

# African Diaspora Engineering Education Student Experiences in the US: A Collaborative Autoethnographic Study

**Abstract**—The number of students of African origin traveling abroad for postgraduate engineering education has increased over the last 30 years. Studying abroad provides unique experiences and benefits for African students and the host country. These experiences place international scholars in an ideal position to reflect on the different experiences between the practices, attitudes, social diversity, and competency development they find in their new study destinations and hence can make suggestions for improvement in their home and host countries. This paper explores the experience, reflections, and adaptation of African scholars to their international educational context during the COVID pandemic, using a collaborative autoethnography methodology. Elements of the theoretical frameworks of social identity theory, acculturation theory, adaptability theory, and Tinto's student retention perspectives were used in the collection, analysis, and discussion of the paper to address the following research questions: 1) What are the experiences and perspectives of African Diaspora graduate scholars in undertaking engineering education studies in the US? 2) What improvements are suggested for the study environments in their home countries and in the US? The findings raise provocative thoughts about the culture of and the philosophies behind the present nature of instruction, assessment, student supervision, experiences, and workload in the US and African countries. We argue for a need to disrupt several realities that have become a norm for African diaspora students and suggest how this can be done drawing from our own experiences within these unique environments.

**Keywords**—diversity, inclusion, African diaspora, engineering education, adapt, studying abroad

## INTRODUCTION

Studying abroad provides unique learning experiences for students. Consequently, for the past thirty years, there has been an increase in the number of students from Europe, Asia, and Africa studying abroad, the United States (US) being a major destination [1], [2]. International students' decision to study outside the shores of their home countries has been found to be informed by social, human, and cultural capitals [3]. While African students tend to gravitate toward international environments for postgraduate study, reports show that they seek to uphold their identities, arguably because they are aware of deep colonial histories between their nations and the host nations [4]–[6].

Study abroad is not only beneficial to the students but is also a key contributor to the economies of the host nations. Studies conducted in 2018 showed that the US alone generated a revenue of over \$40 billion through international students [7] although this figure dipped during the global Covid-19 pandemic [8]–[10]. Aside from economic benefits, the arrival of international students to the US has also been linked to the development of the sociocultural awareness of American students [11]–[14]. Interculturally competent graduates are highly sought after by US employers [15]–[17]. Conversely, the migration of students to the West has also been criticized for reducing the talent pool of developing nations [7] begging the question that these countries are responsible for an unending case of “brain drain” [18], [19]. We draw the attention of the reader to these underlying issues

because international students are constantly grappling with them in their respective programs.

The literature surrounding the acculturation and adaptation of international students is extensive [13], [20]–[22] but the use of the umbrella term “international students” has been skewed towards students from Asia, Europe, and the Americas [23]–[25], with significant focus on the experiences of undergraduate students. Our review of the literature revealed that an ubiquitous term like “international” subsumes many people groups. The few studies that talk about the experiences of African students studying abroad describe the stress, struggles, and racial discriminations they face while adapting to their study environments [26]–[29]. Unsurprisingly, there is still a large gap in the scholarship of the considerations, thoughts, anxieties, and experiences of African diaspora scholars, much more so in engineering education. This provides a unique opportunity to engage in a group inquiry on the experiences of African graduate scholars studying in the US, involved in engineering education research.

The aim of this study is to explore our varied experiences as African students and scholars studying in the US through a collaborative autoethnographic study. Our study is guided by the following research questions: 1) What are the experiences and perspectives of African Diaspora graduate scholars in undertaking engineering education studies in the US? 2) What improvements are suggested for the study environments in their home countries and in the US?

## THEORETICAL FRAMEWORK

Our study unpacks the experiences of African international graduate students and scholars using a conceptual understanding that borrows from social identity theory [30], acculturation theory [31], and an adaptability framework [32]. These theories have been developed and extensively used in the literature surrounding cross-cultural mobility and integration for over four decades [33]. Consequently, they were useful to help us conceptualize the processes by which international students navigate their cultural and social identities in diaspora. We used the four definitions of assimilation, integration, separation, and marginalization suggested from the theory of acculturation to develop reflection prompts for ourselves. Our two core research questions were developed from these reflection prompts.

