly referred to as the *head, hand,* and *heart or the 3H framework*) (Islam et al., 2022; Singleton, 2015; Tan et al., 2021) affirming the applicability of integrating the three spheres and FFA to the case of study abroad and education for transformation.

3.3 Leverage points for sustainability transformation

Analyzing leverage points and agents of change can contextualize *where* and *how* transformations occur. Drawing from the seminal work of Meadows, a leverage point is a place within a system that can "produce big changes in everything" (Meadows, 1997 p.1). Expanded upon greatly, Meadows' work has been applied within the three spheres framework and sustainability transformations more broadly to consider *deep* and *shallow* leverage points as illustrated in Figure 3 (Abson et al., 2017; Fischer & Riechers, 2019; Meadows, 1997; O'Brien & Sygna, 2013). Notably, deep leverage points are perhaps more challenging to alter but can yield more systematic change, while shallow leverage points are perhaps easier to implement but do not necessarily yield widespread system change (Abson et al., 2017, 2017; Meadows, 1997). Considering leverage points for systems change is useful for better identifying mechanisms within the three spheres that can enable sustainable transformations.
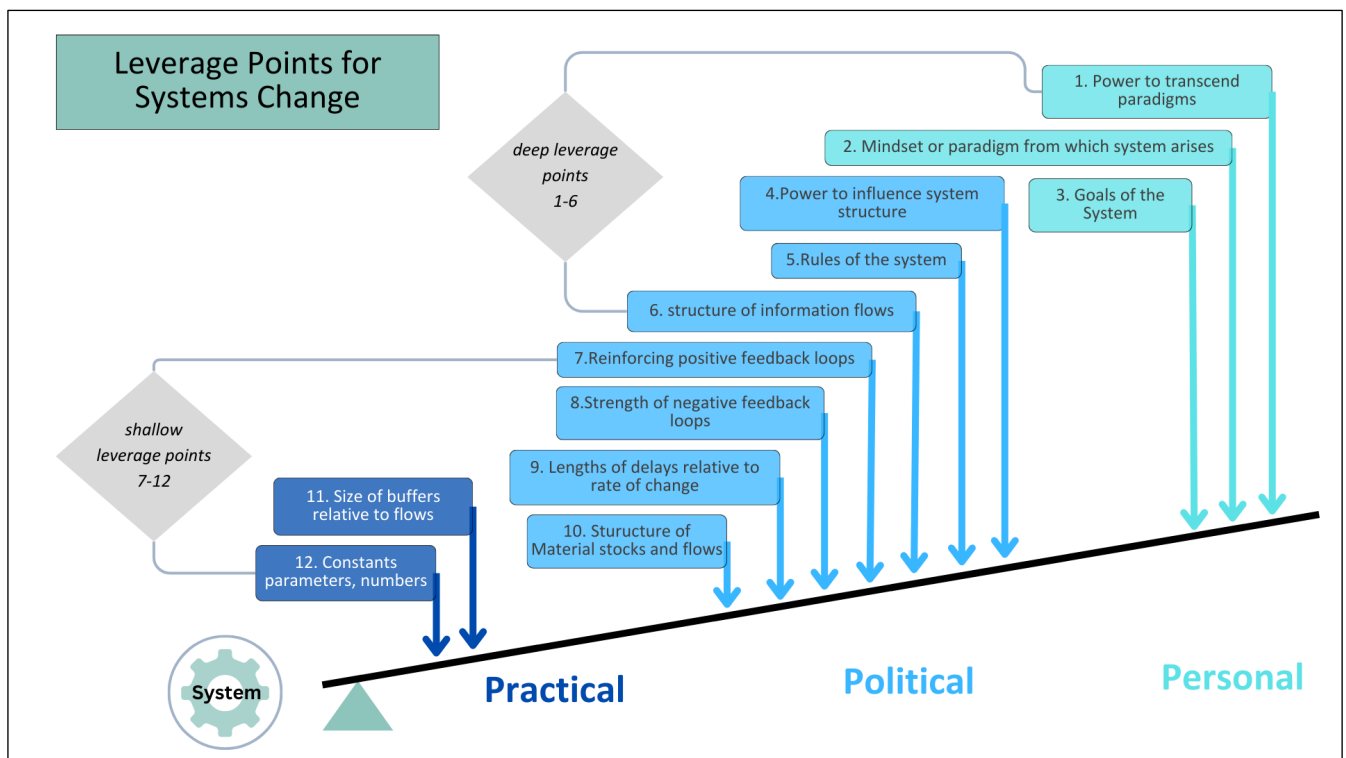
Figure 3. Leverage points for systems change (O'Brien, 2018 modified by author, 2024 p. 158).

4 Methodology

4.1 Research design

Recent studies on international education and climate action have considered opportunities for reimagining studying abroad to align with low-carbon futures (Campbell et al., 2023; McCollum & Nicholson, 2023; Nikula & Van Gaalen, 2022; Nikula et. al. 2023; Shields, 2023). However, no research has explored the dilemma using the *three spheres framework* and leverage points with a FFA approach. For *facts*, I consider education for transformation through coding climate-focused study abroad course syllabi. Surveying international climate educators, I evaluate their *feelings* around the knowledge-to-action gap, and responsibility to act. Lastly, through interviews with CANIE affiliates, I evaluate the *actions* of how the network can serve as an agent of change for sustainability transformations (Figure 4).
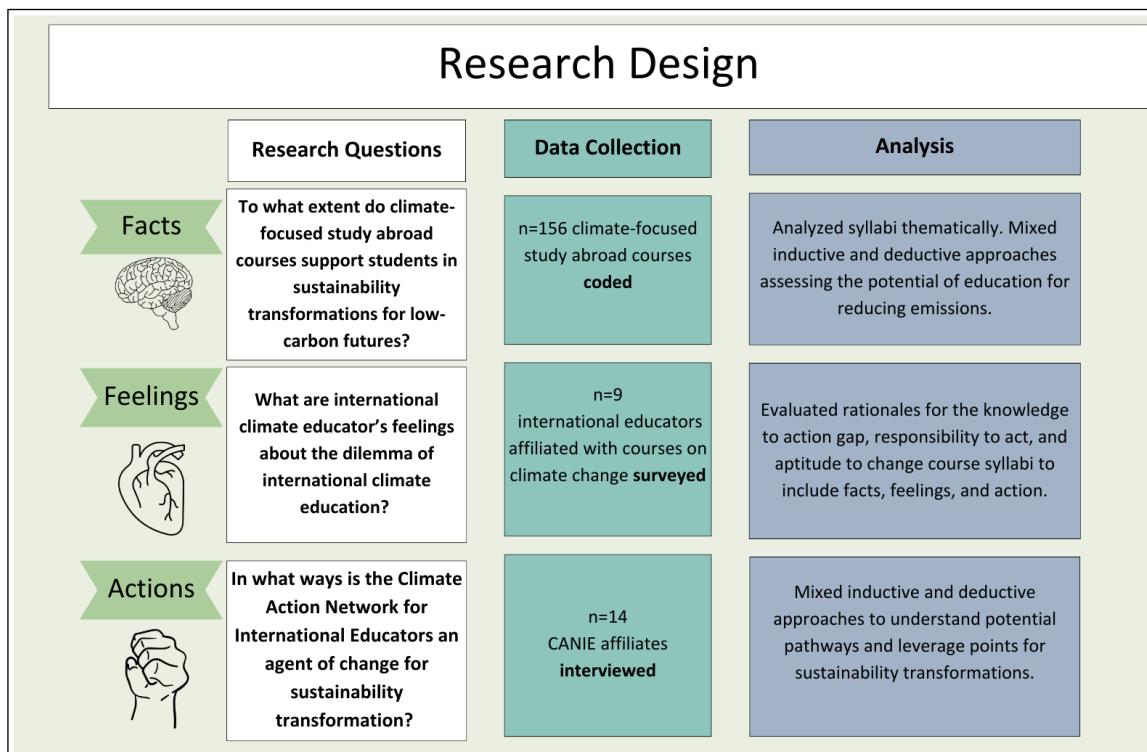
Figure 4. A concept map of the research design (By author, 2024).

4.2 Coding of climate-focused study abroad courses

4.2.1 Case selection

Undergraduate study abroad programs were selected as relevant cases for study because students are frequently self-selected, highly motivated, and among a global cohort of middle to high-socioeconomically-status people who are disproportionately high carbon emitters (Nielsen et al., 2021; Shields, 2019). Eighteen to 22-year-olds are impressionable and at a stage in life when many lifetime behaviors and worldviews are solidifying (Tolppanen & Karkkainen, 2022). Therefore, this population of study is of global importance for understanding global emission reductions and linking personal behavioral change to greater societal change (Leinchenko and O'Brien 2020). Transformation literature shows that social change can happen at different scales through "social movements, innovations, or leadership, to foster new ways of doing things, organizing societies, and thinking about the future" (Leinchenko and O'Brien 2020 p. 192). Study abroad education is a relevant case for considering human agency for personal and collective change.

I began this research with preliminary scoping for relevant coalitions and study-abroad programs using *The International Coalition for Global Education and Exchange*, an initiative coordinated by *The Forum on Education Abroad*, which is an "institutional membership association and welcomes as members all institutions of higher learning, consortia, agencies, and organizations who are committed to improving education abroad" (The Forum on Education Abroad, n.d.). Figure 5 illustrates the case selection.
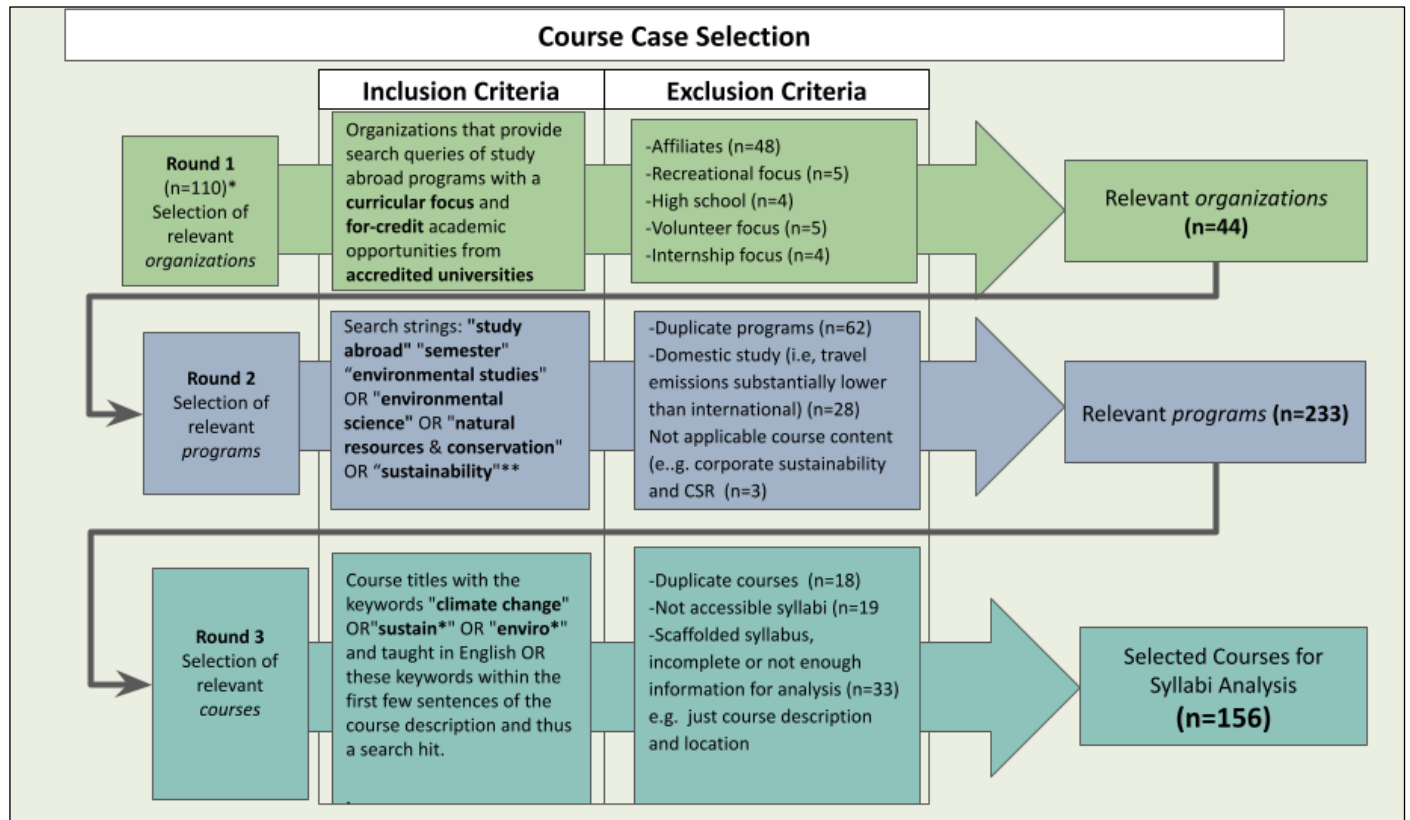
Figure 5. Course selection flow chart for answering RQ1 (By author, 2024).

Note. *Starting from the International Coalition for Global Education and Exchange member organizations (n=110). Figure represents the inclusion and exclusion criteria and three rounds of scoping for answering RQ 1. Round 1 identified relevant organizations for the study (n=44), then in Round 2 (n=233) relevant programs were selected, and in Round 3 relevant courses were selected (n-156). Note: each program had a different search query, so for exact search strings for each member organization and selected syllabi course titles see Appendix A.

4.2.2 Coding of syllabi

I used Nvivo coding software to inductively and deductively code syllabi (Elo & Kyngäs, 2008; Schreier, 2012). Table 1 outlines a pre-determined codebook for the knowledge types based on Frick et. al. (2004)'s study on environmental knowledge and conservation behavior and Tan et. al. (2020)'s study on head, hand, and heart for syllabi review, which I have linked to FFA. I developed a codebook that integrated this educational research into FFA: (1) declarative knowledge (2) affective knowledge, and (3) procedural knowledge (Table 1). In this study, I define *declarative knowledge* as knowledge of facts e.g. demonstrating an understanding of the carbon cycle (Frick et al. 2004). *Affective knowledge* I define as a personal understanding and awareness of emotions, feelings, and attitudes towards climate change e.g. reflect on your carbon emissions in the context of climate change. According to Tan and colleagues "[The heart or affective knowledge] relates to the confidence, disposition, affect and the emotive feelings evoked when tackling the subject" (Tan et al., 2021, p. 196). Lastly, *procedural knowledge* I define as knowledge of how to reduce carbon emissions e.g. flying less will reduce one's carbon footprint. Leinchenko et. al. (2022)'s study aptly titled *"Teaching the "how" of transformation"* found that college students are eager to engage in transformative solutions to the climate crisis, but lack an understanding of how to do so, which was further motivation for considering procedural knowledge in study abroad courses.

Table 1. Codebook for analyzing n=156 syllabi of climate-focused study abroad programs for knowledge and pedagogical approaches.

	Category	Source	Knowledge Type Defined	Sample Knowledge subcodes*	Sample Pedagogy subcodes*
	Facts	(Frick et. al. 2004)	*Declarative Knowledge*: Information or data presented in the curriculum related to climate change	systems thinking global temp. change causes/effects of CC global thinking interdisciplinarity	assignments lecture test paper presentation
	Feelings	(Tan et. al. 2020)	*Affective Knowledge:* Emotional responses or attitudes expressed in the curriculum towards climate change	feelings values perceptions feelings beliefs human-relationship	reflection exercise mindfulness
	Actions	(Frick et. al. 2004)	*Procedural knowledge:* Concrete actions or initiatives outlined in the curriculum to address climate change	mitigation/adaptation response and prevention to CC/conservation practices/ carbon reduction practices	case-study project-based field trip service-learning

*For definitions of the knowledge codes and pedagogy codes, see a more detailed codebook in Appendix A.3.

4.3 International climate educators' feelings

4.3.1 Survey Deployment

To answer RQ2 about *feelings* related to the dilemma of teaching international students who have high travel emissions to learn about climate change, a survey was deployed to international climate educators, curriculum coordinators, and directors or affiliates of climate-focused study abroad courses (Figure 6). Feelings, rationales, and moral perspectives are necessary for simulating action and understanding how to engage in sustainability transformations (Leichenko & O'Brien, 2019).
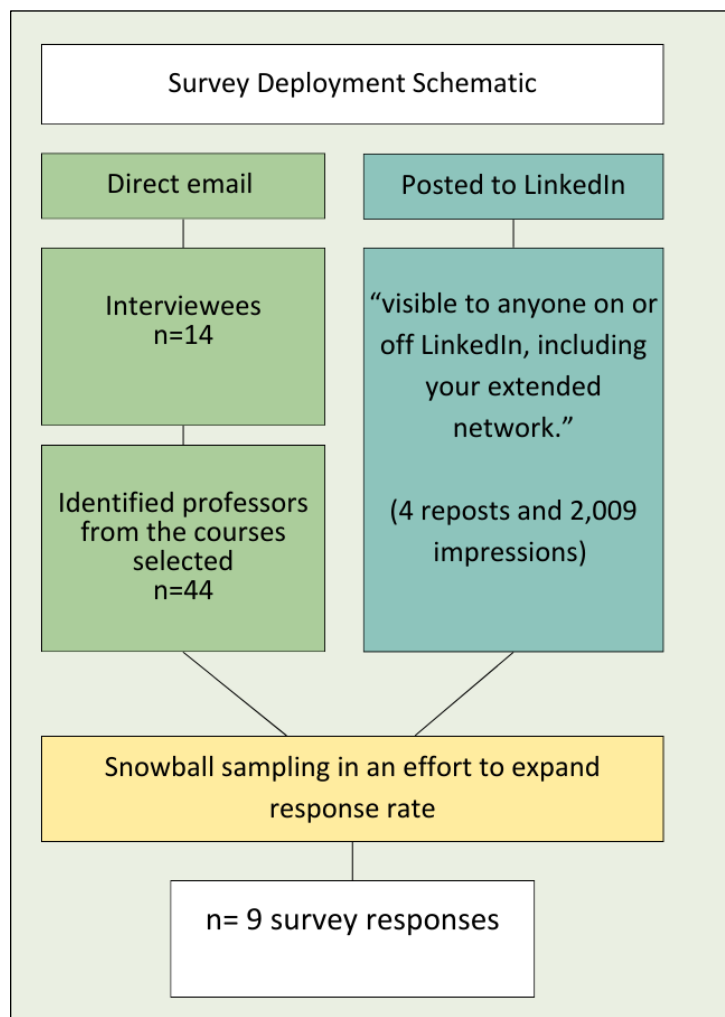
Figure 6. Survey sampling strategy schematic (By author, 2024).

