Promoting Social Health for International Students: A Human-Centered Design Approach to Support In-Situ Social Training, Reflection, and Connection

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Social isolation among international students is often overlooked at U.S. universities. Using formative surveys, interviews, collaborative ideation, rapid prototyping, and preliminary user testing, this paper employs a human-centered design process at a small engineering school (<10,000 students) to design a new sociotechnical intervention for these students. Our prototype helps students prepare for, engage in, and evaluate new social interactions. Initial user testing indicates that the application may help reduce social anxieties associated with meeting new people and encourage student interaction. Our study highlights the potential for ongoing work to refine and validate this method's effectiveness and helps to address a critical and underserved need in higher education.

CCS Concepts: • **Human-centered computing** → **Empirical studies in HCI**; *Collaborative interaction*; Social networking sites.

Additional Key Words and Phrases: Mental health, social isolation, social skills, loneliness, student life, international students

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1 Introduction

In contemporary society, the escalating prevalence of isolation and its adverse impact on individuals' mental well-being has emerged as a significant concern [8]. Social isolation, marked by minimal contact with others, can give rise to detrimental feelings of loneliness, depression, and anxiety [13, 19]. The factors contributing to isolation are diverse, encompassing internal and external elements such as geographical locations, social anxieties, and physical and mental health challenges [10]. To effectively address this intricate issue, it is imperative to consider the unique circumstances and causes specific to each individual [22].

In this paper, we focus on the experiences of international students pursuing education in foreign countries. We chose to collaborate with international students as stakeholders due to their heightened vulnerability to mental health issues compared to their domestic peers [16]. These students face a myriad of challenges, including language barriers and cultural differences. They often exhibit a lower motivation to seek mental health services, face difficulty navigating local medical systems, and experience frequent stigmatization of their loneliness, which reinforces social withdrawal [9]. Consequently, many international students find themselves ensnared in the complexities of loneliness, struggling to envision a way out of their predicament [16]. With over 50% of students reporting mental health concerns in 2024, many universities are unable to adequately address the demand, and some are now adding teletherapy services through national providers in order to supplement traditional in-person counseling services [15]. However, given the issues identified above, it is valuable to continue exploring how to expand models of delivery for new forms of digitally mediated social and mental and health care [12], and ensuring that these are customized to the contextually specific

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needs and desires of student populations [21]. Therefore, our project uses human-centered design to address loneliness among international students at a small R1 engineering-focused university in theUnited States. This involves measuring critical factors such as connection with others, sense of belonging, security, and familiarity with their environment [24]. Through direct engagement with students, we hope to provide a technological aid that not only addresses loneliness but also contributes to improvement in well-being. In doing so, we aim to offer meaningful insights and solutions to the intricate challenges posed by isolation in the context of international students pursuing education abroad.

Our research contributes a preliminary design exploration, resulting in a prototypical solution that should be well-tailored to the needs of participants at our university. Based on design implications derived through our formative work, our prototype provides training and reflection opportunities for students to prepare for, engage in, and evaluate new social interactions. The prototype is a system with several parts (See Fig. 3b): (1) an app that offers social prompts in advance of in-person interactions that would likely occur before or after classes; (2) a timer that simulates a mechanism for users to record whether they feel an interaction is going well or poorly; and (3) an anonymous chat feature that allows users to discuss their experiences with other users who are at a similar level of experience. Preliminary user testing sessions indicate promising results, yet we discuss how future work must further develop, improve upon, and study this design possibility.

2 Related Literature

Although loneliness can sometimes be beneficial for studying or self-focus, it also erodes social skills and traps international students in isolation. Sharing difficulties with fellow international students were found to legitimize their experiences, encouraging them to seek help for loneliness [25]. Moreover, students experiencing loneliness might tend to avoid social gatherings but more consistently attend class [25]. This approach involved educational techniques promoting social integration and teaching styles drawing out diverse cultural experiences and contributions [25].