Leveraging Martin and colleagues' work [32], we adapted the tripartite dimensions of adaptability namely, cognitive, behavioral, and affective in analyzing the data. The cognition dimension was conceived as philosophical (thinking), behavioral as social and cultural, and affective as emotional. As we reflected on our individual and collective responses to the reflection prompts, we went back to the foundational theories to help make sense of what we were seeing in the data. At this stage, we found the social, biographical, and relational perspectives of Tinto's retention [34] and Berry's acculturation model [35] extremely useful lenses to help us analyze, categorize and report our findings, which led us to include the material/physical dimension.

## POSITIONALITY STATEMENT

The participants of this study are nine African scholars (eight doctoral students and one short-term research scholar) who are currently studying at six universities across the US. The authors comprise of six males and three females, representing their home countries of Liberia, Nigeria, South Africa, and Uganda (hereafter collectively referred to as “home”). The authors all have undergraduate engineering qualifications and collectively have diverse experience across industry and academia with various portfolios ranging from early career researchers, specialists, management, and thought leaders in engineering education. Whilst the authors have varying epistemological and ontological paradigms, we have agreed to take a collaborative constructivist approach in this study. We recognize that our constitutions as Africans studying internationally are laced with our own views and perspectives tied to our backgrounds and individual experiences. These factors are never fixed, are constantly evolving, and ever present in research [36]. Thus, we do not deny that these inherent biases shape our methodology and how we report our findings in this study. Most importantly, we do not claim that these findings are representative of the experiences of all international African students’ studying engineering education abroad.

## METHODS

The study takes a collaborative autoethnographic approach, a qualitative research method conducted by two or more researchers dialoguing to analyze and interpret the collection of autobiographic data [37]. Collaborative autoethnography enables the articulation of insider knowledge of a cultural experience from one’s own position and experience [38], [39]. It allows multiple researchers to contribute to data generation, analysis, and writing and hence provides multidimensional perspectives to the research [37]. Also, collaborative efforts in engineering education are important to ensure formation of identity for students [40], [41].

Our collaborative autoethnographic study was developed through a series of online discussions, using Zoom. This related to our experiences as nine African students with experiences in the United States and at home. These discussions were led and facilitated by the lead author with rules of engagement and confidentiality requirements clearly articulated and agreed amongst all participants. The data were collected through a combination of a survey and three open-ended collaborative discussions hosted online. We initially generated a series of discussion prompts and an online survey-style living document based on the theoretical framework which was used as a roadmap for the discussions. We responded to the discussion prompts in our spare time offline, and the online meetings were used to facilitate collective reflections and narratives. During the meetings, our discussions fostered revisions and updates based on the follow-up questions we had for each other. Throughout, we sought to understand and clarify each participants’ thoughts and experiences.

With the data from the written survey and follow-up open discussions, meetings were scheduled to collaboratively analyze the data. The theoretical framework was used to initially synthesize the results, and the results underwent a member checking process for the authors to validate and

verify whether their information and views had been captured accurately and described coherently.

## RESULTS & DISCUSSION

The analysis identified 12 thematic areas, of which we only extensively discuss instruction, assessment, and workload in this paper, as these most closely align with the theme of this conference. In addition, our analysis revealed extensive data for these 3 areas. The four dimensions identified from the theoretical framework — social/cultural, philosophical/political, physical/material, and emotional were integrated into each of the thematic areas to improve readability. Our discussions and reflections cover the breadth of our adaptations to the education systems in the US, which include disruptions experienced due to the COVID pandemic. We also offer our perspectives on why such differences exist between our home and host contexts and suggest improvements. All claims and reported results in these sections are solely based on the analysis of the experiences of the 9 participants.

TABLE I. NUMBER IN CONSENSUS

Grouping	None	Few	Some	Most	All
Number of people	0	2-3	4-5	6-8	9

In this section, when we refer to “few”, we infer that the response was agreed by “2-3 people”; “some, 4-5”; and “most, 6-8”. Where appropriate, we also specify when one, none, or all participants agreed with the assertions (See Table I).

