2023 Annual Conference & Exposition
Baltimore Convention Center, MD | June 25 - 28, 2023
The Harbor of Engineering Education for 130 Years
ASEE
Paper ID #38751

Understanding international graduate engineering students' well-being: What do they need to thrive? (Work in Progress)

Manuel José Alejandro Baquero-Sierra, Purdue University at West Lafayette (PPI)

Alejandro Baquero-Sierra is a 2nd year Ph.D. student in Literacy and Language at Purdue. He got a bachelor's degree in Psychology and a Master's degree in Public Administration.

Mr. Cristián Eduardo Vargas-Ordóñez, Purdue University at West Lafayette (COE)

Cristian Vargas-Ordóñez is a Ph.D. candidate in Engineering Education at Purdue University. His research interests include arts and engineering integration for epistemic justice and multicultural engineering education. He has experience in teaching and designing curricula for various educational programs, including first-year engineering and underrepresented pre-college students. Vargas-Ordóñez also has engineering experience in fields such as environmental control and operations management. He has published several papers on topics such as academic identity construction and transdisciplinary STEAM education.

Dr. Jacqueline E McDermott

Dr. Jackie McDermott joined Purdue University in August 2018. Jackie completed her B.S. in Biology from Hofstra University with minors in Spanish and Biochemistry, and her Ph.D. in Molecular and Cellular Biology from Brandeis University. At Purdue, Jackie is enthusiastic about recruiting future graduate students as well as supporting current graduate students in Engineering. She recognizes that more Black Graduate Students in Engineering are needed, and therefore attends and recruits at the National Society of Black Engineers (NSBE) National Conference each year. To increase the number of Black Engineers coming to graduate school, Jackie helps lead the Pathways Scholars program, which supports underrepresented undergraduates in their summer research. In addition, she works closely with the Sloan Indigenous Graduate Engineering Scholars and is passionate about increasing the diversity and representation of future engineering faculty.

Stephen Mark McBride, Purdue University

Stephen McBride is the Assistant Director of Graduate Student Success for the College of Engineering. With a strong background in leadership development and career preparation, he received many of the highest honors in the National 4-H and National FFA Organizations. During his year of service as the National FFA Southern Region Vice President, Stephen was trained as a professional facilitator and keynote speaker while representing the National FFA Organization on his visits to more than 30 states and Japan. He is passionate about student development and connecting students with the resources and training they need to achieve their career and professional goals.

Understanding International and Domestic Graduate Engineering Students' Well-being: What Do They Need to Thrive? (Work in Progress)

Abstract

International and domestic graduate engineering students (GES) have unique challenges different from domestic students. At large land-grant institutions, these students may feel left out and experience anxiety or stress that hampers their ability to succeed academically. Understanding the antecedents to the challenges GESs face can help engineering colleges better support their international graduate students to ensure they thrive at their institutions. Previous studies have investigated the historical, cultural, and social factors that have impacted the construction of GES's academic identities. However, broader efforts are needed to understand the population of engineering graduate students with a strong engineering focus at universities. This Work in Progress study presents the results of a pilot survey developed that seeks to understand the factors that impact the well-being of international and domestic graduate engineering students. For this, we selected a survey that evaluates this population's social resources. The social resources component assesses social and institutional support, their relationships with advisors, institutional support, and networking capacities. In addition to the dimensions mentioned earlier, we included the PERMA-profiler (Positive emotion, Engagement, Relationships, Meaning, and Accomplishment) to assess the factors of flourishing and well-being of the GESs and determine the impact of the components mentioned above. We plan to apply the refined survey version during the spring semester of 2023. The results will help identify the needs and resources of GESs and their social determinants. Additionally, it will allow the design of programs, workshops, or events that the engineering faculty of Purdue University could create to support their GES.

Introduction

International students are a significant workforce in the United States (U.S.) academy. In the University setting, the growth rate of domestic students is expected to be 0.2%, while that of international students is 6%. In addition, international students allow universities in the U.S. to embrace a diverse environment on their campuses, enrich the learning environment with new cultural perspectives, recruit the best candidates within a broader and more diverse pool, increase their cost revenues in academics, and form a qualified workforce for important positions for national and global development [1].