Institutional Interventions On-campus barriers to social integration for international students include adapting to a new social life, potential language barriers, and limited knowledge of the new culture [18]. Overcoming these challenges requires institutional interventions, such as integration programs and cultural exchange initiatives. In the U.S., colleges actively promoting community engagement contribute to a more inclusive environment [14]. Cross-cultural interactions foster a sense of belonging, alleviating loneliness [3]. Specialized support services and counseling programs tailored to the cultural and linguistic needs of international students are essential [6, 11]. While these solutions can be effective, on-campus resources often provide general tools rather than personalized solutions. Moreover, universities do not typically offer in-situ training and practice opportunities during the normal course of classes and academic life; it is possible that new sociotechnical solutions could unobtrusively help international students to succeed at social interactions, when they might otherwise be too anxious to try.

External Interventions Seo et al. explored online forums, social media, and virtual communities' role in mitigating social isolation among international students [20]. These platforms facilitate information exchange, social support, and the development of virtual communities. Wright emphasized the positive impact of engaging international students in community activities and volunteer opportunities [23]. Technological interventions, such as Foursquare for face-to-face interactions [7], have been attempted. However, social media's limitations and challenges in fostering meaningful connections [20] and the struggles of social interaction apps [7] are evident. Existing mobile apps aimed at reducing loneliness have also faced challenges in accessibility [5]. Baecker et al. highlighted opportunities and challenges in technology's role in combating loneliness, including synchronous communication and multi-modal input [4]. It is

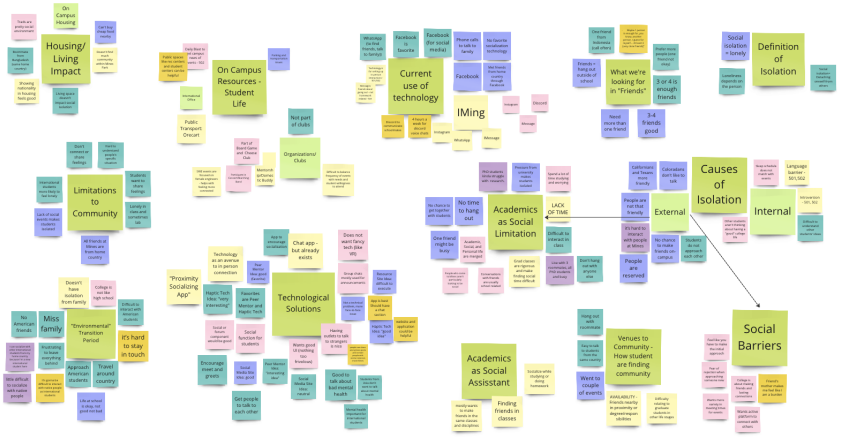


Fig. 2. Screenshot of the affinity mapping process conducted on the Miro platform.

important to note that these applications, although used by international students, were not specifically designed for their needs. Our contributions extend beyond existing technological solutions by incorporating an unobtrusive physical device interface, personal growth goal-setting and progress tracking, and international-student-oriented options.

3 Formative Methods

To approach our problem, we employed a method inspired by Grounded Theory Method (GTM) [17]. This methodology involves inductively generating a theory through collecting and analyzing data. Every member of our team has received Collaborative Institutional Training Initiative (CITI) training. Our protocol was reviewed by the Human Subjects Research board at our institution and received an exemption from IRB review to conduct our project.

We recruited participants by messaging residential facilities near campus that house many international students, an international student organization, and the university's General Study Group Discord channel. This message included a short description of our project and a link to a screener survey. We asked 3 questions from the UCLA Loneliness Scale (questions 2, 11, and 14) [1]. Our screener received 23 responses. Six participants from four different countries were selected for one-on-one interviews due to their UCLA Loneliness Scale score being 6 or higher. Figure1 lists them with their year, degree, and major. We recorded interview audio and performed selective transcription of key elements of the interviews, which were then open-coded. We used affinity mapping and reported on emergent themes in the results and design implications sections.

ID	Year	Degree	Major
01	1st	MS	Electrical Eng.
02	1st	UG	Chemical Eng.
03	3rd	UG	Computer Science
04	1st	PhD	Computer Science
05	1st	PhD	Metallurgical Eng.
06	1st	PhD	Mechanical Eng.

Fig. 1. Participant information, including participant identification (ID) numbers, academic year, degree pursuit, and declared major.

