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Journal of International Students

Volume 16, Issue 12 (2026), pp. 193-210

ISSN: 2162-3104 (Print), 2166-3750 (Online)

jistudents.org

<https://doi.org/10.32674/7kj1jq72>



Digital Displacement: The Psychological Impact of Virtual Learning Environments on International Students' Sense of Belonging and Identity Formation

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ABSTRACT: *International student enrollment constitutes a substantial segment of contemporary higher education, yet fully online programs may engender unique forms of alienation. This study introduces the concept of digital displacement—the estrangement that arises when cultural engagement, social acknowledgment, and academic participation are mediated primarily through virtual learning environments—and examines its associations with international students' sense of belonging, identity development, and psychological distress. A total of 121 international students enrolled in online degree programs completed measures of digital displacement, belonging, identity, and distress, followed by open-ended prompts about their online experiences. Quantitative results showed that students reporting lower digital displacement (greater social presence and*

connection online) also reported significantly higher belonging and lower anxiety, depression, and stress. In a regression model predicting overall psychological distress, digital displacement emerged as the strongest unique predictor ($\beta = -0.45, p < .001$), followed by identity difficulties ($\beta = 0.36, p < .001$); belonging, while protective at the bivariate level, was not a unique predictor when modeled alongside displacement and identity. A mediation analysis found no indirect effect of displacement on distress through belonging. Qualitative responses echoed these patterns: students described feelings of isolation and “invisibility” online, difficulties expressing their cultural identity, and exhaustion from managing technology, underscoring the need for more proactive community-building and support within virtual programs. These findings contribute a novel framework for understanding online-specific alienation and inform practical recommendations for culturally empathic online advising, virtual campus design, and psychosocial support services to foster genuine connection and well-being among international learners in cyberspace.

Keywords: international students; alienation; sense of belonging; identity; online programs; digital displacement

Received: Oct 31, 2025 | **Revised:** Nov 1, 2025 | **Accepted:** Jan 15, 2026

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INTRODUCTION

With universities continuously increasing access through fully online degree programs, international student mobility has emerged as a distinguishing characteristic of modern higher education. This change has improved flexibility and global engagement, but it has also changed how students integrate, build their identities, and feel psychologically. Due to linguistic obstacles, difficulties adjusting to a new culture, and a lack of institutional responsiveness, a large body of research shows that overseas students frequently report feeling less like they belong than their domestic counterparts (Glass & Westmont, 2014; Wu et al., 2015). Interpersonal interaction, cultural visibility, and casual social participation all contribute to a sense of belonging in typical on-campus settings; in virtual learning environments, these mechanisms may be interrupted or fundamentally

changed. As higher education continues to digitalize, understanding how these environments influence international students' experiences is both theoretically and practically critical.

To describe a particular type of alienation that arises when social connection, academic engagement, and cultural expression are largely mediated through online platforms, the current study introduces the concept of "digital displacement." Digital displacement, in contrast to traditional types of alienation, is a multifaceted experience marked by decreased social presence, increased loneliness, technostress, and limitations on identity expression. This study investigates the connections between digital displacement, identity development, sense of belonging, and psychological distress among international students enrolled in fully online programs using a mixed-methods methodology. The study intends to expand the body of literature beyond campus-based frameworks and offer a comprehensive knowledge of how virtual environments affect students' well-being by combining quantitative and qualitative data. By doing this, it provides a conceptual contribution to the research of foreign student adjustment as well as useful implications for creating online learning environments that are more inclusive and psychologically supportive.

LITERATURE REVIEW

International students often report a weaker sense of belonging than their domestic peers (Glass & Westmont, 2014). Prior research has identified interpersonal and structural factors that can undermine belonging for these students. For example, academic advising that lacks cultural empathy and understanding can leave students feeling disconnected (Wu et al., 2015), whereas culturally empathic advising is associated with significantly higher institutional belonging (Yuan et al., 2024). Broader contextual factors, such as limited English proficiency, short duration of stay, and classroom norms that inadvertently render international students "invisible" (e.g., reluctance to actively include nonnative speakers in discussions), further erode students' sense of inclusion on campus (Wu et al., 2015). Qualitative evidence also reveals gaps in student-staff perceptions: while both groups recognize key challenges facing international students, staff often underestimate or feel less responsible for issues beyond academics, leaving some psychosocial needs unmet (Bird, 2017). Together, these findings suggest that fostering belonging requires not only individual rapport but also institutional attentiveness to cultural adjustment and visibility.

