Exploring the Relationship Between Student Characteristics and their Transformative Experience from Short-Term Study Abroad Programs

Sukeerti Shandliya, University of Cincinnati

Sukeerti Shandliya is a doctoral student in Engineering and Computing Education and a GRA in the Department of Engineering and Computing Education at the University of Cincinnati. Her research interests include engineering workforce development, DEI in STEM, experiential learning, development of global competencies and cultural competencies in higher education and the workforce. She has completed her bachelor's in Electronics and Communications Engineering from Banasthali University, India, and has an MBA from NIT Trichy, India.

Dr. Cedrick Kwuimy, University of Cincinnati

Dr. Cedrick Kwuimy is a dedicated educator with a passion for revolutionizing engineering education to attract and retain a diverse range of learners. His primary focus centers on the untapped potential of engineering education to deliberately create transformative learning experiences for all students through experiential learning. Dr. Kwuimy is particularly interested in practical approaches for implementing these transformative learning experiences within engineering education. Cedrick earned his Bachelor's degree in Physics from the University of Dschang in Cameroon and subsequently completed his Ph.D. in Applied Physics at the University of Yaounde´ 1, also in Cameroon. Currently, he holds the esteemed position of Associate Professor at the University of Cincinnati.

Dr. So Yoon Yoon, University of Cincinnati

Dr. So Yoon Yoon is an assistant professor in the Department of Engineering and Computing Education in the College of Engineering and Applied Science at the University of Cincinnati, OH, USA. Dr. Yoon received her Ph.D. in Gifted Education, and an M.S.Ed. in Research Methods and Measurement with a specialization in Educational Psychology, both from Purdue University, IN, USA. She also holds an M.S. in Astronomy and Astrophysics and a B.S. in Astronomy and Meteorology from Kyungpook National University, South Korea. Her work centers on elementary, secondary, and postsecondary engineering education research as a psychometrician, data analyst, and program evaluator with research interests in spatial ability, STEAM education, workplace climate, and research synthesis with a particular focus on meta-analysis. She has developed, validated, revised, and copyrighted several instruments beneficial for STEM education research and practice. Dr. Yoon has authored more than 80 peer-reviewed journal articles and conference proceedings and served as a journal reviewer in engineering education, STEM education, and educational psychology. She has also served as a PI, co-PI, advisory board member, or external evaluator on several NSF-funded projects.

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Abstract

Literature has consistently pointed to the significant role of personality in students' decisions to participate in study abroad programs. Studies have highlighted how such experiences are impacted by key personality traits such as extraversion, agreeableness, and neuroticism, and social traits such as social information processing, social skills, and social awareness. Yet there remains a notable gap in the limited examination of students' personality attributes and their impact on study abroad outcomes. To address this gap, this study investigates the effects of students' personality attributes and demographic attributes on their transformative learning experiences during their study abroad programs using Mezirow's transformative learning theory. The research integrates quantitative data collected through instruments. Qualitative insights gathered from open-ended questions in the survey to comprehensively investigate important associations between student attributes and their transformative learning experiences during study abroad programs. Results showed that personality traits, particularly openness and agreeableness, and social skills (a social intelligence scale construct) had a strong correlation with different phases of the journey of transformation. Additionally, the results indicated a potential association between students' academic majors and the likelihood of experiencing shifts in their epistemic dimension of habits of mind during their respective short-term study abroad programs.

I. Introduction

Study abroad programs provide valuable academic and personal growth opportunities to students. The study abroad experience has proven to be a competitive advantage for students professionally as well. Vandeveer and Menefee [1] found that students with study abroad experience have more employability probability and greater organizational, communication, and leadership skills. Including study abroad programs in the curriculum helps students achieve holistic learning by gaining intercultural competence and an inclusive, open, and reflective perspective for solving complex global problems.

Due to the highly immersive experiential learning nature of the study abroad programs, they also provide transformative learning opportunities to participants. However, the extent and nature of transformative learning in various experiential learning programs differ among individuals [2] [3]. The broader purpose of this paper is to investigate whether the differential impacts of study abroad programs on the transformative learning outcomes of the participants are related to their personality attributes.

Transformative Learning in Study Abroad

Study abroad programs are exemplars of high-impact experiential learning. In Kolb's experiential learning theory, they focused on the centrality of experience and reflecting on the experience. Like Kolb, Mezirow [4] also emphasized learning through critical reflection and proposed the transformative learning theory rooted in constructivism. According to Mezirow,

when a disorienting event challenges an individual's deep-rooted beliefs and assumptions, they would critically reflect on those assumptions, initiating the transformative learning process [4]. Consequently, the individual gains transformed worldviews and perspectives.