As the target population was disparate, self-completed surveys deployed over email allowed for a larger sample size (Bryman, 2016). However, a disadvantage of a self-completed survey was that I could not garner specific insights and nuanced responses about people's feelings and attitudes (Bryman, 2016). I provided an opportunity for further reflection by including an optional "comment" field after responses. Through snowball sampling, I welcomed respondents to share the survey with people who fit the survey frame. The survey was also posted to LinkedIn and respondents were encouraged to share the link within their network. A limitation of this strategy is selection bias. However, given time restrictions and the self-completed nature of the survey, it was deemed an appropriate approach to garner a higher quantity of respondents. Both positively and negatively framed statements were posed, to avoid response bias (Bryman, 2016). The survey was piloted to 3 professors and 10 MSc students after which revisions were made for clarity. The survey was open from March 12th-April 4th 2024.

4.3.2 Survey Design

The twelve-question survey was designed in a single-flow format to allow respondents to see the entire survey at a glance, which was intentional so that respondents precisely knew the length of the entire survey (Bryman, 2016). Four questions asked about demographic information and one question asked about the emissions of students flying from New York to Milan to swerve as a random intercontinental flight to understand the respondent's baseline knowledge of relative carbon emissions of air travel.

The first core section of the survey included fifteen statements about respondents' awareness of the environmental impact of travel affiliated with study abroad and their perceived rationale for continuing to engage in such programs. Each statement was theoretically informed based on synthesized research of the knowledge-to-action gap (Frick et al., 2021; Wolrath Söderberg & Wormbs, 2022) (

Table **2**).

The second core section included eleven statements about climate change and syllabi to better understand respondents' perspectives on integrating declarative, affective, and procedural knowledge within the syllabi (Appendix B). The survey was formulated based on the methodological approaches of previous studies on climate change education (Leal Filho et al., 2021) study abroad (Kolenatý et al., 2022) and public attitudes toward climate action (Nayna Schwerdtle et al., 2023).

Table 2. Theoretical alignment of knowledge to action gap with survey statements (By author, 2024).

Theory	Defined	Source	Survey Statement
account budget thinking	rationally accounting for X based on Y "budgeting" through an equilibrium heuristic	Wolrath Söderberg and Wormbs 2022	*I do climate action in other aspects of my life to compensate for the travel emissions of students taking the course.*
cognitive dissonance	holding two but contradictory attitudes or beliefs	Frick 2021	*I do not think about the travel emissions for students to engage in this course.*
emotional blocking	emotions can hinder the ability to process or accept new information	Frick et. al. 2021	*I feel badly about the travel emissions students have to take the course.*
guilt/conflict	feeling guilty or conflicted about the practice	Wolrath Söderberg and Wormbs 2022	*I feel guilty/conflicted about students traveling long distances to learn about climate change.*
habituation effect	accustomed to existing practices or routines	Wolrath Söderberg and Wormbs 2022	*I feel travel is so deeply ingrained in the practice of the program and therefore it is hard to change.*
Information-deficit model	lack of information or awareness among stakeholders	Wolrath Söderberg and Wormbs 2022	*I believe I have information on where students come from and what travel emissions they have to engage in the course.*
knowledge	discrepancy between the knowledge or evidence available and the needs or priorities of stakeholders	Wolrath Söderberg and Wormbs 2022	*I believe there are low travel emissions for students to take this course.*
mismatch	considering the dilemma between international education and climate change	Frick et. al. 2021	*I feel there is a tension between teaching about climate change and students traveling long distances to take the course.*
relativization	comparing one's actions or behaviors to other individuals or institutions	Wolrath Söderberg 2022 cite Nogaard 2011	*I believe my students' emissions traveling to take this course are relatively low compared to other people in the world.*
socially-organized denial	collectively rejecting or dismissing current practices because other people or institutions do the same	Söderberg 2022 cites Nogaard 2011	*I believe I legitimize the travel emissions for students to take this course because other programs do it too.*

Questions were asked using a 5-point Likert scale from strongly disagree to strongly agree, which is consistent with previous research on people's attitudes toward climate change and climate action (Nayna Schwerdtle et al., 2023) and study abroad (Kolenatý et al., 2022). Survey respondents were required to fit certain self-identified criteria of "higher education professors, curriculum coordinators, and directors and/or affiliated with courses related to climate change for international students". For the full survey see Appendix B.

4.3.4 Survey Analysis

Survey responses from the 5-point Likert scale on knowledge-to-action gap rationales were aggregated into a 3-point scale of agree (strongly agree + agree) neither agree nor disagree and disagree (strongly disagree + disagree) because of the low response rate. This was deemed methodologically appropriate because a specific distinction between strongly agree and agree or strongly disagree and disagree was not of high importance to answering RQ2. Given the mixed results and small sample size, comparing the highest agreement and the lowest agreement was considered most relevant to the research question at hand. That said, there is a limitation to only representing the highest agreement and lowest agreement as it does not capture the "average" agreements.

4.4 Interview methods

4.4.1 Climate Action Network for International Educators and CANIE Accord

The *Climate Action Network for International Educators* (CANIE) is a grassroots collective of diverse international practitioners from 750-plus institutions from around the world who convene around a collective goal to "bring the sector together to act as a catalyst for action" (Climate Action Network for International Educators [CANIE] 2024). Notably, CANIE developed the CANIE Accord, a "set of principles," of 70 actions to guide institutions towards net zero. The principles include 5 domains: (1) leadership and influencing (2) emissions accounting and reduction (3) travel (4) facilities, operations, and procurement, and (5) climate education (CANIE Accord, 2022). CANIE is an important governing body within the international climate action space and people affiliated with CANIE served as my interviewees to understand its potential as an agent of change for sustainability transformations.

Semi-structured interviews in the climate action space were conducted with affiliates of CANIE who are deemed expert professionals working at the intersection between international climate education and climate action. Semi-structured interviews were selected as a dynamic and flexible approach (Bryman, 2016; Kvale & Brinkmann, 2009) to gather qualitative data. This approach offered open dialogue and

therefore I was able to capture more nuanced insights from interviewees (Bryman, 2016). Interviewees were selected based on their professional work at the intersection of international education. All interviewees were contacted via email or LinkedIn (Figure 7).
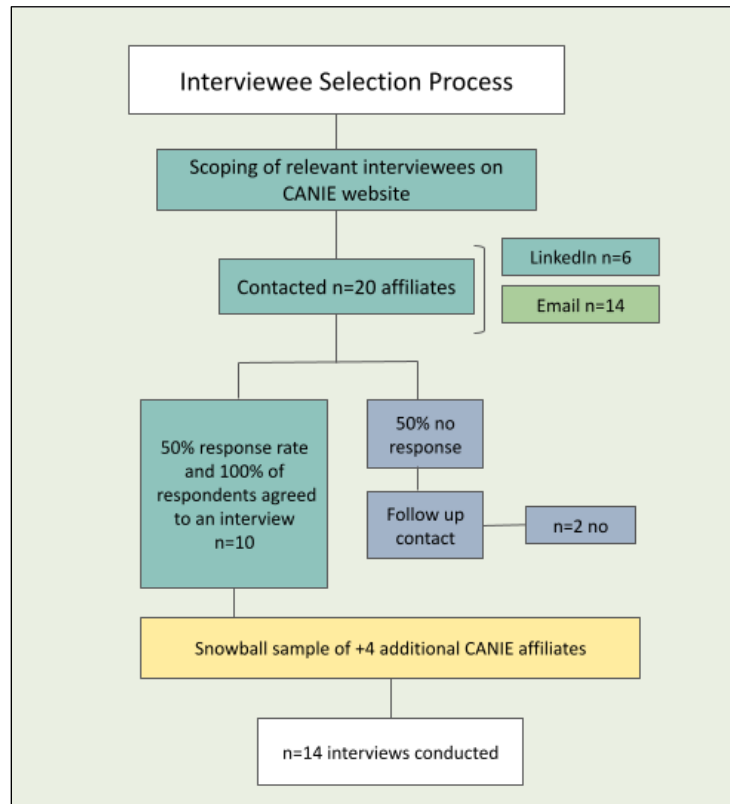
Figure 7. Interview Sampling Strategy (By author, 2024).

Affiliates of CANIE come from diverse professional roles within international education but are unified by the desire to enact climate action within their institutions. Twenty stakeholders were identified using LinkedIn using the keywords "international education and climate action" and contacted directly on LinkedIn or via email. Ten people responded and took part in 24–45-minute interviews. Interviewee 1 had a spotty internet connection, so we turned off the video to conduct much of the interview, which might have altered my approach to probing, but I methodologically valued a stronger audio connection more than having visual cues. The interviewees held diverse professional roles and currently reside in ten countries (Table 3).

Table 3: Descriptive information of n=14 interviewees (By author, 2024).

Interviewee	Gender	Duration (min)	Location	Mode
Interviewee 1	M	34:04	Australia	Audio Call
Interviewee 2	F	42:33	Dubai	Video Call
Interviewee 3	F	24:11	USA	Video Call
Interviewee 4	M	44:40	Ireland	Video Call
Interviewee 5	F	35:16	Italy	Video Call
Interviewee 6	M	41:35	South Africa	Video Call
Interviewee 7	M	33:32	USA	Video Call
Interviewee 8	F	31:45	Germany	Video Call
Interviewee 9	M	26:25	USA	Video Call
Interviewee 10	F	38:16	Netherlands	Video Call
Interviewee 11	M	39:43	USA	Video Call
Interviewee 12	M	24:46	Belgium	Video call
Interviewee 13	M	39:43	USA	Video call
Interviewee 14	M	30: 33	Spain	Video Call

4.4.2 Interview design and analysis

Interview questions were designed based on RQ1 findings and the three spheres framework (O'Brien & Sygna, 2013) (Table 4).I piloted questions with two participants—one through a formal video interview and the other through an email as this participant could not take part in a video call. The questions were subsequently refined for clarity. Given the potentially sensitive topic around the climate crisis, climate action, and international education, I took a few minutes at the beginning of the interview to *warm up* and build comfort and professional rapport with the interviewee (Kvale & Brinkmann, 2009; Louise Barriball & While, 1994). The focus of interviews was to what extent institutional action (political sphere) through the lens of CANIE affiliates influences the personal and practical spheres for sustainability transformations. All interviews were conducted over Zoom in March and April 2024 and recorded and Otter.ai was used for *denaturalized* transcription. Denaturalized transcription focuses on *what* is said rather than *how* because the content was more relevant to the research questions (Nascimento & Steinbruch, 2019). Interviews

were coded for meaning (Kvale & Brinkmann, 2009), using the three spheres of transformation and then further analyzed using Meadows' leverage points (1997). I used Nvivo to code interview data for qualitative content analysis (Elo & Kyngäs, 2008; Schreier, 2012).

Table 4: *Three spheres of transformation* aligned interview guide for semi-structured interviews (By author, 2024).

Theme/Theory	Guiding Question		
Introduction	Could you introduce yourself?		
Affiliation	Would you like to remain anonymous in my write-up of the thesis, or can I include your affiliation with CANIE and/or X?		
Lead-In	What is your perspective on the connection between climate change and international education?		
RQ 1 and Personal Sphere	How would you define climate action?		
	What are your thoughts about individual vs collective action for climate change?		
	Within the field of international education, whose responsibility is it to engage in climate action?		
	To what extent does international education teach students the knowledge to take climate action?		
	To what extent does international education teach students the skills to take climate action?		
Political Sphere	To what extent can the internationalization of education undermine global climate goals? To what extent can the internationalization of education support global climate goals?	"The political sphere represents the systems and structures that facilitate or constrain practical responses to climate change." (O'Brien, 2018, p. 156)	Supporting Theory
Personal sphere and Political Sphere	To what extent can this internationalization promote sustainable action among students? faculty? affiliates?	"The social practices literature emphasizes the links between behaviors and the political sphere, arguing that behaviors such as showering or driving a car to work are not about personal choice, but rather about the social systems and cultural practices that have collectively emerged (Shove and Walker, 2010)." (O'Brien and Sygna, 2013, p. 7)	
Practical Sphere and Political Sphere	To what extent do you think international education can influence policy strategies related to climate action?	"The political sphere represents the systems and structures that facilitate or constrain practical responses to climate change" (O'Brien, 2018, p. 156)	
Practical Sphere	Do you have any examples of successful initiatives where international education has effectively contributed to climate action? Either through CANIE or something else.	"Observable and measurable influence on climate policy goals such as mitigation, adaptation or sustainable development" (O'Brien and Sygna 2013 p.5).	

4.5 Research ethics

While the syllabi were available online through open-source data, I anonymized courses to codes and omitted any course-identifying data that could link the course to a specific instructor to protect the privacy of instructors and institutions because I did not receive direct consent from them. All survey respondents were invited to share their institutional affiliation and job title to contextualize findings and explore potential demographic correlations, though this was optional and did not affect individual anonymity. Survey respondents were linked to a separate form upon completion for them to provide their email addresses if they were interested in receiving a final copy of the thesis. All interviewees were given an informed consent briefing and provided verbal consent at the start of the interview (the interview that conducted over email with signed written consent) to ensure integrity and comply with research ethics (Kvale & Brinkmann, 2009). See Appendix C for the informed consent document.

5 Results

Findings integrating the coded syllabi (n=156), survey (n=9), and interviews (n=14) reveal mixed results on whether courses support students in sustainability transformations for low-carbon futures. **Sections 5.1 and 5.2** provide educational context and syllabi findings with a specific focus on RQ 1: "*To what extent climate-focused study abroad courses support students in sustainability transformations for low-carbon futures?*"

Embedded throughout the results is RQ2: *"What are international climate educators' feelings about the dilemma of international climate education and emission reductions?*" but a specific focus on this question and the responsibility for action is in **Section 5.3**. Through the survey (n=9) I found international climate educators' feelings about the dilemma between climate education and emission reductions showing the knowledge-to-action gap rationalized through *account budget thinking* and *habituation.* Findings reveal that international climate educators did not see themselves or their programs as personally responsible for reducing emissions and were vague about how collective action could yield emission reductions.

Lastly, **Section 5.4** answers RQ 3 "*In what ways is the Climate Action Network for International Educators an agent of change for sustainability transformation?*" Interviews with CANIE affiliates (n=14) suggest that CANIE acts as an agent of change for sustainability transformations by disrupting the normalized practice of studying abroad through a variety of pathways in the personal, political, and practical spheres of transformation.

5.1 Educational context and syllabi findings

The courses analyzed took place in 27 countries: 24 from middle to high-income countries and 3 from low-income countries (*World Bank* n.d.). Courses ranged from 6-week full-time courses to semester-long courses of 22 weeks. Courses were affiliated with 11 universities and 3 independent study-abroad organizations (without a direct university affiliation). The syllabi varied in the depth of information they included, so it would be methodologically unsound to quantitatively compare the syllabi for the different knowledge types and pedagogical approaches. For example, some syllabi included *all* learning activities in the course, while others just included a skeletal overview of the course. Therefore, results reflect a more holistic qualitative analysis of the deductively and inductively coded themes.

5.1.1 Value(?) of Study Abroad

My findings suggest educators believe studying abroad has inherent value, but show mixed results on the link between values garnered through studying abroad and behavioral change for emission reductions.

Figure 8 illustrates the top 10 values of studying abroad identified by the 14 interviewees. For interview references of each value see Appendix C. Despite the perceived value(s) of studying abroad, all 14 interviewees reflected on the practice of studying abroad from a climate standpoint, and seven interviewees from a social justice standpoint (I1, I3, I4, I6, I9, I11, I12). Interviewees reflected on what students do with the knowledge and skills they garner after returning to their home countries and questioned if students changed their behavior or practices around climate change (I1, I3, I6, I7, I10).
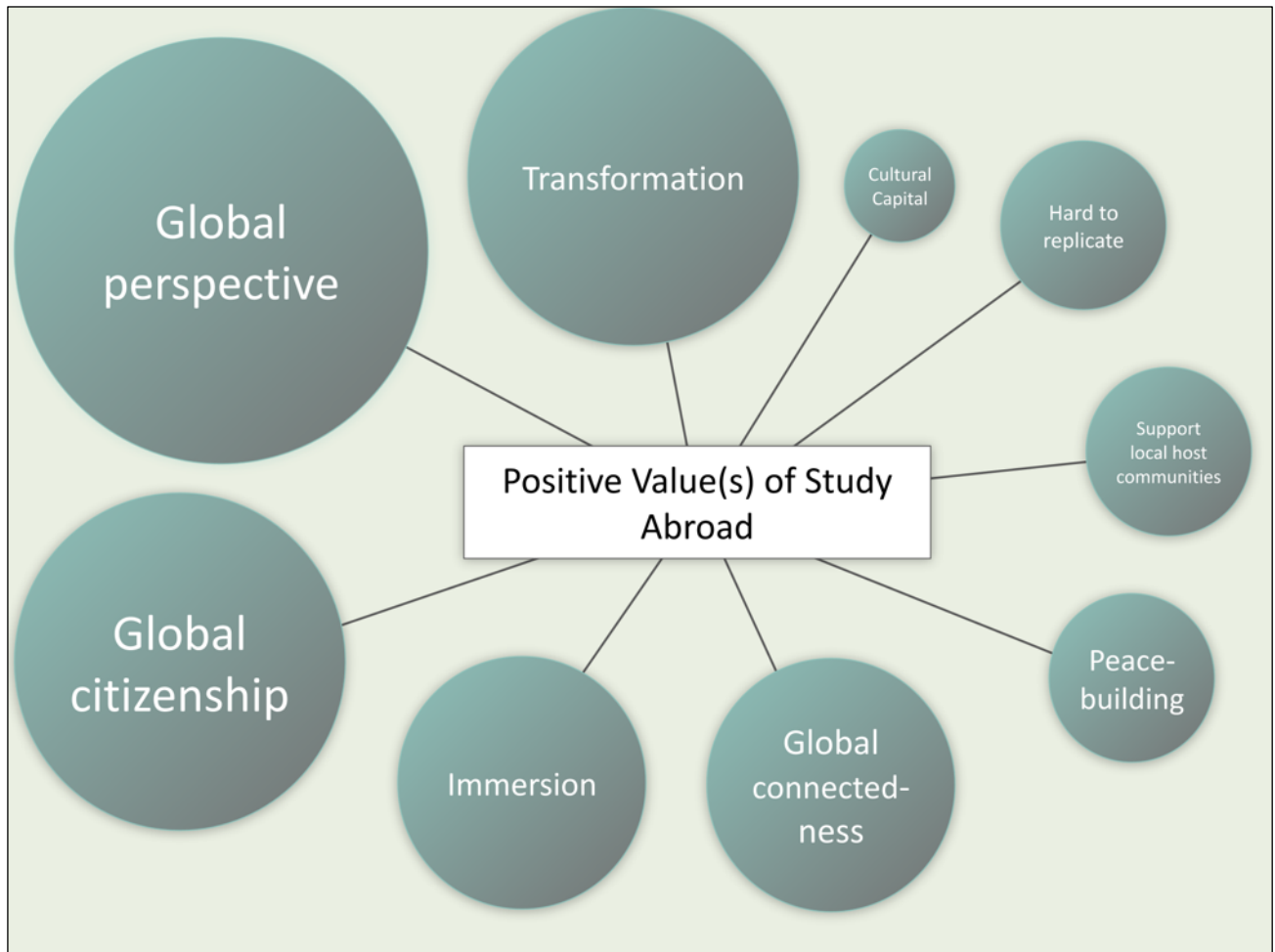
Figure 8. Positive value(s) of study abroad as expressed by the interviewees (By author, 2024).