4 Results

Figure 2 shows our open codes clustered around axial themes. Key findings reveal a multifaceted issue: students perceive isolation due to limited social events and high academic demands; they struggle to balance study with social life given the intense demands of the engineering curriculum at our institution. Internal factors like introversion, fear of rejection, and language barriers also tend to exacerbate their isolation. This is coupled with external elements–for example, they perceive the local student population as unfriendly and the cultural differences as insurmountable.

Academic Demands. Academics are the primary source of finding and maintaining social connections. *"A good college life is making friends, making connections, having people talk to, and social connections that last [at least] nine months"*(P02). However, participants indicated that academics also become a limiting factor to a social connection due to their serious nature, time commitment, and limited free time. P06 emphasized this tension, *"I think lots of pressure from the university and lack of social events to hang out [make students feel more isolated]."* The clash between academic duties and the need for social interaction is clear, as expressed by P03, *"[Student life is] definitely very busy. Every week, every day they tell you guys homework and the weekend is always going to invest in a project."*

The complex interplay between academic demands and time constraints within the university environment often generates tension, with the potential to lead to either social isolation or the formation of close-knit communities. Our research revealed that a lack of time coupled with the university's academic demands contributes to isolation among international students. By incorporating features that encourage socialization during study sessions or within classroom environments, the technology we build can act as a bridge between academic responsibilities and social engagement, aligning with participants' recognition of academic spaces as potential venues for cultivating meaningful connections.

Solely online connections. Most international students tend to form social circles with peers from their own countries. Digital platforms are crucial for social connections, with approx. 66% using Instagram, 33% Discord, and 33% Facebook. While technology serves as a crucial tool for connection, our findings revealed a tendency for these interactions to remain predominantly online. However, participants indicated that their primary desire is to set up in-person interactions. P01 said, *"It's easier to talk to people, like you know, person to person experience"*.

Internal and external barriers. Internally driven factors such as introversion, fear of rejection, and language barriers were identified as significant contributors to isolation in our interviews. Individuals experiencing these internal challenges found it difficult to engage in social interactions. External perceptions, particularly the perceived *"unfriendliness"* or *"reserved"* nature of students at the university, have a significant impact on social isolation. *"I think people here are not that friendly. Kinda reserved. They don't like to talk"* (P06).

From these results, we derived the following design implications:

- **The Classroom and Beyond:** Design solutions should balance tensions of academic performance with opportunities for building community organically through academic interactions. The system we design should connect students through academics, allowing them to take advantage of the community around them to make connections within. However, we want to ensure that connections last beyond the classroom and encourage users to focus on social development.
- **Challenge Our Worst Enemy: Ourselves:** Designs should help users overcome internal barriers to socialization such as introversion, fear of rejection, or language barriers. This required the design to be sensitive and

have a low barrier to entry. Users should develop new skills through the use of the design that cater to different communication preferences, offer language support, and foster a supportive environment for interaction initiation enhances the inclusiveness of the technology.

- **Facing Unfriendly Realities:** An informed design should take into account the institutional culture and features should take into account the diversity within this context. Interviews emphasized the importance of expanding social networks to include a more diverse array of relationships, such as P01 who said, *"I am more like a multicultural person. I love to get to know people from many other cultures"*. Design solutions should address the perception of a reserved or unfriendly perception of the community by surfacing other friendly people who *are* in the community.
- **From E-vite to Invite:** Design solutions should actively encourage and facilitate face-to-face interactions, acting as a catalyst for meaningful relationships rather than a substitute. Features should promote offline meet-ups, study groups, etc. This addresses the participants' desire for technology for enhancing meaningful in-person connections.

5 Ideation & System Design

5.1 IDEO Ideation

In pursuit of innovative solutions to address the challenges faced by the international students we interviewed, our team engaged in an IDEO-inspired process involving internal brainstorming sessions. We generated 17 distinct ideas through divergent thinking, encompassing technological and social solutions, after which we employed convergent thinking to distill these diverse ideas into three primary concepts: (1) international student peer mentorship app/program; (2) prompt-based social app with a physical device; and (3) social media site for international students. We then scrutinized these ideas based on their ability to satisfy our design implications; the prompt-based social app emerged as the most promising solution.