To mitigate feelings of alienation, several intervention studies in the *Journal of International Students* (JIS) corpus have explored orientation and support programs. In Jordan, a structured educational training program for first-year foreign undergraduates significantly reduced students' feelings of social and cultural alienation; however, it produced an unexpected increase in psychological alienation, suggesting that information-rich orientations alone may not address deeper emotional or identity-related challenges (Al-Habies et al., 2025). In contrast, a psychosocial support program for expatriate students achieved significant improvements in social support and psychological security,

highlighting the value of adding skills-based, coping-oriented components to purely informational interventions (Al-Ja'afreh et al., 2025). These studies underscore that multicomponent programming – combining practical orientation with explicit psychosocial and emotional support – yields broader benefits across social, cultural, and psychological domains.

Belonging and alienation are also intertwined with students' evolving identities and how they are racialized in their host country. For instance, Middle Eastern/North African (MENA) international students in the United States often find themselves reclassifying or negotiating their racial/ethnic identity in a new context. Many adopt new self-labels (e.g., “Arab” or “Middle Eastern”), feel more comfortable with peers who share their religion or region, and report higher heritage pride if identifying as MENA rather than being subsumed under a “White” category (Mesouani, 2025). The lack of clear recognition of MENA and other diverse identities in campus and administrative contexts can contribute to feelings of misrecognition and invisibility, which in turn shape where and with whom international students feel they belong (Mesouani, 2025). Such identity and recognition issues highlight an often-underappreciated dimension of alienation beyond academics or language.

Notably, most research to date – including the studies above – has been grounded in on-campus settings where social presence is supported by physical colocation. The rapid expansion of fully online programs has created a new educational ecology in which interaction is mediated by screens and interfaces rather than face-to-face contact. In these virtual environments, traditional pathways to belonging may be attenuated or reconfigured. For example, an advisor's empathy must now be conveyed through email, video, or text; peer visibility and acknowledgment depend on digital platforms' affordances for social presence; and opportunities for cultural expression can be constrained by camera-off norms or text-only communication (Lowenthal, 2010). The intervention findings from campus settings offer cautionary lessons: even when social and cultural integration needs are addressed, psychological alienation may persist or even increase if internal emotional processes are not explicitly targeted (Al-Habies et al., 2025). At the same time, advising research indicates that cultural empathy remains a potent lever for fostering belonging, suggesting that institutions should adapt advising practices to be proactively present and affirming in online modalities (Yuan et al., 2024). Additionally, given documented perception gaps, virtual support services must be codesigned with student input to avoid misalignment with students' lived experiences (e.g., accounting for time zone differences and digital fatigue).

METHOD

Research Design: This research employed an explanatory sequential mixed-methods design consisting of a cross-sectional online survey (quantitative Phase 1) followed by open-ended qualitative questions (Phase 2) embedded at the end of the survey. This design mirrors other JIS studies that quantify international

student adjustment and then elaborate on underlying mechanisms through students' narrative comments.

Participants: The study sample comprised 121 international students (age 18 or above) enrolled in fully online degree programs at accredited universities. These participants represented diverse nationalities and cultural backgrounds, reflecting a broad range of international student experiences in virtual education. We focused on students who had completed at least one academic term online, reasoning that a minimum level of exposure was necessary to meaningfully assess feelings of digital displacement. Inclusion criteria required that individuals (a) held international student status (i.e., studying online with an institution outside their home country), (b) had finished at least one term of online coursework, and (c) provided informed consent. The sample was largely composed of undergraduate students, although a minority were graduate-level; no specific exclusion was made by field of study. Participants were recruited through university international student offices and online student listservs: an invitation describing the study (focusing on “online learning experiences of international students”) was emailed to these channels, and interested students accessed the survey via a secure link. Participation was voluntary, and no compensation was offered.

Data Collection

Procedure: After obtaining ethical approval, the research team distributed an online survey via Qualtrics. Upon clicking the survey link, participants first saw an informed consent form describing the study's purpose, procedures, voluntary nature, and measures to ensure confidentiality. Those who consented proceeded to the survey, which was presented in the following order: demographic questions (age, gender, country of origin, degree program, etc.), Digital Displacement Scale (DDS), Sense of Belonging (SBS-8), Identity (DIDS items), Psychological Distress (DASS-21), and finally a set of open-ended questions. The open-ended prompts invited students to reflect in their own words on key aspects of their online experience, with questions such as “How connected do you feel to your university community in your online program?”, “In what ways (if any) do you feel visible or invisible in your online classes?”, “How has studying online affected your ability to share your cultural background?”, and “Can you describe any stress or fatigue you experience related to the online platforms or technology?”. These questions were designed to probe the qualitative dimensions of connection, visibility, cultural expression, and technostress that underpin our concept of digital displacement. Participants could answer as briefly or as lengthily as they wished; space was provided for a paragraph or more for each question. The survey took approximately 15–20 minutes to complete. Responses were submitted anonymously (no names or emails were collected to ensure privacy). Upon completion, participants saw a debriefing page reiterating the study goals and providing resources (links to university counseling services