Note. The area of the bubble illustrates the level of agreement in the value statement i.e., global citizenship and global perspective were the highest expressed values in the interviews. For interviewee alignment, see Appendix C.

A common theme throughout the interviews was questioning whether international travel was *worth it*, (I2, I3, I4, I6, I7). One interviewee shared:

> "They say sometimes you must climb on a crocodile to cross the river. So, in this case, the flight would be that crocodile. But what we do when we're on the other side of the [river] will determine whether it was worth it or not to cross the river in the first place" (I6).

Findings from interviews with CANIE affiliates (n=14) suggest the potential for study abroad to shape behavioral change but the potential depends on where the students are coming from and what they are studying. Many interviewees reflected on students traveling from high-emitting countries and their disproportionate contributions to climate change and saw the potential positive behavioral impact of traveling to countries where consumption behaviors are less (I1, I3, I7). For example, a student traveling from a high-emitting country to study in a lower-emitting country (I2, I3, I4, I8, I9) could reduce their consumption (I2, I7, I8). Alternatively, students coming from lower-emitting contexts to higher-emitting contexts can also have different consumption behaviors while studying abroad: "You know, I think about the examples of European students going [to the] United States and their carbon footprint doubling just by being in the United States" (I7).

5.1.2 Knowledge for transformation

Coding the syllabi (n=156), I found that study abroad courses intend to teach students factual knowledge over feelings and action knowledge for addressing climate change and emission reductions which is insufficient for equipping students with the *know-how* for personal emission reductions. Of the n=156 climate-focused study abroad course syllabi deductively coded for knowledge types, all the courses included declarative knowledge. Almost 1 in 5 courses included procedural knowledge and about 1 in 16 courses included affective knowledge (Figure 9).
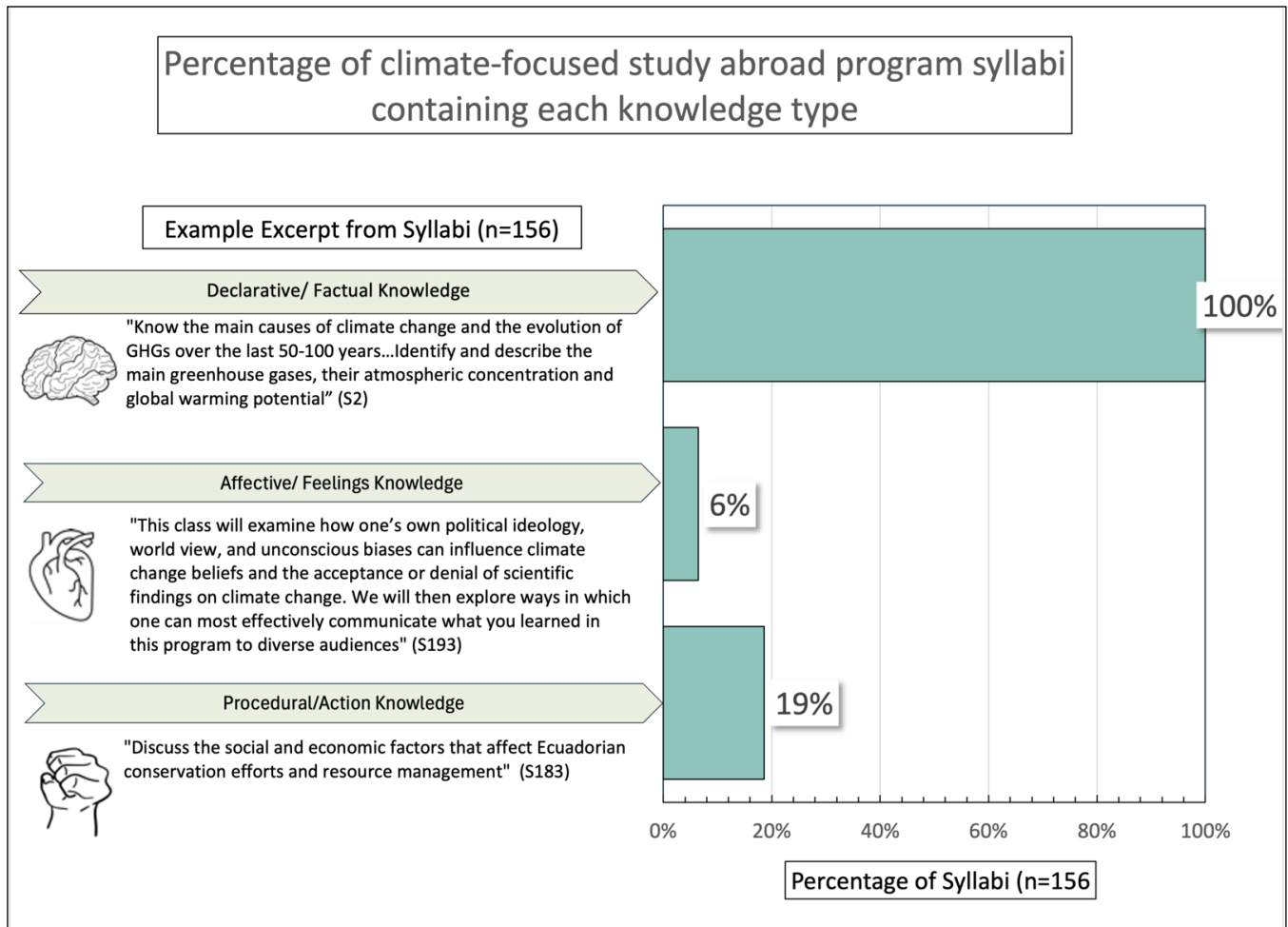
Figure 9. Percentage of climate-focused study abroad program syllabi containing each knowledge type (By Author, 2024).

Note. Example excerpts from n=156 syllabi were selected to represent the three knowledge types. Illustrated in relation to the percentage of syllabi deductively coded for each knowledge type.

5.1.3 International climate educators' perspectives on knowledge for reducing emissions

Contrary to what was found in the syllabi, international climate educators agreed all three knowledge types should be taught: declarative knowledge (84%,) affective knowledge (53%,) and procedural knowledge (95%) (Figure 10). These findings reveal a mismatch between what knowledge types were found in syllabi (Figure 9) and what international climate educators believe is important to teach in courses related to climate change (Figure 10).
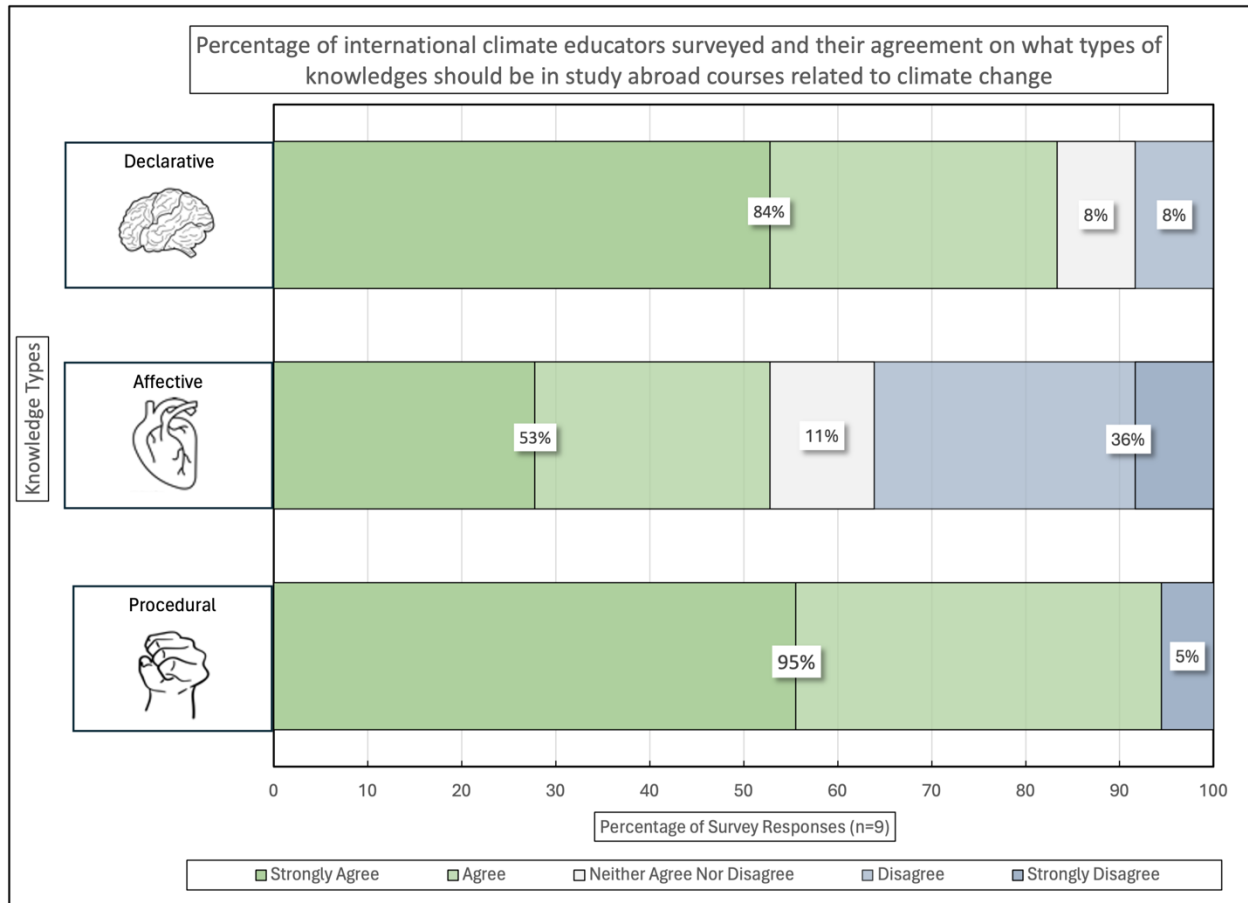
Figure 10. International climate educators level of agreement with what knowledge types should be in study abroad courses (By author, 2024).

Note. International climate educators' beliefs on what knowledge types should be taught in study abroad courses related to climate change. Data labels reflect the aggregate of strongly agree + agree and strongly disagree + strongly disagree to best visualize the findings.

5.1.4 Inductive findings in support of sustainability transformations

Inductively coded findings suggest that study abroad courses related to climate change could support students with the knowledge to engage in sustainability transformations broadly, but yielding emission reductions *specifically* is unclear based on my findings. As I began coding deductively, seven broad themes emerged supporting student learning of the knowledge and skills to address sustainability transformation, which are in Table 5. These broad themes mirror language in sustainability science literature on capacities needed for sustainability transformations (Kates et al., 2001).

Table 5. Syllabi themes inductively identified through coding the n=156 syllabi (By author, 2024).

Theme	Knowledge & Skills	Inductively defined within the coded knowledge types and pedagogical approaches	Example Excerpt in Syllabus	Syllabus reference
1	collaboration & communication	mention of collab* or communica*	"Integrates the necessary knowledge, skills, and attitudes to learn interpersonal communication techniques."	S13
2	cross-cultural and/or global perspective	Including internationally minded, multicultural, global understanding, exchanging information from different cultures, cross cultural	"Understand international environmental politics at local, regional and global scales."	S60
3	interdisciplinarity	integration of multiple disciplines either content or methodological approaches	"Ability to encourage the knowledge of ecology with the integration of other social and biological sciences"	S17
4	place-based learning	learning topics related to the location of study and *in* the place of study	"By undertaking field trips to various conservation project sites, students gain first-hand information about different conservation challenges and approaches from diverse stakeholders such as decision-makers"	S162
5	risk assessment & management	assessing risks/management of climate impacts (e.g. extreme weather events, sea level rise, food)	"and the role of risk assessments in risk-reduction strategies."	S193
6	solution-oriented learning	mention of solutions to climate change, problem solving, and critical thinking	"Identify challenges and seek system-based solutions through dialogue and collaboration, establishing and respecting commitments"	S26
7	systems-thinking	explicit mention of a "systems*" thinking OR approach	"applies a systems thinking and understanding"	S23

5.2 Pedagogy for transformation

Deductively coding syllabi (n=156) for pedagogy showed mixed approaches for *how* declarative, affective, and procedural knowledge are taught. I found there is a greater opportunity for more intentional place-based learning or service learning that can support host communities with climate adaptation and mitigation practices in support of emission reductions. The deductively coded pedagogical findings varied across the syllabi and less than 50% of the syllabi included information on the pedagogical approaches for the three knowledge types. Further, less than 30% of syllabi linked learning outcomes with the pedagogical approaches. Of the n=49 syllabi that included pedagogy, the most common pedagogical approaches for *declarative knowledge* were lecture, essay/paper, quiz/test/exam. The most common pedagogical approach for *affective knowledge* was through reflection/reflexive exercises. Lastly, the most common pedagogical approach for *procedural knowledge* was through place-based learning or service learning.

Table 6. Example excerpts of syllabi deductively coded for pedagogical approaches (By author, 2024).

Knowledge Type	Pedagogical Approach	Examples in Syllabi	Referenced Syllabus
	declarative (factual) pedagogy	"This seminar focuses on the analysis and use of climate models in understanding and projecting climate change in the future."	S187
		"The course will integrate course lectures and readings with group discussions and interactive excursions outside the classroom in order to thoroughly interrogate course topics"	S219
	affective (feelings) pedagogy	"Promote empathy, self-reflection, and critical thinking as complementary and mutually reinforcing learning skills"	S198
		"The purpose is to ask the students to reflect on their own positionality and make them aware of the ways positionality shapes the research question, relation with the research participants, approach in data collection, data processing, and the representation of research participants in the final project."	S189
	procedural (actions) pedagogy	"Students will analyze carbon footprints at three scales, create carbon scenarios for all scales, and determine the most efficient level of implementation."	S187
		"Aboriginal culture was a spoken culture of stories, and so students' learning is based on the principles of close observation, discussions, and firsthand experience, in order to acquire a better understanding of the First Australians' intimate understanding of ecology, environmental management, and Aboriginal cultural conservation and restoration."	S176

5.2.1 Emission reduction during studying abroad

The relationship between learning activities and overall emission reductions during study abroad is unclear. Some interviewees spoke about embedded climate action in study abroad programs with which they are involved (I4, I9, I11, I14). For example, interviewee 4 spoke about a service-learning activity where students work with an organization to reforest the coast of the hosting country as a way of offsetting student transatlantic flights (I4). Interviewee 11 discussed environmental quality assessments students engage in during their studies. Interviewee 15 spoke about regenerative agriculture projects students are involved in during their studies. Except for interview 4 and the intentional carbon offsetting of the transatlantic flight, it is unclear whether environmental quality assessment (I11) or regenerative agriculture (I15) activities embedded in the study abroad programming incite emission reductions. A noteworthy excerpt that speaks to the pedagogical approach of experiential learning as a means for transformation was found in syllabi from the *School for International Training*, reading:

> "Experiential learning theory recognizes that learning is an active process that is not confined to the formal curriculum; "knowledge is created through the transformation of experience" (Kolb, 2015, p. 49). Learning involves a community and is a lifelong endeavor. Learning is transformational. The suggested four step-cycle of a concrete experience, reflective observation, abstract conceptualization, and active experimentation embedded in the experiential learning model is not linear and might not always happen in that specific order, as any learning is highly context-dependent. These stages of taking part in a shared experience; reflecting on that experience by describing and interpreting it; challenging their own assumptions and beliefs to generate new knowledge; and ultimately applying new knowledge, awareness, skills, and attitudes in a variety of situations and contexts are important for students to engage in to become empowered lifelong learners" (S188).

This quote captures the importance of teaching and learning that emphasizes declarative, affective, and procedural knowledge and mirrors the findings from the interviews. Place-based learning within the community or through service learning could be an effective *procedural* pedagogical approach for equipping students with the skills for emission reduction. Additionally, having such learning activities embedded in the study abroad course supports local host communities.