### Instruction

The first major topic we discussed was how we experienced the varying pedagogical types (modes and means) of instruction in the US and at home.

### Mode of Instructional Delivery - Active, Blended, Collaborative (ABC) Learning

The culture of instructional delivery in higher education is differentiated along the lines of student-centered teaching and the traditional style of lecturing [42]–[44]. In our reflections, we realized that several classes we took as graduate students in the US required that we be active participants in the learning process as opposed to the traditional style of teaching that we had our grounding in, at home. One participant reflected:

*“I think that some of the lecturers here (US) have really embraced new educational methods...where lecturers are mostly facilitators. Back at home I faced the sage-on-the-stage type of instruction in many cases.”*

This comment betrays our preference for student-centered classes, consequent upon our belief that students are not only intellectual but also social beings. Hence, we argue that engaging interactions should be a key component of instructional design. We discovered an increased learning gain when the classroom culture actively engaged us compared to cultures of passivity. Ironically, despite the comparative associated benefits of active learning, a few of us reported peculiar cases where it was overdone in some classes in the US, limiting the time for deeper reflections —

*“... [active learning activities] can be mentally exhausting sometimes. In some activities, we just zoned out”.*

We also shared differing views on our adaptation to the 'unusual' learning environment created by the disruption during the global pandemic. While most of us felt we adapted well to the remote style of instructional delivery in the US, a few of us could not mask our struggles with this mode of teaching. An excerpt from the camp of those who adapted well to the change is presented:

*"I started my PhD program in an online environment, and I am really happy [it] exists since I needed to be at home during the initial stages of the COVID pandemic. I adapted quite easily since I have been in classes all my life. The types of instructors don't vary that much to the extent that it can affect your education negatively...remote classes can actually be useful since you can have access to your computer while you work."*

It is important to problematize the fact that this statement assumes that students already have resources that make online learning possible i.e., computers, internet, and electricity [45]. Conversely, those among us who struggled with online learning, despite having these resources complained about what exactly it cost us. In the words of one participant:

*"Remote classes are not my [preferred] method of learning, I prefer in-person classes and group study. I was robbed of my preferred means of learning during the Covid-19 outbreak."*

Upon reflection, for those of us who struggled with remote learning, we believe our struggle stemmed from the fact that it deprived us of an especially vital component that we culturally enjoy i.e., in-person interactions. On the other hand, the yearning to experience 'newness' could be the underlying factor responsible for those of us who adapted easily to remote learning.

#### *Means of Instructional Delivery - Different Strokes for Different Folks*

Cultural differences have a strong impact on the learning experiences of international students [46]. Perhaps nowhere is this more prominent than in the ways we adapted to new accents, sports metaphors, or pop culture references. This expectedly introduced some learning difficulty for us within the first few months of our arrival in the US, especially understanding some illustrations or even jokes made by instructors, to which everyone laughed except for the international students. In the words of two of the authors,

*"I had to become more and more comfortable with telling instructors - 'Please, can you repeat what you just said? What was that? I am not familiar with that reference.' Teachers sometimes speak so fast that [even] my relatively well-developed 'listening skills' struggle."*

*"Other times, they [instructors] make references to American shows or movies that may be so popular to the rest of the class, but I have no idea what they are saying. It was embarrassing at first. But as I practiced asking for clarifications, I realized I learned more, I even gave students like me who struggled the permission to ask about and understand things better."*

Clearly, these references are grounded in the cultural orientations of people in the US. However, we observed that pushing through the discomfort of asking for clarifications not only helped us, but also gave other international students who

were hesitant to pause the flow of class a sense of belonging and the boldness to ask for clarifications themselves.

#### *Assessments*

The second major topic discussed is how we adapted to the different forms of assessments we experienced at home and in the US. We discussed the designs of assessments and the differences in the philosophies behind the designs. We also discussed the intention: whether it was to pass students or weed them out, to create an elitist system or an inclusive one?