5.2 System Description

App design with social challenges and prompts The proposed sociotechnological solution is an innovative app crafted to enhance social interactions within the institutional community by helping users work through social barriers. In the app (Figure 3a), users are first presented with a diverse range of social challenges that could occur in the line of daily academic life (classroom, stranger, and public). These challenges are customized to match their comfort level and personal goals. Then they are guided through the process of engaging in meaningful social interactions–for example, they are provided with prompts that they can plan to use later to try to start conversations. These challenges extend beyond academic settings but leverage the classroom environment to encourage social connections without imposing excessive demands on the participants.

5.3 Physical device for tracking emotions during an interaction

Our concept also includes a paired physical device for feedback that enhances the other features. The device is intended to be small and unobtrusive–*e.g.,* a keychain or fob–so that usage of the device could be easily hidden or perceived as socially acceptable fidgeting. For our minimum viable prototype (MVP), in lieu of a large clunky prototype, we opted to use the iPhone stopwatch's lap feature to track the interactions (see Figure 3b). By clicking buttons on the device during the interaction, the user can indicate their general feelings switching between positive or negative during the

interaction. This data is saved for subsequent review in order to observe how emotions were shifting during a single conversation, and how interactions evolve over time. The availability of this data enables users to reflect on their overall success and focusing on relative improvement over time, rather than getting caught up on any one individual moment or interaction. These assist users in challenging their own perspective and perfectionism in order to set attainable goals.

Social reflection through anonymous matchmaking Once users have completed a challenge, they can be paired anonymously online with another user who either has just finished the same challenge, has comparable social strengths or weaknesses, or has spent a similar amount of time on the app. As a result, users of the app can converse in a relaxed and low-stakes setting by connecting anonymously with people who are in a relatable stage of social development. It helped them to develop more meaningful exchanges or friendships, and users have the option to move these contacts offline, fostering relationships that go beyond the digital sphere. Through low-pressure, anonymous engagement, users can overcome both external and internal boundaries.

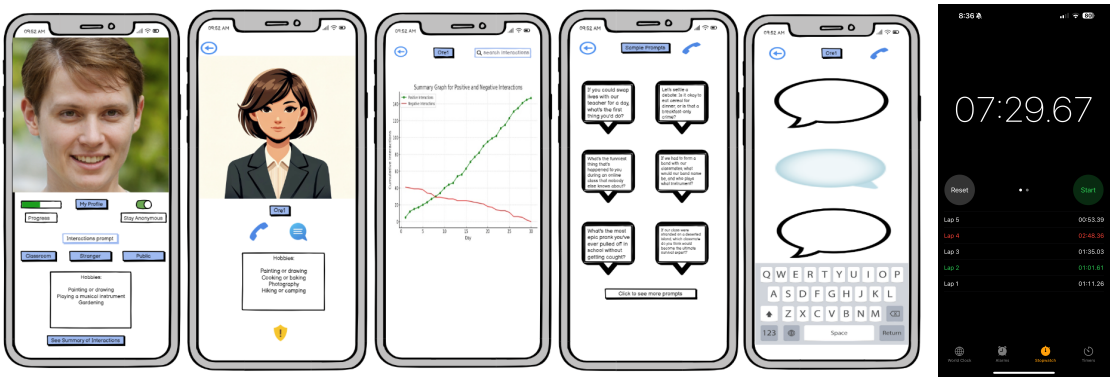
5.4 Design justification

This particular idea has many strengths that lead to its choosing:

- **Academic Support**: The system can seamlessly integrate into existing academic structures, fostering collaboration and support among students within classroom environments. This idea supports our first design implication, The Classroom and Beyond.
- **Addressing Social Anxieties**: By fostering non-intrusive interactions, this system helps mitigate social anxieties. It offers a comfortable environment for students to start conversations, facilitated by the app's feature that provides conversation prompts in advance. This approach eases the process of initiating dialogue, making social interactions more approachable and less daunting.
- **Facilitating Interaction Opportunities**: In conjunction with a physical device (which we will describe shortly), the app not only facilitates nearby user interactions but also enhances these encounters by later incorporating a matchmaking feature. This feature is based on shared interests, promoting spontaneous and meaningful connections among users. This supports our third design implication, Facing Unfriendly Realities.
- **Promoting Face-to-Face Connection**: The system's emphasis on physical proximity encourages genuine face-to-face interactions, surpassing the limitations of purely online social platforms. This notion is consistent with our fourth design implication, From E-vite to Invite.