5.2.2 International climate educators' perspectives on pedagogy for reducing emissions

There is a gap between what CANIE affiliates see as valuable pedagogical approaches and what is done in practice. CANIE affiliates spoke to the importance of immersion (I1, I8, I10) and supporting host communities (I3, I4, I5, I6) but few courses deliberately teach declarative knowledge or affective knowledge through immersive approaches in support of local host communities. Overall, there is a greater

opportunity to align international climate educators' feelings on valuable knowledge and pedagogy for climate education and practice.

5.3 Feelings about the dilemma and responsibility for action

5.3.1 Feelings about the dilemma

Based on the survey, international climate educators have mixed feelings about the dilemma of engaging in carbon-intensive travel while teaching climate change. Over 50% of the survey respondents (n=9) saw a "mismatch" between international education and climate action. The international climate educators surveyed agreed with account budget thinking and the habituation effect as rationalizations for the knowledge-to-action gap (5.3.2). Survey respondents agreed (78%) with the need to reduce travel emissions, but 11% of respondents disagreed with the need to reduce emissions from travel and 11% neither agreed nor disagreed. Results revealed a misalignment between the dilemma itself and personal responsibility for emission reductions. The international climate educators surveyed strongly agreed with including FFA within the educational content (5.1.3) but favored collective action over individual action for overall emission reductions (Figure 13).

5.3.2 Knowledge to action gap rationales

International climate educators surveyed (n=9) had mixed feelings about why they teach courses related to climate change despite the high emissions cost for students to take the course. The survey found international climate educators have strong agreement with *account budget thinking* (67%) and *habituation effect* (56%) and high disagreement with *socially organized denial* (78%) and *guilt* rationales (67%) (Figure 11). *Account budget thinking* suggests that international climate educators feel they do climate action in other aspects of their lives to compensate for the travel emissions of students taking the course. *Habitation effect* is when international climate educators feel travel is so deeply ingrained in the practice of the program that it is hard to change. These findings reveal international climate educators' feelings toward knowledge-to-action gap rationales and that transformation efforts for overcoming the knowledge to action gap should focus on overcoming account budget thinking and the habituation effect over guilt or socially organized denial rationales.
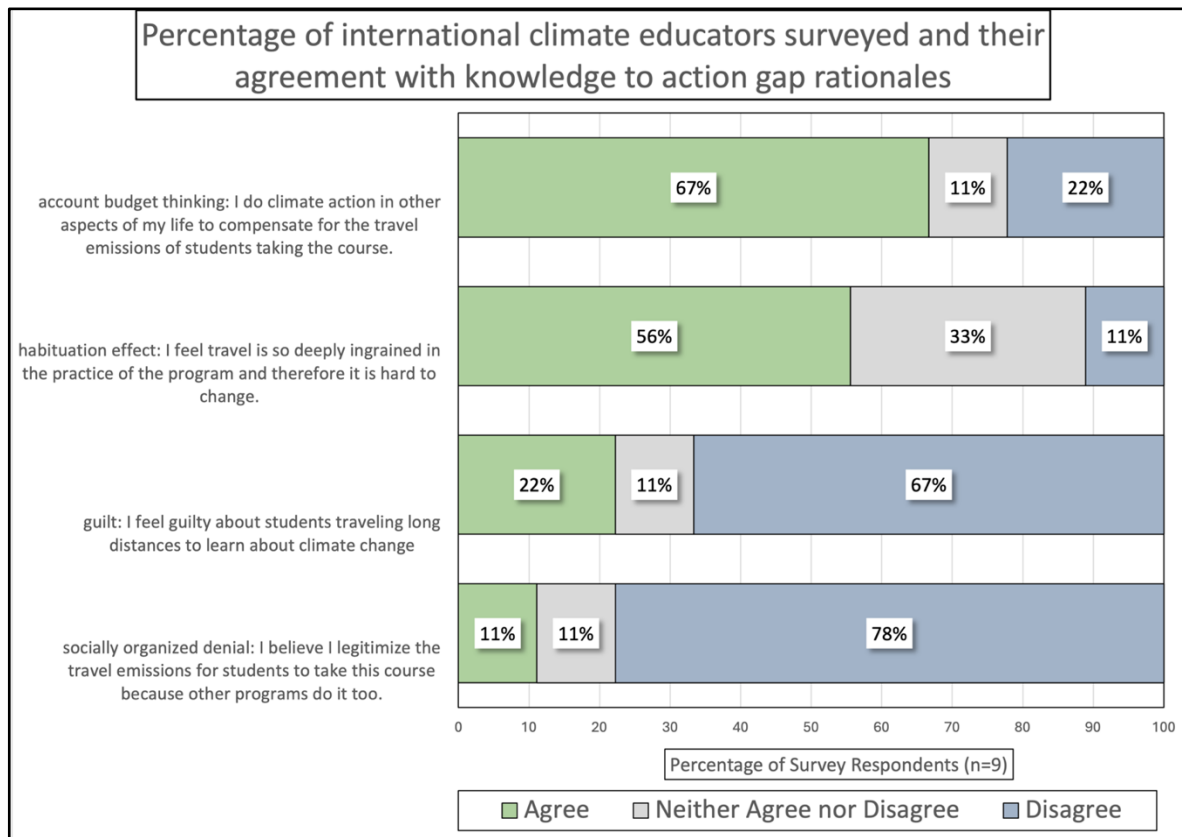
Figure 11. Percentage of international climate educators' agreement with knowledge to action gap rationales (By author, 2024).

Note. Data labels reflect the aggregate of strongly agree + agree and strongly disagree + strongly disagree to best visualize the findings**.**

5.3.3 Responsibility for emission reductions

Interviewees emphasized the role of CANIE as an educating body, influencing other institutions, students, and educators with knowledge about the climate impact of international education and inspiring others to take responsibility for their climate impact. Three subthemes associated with responsibility for action emerged for each of the spheres as illustrated in (Figure 12). Within the personal sphere, interviewees spoke to the responsibility of *cultural, individual,* and *collective* change needed for climate action. Within the political sphere, interviewees feel it is the role of the university, institutions at large, and governmental to take responsibility for climate action. Within the practical sphere, interviewees talked about educators themselves, host university staff and home university staff as responsible for taking climate action (Figure 12).
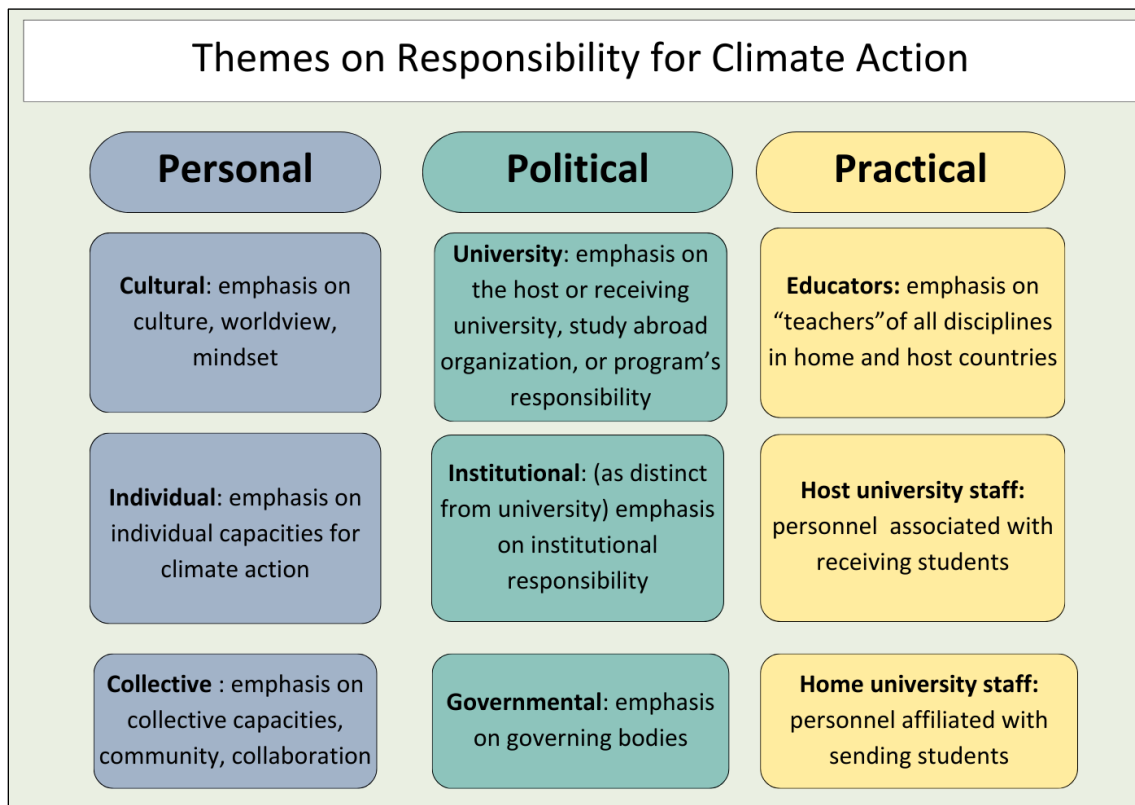
Figure 12. Themes on responsibility for climate action within the three spheres of transformation (By Author, 2024).

Note. Thematic synthesis of n=14 Interviewee's perspectives on responsibility for climate action in the international education sector.

5.3.4 Individual vs collective action

International climate educators surveyed (n=9) and CANIE affiliates (n=14) favored collective action over individual action for reducing emissions. In the survey, when asked on a sliding scale how much emphasis should be on collective action compared to individual action, survey respondents favored collective action (68%) over individual action (32%) (Figure 13).
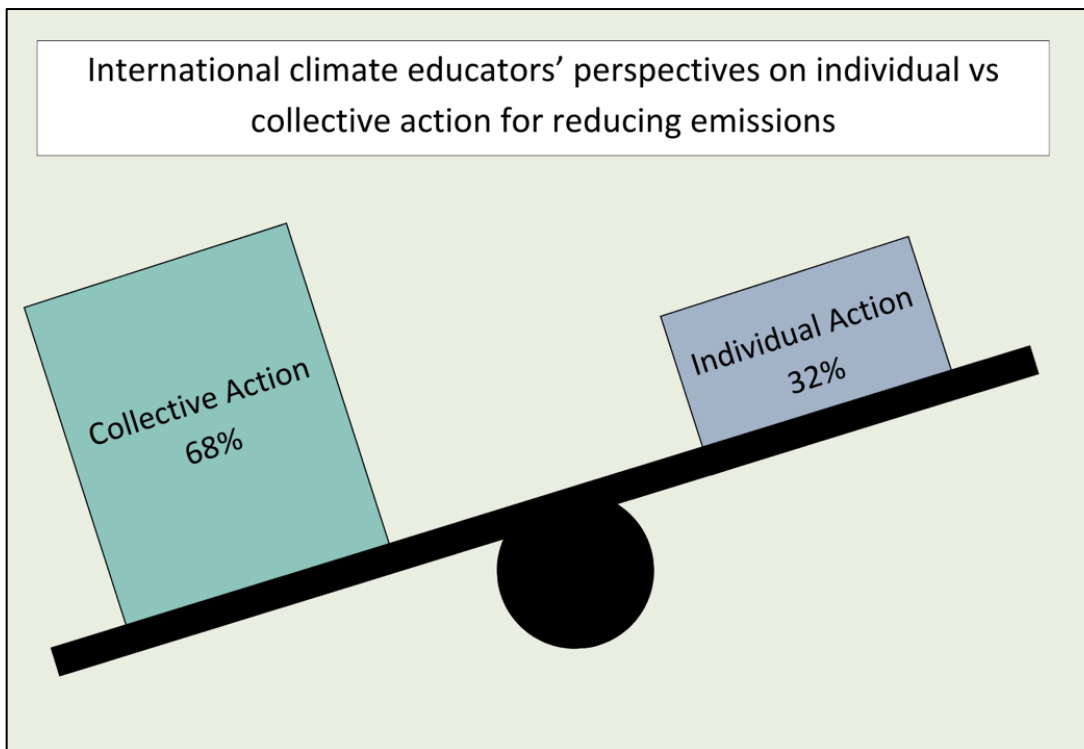
Figure 13. Individual vs. Collective Action (By author, 2024).

Note. International climate educators' perspectives on the relevance of individual vs collective climate action in the international education sector, based on a survey of n= 9 international climate educators (By author, 2024)

All interviewees shared there is a connection between individual action and collective action with more interviewees prioritizing collective action over individual action, mirroring the mission statement of the CANIE: "Our mission is to lead and support international educators around the world to take bold climate action by providing open access to information to raise the collective ambition of the sector." (CANIE 2024). A couple of notable interview excerpts that speak to this claim:

> "Unless there's collective action, it's hard to see how the problem the problem kind of an aggregate gets addressed" (I1) and "…obviously we need a systemic change, though we need this to be embraced by the collectivity because this cannot be like [a] one person sacrifice, you know, it has to be systemic and collective action" (I5).

Most interviewees shared a personal responsibility to act and reduce their own travel-related emissions in the international space (I1, I2, I3, I4, I5, I7, I9, I10) by as much as 10% (I7). Within the practical sphere, interviewers emphasized the responsibility of educators and university staff to "walk the talk" (I1, I5). Most interviewees believed the responsibility for transformation did not lie in the hands of students, but rather that students should be given all the educational material and information to make informed choices about their climate impact for travel and studies. While interviewee 5 spoke to the importance of collective action, they also underscored their own responsibility to engage in climate action:

> "This is our role [as international educators]…we cannot drop this on students, we need to take responsibility and on our transformative power…we cannot expect students to say, 'oh, you know what, I'm going to sacrifice my experience because you told me so' while you are actually traveling everywhere. I think we need to walk the talk. And also, like give students the tools to make an informed decision, not just when they're inside. But before" (I5).

The quote above further supports claims made about practical pathways for transformation by equipping students with the knowledge and how-to to make informed choices about reducing carbon emissions. Another interviewee emphasized the responsibility to educate students:

> "I feel like there's a big responsibility, because we're contributing a lot in terms of flight emissions and sending students who otherwise might not have that carbon footprint. We're involving them in international education, encouraging them to take these flights. So I think that we have a responsibility to educate them about the impact of those decisions that they're making, and to do our best to mitigate those impacts" (I3).

Most interviewees talked about the responsibility of CANIE as an educational body coalescing knowledge, sharing knowledge, and disseminating knowledge about climate action—bringing visibility to the climate impact of study abroad.

5.4 CANIE as a change agent

In this section, I employ the three spheres of transformation (O'Brien, 2018b) and leverage points (Meadows, 2009) to answer RQ3 *In what ways is the Climate Action Network for International Educators an agent of change for sustainability transformation?* Thematically analyzing the interviews with CANIE affiliates (n=14) revealed how CANIE is an agent of change for transformation within the personal, political, and practical spheres of transformation. I examine leverage points for sustainability transformation within the case of study abroad and categorize the state of transformation of each leverage point (Figure 3) based on my thematic synthesis of interviews. I then share results on personal, political, and practical pathways for the transformation of study abroad. For interview excerpts used in the analysis of 5.5 see Appendix C.

5.4.1 Mechanisms for Transformation

The interviews revealed a variety of pathways for how CANIE disrupts the normalized practice of studying abroad working within and across the practical, political, and personal spheres to leverage low-carbon transformation for studying abroad and international education (Figure 14). Within the personal sphere, CANIE in principle is an organizing body that *reimagines study abroad* practices by *coalescing* like-minded individuals for *collective change* (Figure 14). Through the *CANIE accord* and active *communication*, CANIE has *institutional influence* on peer institutions and is working towards *changing personal perspectives* toward climate action (Figure 14). Throughout the following section, I italicize leverage points as defined by Meadows in their application to the case of CANIE and study abroad (1997).
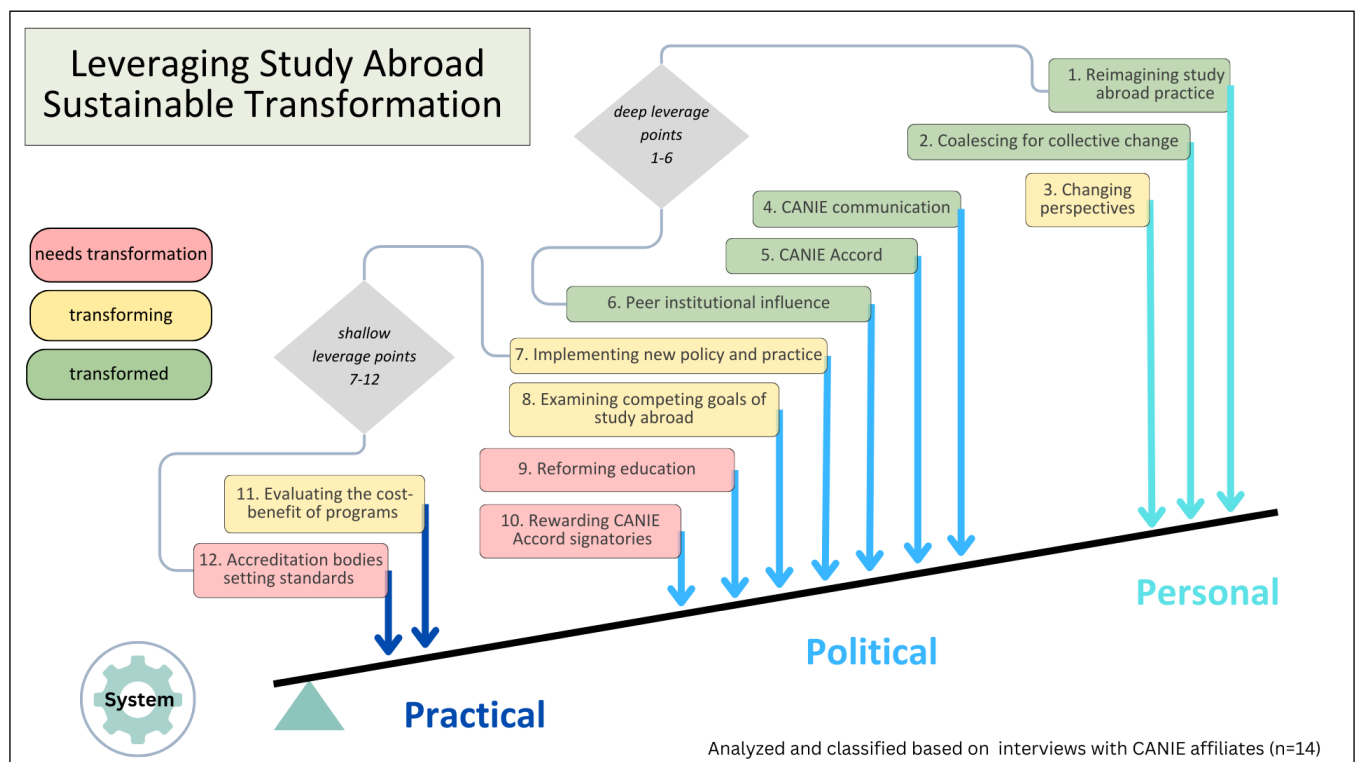
Figure 14. Applying the three spheres of transformation and leverage points to the case of study abroad (By author, 2024, based on Meadows 1999 and O'Brien & Sygna 2018).