#### *The Design and The Purpose of Assessments in the US and at Home - A Difference in Philosophies?*

We all reported the abundance of both formative and summative assessments at home; summative assessment being the final examination and formative referring to assessments prior to the final examinations [47]. At home, formative assessments are not weighted highly, and are generally low-stakes assessments, therefore students do not necessarily focus on them [48]. Furthermore, students' performances on these formative assessments have little bearing on their successes in the course. Consider one of the author's frustrations over this:

*"It makes it very difficult for you to do projects, because the question you ask yourself is - all these projects I'm doing, for just 30 marks?"*

Conversely, our experience in the US shows that all assessments prior to the final assessment are weighted much higher than at home and are based on assessing your learning progressively. Hence, they are taken more seriously by students. Furthermore, it is rare in the US that a concept will be tested more than once. Unlike at home, understanding of concepts in the US will either be tested in the formative assessments or final examinations, but rarely in both.

Assessments in the US are based on clearly communicated outcomes, and students know what is expected of them, unlike many of the assessments experienced back home. This difference took some time for us to adapt to, which caused some level of anxiety. We were mostly used to expecting some trick questions or questions that were ordinarily not covered in the lecture or suggested material content. To address trick questions at home requires additional efforts to understand the depth of concepts. Students often practice different types of problems, and in some cases consult textbooks and other material that were not suggested by the lecturer. One respondent commented:

*"If you're doing an undergraduate engineering qualification and you just superficially go through the content, you're not going to make it. You would have to either get thorough conceptual understanding or you have just done lots of examples just to understand how those examples work"*

Initially, some of us decided that we should use the same approach in the US. We learnt over time by observing how students in the US approached assessments; that it was better to focus mainly on the outcomes illustrated in the course. Many of us adjusted accordingly, especially during periods of high workload. Another respondent contributed to the discussion thus:

*"They (Students in the US) can just submit against those outcomes in like maybe a couple of hours, and I'll probably spend 2 days trying to understand much more than maybe,*

*what those outcomes require...It was probably because I was not used to the outcome-based system that they know. I didn't learn like that. I learned to understand the depth of a concept rather than focusing on the outcomes"*

The consequence of this outcome-based assessment design is that students in the US can become very mechanical, master the art of ticking the boxes without necessarily digging deep for understanding [49]. This makes them less prepared for real-world problems which are known to be ill-structured and rarely ever designed like exam questions.

As we dug deeper into the reasons behind these differences in the design of assessments in our home and host countries, we began to see a pattern. At home, there appears to be an elitist system of creating engineers [50]. The facilitation of learning and assessments are designed not for people to achieve outcomes, but to separate people based on their approach to learning, and their intellectual prowess [51]. Few participants explained that at home, the profession of engineering was historically restricted to certain race groups for a long time. Other categories of engineering professionals were created like technologists and technicians. Although this seemed to be politically justifiable, it still served to create an elitist system within the engineering profession. Other participants reported a similar form of elitism. All of us seemed to agree that our patriarchal systems had historically marginalized women from the field. We have seen similar situations in the US although they are not as prominent.

Finally, some of us believe that in our home countries, even if the undergraduates graduated with top class degrees, they have no real skills for the workplace. This can be inferred from the following excerpt:

*"I studied software engineering; [yet], I couldn't code after 4 years of learning programming. I couldn't program but I passed all the exams"*

This was not a consensus finding across all our home countries and respective programs in Africa. Some programs had assessment systems not being aligned to skills required by industry, which meant that intensive learning programs were required to bring undergraduates up to speed within industry:

*"They [graduates] either have to do another course, or they have to learn everything from scratch in the workplace environment"*

Despite the assessment methods at home, we saw our undergraduate education context giving us a strong foundation for the workplace, even though the required technical skills were not aligned to industry. Our ability to get through an educational system with the type of assessments experienced, combined with limited defined outcomes and minimal resources and support from our home educational system, required us to be resourceful in attaining what we needed to succeed. This we believe gave us an opportunity to develop learning skills, engage more in peer support, and made us more adaptable and innovative in our approach to learning and engineering.

### *Workload*

When discussing workload in the US, we included coursework, research work, assistantship or fellowship work, and leadership work. We compared workload in our home countries and the US, and how we adapted to them during the COVID pandemic.