International graduate engineering students (IGES) comprise a significant portion of the student population. In the United States, there were more than 385,000 international graduate students in the 2021-22 academic year [2], and temporary visa holders earned 58% of all engineering doctorate degrees awarded in 2019 [3]. At Purdue University, 128 countries are represented by the 2,369 IGES in the College of Engineering; this is among a total of 4,992 graduate students in

engineering at our institution [4]. There are 52 African students, 814 East Asian or from the Pacific, 75 from Europe or Eurasia, 111 from the Near East, 1,161 from South or Central Asia, and 156 from the Western Hemisphere.

Although there is a large number of IGES, these students face many barriers that domestic graduate students do not typically share. For instance, non-native English speakers may experience language barriers in the classroom or laboratory. Studies have shown that international students usually read well, but their writing and listening capabilities could be more proficient [5]. Further, IGES may have low confidence levels in courses that are more demanding for English use. Cultural barriers also exist when IGES are tasked with meeting expectations different from their home countries' culture or background [6].

Additionally, Alharbi & Smith show differential impacts on international students during their temporary residence in another country [7]. First, stress and mental health problems are reported in a higher proportion by younger international students and women. Second, acculturative stress is more remarkable in Asian students than European students, and third, there are significantly higher discrimination reports for African students compared to Asian or Latin American students.

International graduate students are interested in coming to the U.S. to study, learn, and work. Esaki-Smith found in a survey that at the end of their studies, if getting a job in the US was more effortless, 71% of international graduate students would want to stay and work in the U.S. after graduation, and 22% were unsure of whether they would like to stay in the U.S. or to another country [8]. International graduate students also apply for and receive approval to work in the U.S. In the same survey, 66% of participants claim to be eligible for Optional Practical Training (OPT) [8]. According to Business Roundtable, the presence of immigrants has positive effects in creating jobs and new businesses, reducing labor shortages, filling critical gaps in the labor market, and increasing total consumer spending [9]. In this group, international graduate students have higher average earnings and a lower rate of unemployment in comparison with U.S. workers [10].

Finally, the National Science Foundation [11] reported an increase in the percentage of doctoral recipients who are temporary visa holders that intend to live in the U.S. from 55% in 1995 to 75% in 2015. In the same period, the proportion of international graduate students who intend to return to their country of origin after graduation declined from 36% to 18%. Interestingly, in the same report, a relatively stable share of all temporary visa holder doctorates, between 6% and 9% each year, plan to move to a non-U.S. location other than their home country [11]. This trend shows the crucial presence of the international workforce with master's and doctoral degrees in vital areas for the United States economy and development.

Since international graduate students are a growing population in the academic setting, it is crucial to understand better how U.S. universities can best support this population through their Master's and Doctoral Studies. The intersectional identity of "graduate student" and "international student" brings specific challenges for their adjustment and well-being to a campus environment in the US. This work in progress aims to present the design process of a survey that assesses the factors that influence international graduate students' well-being.

Literature review

In developed countries, international students' involvement in research and development is of academic, economic, and cultural importance. Therefore, there is a growing number of investigations on the impact on two specific areas: psychosocial and sociocultural adjustment of temporary stay in the life of this population. Psychosocial adjustment is usually referred to as an individual's ability to relate to himself and feelings of well-being and satisfaction [12]. Sociocultural adjustment refers to a person's ability to fit in, adapt, and negotiate in a social group with a culture different from their origin [12]. These studies have come mainly from the United States, Canada, Australia, and the United Kingdom, among other countries [12]–[14].

There has been a previous study of temporary residency's psychosocial and sociocultural impact on international students. Briefly, these effects can be grouped into five categories. First, the symptoms of psychological or mental problems or disorders (sad mood, irritability, worries) [15]–[17]. Second, the physical symptoms such as physiological stress responses (arousal, insomnia, stomach ache) [18], [19] and stress-related behaviors (smoking or drinking) [20]. Third, the stress associated with daily life problems, such as academic responsibilities, possible racism and discrimination, and coping [21]. Fourth, the acculturative or assimilation stress derives from the length of stay in the host country, proficiency in English, and feeling disconnected from people in the United States and their families and groups of origin [22], [23]. Finally, the sociocultural adjustment from the students' adjustment capacity by acquiring appropriate cultural skills, resources, and experiences such as courtesy formulas, social practices, routines of daily life, and celebrations [14], [24], [25]. This adjustment includes the frequency of conversation with local people, the consumption of visual media, participation in activities of the host country, and satisfaction with the reception process in the new context [26].