Note. Leverage points are classified into the practical, political, and personal domains by O'Brien (2018) and applied to the case of study abroad as analyzed based on *meaning coding* of interviews and how CANIE affiliates consider the role of CANIE in supporting low-carbon futures. Transformation status classified based on the number of interviewees who spoke to a particular topic and meaning coding. Red: needs transformation indicates that the object, system, or entity has not yet undergone any significant change from its original state. Yellow: transforming suggests that the object, system, or entity has undergone some level of transformation, but it is not yet fully complete or may still require further changes. Green: transformed denotes that the object, system, or entity has undergone a substantial transformation, resulting in a significantly altered state or condition compared to its original form as analyzed through meaning coding of interviews (Kvale & Brinkmann, 2009). (*note green does not necessarily denote no more transformation is needed).

5.4.2 CANIE's role conceptualized with the three spheres of transformation

Themes from the interviews with CANIE affiliates were analyzed using the three spheres framework and categorized into needs transformation, transforming, and transformed (Figure 15) based on *meaning* coding of the interviews (Kvale & Brinkmann, 2009). Coding interviews revealed a variety of pathways for transformation and aspects of study abroad that are already being transformed. An overview of the themes is outlined below and further elaborated in the proceeding sections.

The three themes that emerged under **needs transformation** were (1) an understanding of individual pathways for carbon emission reductions, as interviewees emphasized collective action and were vague about what types of actions yield high carbon emission reductions, (2) a commitment on behalf of accrediting bodies to set high impact climate mandates for study abroad organizations and (3) a reformation of education and practice to reduce emissions, namely through activities during programming, soft mobility alternatives, and an increase in Collaborative Online Learning (COIL) in place of carbon-intensive travel (Figure 15).

The five themes that emerged under **transforming** were (1) critical assessment of the value of study abroad, (2) negotiation of individual vs collective change, (3) university leadership and protocols, (4) pre/during/post-programming change, (5) provision of information to students regarding climate impact, alternative travel, and carbon offsets (Figure 15).

The five themes that emerged under **transformed** were (1) knowledge dissemination on climate impact, (2) capacity building for transformation through coalescing like-minded individuals and collaboration, (3) CANIE and respective institutional climate agreements, (4) The CANIE accord implementation, and (5) a reduction in staff travel (Figure 15).
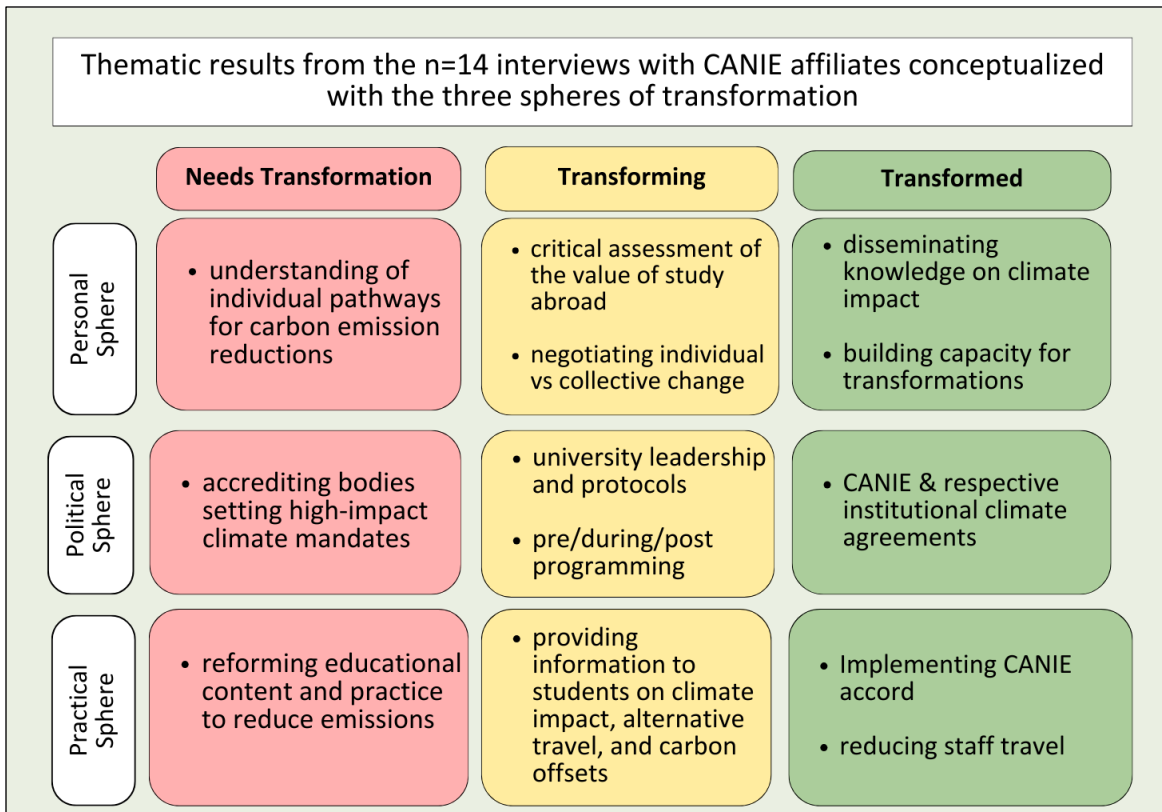
Figure 15. Results conceptualized with three spheres framework (By author, 2024).

Note: Analyzed based on the n=14 interviews with CANIE affiliates. Transformation themes are categorized on a traffic-light scale based on *meaning coding* the interview responses. Red: needs transformation indicates that the object, system, or entity has not yet undergone any significant change. Yellow: transforming suggests that the object, system, or entity has undergone some level of transformation, but it is not yet fully complete or may still require further changes. Green: transformed denotes that the object, system, or entity has undergone a substantial transformation, resulting in a significantly altered state or condition compared to its original form as analyzed through meaning coding of interviews (Kvale & Brinkmann, 2009) (*note green does not necessarily denote no more transformation is needed).

5.4.3 Personal pathways for transformation

CANIE serves as a unifying body of international education affiliates, who rally around the common goal of climate action. Interviewees underscored the value of CANIE from a community and networking standpoint, giving constituents a voice for action with the *power to transcend paradigms.* Despite the unifying mission, they have different spheres of influence and some more powerful institutional roles than others. Interviewees 4, 7 and 10 stated their role as *influencers* in shaping the *mindset* of their colleagues and changing perspectives around climate action:

> "It came very naturally to us as an organization, but only once you get people talking about it within the organization. So, certainly I had had side conversations with folks about their interest in sustainability as a topic and how we might be able to be thinking about this a little bit more concretely, and to infuse it into our day-to-day work. And within that dynamic, I was able to go to our executive team to make a case that we should have a dedicated working group focused on this topic, as well as sign the CANIE Accord"(I7).

An interviewee spoke to academic responsibility for modeling behavioral change for students to follow suit:

> "So, if I would want to see change in one group of people, it would be academics themselves modeling a way of living that they want their students to follow. And also university leadership, also embody the same set of values. So that's probably right, start" (I1).

Some of the interviewees discussed cultural barriers to action within the sector. For example:

> "Travel and international schooling [are] a part of our culture, which is ingrained in our education system. It becomes a problem to deal with it, because it's something which has been cultivated for centuries" (I9).

CANIE works to shift the cultural mindset around studying abroad to align with climate action. One interviewee shared the importance of CANIE for facilitating a place of connection and belonging. Equipping her with not only the knowledge and content to engage in climate action but also a community of understanding:

> "People need a space where they can connect and talk about this [climate action and international education] because this can make you feel very lonely and isolated…. It's a huge psychological burden to carry. And hence, climate anxiety…CANIE provided not just knowledge and content, but also a space for people to feel part of a community…Where you can belong to a group who care…Sometimes you have a lot of people around caring, but if you don't know who is in the room with you, then you will feel maybe your institutions are not supporting you, maybe nobody understands you" (I5).

Other interviewees also shared the importance of feeling connected to a community for leveraging political/institutional pathways for change (I2, I3, I5, I9, I14). "And I think that lots of people taking individual action together can put pressure on those bigger corporations, governments, institutions to make the bigger changes that are needed" (I3) to influence *system structure* and the *goals of the system.* Additionally, interviewees shared how cultural changes embracing sustainability can influence peer institutions to act sustainably (I1, I8, I9) indicating the transformative power of CANIE beyond the study abroad sector.

Interviewees spoke to the role of CANIE in shaping a "culture" (I9) around climate action, reaching wider audience by influencing others to engage in climate action. Additionally, the value of being in leadership positions to influence others in favor of climate action:

> "For me personally, yeah, getting to a certain leadership position gives you that stage to be able to be vocal about these issues. And to get the attention of wider groups of people to either finding a solution, immediate, medium, long term, or act immediately on it, whether it's just you know, in XXXX district where we're planting trees, or whether it's going to be in, in the field of international education, on a, on a university level, where we start reducing carbon emissions" (I10).

5.4.4 Political pathways for transformation

Interviewees spoke to CANIE *influencing system structures* through its operations and the CANIE Accord (*CANIE*, n.d.; *CANIE Accord 2022*). CANIE effectively facilitates the *structure of information flow*s through educational outreach, webinars, podcasts, and the CANIE Accord itself—working to transform the institutional practice of studying abroad to align more closely with low-carbon transformation (*CANIE*, n.d.). According to the interviewees, an opportunity for further transformation would be if international education accreditation bodies mandated sustainable practices for members (I3, I4, I5, I7) *to change the rules of the systems*. Interviewees expressed the challenges of having individuals who were motivated by sustainability practice but saw a mismatch between their motivations and wider institutional support (I3, I4, I5, I6, I12, I14). Interviewees expressed an eagerness for governmental mandates to prioritize and incentivize having full-time employees committed to sustainability (I5) because sustainability work is often voluntary, relying on selectively motivated sustainability-minded employees (I3, I7, I8). One interviewee compared Title IX officers (officers responsible for monitoring compliance with state laws prohibiting sex discrimination) mandated in higher education in the United States as the type of mandate that could be successful for widespread accountability (I7).

The influencing role of climate action is also observed in institutional change for sustainability practice. An interviewee from the United States spoke about how institutional change at the university level can influence political climate action:

> "I think, especially in a place like XXXX, where climate action isn't necessarily politically popular, I'm seeing that type of movement towards more sustainable practices, especially if that can spread to other universities across the state can create a more friendly climate where politicians feel like maybe it's possible to introduce a climate bill and it's not going to have so much opposition because there's already this and this and this being done" (I3).

Interviewees spoke about the role of institutions in sharing knowledge and generating new ideas and the role of the institution in shaping paradigmatic shifts in favor of climate action. For example:

> "But I mean, you know, I think for me, the space is like, CANIE, so important, because, you know, those engagements, hearing from other people and you know, getting ideas how people do things at other institutions, you know, how you, sometimes you have to invite somebody from the outside to come and say, you know, to people, you know, you're not doing anything, you need to do things, you know, it's easier for the outsiders to do that" (I2).

5.4.5 Practical pathways for transformation

Practical pathways for transformation identified through the interviews can be classified into pre-, during, and post-programming and were synthesized and illustrated in (Figure 15). The consensus among interviewees was not an outright reduction in student travel, but rather intentionality behind current programs and perhaps a reduction in programs that have less value e.g., short-term study, adjusting the *parameters* of what programs operate. This finding is consistent with the survey findings and account-budget thinking, rationalizing the interviewees questioned the value of short-term study specifically (I1, I2, I3, I6, I11, I13, I4). The modal climate action discussed in the interviews was education and knowledge dissemination—which can happen within collegial circles, with students, and at the institutional level can take place pre-program, during the program, and post-program (Figure 15).

Interviewees had varied definitions for how they defined climate action with most interviewees defining climate action including some capacity of knowledge transfer (I1, I2, I3, I4, I5, I6, I7). Through practical means, interviewees emphasized the importance of talking about the conflict between engaging in study abroad at the expense of the climate (I2, I4, I5, I6, I7, I8, I10, I14).

Interviewees emphasized that students should receive education on the climate impact of their program(s) and provided information on alternative travel options and carbon offsetting options (Figure 15). Interviewees expressed how this information delivery could be embedded in pre-existing pre-departure

briefings, which are already standard practices for most study abroad programming (I3, I4, I6, I8, I12, I14) (Figure 16). Overall, practical pathways emphasized by interviewees were preparing students with the knowledge to make informed decisions about carbon emission reductions and placing the responsibility on students to make such choices.

Practical Pathways for Transformation

pre-program

- critical evaluation on the "value" of the program(s)
- students receive education on the climate impact of their program(s)
- students provided with information on alternative travel options and carbon offset options
- delivery of student material on climate can be coupled with pre-departure materials on cultural competencies or health & safety

during program

- students receive education on their climate impact and local impact
- students engage in service learning component to benefit local climate action
- students actively support the host community with resilience& adaptation projects
- students engage in climate-friendly travel and consumption behavior in the host country

post-program

- student returnees engage in climate advocacy and action
- student returnees support home communities with climate resilience & adaptation projects
- student returnees can consider offsetting emissions of their travels
- student returnees maintain partnership with their host communities

Figure 16. Practical pathways for transformation of study abroad (By author, 2024).

Note. Pathways identified by interviewees for the transformation of study abroad in pre-program, during-program, and post-program.

6 Discussion

This thesis employed the three spheres framework to examine the climate clash between study abroad and climate action—questioning the compatibility of the two endeavors. The study abroad programs that run under the theme of climate change examined in this study (n=156) focused on declarative knowledge (facts) concerning climate change, with greater frequency than affective (feelings) or procedural (actions) knowledge (100% vs. 6% and 19%, respectively). Accepted norms regarding studying abroad push educators to support high-carbon travel practices.

Investigating this knowledge-to-action gap through a survey and interviews, I found international climate educators have mixed feelings about this dilemma but rationalize their inaction through account-budget thinking and habituation. In general, international educators align more closely with collective action over individual action, despite individual actions being important levers for collective transformation. Analyzing the interviews and practices of CANIE showed that the organization serves as an agent of change through *deep leverage points,* by reimagining study abroad practices, coalescing for collective change, and influencing peer institutions to reduce emissions. Despite this finding, interviewees suggested a stronger emphasis on *shallow leverage points,* such as further evaluating the cost-benefit of programs and increasing regulatory parameters by accreditation bodies.

My analysis revealed opportunities for further transformation across and within the personal, political, and practical spheres of transformation. Research findings support a variety of practical pathways for further transformation, namely by prioritizing education for transformation and overcoming knowledge-to-action gaps. In response to these findings, further quantitative research is needed to evaluate which levers are most effective at realizing carbon emission reductions in practice.

6.1 Education for transformation

6.1.1 Knowledge for transformation

There are mixed results on whether climate-focused study abroad programs support students in sustainability transformation toward low-carbon futures. A mismatch exists between what international educators see as important *knowledge* for climate action (facts, feelings, and actions) and the intended learning outcomes (Figure 9 and Figure 10). This finding is consistent with earlier literature on climate literacy showing a lack of emphasis on procedural knowledge for climate action (Wynes & Nicholas 2017) and affective knowledge in climate education (Fasbender and Wachten, 2017). Pedagogical approaches

should adequately integrate FFA to support students navigating the climate crisis and equip them with the knowledge about how to personally act.

This study elaborates on a study by Fasbender and Watchen (2017), who assessed effective pedagogical approaches for shaping student decision-making in the context of climate action. They found that students who learn how to cope with dilemma scenarios through facts and feelings can positively affect children's beliefs about climate protection (Fasbender & Wachten, 2017). Further, emotional language and feelings are seen as important bridges between knowledge and action (Knutti, 2019; Wolrath Söderberg & Wormbs 2019), supporting a greater emphasis on climate feelings in education for transformation. Programs like the *Climate Literacy Project* strive to incorporate FFA into curricula (*Carbon Literacy Project,* 2024).

6.1.2 Values and approaches for transformation

Consistent with educational literature and claims made in 41 of the coded syllabi, rich learning opportunities often happen outside of traditional classroom environments (Lewin, 1997; Piaget, 2008). Lewin claims that changes in the behavior of individuals must be helped by understanding themselves and their situation (1997), which confirms the importance of having curricula that incorporate feelings and self-reflection and about pathways for climate action. However, only 6% of climate-focused study abroad syllabi included affective knowledge, and even fewer included self-reflection as a pedagogical approach (Figure 9). Taking an integrative approach of FFA, capturing "beliefs, values, worldviews, emotions, motivations, and perceptions of climate change" can support a more effective transformation and empower climate action (Fraude et al., 2021 p.179). Universities and educators can reform education to enhance student capacities beyond "knowledge of their climate impact" and to a more prominent role in how they can support transformative change for sustainability (Leichenko et al., 2022).

The three most important values of studying abroad as emphasized by international educators— "global citizenship" "global perspectives" and "support to local host communities"—are perhaps not garnered through one course, but rather the comprehensive experience of a student being abroad, immersing themselves in new ways of life, and engaging in experiential, place-based learning. Therefore, a greater emphasis on pedagogical approaches that immerse students in host countries is important for most effectively shaping behavioral change for emission reductions. Through active learning, students can increase their understanding of personal responsibility for climate action and their own agency for engaging in emission reductions (Leichenko et al., 2022).