Study abroad programs designed through transformative learning pedagogy generally include experiential learning components, such as field trips, site visits, community interaction, peer interactions, and other active learning components. Another essential pedagogical design component that increases the transformative learning potential of study abroad programs is reflective learning activities, such as journal entries and self-reflection assignments [5] [6] [7] [8]. Research indicated that these experiential components played a crucial role in challenging students' ethnocentric beliefs, habits of mind, and predetermined frames of reference [5] [6]. Any situation that causes a disorienting dilemma during study abroad provides an essential pedagogical entry point for a transformative learning process to initiate. However, if participants do not process these dilemmas correctly or at all, it could lead to mis-educative or un-educative experiences that can be counterproductive for study abroad learning outcomes by solidifying students' previously held assumptions, beliefs, or misunderstandings [5] [8].

However, limited studies have explored the impact of short-term study abroad programs on the transformative learning experiences of the participants [8]. Transformative learning pedagogy takes a holistic approach, focusing on the entire student within the learning process. Due to factors, such as individual personalities, learning styles, and other contextual influences, determining the mechanism of transformative learning has been difficult [9]. Moreover, not all students have the same level of transformative learning readiness. For students to become reflective, self-directed transformative learners, they must possess or inculcate certain characteristics, such as risk-taking and openness to new experiences, that aid their transformative learning experience [10] [11] [12].

Study Abroad Experience and Personality

Much of the literature on study abroad programs has primarily focused on how these programs affect students' attitudes, growth, learning, and development. Studies have found study abroad programs have positive outcomes regarding students' self-esteem and confidence [1][13], perceived self-efficacy [14] [15], cultural intelligence, intercultural competence and cross-cultural adaptability [1] [6] [16], global awareness [5] [6], tolerance, empathy, respect for others [1], communication skills [1] [6], professional identity and self-awareness [17] and transformative thinking [5].

Study abroad literature has extensively focused on the Big Five personality traits which include agreeableness, openness, conscientiousness, neuroticism, and extraversion [18] [19] [20]. For example, Niehoff et al. [18] found that study abroad experience positively affects extraversion and agreeableness and negatively affects neuroticism. However, they did not find any effect on openness which was expected to be affected positively. They speculated that study abroad participants may decrease their perception of their own level of openness as they often confront their own prejudices or ignorance of other cultures during their experiences abroad.

Motivation to Study Abroad

Previous studies have explored the factors affecting student's intentions to study abroad [21] [22]

[23]. Ramirez [16] and Bakalis and Joiner [21] studied the role of personality in the decision to participate in study abroad programs. They found that students with a high degree of openness and a high tolerance for ambiguity were more likely to participate in these programs. Li et al. [23] and Niehoff et al. [18] found that demographic factors, such as gender and age, also affected motivation to study abroad.

Psychological and Sociocultural Adjustment During Study Abroad

Harrison and Brower [23] found that students' cultural intelligence positively influenced their degree of cross-cultural adjustment in study abroad programs. Basow and Gaugler [20] examined how multicultural personality traits, social interactions, and language proficiency influenced US students' psychological (i.e., well-being and emotional state) and sociocultural (i.e., ability to fit into the host culture) adjustment during a study abroad program in Costa Rica. They found that high levels of conscientiousness, agreeableness, and extraversion coupled with low levels of neuroticism best predicted psychological adjustment, and interactions with locals and language ability best predicated sociocultural adjustment.

Even though the literature has extensively explored the impact of study abroad on student growth and learning outcomes [24], Harrison and Voelker [13] noted that only a few studies have examined the impact of students' psychosocial attributes on study abroad outcomes. Research on the same was proposed in some studies as future work [18] [25].

Purpose of the Study

A student's unique personality and demographic attributes may determine their reactions and responses to the transformative learning opportunities they encounter during their study abroad programs. Recognizing transformative learning as a crucial study abroad outcome and understanding its dependency on an individual's attributes, this study investigated the relationship between students' various personality attributes and their transformative learning outcomes during short-term study abroad programs within the framework of Mezirow's transformative learning theory [27]. The research questions developed for this study are as follows:

*RQ1: To what extent do students' personality attributes impact their transformative learning outcomes in a short-term study abroad program**?***

*RQ2: To what extent do different student demographics impact transformative learning outcomes in a short-term study abroad program**?***

II. Theoretical Framework

Transformative Learning Theory

Mezirow's framework plays a pivotal role in comprehending the nature and extent of transformative learning in study abroad programs. The transformative learning theory proposed by Mezirow posits that experiential activities often lead to situations known as 'disorienting dilemmas' [4] compelling learners to critically reflect on their preconceived notions and assumptions. This reflection results in modifications to their established meaning perspectives and the development of new frames of reference through a transformative shift in perspectives [26].