The demographics from these investigations generally have a large proportion of students from China, India, South Korea, and Middle Eastern countries, focused on undergraduate students whose average age ranges between 19 and 25 years in the different disciplines. In some of them, women have more participation in the samples [12], [13], [27]. Therefore, there is a gap in the literature, and more needs to be known regarding the specific experiences of international graduate students in engineering.

There are different models to describe the experiences of temporary residency for international students, such as the sojourner adjustment framework and the acculturation models. The sojourner adjustment framework establishes two different types of results, including psychosocial and cultural [28]. The results have also been explained from acculturation models that suggest that people move in two dimensions (adherence to the home culture and adherence to the host culture), with four strategies that derive from the combination of the dimensions in quadrants [29], [30]. Likewise, a set of results discusses stress as transactions and the coping process, which includes specific situations such as minority stress or stress related to racism [31]. Other theoretical frameworks focus on other factors, such as the separation process and affective loss, the expectations of results and achievement, goal orientation, contact and interaction between groups, and the construction of identity and self-identity in the framework of collectivist or individualistic cultures [32].

Previous qualitative research found that the social resources and historical experiences before arrival help shape international students' identities [33]. Both experiences and resources are recognized as identity funds and essential for graduate students of the Purdue College of Engineering's self-definition, self-expression, and self-understanding. These funds are vital in a system perceived as challenging for creating a significant social network, understanding the cultural context, and learning to navigate daily life. In that sense, in addition to international undergraduate students' challenges toward migration, it is crucial to consider that international postgraduate students have different trajectories, professional experiences, and personal experiences that are also relevant.

Likewise, research must positively approach psychosocial adjustment regarding subjective, psychological, and eudaimonic well-being. Some investigations with international students have mainly recognized well-being factors such as satisfaction with life, self-esteem, and self-efficacy. Models such as the PERMA profile show how well-being can be understood as a construct that includes Positive emotions, Engagement, Relationships, Meaning, and Achievement (characteristics that give the model its name). Psychological research has shown how these five factors are recurrently part of a happy and worthwhile life associated with positive mental and physical health outcomes and psychosocial adjustment. In addition, the model has an indicator of negative emotions and not a mental disorder such as depression or anxiety, which can help to understand the emotional landscape of people without pathologizing their experience. Finally, it has three more indicators for quality of life related to health, happiness, and loneliness that complement the measurement of well-being. In the characterization process of this nature, it is essential to be clear whether the well-being profile of graduate students is associated with domestic or international student status or other demographic characteristics such as gender, age, marital status, or program. For this reason, this study includes these variables explicitly.

Given the prior research findings, we selected the social capital aspects for this characterization of well-being. Social capital can predict positive results in economic productivity and psychosocial adjustment. Social Capital is a source of information, material resources, and emotional support. These factors can also mitigate the potential negative impact of academic, interpersonal, and social experiences during an international student's time abroad. In the same way, this study is expected to determine the role of English proficiency as a moderator or mediator between well-being and social capital.

Methodology

Ethics Statement

Methods will be approved by Purdue University's Human Research Protection Program and Institutional Review Board (IRB), and the participants will complete the surveys following relevant guidelines and regulations.

Participants

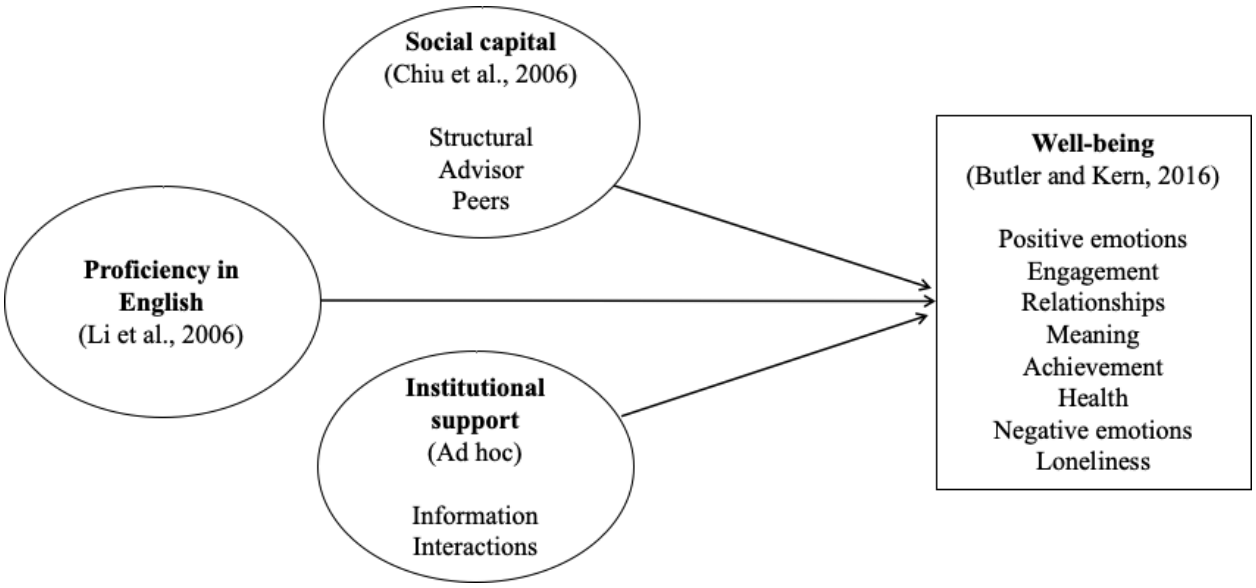
This study expects to reach 10% of total graduate students, i.e., about 499 domestic and international graduate students in the College of Engineering from Purdue University. Participants will be contacted through the College of Engineering email lists and the representatives of graduate student associations and international graduate student organizations.