6.1.3 Personal reflections on thematic findings based on literature

The theme of collaboration and communication was seen throughout the syllabi (Table 5) and interviews with interviewees. I am curious to what extent collaborative approaches to sustainability could perhaps blur personal or individual capacities for carbon reductions. Further, the high emphasis on cross-cultural and/or global perspectives might incentivize mobility and travel at the expense of the environment. Interdisciplinarity and systems thinking are seen as key approaches to sustainability science (Kates et al., 2001; Wiek et al., 2011), and central to the theory of transformation I have employed throughout (Meadows, 2009; O'Brien & Sygna, 2013). However, I wonder if there is a moral or philosophical mismatch between the desire to exchange ideas and the necessity for air travel or if there can be more on-the ground alternatives to instilling a global mindset. Given that solution-oriented learning is a core theme throughout the syllabi, it is imperative to have more procedural knowledge to support this domain. Lastly, it is perhaps not surprising that place-based learning emerged as one of the thematic findings of coding study abroad courses. While I did not code for the relationship between themes, place-based learning that also captures solution-oriented learning could be beneficial to host communities. These findings offer rich opportunities for further analysis.

6.2 Knowledge to action gap

Study-abroad educators who teach courses related to climate change implicitly endorse high-emitting travel contrary to their knowledge about how to reduce carbon emissions. To overcome this knowledge-to-action gap, I have turned to the literature on flying-less, which has examined pathways for behavioral change to transform individual air travel behavior (Jacobson et al., 2020; Wolrath Söderberg &Wormbs, 2022).

6.2.1 Overcoming account-budget thinking
Opportunities for overcoming account-budget thinking can take place in personal, political, and practical domains. In a study on how people stopped flying, Wolrath Söderberg and Wormbs (2022) interviewed non-flyers and found that when presented with more information on the climate impact of flying by new actors, people decided to stop flying. For this reason, making the climate impact of travel emissions more visible to practitioners of study abroad could be a useful tool for educators and students to visually see the relative impact of flight emissions. A concrete understanding of the relative carbon emissions of individual actions is key for adequately understanding the disproportionate impact of flying compared to other behaviors (Wolrath Söderberg & Wormbs, 2022; Wynes & Nicholas, 2017).

6.2.2 Disrupting habituation

Disrupting *habituation* requires strategic disruption of behaviors and norms, which CANIE does through critically examining the purpose of studying abroad and seeking low-carbon alternatives to align with climate goals. Shifts to transform flying culture have been observed by increasing knowledge, embracing negative emotions, and promoting positive feedback, as observed in Sweden (Jacobson et al., 2020). The role of CANIE as a collaborative body for shaping cultural mindsets towards sustainability is key for disrupting habitual practices and norms and deep leverage points for transformations.

6.3 Generalizability of Findings

There are some limitations to consider when assessing the generalizability of the conclusions drawn from this study. The overall framework of the three spheres is context-dependent (O'Brien, 2018), therefore it is hard to generalize the empirical findings from the case of study abroad to other cases at large. However, the educational findings could likely be expanded to other climate-related education programs beyond study abroad and likely expanded to master's level education. Conclusions drawn from the survey about knowledge-to-action gap rationales should be taken lightly as it would be methodologically unsound to generalize from a statistically weak sample size. Rather, my results more broadly point to the effectiveness of deep leverage points for shaping personal behavior change, and paradigmatic shifts in institutional practice as evidenced by the thematic synthesis of the interviews. The findings from this study can reasonably inform pathways within the practical, political, and personal domains that can support transformation for sustainability. However, there is no silver bullet to addressing the urgency of shifting to low-carbon futures in the face of climate change. Meadows articulates this well:

> "Magical leverage points are not easily accessible, even if we know where they are and which direction to push on them. There are no cheap tickets to mastery. You have to work at it, whether that means rigorously analyzing a system or rigorously casting off your own paradigms and throwing yourself into the humility of Not Knowing" (Meadows, 1999 p.19).

One can reasonably generalize the value of holistic education, knowledge dissemination, and collaborative approaches across other systems and structures for sustainability transformations—consistent findings with earlier literature on education for transformation and systems change (Leichenko & O'Brien, 2019).

6.4 Limitations

Various methodological limitations are evident in this study. The value of studying abroad perhaps cannot be captured by written material in course syllabi because rich learning can happen outside of the

classroom (Dillon & Lovell, 2022). Further, the case selection for courses was limited to *The Forum for Education Abroad,* which albeit a global accreditation body, produces a sampling frame that likely missed relevant climate-related study abroad courses that could have contributed to this empirical work. Another limitation of my coding approach was that there was no guarantee that syllabi listed on the program websites reflect the syllabi used in practice, and coursework learning objectives and learning activities are often subject to change. For example, one of the syllabi had a disclaimer: "The instructor reserves the right to make changes or modifications to this syllabus as needed" (S2). An important limitation to acknowledge is the statistically weak survey with a response rate of less than 10% despite mixed modes of deployment and reminders in attempt to increase it. A more robust survey would have questioned knowledge-to-action gap rationales across multiple questions to strengthen the validity and reliability of responses (Trochim n.d.).

A more robust approach could have triangulated my empirical data collection from the coding of syllabi by also talking with educators about the intended learning outcomes of the courses. Further, I could have linked knowledge and action gap rationales employed in the surveys to the interviews with CANIE affiliates. A limitation of meaning coding is its susceptibility to subjective bias. Despite aiming for neutrality in the research process, interpretations of data may be influenced by personal perspectives and preconceptions, potentially leading to skewed or incomplete analyses. Lastly, the absence of the student perspective in this study represents a significant limitation, as their insights could provide crucial perspectives on the efficacy and challenges of climate-focused study abroad programs, thereby enriching the overall understanding of the topic.

6.5. Further Research

Future research could expand upon the survey to capture the perspectives of more international educators at the interface of teaching climate-related courses. Given the disproportionate effects of climate change on low-income countries and high emissions from high-income countries (Calvin et al., 2023), socioeconomic and cultural differences between incoming and outgoing students are important factors to consider for assessing whether such programs equip students to engage in low-carbon transformations. Further quantitative evaluation and assessment on how leverage points have yielded carbon reductions either through constituents' behavior within the study abroad sector or student actions after returning home is a suitable area for study.

6.6 Implications

This thesis provides strategies for overcoming the dilemma of studying abroad and climate action at the personal, political, and practical levels. Studying abroad can shape worldviews for effective climate action if educational reform can capture declarative, affective, and procedural knowledge. This study draws attention to educators' endorsement of experiential and place-based learning, but also reveals a literature gap in student behavioral change for emission reductions. CANIE should continue to leverage transformation through the CANIE Accord, knowledge dissemination, and community building. The CANIE Accord and operations of CANIE affiliates can serve as a model for institutions wanting to transform practice for sustainability.

7 Conclusion

This thesis grappled with the dilemma between climate-focused study abroad courses and climate action. On the one hand, studying abroad is a ripe opportunity for exchanging knowledge, values, and worldviews, which could support low-carbon transformations. On the other hand, in practice, study abroad fundamentally relies on carbon-intensive air travel at the expense of the environment. If international education has transformative power for behavioral change, there should be a larger focus on how personal behaviors and attitudes can influence institutional and paradigmatic shifts for more widespread sustainable transformations. Inspiring climate action for all constituents involved in studying abroad can take many forms at the personal, political, and practical levels.

Findings from coding syllabi (n=156), surveying international climate educators (n=9), and interviewing CANIE affiliates (n=14) revealed opportunities for overcoming business-as-usual through educational reform, overcoming knowledge-to-action gap rationales, and taking responsibility for personal behavioral change. If education is a transformational endeavor, there should be a greater emphasis on affective and procedural knowledge in practice. Exploring the role of agency and the responsibility for change, this thesis contributes insights to the study of sustainability transformation by suggesting opportunities for educational transformation and reform for low-carbon futures.

However, further research is needed to quantify carbon emission reductions from the leverage points identified in this study. My findings offer practical recommendations for international climate educators to refine their teaching practice beyond factual knowledge to include feelings and actions. While there is not a one-size-fits-all all approach to sustainability transformations as each solution is geographically bounded and context-dependent, these findings suggest various pathways for igniting personal behavioral change toward sustainability. Beyond the case of study abroad, this agrees with transformation literature on the importance of community and collective capacities for galvanizing change. Rethinking how we teach climate change and engage in study abroad is necessary for navigating the climate crisis and ensuring behavioral change for sustainability transformations.

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9 Appendices

Appendix A. Coding of Syllabi

A.1 Program to Course Selection Methods

Table 7. Methodology of first-round scoping for member selection

Members of First Round Scoping	Search String
Accent Global Learning	Not applicable
AIFS	"study abroad" "semester" "in any destination" and "during any term" and filtered search to look at global themes under "global sustainability" in areas of interest "agriculture" OR "ecology" OR "environmental studies" OR "environmental/research" OR "natural resources & conservation" OR "marine biology" OR "service learning & community service" OR "sustainability"
Allegheny College	No relevant offerings
Beloit College	Under fields of study "environmental studies"
Buffalo State College	Program search under State University of New York "
California Colleges for International Education	Firewall and could not access
CAPA: The Global Education Network	Under "I'm interested in" "study" and fields of study/subject area under international studies "sustainability," under sciences "agricultural studies" OR "ecology" OR "env. sciences" OR "urban planning" and program length "semester" and toggled to show "closed programs" to ensure programs that were filled with applicants were still visible
Chippewa Valley Technical College	No relevant offerings
Columbus State Community College	No relevant offerings
Council on International Educational Exchange (CIEE)	CAN SEARCH DIRECTLY FOR COURSES (so...skipped the programmatic narrowing step)
Dartmouth College	In "search (advanced) programs search program name any show "outgoing" and under parameters, language of instruction "english" and major "environmental science" OR "environmental studies" OR "sustainability"
Dickinson College	Dickinson-specific programming, decide if you want to explore further?! language specific courses in Latin America won't be applicable
Elon University	Under program search (advanced) "susatin*" OR "enviro*" OR "climate"
Georgia Institute of Technology	In "search (advanced) programs search program name any show "outgoing" and under parameters, language of instruction "english" and major "environmental science" OR "environmental studies" OR "sustainability"
IPSL Institute for Global Learning at NUNM	Could not find syllabi, excluded
James Cook University	Under the "global experience program portal" keywords "environment" OR "climate change" OR "sustainability"
Northeast Wisconsin Technical College	No relevant offerings
Northwestern Michigan College	No relevant offerings
Northwestern University Global Learning Office	In "search (advanced) programs search program name any show "outgoing" and under parameters, language of instruction "english" and major "environmental science" OR "environmental studies" OR "sustainability"
Reed College	Under the "pick a program" search query and under "language of instruction" select "English" and by discipline "environmental science"
Rutgers University	In search key terms ""environment" OR "sustainability" OR "climate change"

San Jose State University	In "search (advanced) programs search program name any show "outgoing" and under parameters, language of instruction "english" and major "environmental science" OR "environmental studies" OR "sustainability"
Santa Clara University	Under program discovery "global programs" and "spring semester" OR "fall semester" and "environmental studies" and selected "no" to internship
SUNY Oswego	Program search exhausted b/c of above
The School for Field Studies	Under program finder "semester programs" AND "sustain*" OR "enviro*" OR climate" in the program title
The School for International Training (SIT)	In the search query "climate & environment" and semester programs
Tulane University	In "search (advanced) programs search program name any show "outgoing" and under parameters, language of instruction "English" and major "environmental science" OR "environmental studies" OR "sustainability"
University of Colorado, Boulder	In CU Degree Requirements "Environmental Design: Various Requirements, Environmental Studies: Other Major requirements, "Environmental Studies: Specialization requirement hours" ,
University of Kansas	In search key terms ""environment" OR "sustainability" OR "climate change"
University of Minnesota	Advanced program search what do you want to study? "environment and natural resources studies" AND "experiential learning"
Washington University in St. Louis	In "search (advanced) programs search program name any show "outgoing" and under parameters, language of instruction "english" and major "environmental science" OR "environmental studies" OR "sustainability"
Wesleyan University	Not applicable
WorldStrides (note no enviro)	Not applicable

A.2 Courses Selected

Table 8. Courses selected (n=156) for coding syllabi

Institution/Program	Title of Course	Syllabus Code
Corvinus University	Global Environmental Policy	1
Corvinus University	Global Climate Change and Trade	2
Corvinus University	Sustainability Management	3
Veritas Universidad	Agroecology and Sustainable Food Systems	4
Veritas Universidad	Biotechnology for Sustainability	5
Veritas Universidad	Climate change impacts and adaptations	6
Veritas Universidad	Sustainability and Resource Management in the Ancient World	7
Veritas Universidad	Sustainable Development and Environmental Awareness	8
Veritas Universidad	Sustainable Lifestyles	9
Stellenbosch	Conserving Nature	11
Cultural Experiences Abroad Sydney Program	Sustainable agriculture: community gardening for improved living	12
Cultural Experiences Abroad. and University of New Haven	People, Place and Culture: Environmental Debates in Australia, New Zealand and the Pacific	13
Cultural Experiences Abroad Veritas Universidad	Humans, Culture & Sustainability	14
Veritas Universidad	Environmental Impact and Social Development	16
Veritas Universidad	Tropical Ecology	17
Veritas Universidad	Conservation Biology and Endangered Marine Species	18
Veritas Universidad	Tropical Marine Biology	19
Veritas Universidad	Marine Mammals of Costa Rica: Biology for Conservation	20
Veritas Universidad	Agroecology and Sustainable Food Systems	21
Veritas Universidad	Sustainable Development and Environmental Awareness	22
Veritas Universidad	Ecotourism: The Case of Costa Rica	23
Council on International Educational Exchange Buenos Aires, Argentina	Gender and Sustainability	25
Council on International Educational Exchange Buenos Aires, Argentina	Systems Thinking and Sustainability	26
Council on International Educational Exchange Buenos Aires, Argentina	Global Change and the Environment	27
Council on International Educational Exchange Dublin Ireland	Global Change and The Environment	28
Council on International Educational Exchange Madrid, Spain	Global Change and the Environment	29

Council on International Educational Exchange Milan Italy	Global Change and The Environment	30
Council on International Educational Exchange Milan Italy	Global Change and The Environment	31
Council on International Educational Exchange Monteverde, Costa Rica	Global Change and the Environment	32
Council on International Educational Exchange Rome, Italy	Global Change and the Environment	35
Council on International Educational Exchange Sydney, Australia	Climate Change Science and Policy	36
Council on International Educational Exchange Monteverde, Costa Rica	Climate Change Science and Policy	37
Council on International Educational Exchange Shanghai, China	Climate Change Science and Policy	38
Council on International Educational Exchange Rome Italy	Environmental Ethics	42
Council on International Educational Exchange Shanghai China	Environmental Ethics	43
Council on International Educational Exchange Sydney	Environmental Ethics	44
Council on International Educational Exchange Madrid, Spain	Global Change and the Environment	46
Council on International Educational Exchange Milan, Italy	Global Change and The Environment	48
Council on International Educational Exchange Gaborone, Botswana	Global Change and the Environment	49
Council on International Educational Exchange Milan, Italy	Global Change and The Environment	50
Council on International Educational Exchange Monteverde, Costa Rica	Fisheries, Biology and Sustainability Global Change and the Environment	51
Council on International Educational Exchange Barcelona, Spain	Climate Change Science and Policy	55
Council on International Educational Exchange Monteverde, Costa Rica	Principles of Environmental Science (Lab Course)	56
Council on International Educational Exchange Barcelona, Spain	Global Environmental Policy	57
Council on International Educational Exchange Monteverde, Costa Rica	Principles of Environmental Science (Lab Course)	58
Council on International Educational Exchange Barcelona, Spain	Global Environmental Policy	59
Danish Institute for Study-Abroad Berlin	Global Environmental Policy	61
Arizona State Uni Global Flex	Global Environmental Policy	62
Arizona State Uni Global Flex	Global Environmental Policy _1	63
Arizona State Uni Global Flex	Global Environmental Policy _2	64
Council on International Educational Exchange Madrid, Spain	Global Environmental Policy	65

Council on International Educational Exchange Madrid, Spain	Global Environmental Policy	66
Council on International Educational Exchange Madrid, Spain	Global Environmental Policy	67
Council on International Educational Exchange Yucatan, Mexico	Global Environmental Policy	68
Council on International Educational Exchange Milan, Italy	Global Environmental Policy	69
Council on International Educational Exchange London, England	Global Environmental Policy	70
Council on International Educational Exchange Madrid, Spain	Global Environmental Policy	71
Council on International Educational Exchange Monteverde, Costa Rica	Global Environmental Policy	72
Council on International Educational Exchange Paris, France	Global Environmental Policy	73
Council on International Educational Exchange Prague, Czech Republic	Global Environmental Policy	74
Council on International Educational Exchange Rome, Italy	Global Environmental Policy	75
Council on International Educational Exchange Buenos Aires, Argentina	Environmental Science (Lab Course)	76
Council on International Educational Exchange Seville, Spain	Environmental Science (Lab Course)	77
Council on International Educational Exchange Kyoto, Japan	Environmental Science (Lab Course)	78
Council on International Educational Exchange Monteverde, Costa	Environmental Science (Lab Course)	79
Council on International Educational Exchange Rabat, Morocco	Environmental Science (Lab Course)	80
Council on International Educational Exchange Amsterdam, Netherlands	Environmental Psychology	88
Council on International Educational Exchange Yucatan, Mexico	The Arts and Social Change in Mexico	89
Council on International Educational Exchange Yucatan, Mexico	The Arts and Social Change in Mexico	91
Council on International Educational Exchange Monteverde, Costa Rica	Environmental Engineering for the Tropics	92
Council on International Educational Exchange Gaborone, Botswana	Environmental Ethics and Psychology	97
Council on International Educational Exchange Monteverde, Costa Rica	Sustainability: Environment, Economy, and Society	98
Council on International Educational Exchange Monteverde, Costa Rica	Sustainability: Environment, Economy, and Society	99
Council on International Educational Exchange Prague, Czech Republic	European Environmental Studies	100
Council on International Educational Exchange Prague, Czech Republic	European Environmental Studies	101