6 System Implementation

For our minimum viable prototype (MVP), we decided to include four major functions from our preliminary design idea: prompts, interaction results, chat pages, and the hand-held device. To simulate the handheld device, we ran the iPhone stopwatch and had users click on the lap button to indicate when their emotions switched from positive to negative or vice versa. The mobile app framework was created using Balsamiq - a wire-framing and mock-up tool used in the field of user experience design and software development. This tool has features to create interactive prototypes for mobile and web apps. A majority of the icons we used for the app were collected from icons8.com and the profile pictures were generated with Generative AI tools [2] and thispersondoesnotexist.com. We added a safety feature to each profile that allows users to report another user if they feel unsafe. We used the website disposablechat.com to simulate the temporary chat room.



(a) MVP screenshots,from left to right: User's own profile; another user profile that is open for interaction; a graphical summary of positive *v.s.* negative feelings during live interactions; prompts available for each user category; a conversation between two anonymous users.

(b) Stopwatch. A physical device for the prototype to simulate recording interactions that feel positive *v.s.* negative by using the built-in "lap" function.

Fig. 3. Minimum Viable Prototype (MVP). An app (left) with an accompanying stopwatch (right).

7 User Testing

We recruited three participants (2 unique countries of origin) from those who participated in interviews. In the user testing session, we introduced the app interface and the external device (iPhone stopwatch) to the tester and then allowed them to ask questions. We then allowed them to browse the interface and become familiar with the design. Throughout the process, we observed what features they were drawn to, where they got confused, and which category they chose out of three categories (classroom, stranger, and public). Each user testing session lasted approximately 30-60 minutes, during which we showcased our MVP, simulated an interaction with the stopwatch, and then simulated the anonymous chat. We asked for input on the application's usability and usefulness and received generally positive feedback.

Figure 4 illustrates the main takeaways from our project and user testing sessions. These testing sessions helped to refine our understanding of how users interact with and perceive the app, ensuring that our design choices are grounded in actual user experiences. Using a similar GTM analysis, primary findings were that multilingual support, interactive features, structured onboarding processes, and elements targeted to alleviate social isolation and loneliness should be implemented. Users commented positively on the app's usability, and requested adding emojis into chat capabilities.

8 Conclusion

This project delves into loneliness and isolation experienced by international students studying abroad at a small engineering-focused university in the United States. Employing a human-centered design process, we conducted formative data collection to investigate the multifaceted challenges these students face regarding social isolation. Our technological solution aims to alleviate their feelings of isolation by offering a platform that facilitates meaningful connections and well-being in a university environment. The prototype features a physical component—an iPhone stopwatch to track positive and negative emotional shifts during these encounters and offers valuable insights into

Design Implication	Key Features & Technological Aids	Summary of User Feedback	Quoted User Feedback
The Classroom and Beyond	Academic Support; Suggested multilingual support and interactive app features.	Users appreciated the ability to connect within and outside classroom settings.	"*Helpful to connect people in classroom and outside classroom.*"- Tester 2
Challenge Our Worst Enemy	Addressing Social Anxieties; Proposed onboarding processes and interaction guidelines.	Feedback highlighted the app's potential in making social interactions comfortable and motivating.	"*I want to know more information about the person that was on the other side of the chat...*"- Tester 3
Facing Unfriendly Realities	Facilitating Interaction Opportunities; Proposed an application with the feature of "Prompts in Advance".	The "prompts in advance" feature was seen as interesting and helpful for initiating conversations.	"*Having more ready personalized prompts would be really helpful.*" – Tester 2
From E-vite to Invite	Promoting Face-to-Face Connection; Aims at reducing loneliness through digital means.	Users felt safe and were positive about the face-to-face interaction features of the platform.	Feedback on the safety and effectiveness of face-to-face meetings was positive. (No direct quote provided)

Fig. 4. Summary of Design Implications, Technological Features, and User Feedback

the dynamics of users' experiences. Feedback from users indicated an overall positive reception of the application, although it is worth noting that our work has limitations in its small sample size and reliance on a separate platform for simulating the chatting and communicating experience. Despite this, the insights gained from user chatting and feedback provide a foundation for future developments and refinements.