Instruments

Well-being. The PERMA Profiler is an instrument to assess happiness and well-being in adult people [34]. It contains 23 items responded to on a 0 to 10-point scale with varying anchors. These items measure the five elements of PERMA (Positive emotions, Engagement, Relations, Meaning, and Achievement) [34], a summary score that includes all five elements, and four additional measures (Negative emotions, Health, Happiness, and Loneliness).

Social capital. Social capital is a second-order construct, including structural, relational, and cognitive capital, as suggested by most social capital studies [35]. This study will evaluate the three types of social capital separately. Structural capital is the general network pattern that an individual perceives in its context [35]. The four-item network connection scale will be used to measure it [35]. Examples of items for peer social capital include "I maintain close social relationships with my peers" and "I know some peers on a personal level." Relational capital refers to trust and mutual obligation characteristics in a relationship [35]. We will use a three-item scale to measure trust [35]. Sample items for advisor equity include "I can always trust my advisor to help me if I need it" and "I can always trust my advisor to make my job easier." Finally, cognitive capital refers to creating shared meaning and understanding, such as common language and goals [35]. The three-item scale measures shared language [36]. Sample items for cognitive capital include "Experts, and I use common terms or jargon" and "Experts, and I use understandable narrative forms to post messages." Previous research has found that the

peer, advisor, and expert social capital scales have Cronbach's alphas of 0.889, 0.916, and 0.970, respectively [36].



Institutional support. The researchers designed a 7-item survey to assess information availability, clarity for graduate students, and fair and supportive communication by Purdue University College of Engineering Staff.

Proficiency in English. English Proficiency will be measured with five self-reported items previously described in the literature [23]. Participants will assess their current ability to listen, read, write, and speak English on a 7-point scale ranging from 1 (very poor) to 7 (similar to a native). Participants will also self-report their foreign accent's strength on a scale ranging from 1 (none) to 7 (extremely strong). In the study by Wilson et al., a Cronbach's alpha of .84 was reported [23].

Procedure. A Qualtrics survey was created with the study instruments. This survey is voluntary for participants, and an informed consent statement is at the beginning of the survey. If the participants accept the conditions of the study, they continue to the survey form. If the participants do not accept, then the survey closes. For those who agree to participate, the survey has one instrument per section, and the items on each form are presented randomly to avoid response patterns. There are two items to monitor that participants are paying attention to near the middle and bottom of the form. A reinforcement message is delivered between the sections to motivate the completion of the survey. We have added an incentive for people who complete the survey. Therefore, at the end of the survey, participants can register on a separate survey with their name and email address to win a random drawing of two incentive gift cards. There is no way to link information between the two surveys.

Analysis of the information. The information will be processed and analyzed using JASP. JASP is a free and open-source program for statistical analysis supported by the University of Amsterdam. It is expected to do a cluster analysis according to the welfare profile, which can help identify implicit groups existing in the sample. With these clusters formed, a chi-square analysis (for categorical variables) and ANOVA (continuous variables) will be carried out to determine differences according to demographic data. Finally, a linear regression analysis will be developed between the predictor and result variables.