A learner's frame of reference comprises their habits of mind, shaped by life experiences, previous education, personal interests, and social influences [27]. Cranton [28] categorized these into six dimensions: Philosophical (dealing with transcendental worldviews), Moral and Ethics (related to conscience and morality), Psychological (pertaining to self-concept and personality traits), Sociological (involving social norms and cultural expectations), Epistemic (related to knowledge acquisition), and Aesthetic (concerning values, attitudes, and judgments). According to Mezirow's theory [4], students undergoing transformative learning identify and engage with their problematic frames of reference, resulting in a lasting shift in perspective. Conversely, students who do not undergo such transformation may experience only marginal and transient changes in their perspectives or none at all [29]. The transformative learning process is characterized by Mezirow's ten-stage framework:

Stage 1. A disorienting dilemma
Stage 2. Self-examination with feelings of guilt or shame,
Stage 3. A critical assessment of epistemic, sociocultural, or psychic assumptions,
Stage 4. Recognition that one's discontent and the process of transformation are shared and that others have negotiated a similar change,
Stage 5. Exploration of options for new roles, relationships, and actions,
Stage 6. Planning a course of action,
Stage 7. Acquisition of knowledge and skills for implementing one's plans,
Stage 8. Provisional trying of new roles,
Stage 9. Building of competence and self-confidence in new roles and relationships; and
Stage 10. A reintegration into one's life based on conditions dictated by one's new perspective.

King [12] summarized the ten stages of Mezirow's transformative learning theory. He conceptualized "journey of transformation" comprising four major phases: (a) Discontent (Stages 1-2) – experiencing the disorienting dilemma; (b) Testing and Exploring (Stages 3-5) – critically reflecting on our assumptions and values; (c) Affirming and Connecting (Stages 6-9) – experimenting with new viewpoints; and (d) New Perspectives (Stage 10) – integrating and acting upon the new perspective gained through this process.

III. Conceptual Frameworks

In the context of this paper, "Personality Attributes" are conceptualized to include a comprehensive range of characteristics that affects a students' cognitive, social, and behavioural domains. To that extent, we utilized multiple concepts, such as Big Five personality traits, and social intelligence. This paper aims to utilize these conceptual frameworks to explore the relationship between transformative learning outcomes and personality attributes.

IV. Method

Participants

The study included 18 undergraduate students from four U.S. universities who participated in faculty-led short-term study abroad programs. Gender distribution among the participants was balanced with eight female and eight male students. Two students preferred not to disclose their

gender. The majority were White students (n = 15), followed by African American students (n = 2), and one student who preferred not to disclose their race. Students' academic majors were fairly divided, with a slight majority in engineering (n = 10) compared to non-engineering majors (n = 8). Two students in the sample identified as first generation, and only one student identified as an international student.

Setting

Each program at four U.S. universities was a short-term study abroad program, spanning an average of two weeks, and none extending beyond a single academic semester. Program destinations displayed a diverse range across African, European, Asian and Latin American countries. Almost all programs included field trips and group activities, and more than half of the programs included components, such as reflective exercises, lectures, reading/writing assignments, and projects.

Measures

An online survey using Qualtrics was distributed to the students after the commencement of their respective study aboard programs. To collect all the relevant student characteristics, items regarding student attributes were grouped into three categories on the survey- programmatic, demographic, and personality. *Programmatic attributes* included students' previous experiences, such as prior participation in study abroad programs and living abroad for extended periods. *Demographic attributes* included factors, such as gender, race, ethnicity, academic major (distinguishing between Engineering and non-Engineering fields), residency (domestic or international), and first-generation status. *Personality attributes* were assessed using the following measures: (a) the Big Five Personality Scale, which measured key personality traits, and (b) the Tromso Social Intelligence Scale, which characterized various elements of social intelligence. Figure 1 shows the assessments used in detail.