Future work. There are numerous valuable avenues for future work. First, our prototype is in a highly preliminary phase. It will be valuable to build and deploy a higher fidelity prototype to gather actual in-the-wild data with a larger and more diverse group of international students. Second, it may be possible that our system design can be helpful beyond international students. For example, in might be helpful for other minority groups or other people struggling with social anxiety. Given the prevalence of mental health issues among students, incorporating diverse perspectives will enhance the inclusiveness and effectiveness of the application. Finally, we acknowledge the limitation that we did not have the capacity to work with a mental health professional during this initial design phase. In the future, we hope to collaborate with mental health clinicians to first incorporate their feedback on our design ahead of a larger study, as well as to ensure that our research protocols provide adequate support and safety for participants. Bringing greater focus to a participant's social isolation might cause them distress, or difficulties encountered while trying to practice social skills through use of our system could backfire. Thus it is essential to future work on this system that there are adequate resources made available to participants in advance and throughout the course of study.

References

[1] [n. d.]. A Short Scale for Measuring Loneliness in Large Surveys - PMC. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2394670/

[2] Dec 2023. OpenAI, "Examples of Prompt texts to begin the intraction with" prompt. chat.openai.com/chat

[3] Omarbekov Abdishukur. 2023. A study of the impact of the International Student Cultural Festival on the local integration of international students visiting China: The mediating effect of embodied experience. *Open Journal of Business and Management* 11, 05 (Sep 2023), 2572–2608. https://doi.org/10.4236/ojbm.2023.115142

[4] Ron Baecker, Kate Sellen, Sarah Crosskey, Veronique Boscart, and Barbara Barbosa Neves. 2014. Technology to Reduce Social Isolation and Loneliness. In *Proceedings of the 16th International ACM SIGACCESS Conference on Computers & Accessibility* (Rochester, New York, USA) *(ASSETS*

'14). Association for Computing Machinery, New York, NY, USA, 27–34. https://doi.org/10.1145/2661334.2661375

[5] Rogerio A. Bordini and Oliver Korn. 2021. A Mobile App to Combat Loneliness and Social Isolation Among University Students.. In *22nd International Conference on Human-Computer Interaction with Mobile Devices and Services* (Oldenburg, Germany) *(MobileHCI '20)*. Association for Computing Machinery, New York, NY, USA, Article 41, 4 pages. https://doi.org/10.1145/3406324.3409260

[6] Patricia A. Burak. 2019. *Addressing mental health issues affecting international students.* NAFSA: Association of International Educators.

[7] Yang Chen, Jiyao Hu, Yu Xiao, Xiang Li, and Pan Hui. 2020. Understanding the user behavior of foursquare: A data-driven study on a global scale. *IEEE Transactions on Computational Social Systems* 7, 4 (2020), 1019–1032. https://doi.org/10.1109/tcss.2020.2992294

[8] Stephanie T. Child and Leora Lawton. 2017. Loneliness and social isolation among young and late middle-age adults: Associations with personal networks and social participation. *Aging amp;amp; Mental Health* 23, 2 (Nov 2017), 196–204. https://doi.org/10.1080/13607863.2017.1399345

[9] Helen Forbes-Mewett and Anne-Maree Sawyer. 2016. International students and Mental Health. *Journal of International Students* 6, 3 (Jul 2016), 661–677. https://doi.org/10.32674/jis.v6i3.348

[10] R. P. Hortulanus, Anja Machielse, and Ludwien Meeuwesen. 2006. *Social isolation in modern society.* Routledge.

[11] Lan Jin and Lalatendu Acharya. 2022. Developing Tailored Messages to Improve Mental Health and Adjustment of Asian International Students. *Journal of International Students* 12, 2 (2022), 817–842. https://doi.org/10.32674/jis.v12i4.3934

[12] Alan E Kazdin and Stacey L Blase. 2011. Rebooting psychotherapy research and practice to reduce the burden of mental illness. *Perspectives on psychological science* 6, 1 (2011), 21–37.