Preliminary findings

A small focus group was used to initially test and receive feedback on the survey before receiving the IRB approval and emailing it to all Purdue University's engineering graduate students. The instrument battery was uploaded to Qualtrics, and three international students from India, Brazil, and Colombia read through the survey. Based on the interviews conducted, we tested the comprehension and clarity of the selected psychometric instruments. This step led us to choose shorter instruments with less ambiguous phrasing, as agreed upon by the pre-readers. Similarly, we aimed to cover different levels of social capital, such as department, advisor, peers, and institution, as each source posed unique challenges that needed to be addressed. We also recognized the importance of not restricting responses in the demographics section regarding cultural and racial identity, given the intersections between these categories in different world regions (e.g., white Latinos and black Europeans). Participants emphasized the need to include other identification questions, such as living with a partner or husband and having children at home, to clarify the collected information.

Moreover, in addition to assessing English proficiency, we included two items on intercultural communication to understand participants' interactions with people and media in that language. Finally, participants expressed concern that the collected information is used for capacity building in the College, highlighting previous exercises that included "mental health issues" but failed to take specific actions for graduate students. The time range used for completion was from 9 to 15 minutes.

Discussion and Next Steps

Based on the feedback received, we expect to move quickly to obtain IRB approval to send out the survey. After IRB approval, we will initialize the survey distribution to collect information about the well-being profile of domestic and international graduate engineering students and their relationship with the different sources of social capital.

When mental health is evaluated internationally during and after, research shows that characteristics such as gender, especially women, youth, low educational attainment, immigration status, and low income are variables that increase the rates of mental health

symptoms, problems, and disorders [37]. However, insufficient evidence has been built to see the different well-being profile nuances. Positive emotions and achievement are more critical factors in estimating the well-being of men [38], relationships and negative emotions in women [38], meaning for middle and old adults [39], and relationships in migrants or international populations [12]. We could predict that during the data analysis, a higher proportion of the population mentioned above will be in clusters where each of the mentioned PERMA's variables has a high score. These would be demographic factors to be considered in the design of professional development, retention, and well-being strategies sensitive to ethnicity and race factors and that intersect with the configuration of well-being in the young adult and middle adult graduate student population with high education.

The quantitative sources show that due to the COVID-19 pandemic, many international students have a smaller or weaker social network and report a higher rate of symptoms and health problems. In this sense, we expect to determine the different sources of social capital and institutional support associated with the well-being of international students [40], [41]. For the future results, social capital that provides information may be considered essential for domestic students, while social capital providing emotional and informational support is crucial for international students. Finally, this international graduate student survey in engineering will serve as a framework to better address the needs of international graduate students at Purdue University, and that can be replicated in other spaces.

References

[1] N. Hegarty, "Where we are now—The presence and importance of international students to universities in the United States," *J. Int. Stud.*, vol. 4, pp. 223–235, 2014.

[2] E. Duffin, *International students in the U.S. 2004-2022, by academic level*. Statista, 2023. [Online]. Available: https://www.statista.com/statistics/237689/international-students-in-the-us-by-academic-level/

[3] J. Trapani and K. Hale, *Higher education in science and engineering: International S&E higher education*. National Science Board, 2022. [Online]. Available: https://ncses.nsf.gov/pubs/nsb20223/international-s-e-higher-education

[4] C. Collins and A. Thompson, "International students and scholars," Purdue University, International Students & Scholars, Enrollment & statistical report fall 2022., 2022. [Online]. Available: https://www.purdue.edu/IPPU/ISS/_documents/EnrollmentReport/iss_statisticalreportfall22.pdf

[5] Y. Zhang and Y. Mi, "Another look at the language difficulties of international students," *J. Stud. Int. Educ.*, vol. 14, no. 4, pp. 371–388, 2010, doi: 10.1177/1028315309336031.