### *Comparing Workload in the US to our Home Countries*

The most prevalent theme that we discussed was the high workload in the US. The reason for this is due to the combination of different tasks that students and faculty are expected to do. For example, a graduate student can work on research projects, coursework, their dissertation, or leadership roles in the university or community [3]. One of the largest elements which contributed to the high workload was coursework:

*"The workload was high given my learning approach, but also there are assignments due almost every week. Added to my dissertation, supervision, and paid work, it sure got to over 80- and 90- hour weeks"*

The common notion is that 40-hour weeks (20 hours for assistantship work and 20 hours for coursework) is the norm for international students during the study semester. However, in this excerpt, the student reports that the amount of combined time is twice what is expected. The coursework has detracted them from their assistantship and dissertation work. Another student discussed how the workload can also sometimes be self-inflicted due to personal goals they have set:

*"My workload is quite heavy here in the US. I am trying to complete my PhD quite quickly and I am taking many courses. I have fewer family and friends here in the US, so I am able to focus more on myself and my work."*

There were also several comparisons drawn between the workload in the US and the workload at home. This student is commenting on how much more time or energy taking a course in the US is when compared to a course in their home country:

*"Workload in the US is super dense compared to my home country. I jocularly tell my friends that taking two courses in the US equals taking 8 in my home country."*

However, one participant commented: *"Changing fields, the work was the same, but the nature and timing of the work was different"* which most of us agreed to. This meant that the workload was not necessarily higher, but the transition from engineering to engineering education caused the workload to seem higher.

### *Adjusting to the Workload*

When discussing the workload, many of us spoke about the factors that influenced how we adjusted to life in the US as it related to our graduate studies. Being in a different country where the social and cultural norms are different to that of most African countries, makes adjusting to the workload challenging [1]. One of us compared the traditional US student who has been living in the US their whole life and an African international student:

*"I think that we are also not used to how to manage the workload here, because we are not cultured in this system, whereas people in the US, they are cultured in the system."*

The educational system is also quite different and some of us found that the workload can be overwhelming to transition into because of that [2]. However, some university departments in the US do build in time for students to transition during their first year of studies. This works to some extent. To cope, most of us also learned that we needed to

prioritize our choices when invited on to new projects that grab our attention as described by a participant:

*“The best word that a grad student will ever learn to say is NO. I can stand by that. It took years but I later learned to say NO to requests to meet, invitations to be a part of this paper or that. Only if it falls perfectly within the purview of my future work will I say yes. There are so many shiny interests in grad school in the US. Not everything that glitters deserves your attention.”*

This excerpt presents the idea that a student will have to prioritize their workload choices at times to either focus on their coursework, dissertation, assistantship work, or student experience. This poses a challenge without adequate guidance, support and mentorship.

#### *Other Considerations*

Other thematic areas of our discussion bordered on graduate student supervision, cultural inclusion, leadership roles, system trustworthiness, approach and barriers to change, resources and financial stressors, ethics, and overall experience. All of us agreed that the choice of a graduate supervisor is an important life decision, and that power differential in the student-supervisor relationship is more observable at home. In the US, this is less obvious. Another consensus we reached is that research supervisors in the US are more easily approachable than at home where ageism is more prevalent. We also discussed the approach and barriers to change for faculty in the educational systems at home and in the US. At home, we think stakeholders’ reluctance to adapt to change stems from the bureaucratic systems, the philosophy of respecting tradition, and the fear of becoming redundant in the face of change. Also, we identified limited teaching and research funding in engineering education as a significant issue at home. This could be responsible for the prevalent traditional lecture-mode of teaching we find at home.

We discussed several financial stressors that we experience in the US and at home. Lack of access to scholarships and grants is a big issue at home for students and faculty. International students also have less access to funding in the US compared to nationalized US students. In the US, other financial stressors include cost of medical care, accommodation, food, parking, and credit. Leadership roles for students appear less respected and supported in the US compared to home. The US provides better educational resources, that are easier to access compared to what we find at home. The understanding, respect, and execution of policies is a big concern in most of our home countries which is very different compared to our observations in the US.

#### RECOMMENDATIONS

To address our second research question, we categorized our recommendations under instruction and course design, assessment, inclusion, transition and support.