Council on International Educational Exchange Amman, Jordan	Environment, Sustainability and Activism	103
Council on International Educational Exchange Amman, Jordan	Environment, Sustainability and Activism	104
Council on International Educational Exchange Shanghai China	Environmental Conditions and Public Perception in Contemporary China	105
Council on International Educational Exchange Copenhagen, Denmark	Environmental Psychology	106
Council on International Educational Exchange Gaborone, Botswana	Public and Environmental Health Issues in Botswana	107
Council on International Educational Exchange Berlin, Germany	Sustainability and the Anthropocene	108
Council on International Educational Exchange Cape Town, South Africa	Sustainability and the Anthropocene	110
Council on International Educational Exchange Cape Town, South Africa	Sustainability and the Anthropocene	111
Council on International Educational Exchange Sydney, Australia	Sustainability and The Anthropocene	112
Council on International Educational Exchange Copenhagen, Denmark	Fisheries, Biology and Sustainability	113
Council on International Educational Exchange Amsterdam, Netherlands	Business and Sustainability in the Netherlands	114
Council on International Educational Exchange Shanghai, China	Managing Sustainability in Transnational Business	115
Council on International Educational Exchange Amsterdam, Netherlands	Business and Sustainability in the Netherlands	116
Council on International Educational Exchange Shanghai, China	Managing Sustainability in Transnational Business	117
Council on International Educational Exchange Rome, Italy	Managing Sustainability in International Business	118
Council on International Educational Exchange Shanghai, China	Managing Sustainability in Transnational Business	121
Council on International Educational Exchange Monteverde, Costa Rica	Sustainability: Environment, Economy, and Society	122
Council on International Educational Exchange Amman, Jordan	Environment, Sustainability and Activism	124
Council on International Educational Exchange Berlin, Germany	Design and Sustainability Seminar	125
Council on International Educational Exchange Barcelona, Spain	Sustainability and Corporate Social Responsibility: From Theory to Practice	128
Danish Institute for Study-Abroad	Climate, Glaciers, and Human Impact	131
Danish Institute for Study-Abroad	DIS Sustainable Food	132
Danish Institute for Study-Abroad-Stockholm	DIS Sustainable Food	133
Danish Institute for Study-Abroad	Sustainability, Environmental Studies, International Relations	134

Danish Institute for Study-Abroad	Samsø, Denmark and Stockholm, Sweden.	135
Danish Institute for Study-Abroad	Understanding Climate Change	139
Institute for the International Education of Students Abroad Freiburg	Change of Ecosystem as a result of long-term human activities	143
Institute for the International Education of Students Abroad Freiburg	Ethics and Sustainability	148
Institute for the International Education of Students Abroad Freiburg	Technology of Renewables	149
Institute for the International Education of Students Abroad Freiburg	Sustainable Food & Agriculture	150
Institute for the International Education of Students Abroad Freiburg	Freiburg Green City	151
Institute for the International Education of Students Abroad Freiburg	Sustainable Energy Concepts, Policy, Strategies, and Solutions	152
School for Field Studies: Australia Rainforest to Reef	Environmental Sustainability and Socioeconomic Values	154
School for Field Studies: Australia Rainforest to Reef	Tropical Biome Ecology and Climate Change School for Field Studies	155
School for Field Studies Bhutan: Environment and Society in Transition	Land Use, Natural Resources, and Conservation	157
School for Field Studies Bhutan: Environment and Society in Transition	Language, Religion, and Culture of Bhutan	158
School for Field Studies Bhutan: Environment and Society in Transition	Mountain Ecology	159
School for Field Studies Bhutan: Environment and Society in Transition	Political and Socioeconomic Dimensions of Environment	160
School for Field Studies Environmental Justice and Mekong Ecologies	Environmental Ethics and Development	161
School for Field Studies Environmental Justice and Mekong Ecologies	Conservation Science & Practice in Cambodia	162
School for Field Studies Environmental Justice and Mekong Ecologies	Language and Culture of Cambodia	164
School for Field Studies Wild Patagonia: Fire and Ice	Patagonian Ecology	165
School for Field Studies Wild Patagonia: Fire and Ice	Earth Systems and Climate Science	166
School for Field Studies Ecological Resilience Studies	Directed Research	167
School for Field Studies Ecological Resilience Studies	Justice, Resilience, and the Environment	168
School for Field Studies Ecological Resilience Studies	Language, Culture, and Society of Costa Rica	169
School for Field Studies Ecological Resilience Studies	Principles of Natural Resource Management	170
School for Field Studies Ecological Resilience Studies	Tropical Ecology and Ecosystem Resilience	171
School for Field Studies: Tropical Island Biodiversity Studies	Cultural Competence in Conservation	172

School for Field Studies: Tropical Island Biodiversity Studies	Directed Research	173
School for Field Studies: Tropical Island Biodiversity Studies	Environmental Governance, Development, and Conservation	174
School for Field Studies: Tropical Island Biodiversity Studies	Tropical Coastal Ecology	175
Australia: Rainforest, Reef, and Cultural Ecology	Rainforest, Reef, and Cultural Ecology Seminar	176
Australia: Rainforest, Reef, and Cultural Ecology	Sustainability and Environmental Action Seminar	179
Australia: Rainforest, Reef, and Cultural Ecology	Independent Study Project	180
Student International Training: Development, Politics, and Languages	Conservation and Sustainability Practices in Ecuador	183
Iceland: Climate Change and the Arctic	Climate Modeling and Carbon Management	187
Iceland: Climate Change and the Arctic	The Arctic: Changing Ecosystems and Resilie	188
Iceland: Climate Change and the Arctic	Research Project in Arctic Climate Protection	190
International Honors Program (IHP) Climate Change: The Politics of Land, Water, and Energy Justice	Political Economy and Environmental Change since 1492	192
International Honors Program (IHP) Climate Change: The Politics of Land, Water, and Energy Justice	Science and Policy of Climate Change	193
International Honors Program (IHP) Climate Change: The Politics of Land, Water, and Energy Justice	Comparative Issues in Food, Water and Energy	194
IHP Food Systems: Agriculture, Sustainability, and Justice	People, Identity, and Food	195
IHP Food Systems: Agriculture, Sustainability, and Justice	Getting from Field to Fork	196
IHP Food Systems: Agriculture, Sustainability, and Justice	Agriculture, Ecology, and Sustainable Futures	197
IHP Food Systems: Agriculture, Sustainability, and Justice	Politics, Ethics, and Food Security	198
SIT Madagascar: Biodiversity and Natural Resource Management	Biodiversity and Natural Resource Management Seminar	199
SIT Madagascar: Biodiversity and Natural Resource Management	Environmental Research Methods and Ethics	200
Panama: Tropical Ecology, Marine Ecosystems, and Biodiversity Conservation	Human Ecology and Conservation in the Tropics	203
Panama: Tropical Ecology, Marine Ecosystems, and Biodiversity Conservation	Comparative Tropical Ecology	206
Samoa: Social and Environmental Change in Oceania	Pacific Communities in Transition	207
Samoa: Social and Environmental Change in Oceania	Climate Change and Resilience in Oceania	208
Tanzania: Wildlife Conservation and Political Ecology	Wildlife Conservation and Political Ecology Seminar	213

Tanzania: Wildlife Conservation and Political Ecology	Coastal Ecology and Natural Resource Management Seminar	214
University of Canterbury	Business, Society and the Environment	217
University of Canterbury	Introduction to the Principles and Concepts of Sustainability	220
University of Canterbury	Social and Environmental Reporting	221
University of Canterbury	Introduction to the Principles and Concepts of Sustainability	222
University of Canterbury	Social and Environmental Reporting	223
University of Canterbury	Sustainability Transitions, Transformations and Agents of Change	224
University of Minnesota	International Development	225

A.3 Codebook Definitions

Table 9 Codebook definitions for knowledge types.

Knowledge Type	Knowledge Code	Definition
Declarative Knowledge	systems thinking	Knowledge of systems thinking with regard to declarative knowledge
	causes/effects of CC	knowledge of cause and effect of CC e.g. global temperature rise
	interdisciplinarity	integration of multiple disciplines
	global thinking	knowledge of global systems, phenomenon, approach with regards to CC
	Other	declarative knowledge that did not fit with the above codes
Affective Knowledge	feelings	explicit mention of feel*
	value/perceptions/beliefs	knowledge of value (personal) assessment of a particular CC related phenomenon
Procedural Knowledge	mitigation & adaptation	knowledge of mitigation practice or adaptation practice e.g. conserve energy, restore habitat
	policy/advocacy	knowledge of policy or advocacy pathways for climate action
	direct emission reduction practices	Knowledge of approaches to reducing emissions e.g. fly less, eat a plant-based diet

Table 10. Codebook definitions for pedagogical approaches.

Pedagogy Type	Knowledge Code	Definition
Declarative Pedagogy	assignments	including assignments, activities, exercises in-class, homework (not understood as test or paper)
	lecture	Including seminar, speaker, presentation (not by student)
	test	including quiz, exam in written form (if indicated in syllabus)
	paper	including any written assignment, report, essay
	presentation	including oral presentation, share, present*
Affective Pedagogy	reflection	active process of reflecting or reflexive exercise connected to the individual student
	mindfulness	practice of mindfulness, as distinct from "reflection"
	feelings discussion	specific discussion of feelings as mentioned in syllabus
Procedural Pedagogy	case-study	a case study that relates to procedural pedagogy
	project-based	a project that relates to procedural pedagogy
	service learning	service activity or project as written in the syllabus associated with "service"
	field trip	Including field activity, excursion, site visit as written in the syllabus distinct from service learning or project

Appendix B. Survey Material
B.1 Survey (annotated in blue to show theory alignment)

Study Abroad and Climate Action Survey

My name is Julia Roellke, a MSc student in sustainability science at Lund University. I am writing a master's thesis on study abroad and climate action. This survey aims to assess the perspectives and attitudes of international educators who teach and/or coordinate courses related to climate change topics. The findings will be used to understand rationales and potential transformative pathways for international education.

All higher education professors, curriculum coordinators, and directors affiliated with courses related to climate change for international students are invited to participate in this survey.

The survey will take **about 15 minutes** to complete. Thank you in advance for your participation.

Survey and survey results
- While the questions are voluntary, please try and answer the full survey. A good estimation is more useful than an incomplete survey.
- The results of my thesis will be published via Lund University online and in print. They may subsequently be published in scientific journals or presented.
- If you would like to receive a copy of the final thesis, please submit your email at the end of the survey.

When?
- The survey will be open from March 12th to March 26th, 2024.

Your Data
- Your participation in this survey is voluntary.
- Your answers will remain anonymous.
- You have the right to terminate the survey at any time.
- Once you click "submit" you will automatically receive a confirmation email with a PDF of your responses.

At the end of the survey
- I encourage you to send the survey around to your networks to increase the distribution to **All higher education educators, curriculum coordinators, and directors affiliated with courses related to climate change directed at international students are invited to participate in this survey.**
- To maintain your anonymity in the survey, I have a separate form for you to drop your email address if you're interested in receiving a follow-up to the study (you will be prompted with a link after completing this survey).

If you have any questions about the survey or would like to be further involved in my research please contact Julia at ju4432ro-s@student.lu.se

By completing this survey, you agree to these terms and conditions.

Thank you for your participation,
Julia Roellke

Q21

1. What is your title at the university/program? (e.g. professor, director, curriculum coordinator)

Q29

2. How many years have you professionally been involved in international education?

Q28

3. How many years have you been involved in teaching (and/or coordinating) courses related to climate in an international setting?

Q22

4. Optional for you to include the organization with which you're affiliated.

Q23

baseline

5. Do you know the average carbon emissions of 10 students traveling from New York, New York to Milan, Italy direct round trip? (13,000 km)

- [ ] 1.7 tons
- [ ] 3.2 tons
- [ ] 7.1 tons
- [ ] 23.5 tons
- [ ] 56.4 tons

Comment

6. Statements about your awareness of the environmental impact of travel affiliated with studying abroad and your perceived rationale for continuing to engage in these programs are below. When it states "the course" it means the course/program that you teach, and or coordinate. If you are affiliated with multiple courses related to climate change please please choose the one answer that best represents your views of all the courses.

I am interested in how much you agree or disagree with the following statements.

	strongly disagree	disagree	neither agree or disagree	agree	strongly agree
Theory Alignment — Information-deficit model (Wolrath Söderberg & Wormbs, 2022) — I believe I have information on where students travel from to engage in the course.	○	○	○	○	○
mismatch (Frick et. al. 2021) — I feel there is a tension between teaching about climate change and students traveling long distances from abroad to take the course.	○	○	○	○	○
habituation effect (Wolrath Söderberg & Wormbs, 2022) — I feel travel is so deeply ingrained in the practice of the program and therefore it is hard to change.	○	○	○	○	○
cognitive dissonance (Wolrath Söderberg & Wormbs, 2022) — I do not think about the travel emissions for students to engage in this course.	○	○	○	○	○
cognitive dissonance (Wolrath Söderberg & Wormbs, 2022) — I believe there is a low climate impact of partaking in the course.	○	○	○	○	○
knowledge (Wolrath Söderberg & Wormbs, 2022) — I believe there are low travel emissions for students to take this course.	○	○	○	○	○
relativization (Wolrath Söderberg & Wormbs, 2022) — I believe my students' emissions traveling to take this course are relatively low compared to other travelers in the world.	○	○	○	○	○
socially-organized denial (Wolrath Söderberg & Wormbs, 2022) — I believe I legitimize the travel emissions for students to take this course because other programs do it too.	○	○	○	○	○
curricular rationale-linking to RQ1 — I believe the learning outcomes of the course					

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		strongly disagree	disagree	neither agree or disagree	agree	strongly agree
	compensate for the travel emissions associated with students who take the course.					
individual action (Wolrath Söderberg & Wormbs, 2022)	I believe it is essential for individuals involved in climate change education to minimize their carbon footprint from travel activities.	○	○	○	○	○
individual action (Wolrath Söderberg & Wormbs, 2022)	I believe it is essential for individuals involved in climate education to minimize their carbon footprint in other aspects of life (e.g. consumption behavior, diet, energy use)	○	○	○	○	○
emotional blocking (Wolrath Söderberg & Wormbs, 2022)	I feel bad about the travel emissions students have to take the course.	○	○	○	○	○
guilt (Wolrath Söderberg & Wormbs, 2022)	I feel guilty about students traveling long distances to learn about climate change	○	○	○	○	○
conflict (Wolrath Söderberg & Wormbs, 2022)	I feel conflicted about students traveling long distances to learn about climate change	○	○	○	○	○
account budgeting thinking/equilibrium heuristic (Wolrath Söderberg & Wormbs, 2022)	I do climate action in other aspects of my life to compensate for the travel emissions of students taking the course.	○	○	○	○	○

If you have any comments about your feelings/rationales/perspectives towards the dilemma between study abroad and climate change, please feel free to write below.

[text box]

7. Statements about climate change and curricula are listed below. This section asks questions more broadly about the course and curricular changes.

Here are some definitions of terms that can guide your answers:

Facts: Factual knowledge and approaches to teaching related to climate change (e.g. scientific findings on the causes of climate change, historical trends in global temperature, and statistical data on greenhouse gas emissions).

Feelings: Feelings knowledge and approaches to teaching related to feelings, emotional responses, or attitudes expressed in the curriculum towards climate change (e.g. personal reflection about feelings towards vulnerable populations or feelings about a hopeful future).

Action: Action-oriented knowledge and skills related to concrete steps or initiatives outlined in the curriculum to address to mitigate or adapt to climate change (e.g. how to advocate for policy change to reduce carbon emissions or how to reduce personal carbon emissions).

I am interested in how much you agree or disagree with the following statements about teaching a course related to climate change. Again, when it states "the course" it means the course/program that you teach, and or coordinate. If you are affiliated with multiple courses related to climate change please please choose the one answer that best represents your views of all the courses.

		strongly disagree	disagree	neither agree or disagree	agree	strongly agree
curricularly factual (pos)	In teaching a course on climate change, students should learn facts about climate change.	○	○	○	○	○
curricularly factual (neg)	Teaching a course on climate change is not the time to teach facts about climate change.	○	○	○	○	○
curricularly feelings (pos)	In teaching a course on climate change, students should learn about feelings towards climate change.	○	○	○	○	○
curricularly feelings (neg)	Teaching a course on climate change is not the time to engage in climate feelings.	○	○	○	○	○
curricularly action (pos)	In teaching a course on climate change, students should learn about how to engage in climate action.	○	○	○	○	○
curricularly action (neg)	Teaching a course on climate change is not the	○	○	○	○	○

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	strongly disagree	disagree	neither agree or disagree	agree	strongly agree
time to teach climate action.					
fact>action In teaching a course on climate change, the course should focus on facts of climate change over climate action.	○	○	○	○	○
fact>feelings In teaching a course on climate change, the course should focus on facts about climate change over feelings about climate change.	○	○	○	○	○
feelings>action In teaching a course on climate change, the course should focus on feelings over action.	○	○	○	○	○
action>feelings In teaching a course on climate change, the course should focus on climate action over feelings about climate change.	○	○	○	○	○
all Teaching a course on climate change should discuss facts, feelings, and actions around climate change.	○	○	○	○	○

Optional: If you have any comments about climate action, curriculum, or course changes, please add them below:

Q26

8. How much emphasis should there be on individual action rather than collective action?

Use the <> slider to represent how much

(The total sum of question 8 and question 9 should equal 100%)

◀▶ ─────────────────────────────

Individual Action

Q27

9. **How much emphasis should there be on collective action rather than individual action?**

Use the <> slider to represent how much

(The total sum of question 8 and question 9 should equal 100%)

◄►───

Collective Action

Q24

10. Who do you think has more responsibility for reducing carbon emissions in the international education space?

Please rank your answers. Note, that you can only select 1 per line.