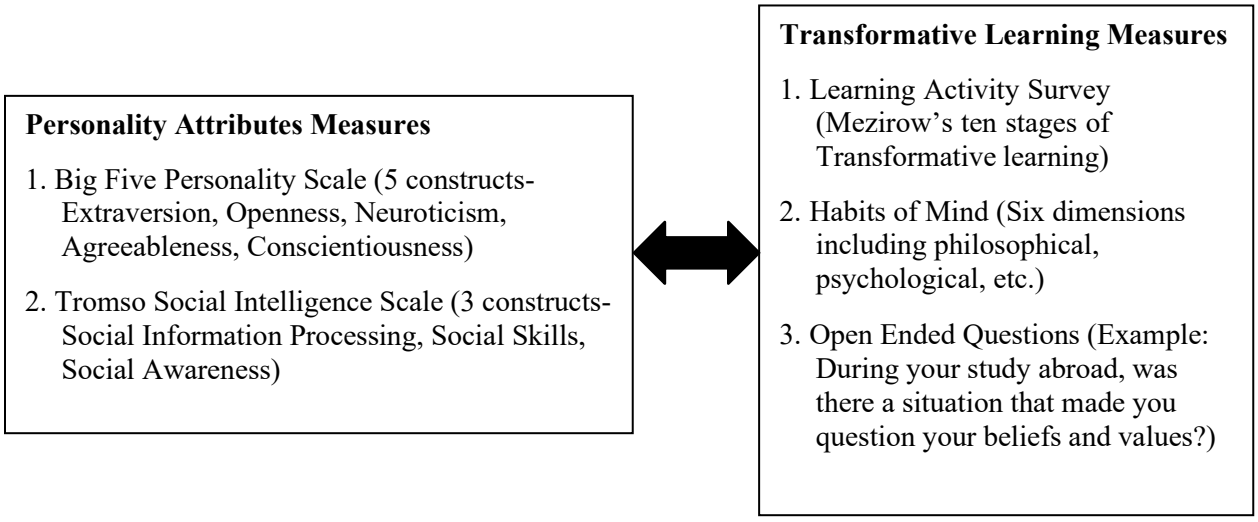

Figure 1. Assessments of the survey

The survey utilized a modified Learning Activity Survey [12] which included 11 Likert-scale items, ranging from 1 (Strongly Disagree) to 6 (Strongly Agree), to assess students' experiences related to Mezirow's ten stages of transformative learning (first two items measured the first stage, subsequent items measured the rest of the nine stages). The survey also employed six

items related to the six dimensions of habits of mind [28]: philosophical, moral and ethics, psychological, sociological, epistemic, and aesthetic. The habits of mind items were intended to investigate whether there was a change in any of the six dimensions, so they were assessed as dichotomous response items (Yes/No). If participants selected "yes" for any dimension, they were prompted with a follow-up question asking them to choose the factors that influenced this change. These included interactions with classmates, support from instructors, encounters during the program, involvement in a team project, the college's support system, and any other notable factors. Finally, six open-ended questions were included in the survey to collect students' reflections on their transformative learning experiences during study abroad.

Data Analysis

The quantitative data collected in the survey were analyzed through descriptive and correlational analysis. Content analysis was used to analyze the qualitative data. A Spearman correlational analysis was performed between different transformative learning measures and student personality measures. The Spearman correlation is particularly effective when sample sizes are small (in our case, $N = 18$). During content analysis of the qualitative data, we used open coding to analyze the responses obtained from the open-ended items in the survey. The codes generated were categorized into *a priori* and emergent themes.

V. Results

Mezirow's Ten Stages of Transformative Learning

As shown in Table 1, most students admitted to experiencing the ten stages of transformative learning, with their responses ranging from "slightly agree" to "agree." The highest mean score was observed for stage 7 (Acquisition of skills and knowledge for implementing the action plan), corresponding to the third phase of the journey of transformation, Affirming and Connecting - experimenting with new perspectives, and the lowest mean score was observed for stage 5 (Exploration of new actions and roles), corresponding to the second phase of the journey of transformation, Testing and Exploring - critical self-reflection.

Table 1. Four Phases of Journey Corresponding to Ten Stages of Transformative Learning

Phases	Stages	*M*	*SD*	Interpretation
Discontent	1. Experience a disorienting dilemma	4.50	1.24	Agree
	2. Self-examination	3.78	1.40	Slightly Agree
Testing & Exploring	3. Critical assessment of assumptions	3.89	1.41	Slightly Agree
	4. Recognition that others shared a similar transformation	4.00	1.45	Slightly Agree
	5. Exploration of new actions and roles	2.67	1.19	Slightly Disagree
Affirming & Connecting	6. Development of an action plan	3.94	1.26	Slightly Agree
	7. Acquisition of skills and knowledge for implementing the action plan	4.94	1.06	Agree
	8. Implementing the plan	3.94	1.00	Slightly Agree
	9. Development of self-confidence and competence in new roles	3.89	1.18	Slightly Agree

New Perspectives	10. Reintegration of new perspectives	3.83	1.20	Slightly Agree

However, in Table 2, when scores for stages were averaged for each phase of the journey of transformation, all four phases received similar mean scores, with students slightly experiencing all four phases. Notably, the first phase of the journey of transformation, Discontent, had the highest mean and second phase of the journey of transformation, Testing and Exploring, had the lowest mean.

Table 2. Descriptive Summary of Journey of Transformation scores ($N = 18$)

	Discontent	Testing & Exploring	Affirming & Connecting	New Perspectives
M	4.26	3.52	4.18	3.83
SD	1.06	1.02	0.76	1.20
Likert Scale Interpretation	Slightly Agree	Slightly Agree	Slightly Agree	Slightly Agree

Habits of Mind

As shown in Table 3, most students ($n = 15$) noted changes in sociological dimension of habits of mind and the least students ($n = 5$) noted changes in epistemic dimension of habits of mind. Additionally, when changes in habits of mind dimensions were compared based on gender, we found that more female students reported experiencing changes in the moral and ethics, and aesthetic dimensions, in contrast to their male counterparts. This finding suggests that there may be a potential difference in how student gender may affect certain aspects of students' perspectives and their transformative learning experiences during study abroad programs.