[13] Maria Elizabeth Loades, Eleanor Chatburn, Nina Higson-Sweeney, Shirley Reynolds, Roz Shafran, Amberly Brigden, Catherine Linney, Megan Niamh McManus, Catherine Borwick, and Esther Crawley. 2020. Rapid systematic review: The impact of social isolation and loneliness on the mental health of children and adolescents in the context of covid-19. *Journal of the American Academy of Child amp; Adolescent Psychiatry* 59, 11 (Jun 2020), 1218–1239. https://doi.org/10.1016/j.jaac.2020.05.009

[14] Nara M. Martirosyan, Rebecca Bustamante, and D. Patrick Saxon. 2019. Academic and social support services for international students. *Journal of International Students* 9, 1 (Jan 2019). https://doi.org/10.32674/jis.v9i1.275

[15] Charlotte Matherly. 2024. Colleges Can't Keep Up With Students' Mental-Health Needs. Teletherapy Companies Are Filling the Gaps. https://www.chronicle.com/article/colleges-cant-keep-up-with-students-mental-health-needs-teletherapy-companies-are-filling-the-gaps Section: News.

[16] Susannah Minutillo, Michelle Cleary, Andrew P. Hills, and Denis Visentin. 2020. Mental Health Considerations for International Students. *Issues in Mental Health Nursing* 41, 6 (May 2020), 494–499. https://doi.org/10.1080/01612840.2020.1716123

[17] Michael Muller. 2014. Curiosity, creativity, and surprise as analytic tools: Grounded theory method. In *Ways of Knowing in HCI*. Springer, 25–48.

[18] Julia Rivas, Monica Burke, and Katherine Hale. 2019. Seeking a Sense of Belonging: Social and Cultural Integration of International Students with American College Students. *Journal of International Students* 9, 2 (May 2019), 682–704. https://doi.org/10.32674/jis.v9i2.943

[19] Nicholas Rohde, Conchita D'Ambrosio, Kam Ki Tang, and Prasada Rao. 2015. Estimating the mental health effects of social isolation. *Applied Research in Quality of Life* 11, 3 (May 2015), 853–869. https://doi.org/10.1007/s11482-015-9401-3

[20] Hyunjin Seo, Ren-Whei Harn, Husain Ebrahim, and José Aldana. 2016. International students' social media use and social adjustment. *First Monday* 21, 11 (Oct 2016). https://doi.org/10.5210/fm.v21i11.6880

[21] C. Estelle Smith, William Lane, Hannah Miller Hillberg, Daniel Kluver, Loren Terveen, and Svetlana Yarosh. 2021. Effective Strategies for Crowd-Powered Cognitive Reappraisal Systems: A Field Deployment of the Flip*Doubt Web Application for Mental Health. *Proceedings of the ACM on Human-Computer Interaction* 5, CSCW2 (Oct. 2021), 1–37. https://doi.org/10.1145/3479561

[22] Gomathi Thangavel, Mevludin Memedi, and Karin Hedström. 2022. Customized information and communication technology for reducing social isolation and loneliness among older adults: Scoping review. *JMIR Mental Health* 9, 3 (Mar 2022). https://doi.org/10.2196/34221

[23] Francis Wright. 2016. Volunteering helps international students integrate: Student Volunteering Week 2016. https://www.timeshighereducation.com/student/news/volunteering-helps-international-students-integrate-student-volunteering-week-2016

[24] Diego Zavaleta, Kim Samuel, and China T. Mills. 2016. Measures of social isolation. *Social Indicators Research* 131, 1 (Feb 2016), 367–391. https://doi.org/10.1007/s11205-016-1252-2

[25] Kangning Zheng, Sonia Johnson, Ruby Jarvis, Christina Victor, Manuela Barreto, Pamela Qualter, and Alexandra Pitman. 2023. The experience of loneliness among international students participating in the BBC Loneliness Experiment: Thematic analysis of qualitative survey data. *Current Research in Behavioral Sciences* 4 (2023), 100113. https://doi.org/10.1016/j.crbeha.2023.100113