##### *Instruction and Course Design*

Efforts should be made at home to encourage intrinsic motivation to learn, and the environment needs to be made to feel more like a learning system instead of a “weeding out” system for students. There should be an increase in student-centered learning in our home countries that incorporate more active learning activities. Students in our home countries should be encouraged to change their mindset to engage with

a student-centered learning system. The US, although implementing active learning better in classrooms, should carefully consider the amount of active learning in some classes to allow adequate time for deep engagement. Courses at home should be better structured and adopt a more outcomes-based system, with instructors indicating clear expectations of what outcomes to expect. Courses at home should be scaffolded in such a way that students are set for success. There should be more focused work than “busy work” allocated in courses both in the US and at home, as one of our participants suggested *“The workload should be reduced as ‘throwing’ a lot of content at students may not necessarily mean they are learning.”* There should be an increase in the use of blended learning to incorporate both the in-class and online experience rather than reverting to fully in-class only in both the US and our home countries.

##### *Assessment*

We suggest including higher weighting on formative assessments prior to the final summative assessments. This can improve student motivation for continuous study. There should be a limitation on trick questions, but rather more attention given to assessments that test deep conceptual understanding. Both the US and home contexts should improve reflection facilitation techniques after examinations and assessments, so that students can have a deeper understanding of their misconceptions. The assessment system in the US should give some priority to an input and process-based system which can encourage students to dive deeper into the content rather than them learning how to tick the right boxes only. There should be more alignment between success in studies, and preparedness for industry.

##### *Inclusion*

Both the US and home countries should incorporate a variety of international and local contexts within their instruction and assessments. We would recommend that lecturers in the US become more interculturally aware of international students. We also recommend a program for international students to become more interculturally aware of the idiosyncrasies of the local context in the US. Classification of different categories of engineering practitioners at home should be evaluated to promote improved access and inclusion into the engineer category.

##### *Transition and Support*

There should be a deeper analysis on workload, which clearly articulates the time spent by international students studying, working, researching, and engaging with other important aspects of student experience. The reasonableness and expectations of the hours should be further debated. Allowance for transitional aspects illustrated in this paper should also be considered and systematically built into the programs. One participant suggested: *“There must be room for student experience beyond research and courses.”*

Students who are studying engineering education should be oriented to the expected changes in social science, and the differences regarding assessments in engineering. The early introduction of an ontological and epistemological course illustrating the differences in engineering and social sciences could aid students to adjust to changes they experience in the new discipline. Orientation programs should include explaining the assessment systems in the US, and how they compare to other international systems. This could help

alleviate anxiety of students and assist them to adapt their learning strategies. Systems of support (peer, emotional, psychological) should be facilitated for international students, rather than left to individuals to discover on their own. This should include adjustment to social and cultural norms.

#### CONCLUSION / FUTURE WORK

In this paper, we aim to fill a gap in the literature surrounding the diverse experiences and perspectives of African students studying abroad. We report the experiences and perspectives of 9 African graduate scholars with research and educational experience in 4 African countries and the US. We also suggest recommendations for changes in the education systems both in the US and in our home countries. The discussions are limited mainly to the themes of instruction, assessments, and workload experiences. All reported results and recommendations in this paper are solely based on collaborative analysis, and reflection on experiences of the 9 participants. Although there may be similarities illustrated by other studies, this remains to be explored for the purposes of transferability.

Whilst there are strengths in this paper, based on the diverse and extensive backgrounds of the participants combined with the depth of reflections illustrated in the collaborative methods, there are some limitations. The participants are only from 4 countries out of 52 countries that make up the African continent. Even the experiences of the participants of these four represented countries are not generalizable across the 4 countries. Further work will need to incorporate the views of other countries, an objective that this group is motivated to explore. Furthermore, countries can have different educational systems both in the public and private space, hence these diversities need to be incorporated in the future work. In addition, the experiences of the participants in the US are more recent, however their experience of the study environment in the home countries has been during the time of their undergraduate and/or master's programs. It is therefore likely that the comparison with their home educational environments may not be up to date, together with comparisons made based on experiences between different levels of programs. Hence further studies will have to be conducted to assess the assertions of the participants.

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