Table 3. Changes in Habits of Mind Dimensions and Its Contributing Factors

Habits of Mind	Frequency			Highest Contributing Factors
	Total ($N = 18$)	Female ($n = 8$)	Male ($n = 8$)	
Philosophical	7	3	3	Peer Support (2), Encounter during Program (2), Cultural Activities (2)
Moral & Ethics	7	4	2	Cultural Activities (4), Professional Exposure (3), Encounter during Program (3), Field Trips (3)
Psychological	11	4	5	Cultural Activities (6), Peer Support (4), Instructor Support (4), Professional Exposure (4), Debrief/Reflection (4)
Sociological	15	7	6	Cultural Activities (8), Encounter during Program (5), Field Trips (5), Educational Activities (5)
Epistemic	5	2	3	Encounter during Program (2), Instructor Support (2)
Aesthetic	12	6	4	Encounter during Program (5), Field Trips (5), Cultural Activities (4)

Associations of Students' Personality Attributes and Transformative Learning

No correlations were found between students' journey of transformation and their learning styles. Furthermore, no correlations were found between students' journey of transformation and different levels (high, medium, and low) of transformative learning readiness. However, when examining the Big Five personality attributes, our analysis revealed significant correlations: Agreeableness had a negative correlation ($r = -0.475$, $p < 0.05$) with the journey of transformation's second phase, Testing and Exploring. Openness showed a positive correlation ($r = 0.581$, $p < 0.05$) with the journey of transformation's third phase, Affirming and Connecting (see Table 4). In the correlation results from the Tromso Social Intelligence Scale, the Social Skills dimension showed a negative correlation with the journey of transformation's second phase, Testing and Exploring ($r = -0.480$, $p < 0.05$) (see Table 5).

Table 4. Correlation between Journey of Transformation scores and Personality measures

Traits	Constructs	Phases of Journey of Transformation			
		Discontent	Testing & Exploring	Affirming & Connecting	New Perspectives
Big Five Personality Traits	Extroversion	0.019	-0.24	-0.163	-0.244
	Agreeableness	-0.195	-.475*	-0.255	-0.466
	Conscientiousness	0.149	-0.14	0.074	0.168
	Neuroticism	0.165	0.373	0.19	0.015
	Openness	0.329	0.198	0.581*	0.427
Tromso Social Intelligence Traits	Social Information Processing	0.449	-0.25	0.223	0.136
	Social Skills	0.027	-.480*	-0.145	-0.214
	Social Awareness	0.342	-0.253	0.081	0.05
Descriptive Statistics	*M*	4.26	3.52	4.18	3.83
	SD	1.06	1.018	0.756	1.2

Note. *$p < 0.05$

Furthermore, results from the Independent-Samples Mann-Whitney *U* Test indicated that there is a statistically significant difference ($U = 3.50$, $p = .017$) in the agreeableness scores between students who reported a change in their sociological dimension of habits of mind and those who did not. This finding suggests an association where students with higher levels of agreeableness are also more likely to report changes in their sociological dimension.

Demographic Attributes with Transformative Learning

The analysis revealed no statistical differences in the journey of transformation scores across different program-related variables, such as the number of study abroad programs undertaken by the student and the previous experience of living abroad for an extended period. Further, there were no statistically significant differences in the journey of transformation scores across various demographic variables (i.e., gender, race, ethnicity, academic major, etc.).

As shown in Table 5, the result of Pearson Chi-square test revealed that engineering students had

a higher likelihood of experiencing changes in epistemic dimension as compared to the non-engineering students, pointing towards the possibility of a meaningful relationship between student majors and the likelihood of changes in habits of mind dimensions.

Table 5. Cross Tabulation Analysis between Students' Academic Majors and Habits of Mind's Epistemic Dimension

Change in Epistemic Dimension	Frequency	
	Engineering (n=10)	Non-Engineering (n=8)
Yes	5 (2.8)	0 (2.2)
No	5 (7.2)	8 (5.8)
Total	10	8

Note. Pearson Chi-square = 5.538, $df = 1$, $p = .019$

Evidence of Perspective Transformation in Student Reflections

Among the 18 students who participated in the survey, 11 students agreed that they experienced situations that changed their beliefs and values and many of them described the situations that compelled them to reassess their previous beliefs and values. These situations acted as "disorienting dilemmas" which made them critically reflect on their preconceived notions or assumptions. Here is an example:

> "*Yes, as our group discussed the language barrier that existed between us and the Kenyan students our age that we were partnered with, we talked about how when someone has a basic knowledge of English, it is easy to associate that person with not being as knowledgeable. We considered that this was due to young children being the other group of people we've worked with that have similar English levels. In reality, the students we worked with were incredibly smart to pick up English in a few years or less. I considered that these presuppositions could be something I've used subconsciously when working and that this thinking is something I want to change*."

However, among the students who stated that they did not experience any situation that might have changed their beliefs and values, their overall reflection showed some evidence of perspective transformation.

> "*I did not experience a situation during my study abroad that changed my beliefs or value…During my study abroad program I learned how truly uneducated I am about other countries. If we had not been provided with a pre-reading, I probably would have gone into the trip completely blind*."