	1 (least responsible)	2	3	4	5	6 (most responsbile)
Government	○	○	○	○	○	○
Educators	○	○	○	○	○	○
Students	○	○	○	○	○	○
Curriculum Coordinators	○	○	○	○	○	○
Home universities	○	○	○	○	○	○
Host universities	○	○	○	○	○	○

Optional: If you have any comments about responsibility for reducing carbon emissions in the international space, please add them below:

[   ]

Q18

11. Does your university/program have an action plan for reducing emissions?

○ Yes
○ No
○ Unsure

If yes, could you comment on what your action plan is:

[   ]

Q19

12. Do you have any comments about the survey? Is there any question that I should have asked? **This is an open comment box. You are invited to leave anything that comes to mind about the study.**

[ ]

Q20

Thank you for taking the time to answer this survey.
Please submit your answers by clicking the "Submit" button.

Thank you very much for participating.

Appendix C. Interview Material

C.1 Informed Consent Form

LUND UNIVERSITY

Consent to Participate in a Master Thesis at the Faculty of Social Science

FOR QUESTIONS ABOUT THE STUDY, PLEASE CONTACT: Julia Roellke ju4432ro-s@student.lu.se

Before I ask you if you agree to participate in this research project, I will give you some information about the research and what is expected from your participation. I invite you to ask me any questions that you feel will help you understand this information.

Presentation of the researcher

This research is being conducted as part of Julia Roellke's master's thesis at Lund University. It is supervised by Kimberly Nicholas, Associate Professor at Lund University Centre for Sustainability Studies (LUCSUS).

Description

The focus of this research is to better understand how practitioners of climate-focused study abroad programs navigate the dilemma between academic travel and study abroad. This study aims to understand the barriers and opportunities of international education as an agent of change for low-carbon transitions. You will be asked to answer questions orally, which will be audio-recorded if you consent. The oral interview will take place in person at an agreed location or through a video call, which will last between 30-45 minutes. Audio files will be transcribed and used for the analysis. Copies of your interview will be made available to you if you wish.

Risks and benefits of participation

The risks associated with this study are anticipated to be minimal, not greater than those experienced in daily life. If you wish to not answer a particular question, you are free to simply decline. The benefit of participating in this study is that you will have the opportunity to reflect on and discuss your perceptions and feelings about working in the international education space. Moreover, you will have the opportunity to reflect on your role and capacities for addressing change at your institution for sustainability transitions.

Payments: Participation is completely voluntary, and you will not receive any monetary compensation for your participation.

Subject's rights: If you have read this form and have decided to participate in this project, please understand your participation is voluntary and you have the right to withdraw your consent or discontinue participation at any time without penalty. You have the right to refuse to answer particular questions. Your privacy will be maintained in all published and written data resulting from the study.

If you have questions about your rights as a study participant or are dissatisfied at any time with any aspect of this study, you may contact us - anonymously, if you wish - at the provided contact details stated on the first page.

Unless the assigned written acknowledgment of consent has been received before the interview, verbal consent will be given on the audio recording, at the start of the interview.

Do you understand the project and the implications of your participation?

☐ YES

Do you agree to confirm that you consent to participate?

☐ YES

Do you agree to have this interview recorded as well?

☐ YES

SIGNATURE:_____

DATE: _____

Thank you very much for your time to participate in this study.

C.2 Interview Data

Table 11. Value of Study Abroad Excerpts (By author, 2024).

Example quote from Interviews	Interview Reference
"The knowledge that students would get about climate action is pretty variable. I guess that's the short answer. It's variable. It depends a lot on where they're going and exposed to that they didn't know already, before going there. From an optimistic point of view that this could be really transformative for students and students who came from a social or political context. for climate change wasn't discussed much with climate act, you know, wasn't presented as something that they might engage in, or a question that they should consider and where the environmental impacts of their life were not discussed, this could really be eye opening and could change the trajectory of their whole lives. So, we should definitely keep open the this optimistic view that international education could inspire climate action in ways that would not have been possible otherwise. I'm not necessarily convinced that that's the norm."	I1
"I think it's really a balance, because I do think that internationalizing education has huge benefits and can really make students much more aware and compassionate about people around the world. Because if we're taking a US perspective, the United States is a huge contributor to climate change but is not going to be one of the first countries feeling the impacts, because we're much more wealthy were relatively resilient in terms of our infrastructure."	I3
"If we interpret students, not as people who are sick, we're just seeking knowledge, but students who are carrying certain forms of capital, then international mobility becomes that conduit to transfer various forms of cultural capital, which in my view, would shape public discourses around climate change in a very meaningful way."	I6
"Depends on what the person does with that education. But if I use the personal experience [of a study abroad program initiated by the interviewee] there is 1600 more young people who would have otherwise not been able to access higher education or have the kind of impact that they are having on the livelihoods of their families and maybe their communities as well. So, if international students are able to leverage that experience for domestic forms of, you know, development, then I think it's a it's a worthwhile exercise."	I6
"I think I, yes, I think there's study abroad can do a lot of different things, depending on the student, their willingness to be open to different ideas, different cultures, different ways of doing things, to be recognizing that expectations actually be the enemy of have a good experience. And so going in without expectations can leave them kind of willing to explore different ways of approaching things."	I7
"Now, the challenge is when students then decide to travel way more than they would otherwise in the United States by plane, all of a sudden, they're that that's all negated, or when a student goes to United States, from Europe and then decides to take full advantage of the excess. And when we do things, then that is doubling their carbon footprint potentially from what they would have had when they were there."	I7

Table 12. Value of Study Abroad Phrases as illustrated in Figure 8 (By author, 2024).

Theme	Interview References
Career Preparedness and networking*	I11, I6
Cultural capital	I6
Global citizenship	I2, I4, I11, I12
Global connectedness	I3, I6, I12
Global perspective	I1, I3, I7, I8 I10
Hard to replicate	I1, I4
Immersive value	I1, I8, I10
Peacebuilding	I2, I12
Support host communities	I1, I6
Transformation	I3, I4, I5, I6
Value of exchange	I1, I8, I10

*Combined career preparedness and networking in Figure 8.

Table 13. Three spheres of transformation excerpts (By author, 2024).

Three Spheres of Transformation Theme	Example quote from Interviews	Interview Reference
Personal→ Political	"I'm glad that there is CANIE, because I can work with people engage with people, get ideas from people, give my ideas to other people and try to, to build a network, build a group of people who are interested in these systemic and structural changes that are needed, and can then take whatever we are talking about here or elsewhere, to the institutions to try to build more and bigger network are seen here."	I2
	"And I think people need a space where they can actually connect and talk about this, because this can make you feel very lonely and isolated. And so it's a huge psychological burden to carry. And hence, climate anxiety, etc. So I think what CANIE provided is not just like knowledge and content, but also a space for people to feel part of a community where you know, where you can belong to like a group who care like the care about this, because sometimes you have a lot of people around caring, but if you don't know who is like, in the room with you, then you will feel like maybe your institutions are not supporting you, maybe nobody understands you."	I5
	"[Collective action] gives you some kind of muscles, which are not money, muscles, but a voice, which kind of forces the politicians to act on certain policies, which otherwise they will do, they will do not have that."	I9
	"And I think that lots of people taking individual action together can put pressure on those bigger corporations, governments institutions to make the bigger changes that are needed"	I3
Personal→Practical	"So, if I would want to see change in one group of people, it would be academics themselves modeling a way of living that they want their students to follow. And also university leadership, also embody the same set of values. So that's probably right, start"	I1
	"I think, is an understanding on multiple levels of accepting that there is a problem there is an issue globally. Also accepting that we are all on all involved, whether on the individual institutional, governmental, national level, and that is the starting point to act…whether it's going to be on individual institutional or national governmental level that up to specific situations, right, we can make influence within our network within our smaller environment, depending on the position we are obtaining, whether it's international education or any other industry."	I10
	"It came very naturally to us as an organization, but only once you get people talking about it within the organization. So, certainly I had had side conversations with folks about their interest in sustainability as a topic and how we might be able to be thinking about this a little bit more concretely, and to infuse it into our day-to-day work. And within that dynamic, I was able to go to our executive team to make a case that we should have a dedicated working group focused on this topic, as well as sign the CANIE Accord."	I7
	"Because it can be a lecture, it can be Dean or a head of a department. It seems that this association unites like-minded people that have concerns and try to find ways of sustainable, sustainable education. Yeah, and I think that's, that's also it. It's not as quick you know, as with smaller organizations, were talking about the whole the whole field of international education. So it's going to be slow. Taking people on board, but it's growing."	I10
Political→Personal	"So, you know, some people would argue, and I have a lot of sympathy for this point of view that civil disobedience is very well justified in this case that protests, other forms of civic engagement, that might challenge political norms that allowed climate change to continue."	I1
Political →Practical	"I think the big change will come when you know, acquisition bodies will say, you know, like, like AACSB, for example, like they will say like business school accreditation will say, I will not give you like this accreditation, unless you show me some like fine action activities. You know, like, those are especially the accreditation bodies by or like, ideally, the ministry, you know, which country like education to set the rules for university to be considered (I5).	I5
	"[The CANIE Accord] is something that institutions can work with and grow within. So it's fantastic, because it's, you know, I've even heard institutions saying we weren't really thinking about this. And then we had a presentation about the CANIE Accord, and we took it to our team, and now we're thinking about it."	I8
	"But also, it's quite interesting that, so I work in South African education been working, among other things, in South African education, not one university, has even considered seriously, you know, endorsing CANIE Accord, because it's asking universities to look in the mirror, and to commit to say, okay, these are some of the things that we're going to do, it's actually not that difficult, you can find really, kind of, CANIE Accord is developed in a way that, you know, you, you can find things that you can commit to."	I2
	"I think there are many things we can do, you know, kind of sometimes, you know, we, we do all the work, we talk about these things, we, we, we try to do things, and then we don't see anything happen. It's quite easy to give up, you know, we're human. But I mean, you know, I think for me, the space is like, CANIE, so important, because, you know, those engagements, hearing from other people and you know, getting ideas how people do things at other institutions, you know, how you, sometimes you have to invite somebody from the outside to come and say, you know, to people, you know, you're not doing anything, you need to do things, you know, it's easier for the outsiders to do that."	I2
Practical→ Political	"I think, especially in a place like X, where climate action isn't necessarily politically popular, I'm seeing that type of movement towards more sustainable practices, especially if that can spread to other universities across the state	I3

	can create a more friendly climate where politicians feel like maybe it's possible to introduce a climate bill and it's not going to have so much opposition because there's already this and this and this being done."	
	"And I give it five years, I'm gonna, you don't have to do today. Yeah, but this, I mean, I, there is a gap between the agenda 2030, the urgency of the call, and the inactivity of universities where everything is kind of left. Not every university, but a lot of universities. Like initiatives like, you know, the CANIE Accord like is just left on one person's shoulders, and just because they really care" (I5)	I5
Practical→Personal	"And through that process of identifying what we're already doing as an organization that fits that candidate core framework, and what we should potentially be doing or could be doing, was what I presented to them along with some consultation with other folks internally at the organization, and then they approved it, and then we were off, hit the ground running now. So, you know, it was it was not a cult of personality or one person effort, right. It's you some advocates internally with your see it's not you're not just on an island, and then you need leadership at the top. And by making a case that this is important to this next generation of students that it's important to our members. It was a pretty easy case for us to make from a business standpoint as well."	I7
	"I think, is an understanding on multiple levels of accepting that there is a problem there is an issue globally. Also accepting that we are all on all involved, whether on the individual institutional, governmental, national level, and that is the starting point to act and To again, whether it's going to be on individual institutional or national governmental level that up to specific situations, right, we can make influence within our network within our smaller environment, depending on the position we are obtaining, whether it's international education or any other industry."	I10

Note. → links two spheres as interpreted by the researcher when interviewee discussed two spheres

Table 14. Excerpts on responsibility for action as related to the personal and political spheres (By author, 2024).

Three Spheres of Transformation	Subtheme	Example quote from Interviews	Interview Reference
Personal	Individual→emphasis on individual capacities for climate action	"I think the responsibility of the individuals is to look for like-minded people to work together."	I2
		"Everybody should be voicing their concerns. I think the students, you know, students can ask institutions, and international education practitioners to actually, you know, develop models and show what is the impact?"	I2
		"I feel like there's a big responsibility, because we're contributing a lot in terms of flight emissions and sending students who otherwise might not have that carbon footprint. We're involving them in international education, encouraging them to take these flights. So I think that we have a responsibility to educate them about the impact of those decisions that they're making, and to do our best to mitigate those impacts"	I3
		"At least individuals see what they can do at their individual level."	I5
		"I think I mean, what an advocacy group can do is to, you know, advocate for change, talk about it as much as possible to like, make people understand or trying to move people to like, to act differently, to think differently to consider things differently. But obviously, there is nothing that is mandatory, we cannot impose anything. So yeah, until it's mandatory, it would just like when it's voluntary, it's always going to be subject to the decision of one person. And so we will always be depending on like one leader, or the pressure, maybe the peer pressure that they feel at some point. But we're not there yet."	I5
		"This is our role, because like, we cannot drop this on students, we need to take responsibility and on our transformative power. So we cannot expect students to say, oh, you know what, I'm going to sacrifice my experience, because you told me so while you are actually traveling everywhere. So I think we need to walk the talk. And also, like give students the tools to make an informed decision, not just when they're inside. But before."	I5
		"I think individual action sometimes is, is funny, because I think it's more realistic, do you because you live it every day. And like, oh, I can do it. Other people can do it, too. Like, during the times where I've been less consuming a lot less meat, it was always easy for me to say, Oh, this is easy. You know, let's just do a lot more. That being said, I'm always influenced by the conversations by folks who argue that individual action doesn't actually move the needle as much as governmental or industry action."	I7
		"For me personally, yeah, getting to a certain leadership position gives you that stage to be able to be vocal about these issues. And to get the attention of wider groups of people to either finding a solution, immediate, medium, long term, or act immediately on it, whether it's just you know, in X district where we're planting trees, or whether it's going to be in, in the field of international education, on a, on a university level, where we start reducing carbon emissions."	I10
	Collective → emphasis on collective capacities, community, collaboration	"I think it goes maybe back to the notion of collective responsibility and possibly not, it might not be possible to lay the responsibility all at one of those stakeholders [students, international educators, institutions], in one of those pockets, hands, if that makes sense. It can absolutely, it's really a combination of all of these."	I1
		"So unless there's collective action, it's hard to see how the problem the problem kind of an aggregate gets addressed"	I1
		"So that we need to, obviously we need a systemic change, though we need this to be embraced by the collectivity because this cannot be like one person sacrifice, you know, it has to be like a systemic and collective action."	I5
	Cultural → emphasis on culture, worldview, mindset	"I think it still does run up against difficult economic realities and institutions where international education is the lifeblood, it's, it's [international education] part of the fuel that makes the whole university work, if you want to see it that way."	I1
		"Because it has become part of our culture, then it becomes a problem. So and the people don't look at it as a source of climate change issues, a global warming such kind of issues, because it has become part of our culture. Traveling, schooling internationally, going to study abroad is such kind of a thing. It's a part of our culture, which is ingrained in our education system. So it becomes a problem to deal with it, because it's something which hasn't been cultivated for centuries"	I9

		"We're and yeah, this small group of us, unfortunately, small group of us at the moment who were concerned by this are trying to change that discourse."	I8
Political	*University* → emphasis on the host or receiving university, study abroad organization, or program's responsibility	"Otherwise, I think it still does run up against difficult economic realities and institutions where international education is the lifeblood, it's, it's part of the fuel that makes the whole university work, if you want to see it that way. And so it's hard for universities to I think, sometimes acknowledge that. And even when they do acknowledge it to come to terms with what their responsibilities, what it means for their responsibilities."	I1
		"The universities must play a bigger role when it comes to climate change, climate action, and climate justice."	I9
		"I think it needs to be a partnership between the hosts and the sending institutions primarily. Because those are really the drivers of international exchange. But I think that they need to give the educators and the students the tools to be involved in that as well. So I think the big picture decision making planning plans to reduce emissions to reach Net Zero need to come from the institutional side."	I3
		"So there are a lot of things that we as institutions can do. I mean, we really, because this, like the students will be the ones that actually will be working for Shell, like in five years."	I5
		"I think it's the the institutions to the host institutions themselves, and anybody who has the ability to educate, and has a platform to do so I think that's where the responsibility should lie…But I think it the responsibility does lie with the institutions that are hosting to talk about this and, and sending to some extent as well."	I7
		"I think as a sector. We've have a responsibility for that. And either I remember the good old days of fino while they're still around, actually, but you cooperation with Ryanair and encouraging students, hey, you're in the heart of Europe, why not? Jump around for a while?"	I8
	Institutional (as distinct from university) → emphasis on institutional bodies responsibility	"I mean, I think it's 90% of the responsibility for climate action falls on the big corporations, the governments has, really, that's where the majority of these emissions are coming from."	I3
	Governmental→ emphasis on governing bodies	"Which means more people involved in the process, more people, you know, looking at what they can do, I think the big change will come when you know, acquisition buddies will say, you know, like, like AACSB, for example, like they will say like business school accreditation will say, I will not give you this accreditation, unless you show me some climate action activities….Or, ideally, the ministry, you know, which country like education to set the rules for university to be considered. And I give it five years, I'm gonna, you don't have to do today."	I5
personal & political excerpts that reflect a responsibility from both personal and political spheres		"Also accepting that we are all on all involved, whether on the individual institutional, governmental, national level, and that is the starting point to act and To again, whether it's going to be on individual institutional or national governmental level that up to specific situations, right, we can make influence within our network within our smaller environment, depending on the position we are obtaining, whether it's international education or any other industry"	I10
		"I think it's, it starts from individual mindset, that builds up into collective institutional and up there. I've not saying this is good. Bottom up or top down in this situation, I don't think it matters that much. The urgency of the topic is, is, is the most important. But I what I feel is happening that many people think that one person action is not changing anything. And this is a mindset. And I think that within the field of international education, or any, any other fields, that there is a need of changing the mindset on the individual level"	I10