[6] S.-Y. Lin and S. D. Scherz, "Challenges facing Asian international graduate students in the US: Pedagogical considerations in higher education," *J. Int. Stud.*, vol. 4, no. 1, pp. 16–33,

2014, doi: 10.32674/jis.v4i1.494.
[7] E. Alharbi and A. Smith, “A review of the literature on stress and wellbeing among international students in English-speaking countries,” *Int. Educ. Stud.*, vol. 11, no. 5, pp. 22–44, 2018.
[8] A. Esaki-Smith, “Is studying in the U.S. worth it? International students on the ‘value’ of their U.S. education experience?” Interstride, 2022. [Online]. Available: https://www.interstride.com/research/2022-career/
[9] B. Roundtable, “The Economic Impact of Curbing the Optional Practical Training Program,” *Bus. Roundtable*, 2018, [Online]. Available: https://www.businessroundtable.org/policy-perspectives/immigration/economic-impact-curbing-optional-practical-training-program
[10] J. L. Neufeld, *Optional Practical Training (OPT) and International Students After Graduation*. Niskanen Center, 2019.
[11] National Science Foundation, “Which fields attract students? Science and Engineering Doctorates.” Feb. 10, 2023. [Online]. Available: https://www.nsf.gov/statistics/2017/nsf17306/report/which-fields-attract-students/temporary-visa-holders.cfm
[12] J. Zhang and P. Goodson, “Predictors of international students’ psychosocial adjustment to life in the United States: A systematic review,” *Int. J. Intercult. Relat.*, vol. 35, no. 2, pp. 139–162, 2011, doi: 10.1016/j.ijintrel.2010.11.011.
[13] N. C. Brunsting, C. Zachry, and R. Takeuchi, “Predictors of undergraduate international student psychosocial adjustment to US universities: A systematic review from 2009-2018,” *Int. J. Intercult. Relat.*, vol. 66, pp. 22–33, 2018, doi: 10.1016/j.ijintrel.2018.06.002.
[14] R. J. Y. Vakkai, K. Harris, K. S. Chaplin, J. J. Crabbe, and M. Reynolds, “Sociocultural Factors That Impact the Health Status, Quality of Life, and Academic Achievement of International Graduate Students,” *Lit. Rev. J. Int. Stud.*, vol. 10, no. 3, pp. 758–775, 2020, doi: 10.32674/jis.v10i3.1222.
[15] B. A. Barton and S. M. Bulmer, “Correlates and Predictors of Depression and Anxiety Disorders in Graduate Students,” *Health Educ.*, vol. 49, no. 2, pp. 17–26, 2017.
[16] Z. Lian and B. C. Wallace, “Prevalence of past-year mental disorders and its correlates among Chinese international students in US higher education,” *J. Am. Coll. Health*, vol. 68, no. 2, pp. 176–184, 2020, doi: 10.1080/07448481.2018.1538147.
[17] J. Wang, “A study of resiliency characteristics in the adjustment of international graduate students at American universities,” *J. Stud. Int. Educ.*, vol. 13, no. 1, pp. 22–45, 2009, doi: 10.1177/1028315307308139.
[18] S. B. Stillwell, A. L. Vermeesch, and J. G. Scott, “Interventions to reduce perceived stress among graduate students: A systematic review with implications for evidence‐based practice,” *Worldviews Evidence‐Based Nurs.*, vol. 14, no. 6, pp. 507–513, 2017, doi: 10.1111/wvn.12250.
[19] M. Yusufov, J. Nicoloro-SantaBarbara, N. E. Grey, A. Moyer, and M. Lobel,

"Meta-analytic evaluation of stress reduction interventions for undergraduate and graduate students," *Int. J. Stress Manag.*, vol. 26, no. 2, pp. 132–145, 2019, doi: 10.1037/str0000099.

[20] K. Van Berkel and B. Reeves, "Stress among graduate students in relation to health behaviors," *Coll. Stud. J.*, vol. 51, no. 4, pp. 498–510, 2017.

[21] H. Park, M. J. Lee, G. Y. Choi, and J. S. Zepernick, "Challenges and coping strategies of East Asian graduate students in the United States," *Int. Soc. Work*, vol. 60, no. 3, pp. 733–749, 2017, doi: 10.1177/0020872816655864.

[22] Y. Du and M. Wei, "Acculturation, enculturation, social connectedness, and subjective well-being among Chinese international students," *Couns. Psychol.*, vol. 43, no. 2, pp. 299–325, 2015, doi: 10.1177/0011000014565712.

[23] S. R. Wilson, C. Billotte Verhoff, C. A. Yue, E. Dorrance Hall, and J. McNallie, "Chinese international undergraduate students' English language ability, advice from domestic and international friends, and psychosocial adjustment to college," *J. Lang. Soc. Psychol.*, vol. 39, no. 2, pp. 260–270, 2020, doi: 10.1177/0261927X19872791.