Student Attributes as Reflective Lenses

All the responses showed that some students were more introspective and reflective than others. Students employed distinct facets of their personalities and personal attributes to articulate their experiences and insights regarding the transformative learning opportunities they encountered in their study abroad programs. Student reflections were coded based on the different personal attributes the students referred to, which we will call "reflective lens." The codes were categorized into two groups-- a priori themes and emergent themes. A priori themes consisted of codes related to the theoretical constructs of different personality measures we used in the study, such as learning styles, Extraversion-Introversion, openness to experience, etc. The emergent themes comprised the unique codes that emerged from the content analysis, such as engineering

identity, racial identity, etc. Table 6 depicts all the codes related to both themes and relevant excerpts from student reflections associated with them.

Table 6. Personal Attributes as Reflective Lens

A Priori Themes	**Example statements**
Openness to Experience (Big Five Personality Construct)	*"I learned that I'm increasingly getting better at participating in activities that make me uncomfortable/scare me…I didn't shy away from things that I thought used to terrify me"* *"I was able to be more adventurous and get out of my shell more."*
Agreeableness (Big Five Personality Construct)	*"I feel that my goals prior to the program were very self-centered, but I have changed my goals and expectations for my life to be more focused on others rather than myself. "*
Extraversion-Introversion (Big Five Personality Construct)	*"I tend to become more shy when I am placed in a place where I am not like every one around me, especially when I do not speak the same native language of others."* *"I am more outgoing than I originally thought and made more friends. "*
Learning Style	*"During the study abroad program, I learned how much I enjoy helping others and working in a hands-on environment."* *"My learning style requires variety, which could only be met outside of the classroom. "*
Emergent Themes	**Example statements**
Engineering Identity	*"Many mechanical engineers I know in my field are extremely motivated by their prospective high salaries. This changed my perspective on the motivation that is involved in mechanical engineering."*
Sociocultural Identity	*"the way Americans do things is seen as weird or bad by the standards of better countries. It was not one experience but just how everything was pretty much."* *"America is not the best country, and being confined to comfort is one of the worst life mistakes."*
Racial Identity	*"[I] found out that my political values align more with Ghanaians than those of African-Americans."*
Comfort with Ambiguity	*"I can do hard things, withstand uncertainty and discomfort…even in a different country"*

VI. Discussion

Literature has explored study abroad programs' ability of being transformative, however the degree of transformative learning has varied among individual participants. Our study found that students indicated highest agreement for experiencing the "Disorienting Dilemma" phase but lower agreement for experiencing subsequent phases. We contemplate a few reasons behind this finding. First, even though the students encountered situations that challenged their existing beliefs or assumptions, they might not have had sufficient time to fully comprehend their

disorienting experiences owing to the duration constraint in short-term study abroad programs [30]. Second, the extent of disorienting dilemma encountered depends on the cultural distance of the study abroad destination from the students' host country [31] [32]. Since most participants were U.S. students except one international student, the student who went to a country which has a higher cultural distance from the U.S. might arguably encounter stronger disorienting dilemmas. Third, since the sample contained students who participated in different study abroad programs, programmatic factors might also have played a role in enabling or deterring the critical reflection on the disorienting dilemmas needed for transformative learning to occur. Study abroad participants require guidance for reflecting on these disorientations to help them achieve the subsequent phases of the journey of transformation [33].

Certain personal attributes of students may have affected the process of transformative learning. Our study found that agreeableness had a negative correlation with the Testing and Exploring phase of transformative learning. Agreeableness measures a person's altruistic, empathetic, trusting, and cooperative tendencies [34]. In a study exploring the relationship between Sternberg's thinking styles and Big Five personality dimensions, they found that agreeableness was positively associated with the external thinking style, but negatively associated with the liberal and internal thinking styles [35]. This implies that highly agreeable people might not naturally incline towards the high level of independent critical reflection. However, there are studies that have found no relation between critical thinking and personality dimensions [36]. Moreover, high agreeableness may invite tendencies of conflict avoidance and conformity. Highly agreeable people respect others' beliefs and values. The process of introspection and self-reflection, central to transformative learning, may create internal resistance or conflict for highly agreeable people when they confront their own beliefs, values, and assumptions.

Another salient finding of this study was that openness had a positive correlation with Affirming and Connecting phase of journey of transformation. Openness measures a person's sense of adventure, curiosity, imagination, and willingness to embrace new ideas [34]. The Affirming and Connecting phase of transformative learning involves trying out new ideas, perspectives, and stepping outside one's comfort zone. All these activities align well with the curious, exploratory, and adaptive tendencies of people with high level of openness.

Most students in our study reported experiencing changes in various habits of mind, except for the epistemic dimension. The observed higher changes in sociological, aesthetic, and philosophical dimensions align well with the nature of experiences encountered in study abroad programs. However, the minimal change in the epistemic dimension may be due to the "vacation mindset" of study abroad participants or programmatic factors, specifically, the intended learning outcomes of various study abroad programs. The latter may be a possible explanation for the observed differences in the changes in epistemic dimensions for engineering and non-engineering students.

The findings from the open-ended responses relate to those in the existing literature regarding the impact of study abroad experiences on personality development [18]. Students reported instances where they stepped beyond their comfort zones, along with a noticeable growth in their willingness to embrace new experiences. The way in which students referenced various facets of their identity as a lens to reflect upon their transformative experiences during study abroad

suggests a probable connection between personal attributes and transformative learning outcomes. This observation indicates that these two variables – individual characteristics and the results of transformative experiences – may be interrelated.

VII. Limitations of the Study and Future Research

In this study, we found evidence pointing towards associations with students' transformative learning experiences with their personality attributes. However, it is important to note that the study relied on a relatively small sample. As a result, the generalization of these findings is limited. Despite this, the associations identified in this research contribute to advancing our understanding of how study abroad programs can be made more personalized. By tailoring these programs to align with individual students' personal characteristics, we can better ensure and enhance transformative learning experiences for all students, making this an important step forward.

Future work will focus on finding more substantial correlations between students' attributes, such as personality, learning styles, demographics, and their transformative experiences and outcomes during study abroad. We aim to conduct this investigation using a mixed-methods approach and a larger sample size, which will enable a more comprehensive understanding of how these factors influence the transformative learning process.

VIII. Conclusion

This study has shed light on the extent of transformative learning that occurs in short-term study abroad programs, highlighting the influence of students' personality attributes and demographic backgrounds on the transformative experiences of students. Both qualitative and quantitative findings confirmed that all the participants experienced transformative learning to a moderate extent. Our findings revealed that while these programs are inherently capable of initiating transformative learning through disorienting dilemmas, there is variability in the extent of transformation. These variabilities could be to some extent explained by the unique personality traits of students. Additionally, the variations in the level of reflection in student responses can be attributed to disparities in critical reflection skills and the lack of sufficient scaffolding tools within the programs. Only half of the participants reported that reflective exercises were a component of their study abroad program.

Any travel experience is not inherently transformative in nature; intentionality, planning, and follow-up are essential requirements for cultivating transformative learning experiences [27] [37]. Moreover, transformative learning process often invokes emotional discomfort as students engage with disorienting dilemmas. It is for practitioners and researchers to understand the relationship between the transformative learning process and the affective learning domain. Focused efforts towards equipping students with reflection skills and guiding them through the various stages of their transformative journey can enhance their overall level of transformation. This will help in achieving more uniform and profound transformative outcomes from short-term study abroad programs, effectively bridging the gap between individual predispositions and the transformative potential of these programs.

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References

[1] R. Vandeveer and M. L. Menefee, "Study abroad, international internship and experiential learning: A world-class adventure in learning," in *Decision Sciences Institute Southwest Region (SWDSI)*, 2006.

[2] S. Shandilya, S. Y. Yoon, G. Raju, and C. A. Kwuimy, "Engineering Students' Transformative Learning Experiences from A Virtual International Collaborative Experiential Program," in *IEEE Frontiers in Education Conference (FIE)*, 2023.

[3] S. Shandilya, G. Raju, S. Y. Yoon, and C. A. Kwuimy, "Exploring Transformative Learning from a Summer Bridge Program," in *ASEE Annual Conference & Exposition* , 2023.

[4] J. Mezirow, Transformative dimensions of adult learning, 350 Sansome Street, San Francisco, CA 94104-1310: Jossey-Bass, 1991.

[5] H. L. Bell, H. J. Gibson, M. A. Tarrant, L. G. Perry III, and L. Stoner, "Transformational learning through study abroad: US students' reflections on learning about sustainability in the South Pacific," *Leisure Studies ,* vol. 35, no. 4, 2016.

[6] T. M. Chiang and J. F. Yao, "Transformative Learning Experiences through Short-term Study Abroad programs," *Journal of Transformative Learning,* vol. 7, no. 1, p. 3, 2020.

[7] H. Strange and H. J. Gibson, "An investigation of experiential and transformative learning in study abroad programs," *Frontiers: The Interdisciplinary Journal of Study Abroad ,* vol. 29, no. 1, pp. 85-100, 2017.

[8] J. Wood and J. Jobe, "Short-Term Travel Abroad to Uganda & Guatemala: A Preliminary Assessment of Student Transformative Learning," *Journal of Transformative Learning,* vol. 7, no. 1, 2020.

[9] R. Kiely, "A transformative learning model for service-learning: A longitudinal case study," *Michigan journal of community service learning,* pp. 5-22, 2005.

[10] S. B. Carr and S. M. Vaughn, "Transformative Growth in an International Experience through Cultural Humility.," *Journal of Transformative Learning,* vol. 7, no. 1, 2020.

[11] C. M. Halupa, "Transformative curriculum design," in *Medical Education and Ethics: Concepts, Methodologies, Tools, and Applications*, 2017.

[12] K. P. King, The handbook of the evolving research of transformative learning: Based on the Learning Activities Survey, IAP, 2009.

[13] J. K. Harrison and E. Voelker, "Two personality variables and the cross-cultural adjustment of study abroad students.," *Frontiers: The Interdisciplinary journal of study abroad,* vol. 17, pp. 69-87, 2008.