[24] R. Hirai, P. Frazier, and M. Syed, "Psychological and sociocultural adjustment of first-year international students: Trajectories and predictors," *J. Couns. Psychol.*, vol. 62, no. 3, p. 438, 2015, doi: 10.1037/cou0000085.

[25] M. J. Oudshoorn *et al.*, "Integrating international students into computer science programs: challenges and strategies for success," in *Proceedings of the 2017 ACM Conference on Innovation and Technology in Computer Science Education*, Bologna Italy: ACM, Jun. 2017, pp. 386–387. doi: 10.1145/3059009.3081326.

[26] Y. L. Zhang and T. V. Dinh, "Advising international students in engineering programs: Academic advisors' perceptions of intercultural communication competence," *NACADA J.*, vol. 37, no. 2, pp. 33–43, 2017.

[27] M. Jackson, S. Ray, and D. Bybell, "International students in the US: Social and psychological adjustment," *J. Int. Stud.*, vol. 3, no. 1, pp. 17–28, 2019.

[28] C. Ward and A. Kennedy, "The measurement of sociocultural adaptation," *Int. J. Intercult. Relat.*, vol. 23, no. 4, pp. 659–677, 1999, doi: 10.1016/S0147-1767(99)00014-0.

[29] J. W. Berry, U. Kim, T. Minde, and D. Mok, "Comparative studies of acculturative stress," *Int. Migr. Rev.*, vol. 21, no. 3, pp. 491–511, 1987.

[30] J. W. Berry, "Conceptual approaches to acculturation," in *Acculturation: Advances in theory, measurement, and applied research*, K. M. Chun, P. B. Organista, and GMarin, Eds., Washington, DC: American Psychological Association, 2003, pp. 17–38.

[31] A. Aggarwal and A. Çiftçi, "Colorblind racial ideology, sense of belonging, and racism-related stress in Asian Indian international students," *Psychol. Rep.*, vol. 124, no. 5, pp. 2251–2271, 2021, doi: 10.1177/0033294120961063.

[32] S. E. Cross, "Self-construals, coping, and stress in cross-cultural adaptation," *J. Cross-Cult. Psychol.*, vol. 26, no. 6, pp. 673–697, 1995.

[33] C. Vargas-Ordonez, S. Wei, and T. Li, "At the Bottom of the Food Chain": Constructing Academic Identity in Engineering Education as International Graduate Students," in *2022*

ASEE Annual Conference & Exposition, Aug. 2022.
[34] J. Butler and M. L. Kern, "The PERMA-Profiler: A brief multidimensional measure of flourishing," *Int. J. Wellbeing*, vol. 6, no. 3, 2016.
[35] J. Gu, Y. Zhang, and H. Liu, "Importance of social capital to student creativity within higher education in China," *Think. Ski. Create.*, vol. 12, pp. 14–25, 2014.
[36] C. M. Chiu, M. H. Hsu, and E. T. Wang, "Understanding knowledge sharing in virtual communities: An integration of social capital and social cognitive theories," *Decis. Support Syst.*, vol. 42, no. 3, pp. 1872–1888, 2006.
[37] D. F. Santomauro *et al.*, "Global prevalence and burden of depressive and anxiety disorders in 204 countries and territories in 2020 due to the COVID-19 pandemic," *The Lancet*, vol. 398, no. 10312, pp. 1700–1712, 2021.
[38] P. N. Roberson, K. A. Lenger, J. C. Norona, and S. B. Olmstead, "A longitudinal examination of the directional effects between relationship quality and well-being for a national sample of US men and women," *Sex Roles*, vol. 78, pp. 67–80, 2018.
[39] A. T. Jebb, M. Morrison, L. Tay, and E. Diener, "Subjective well-being around the world: Trends and predictors across the life span," *Psychol. Sci.*, vol. 31, no. 3, pp. 293–305, 2020.
[40] K. Tozini and S. Castiello-Gutiérrez, "COVID-19 and international students: examining perceptions of social support, financial well-being, psychological stress, and university response," *J. Coll. Stud. Dev.*, vol. 63, no. 2, pp. 134–150, 2022.
[41] V. Rekenyi, S. Garbóczy, A. Szemán-Nagy, A. A. B. Al-Tammemi, M. Sayed-Ahmad, and L. R. Kolozsvári, "The Effects and Differences of Social Support, Depression, and Vital Exhaustion during the COVID-19 Pandemic among International and Domestic University Students," *Int. J. Environ. Res. Public. Health*, vol. 20, no. 2, p. 1502, 2023.