[14] J. E. Barbuto Jr, G. Beenen, and H. Tran, "The role of core self-evaluation, ethnocentrism, and cultural intelligence in study abroad success.," *The International Journal of Management Education ,* vol. 13, no. 3, pp. 268-277, 2015.

[15] L. Petersdotter, E. Niehoff, and P. A. Freund, "International experience makes a difference: Effects of studying abroad on students' self-efficacy," *Personality and Individual Differences ,* vol. 107, pp. 174-178, 2017.

[16] R. E. Ramirez, "Impact on intercultural competence when studying abroad and the moderating role of personality," *Journal of Teaching in International Business ,* vol. 27, no. 2-3, pp. 88-105, 2016.

[17] B. Moorhead, N. Ivory, H. Boetto, and K. Bell, "Short-term study abroad programmes in social work: A scoping review of the literature on learning outcomes.," *Social Work Education ,* vol. 41, no. 8, pp. 1577-1591., 2022.

[18] E. Niehoff, L. Petersdotter, and P. A. Freund, "International sojourn experience and personality development: Selection and socialization effects of studying abroad and the Big Five," *Personality and Individual Differences ,* vol. 112, pp. 55-61, 2017.

[19] W. L. Wang and G. S. Ching, "The role of personality and intercultural effectiveness towards study abroad academic and social activities," *International Journal of Research Studies in Psychology,* vol. 4, no. 4, pp. 13-27, 2015.

[20] S. A. Basow and T. Gaugler, "Predicting adjustment of US college students studying abroad: Beyond the multicultural personality," *International Journal of Intercultural Relations,* pp. 39-51, 2017.

[21] S. Bakalis and T. A. Joiner, " International journal of educational management," *Participation in tertiary study abroad programs: The role of personality.,* vol. 18, no. 5, pp. 286-291, 2004.

[22] M. H. Salisbury, M. B. Paulsen, and E. T. Pascarella, "Why do all the study abroad students look alike? Applying an integrated student choice model to explore differences in the factors that influence white and minority students' intent to study abroad," *Research in higher education,* vol. 52, pp. 123-150, 2011.

[23] J. K. Harrison and H. H. Brower, "The impact of cultural intelligence and psychological hardiness on homesickness among study abroad students," *Frontiers: The Interdisciplinary Journal of Study Abroad ,* pp. 41-62, 2011.

[24] O. E. Varela, "Learning outcomes of study-abroad programs: A meta-analysis," *Academy of Management Learning & Education ,* vol. 16, no. 4, pp. 531-561, 2017.

[25] N. L. Gullekson and M. L. Tucker, "An Examination of the Relationship between Emotional Intelligence and Intercultural Growth for Students Studying Abroad," *Journal of*

the Academy of Business Education, 2012.

[26] J. Mezirow, "A transformation theory of adult learning," in *Adult Education Research Annual Conference Proceedings*, 1993.

[27] J. Mezirow, "Learning to think like an adult," *Learning as transformation: Critical perspectives on a theory in progress,* pp. 3-33, 2000.

[28] P. Cranton, Understanding and promoting transformative learning: A guide to theory and practice., Routledge, 2016.

[29] D. T. K. Tien, S. N. Namasivayam, and L. S. Ponniah, "A review of transformative learning theory with regards to its potential application in engineering education," in *AIP Conference Proceedings*, 2019.

[30] S. B. Goldstein, "A systematic review of short-term study abroad research methodology and intercultural competence outcomes," *International Journal of Intercultural Relations ,* vol. 87, pp. 26-36, 2022.

[31] C. Douglas and C. G. Jones-Rikkers, "Study abroad programs and American student worldmindedness: An empirical analysis.," *Journal of Teaching in International Business ,* vol. 13, no. 1, pp. 55-66, 2001.

[32] B. L. Leaver and C. Campbell, "The transformative power of the study abroad experience.," *L2 Journal: An electronic refereed journal for foreign and second language educators,* vol. 15, no. 2, 2023.

[33] A. Gibson, E. Spira-Cohen, W. Sherman, and N. Namaste, "Guided disorientation for transformative study abroad: impacts on intercultural learning," *Studies in Higher Education,* vol. 48, no. 8, pp. 1258-1272, 2023.

[34] P.T. Costa and R. R. McCrae, "The revised neo personality inventory (neo-pi-r)," *The SAGE handbook of personality theory and assessment*, vol. 2, no. 2, 2008.

[35] L.F. Zhang, "Thinking styles and the big five personality traits.," *Educational psychology,* vol. 22, no. 1, pp. 17-31, 2002.

[36] A. Tao and X. Li, "Relationship between critical thinking and personality based on the history of psychology teaching," *American International Journal of Social Science ,* vol. 3, no. 5, pp. 88-93, 2014.

[37] G. A. Stone and L. N. Duffy, "Transformative learning theory: A systematic review of travel and tourism scholarship," *Journal of Teaching in Travel & Tourism,* vol. 15, no. 3, pp. 204-224., 2015.