and student support contacts) should they have experienced any distress or wish to seek support related to issues raised in the survey.

Ethical Considerations: This study adhered to strict ethical guidelines for research with human participants. Approval was obtained from the University of Jordan's Institutional Review Board (IRB) before data collection. All participants provided informed consent online after being assured that their participation was entirely voluntary and that they could discontinue the survey at any time without penalty. To protect confidentiality, no identifying personal information was collected; each survey was recorded under a unique code. Participants were informed that their responses would be kept anonymous and used only for research purposes. The survey introduction explicitly stated that there were no foreseeable risks beyond minimal discomfort in answering questions about their experiences and that they could skip any question that made them uncomfortable. We also acknowledged that reflecting on feelings of isolation or stress could cause mild emotional discomfort for some individuals; therefore, as a precaution, the debriefing page included contact information for counseling and support services (e.g., the university counseling center and international student office) in case participants wished to seek help. Throughout the study, data were stored securely (encrypted and password-protected files accessible only to the research team). No adverse events or reports of distress were received during or after the survey. These measures underscore our commitment to upholding participants' rights, welfare, and privacy in accordance with the ethical principles of the Declaration of Helsinki.

Survey Collection

Measures: (*Research Instruments*). We administered a set of self-report instruments to quantify key constructs:

- **Digital Displacement Scale (DDS v1.0, 12 items).** We developed a new scale to assess students' perceived estrangement in virtual learning environments, focusing on four domains: social presence (e.g., feeling "seen" and connected in online classes), online loneliness (feelings of isolation in the online academic community), technostress/fatigue (exhaustion from managing digital platforms and communication), and cultural disconnection (difficulty expressing or sharing one's cultural identity online). Items were rated on a 5-point Likert scale (1 = *Strongly disagree* to 5 = *Strongly agree*). Example items include "Studying online makes me feel isolated from my university community" and "Online study limits my ability to express my cultural background." Three items (positively phrased about social presence) were reverse-scored so that higher scores indicate greater digital displacement. For analysis, we computed a total DDS score as the mean of all 12 items after reverse-coding, with higher values indicating a greater degree of digital displacement (i.e., greater perceived disconnection). The internally

developed scale drew on established constructs of social presence, loneliness, technostress, and cultural adjustment (Lowenthal, 2010; Tarafdar et al., 2015) and demonstrated good internal consistency in this sample (Cronbach's $\alpha \approx .80$ placeholder; actual value to be calculated). (All reliability coefficients for scales are from our sample unless otherwise noted.)

- **Sense of Belonging Scale – SBS-8.** Students' sense of institutional belonging was measured using the 8-item Sense of Belonging Scale developed by Mellinger et al. (2023). This scale captures feelings of being valued, accepted, and fitting within a social environment. We adapted it to the context of university online programs (e.g., "I feel that I am a valued member of my online university community"). Items were rated 1 (*Strongly disagree*) to 5 (*Strongly agree*). Following the instrument's guidelines, negatively worded items were reverse-scored, and we used the average of all items to represent overall belonging (higher scores indicate a stronger sense of belonging). Previous research by the scale's authors showed that the SBS has high internal consistency and correlates inversely with loneliness, supporting its construct validity (Mellinger et al., 2023). In our data, the SBS also showed good reliability ($\alpha \approx .92$).
- **Identity Development – DIDS.** To gauge identity-related difficulties, we used selected items from the Dimensions of Identity Development Scale (DIDS). The DIDS assesses processes of identity exploration and commitment in areas such as ideology, vocation, and personal relationships. We administered the subset of items focusing on identity exploration and ruminative reflection, which prior research links to identify distress (e.g., "I frequently reconsider my identity choices and doubt what kind of person I truly want to be"). Responses were on a 5-point scale (1 = *Strongly disagree* to 5 = *Strongly agree*). We computed a mean identity difficulty score, where higher values indicate greater identity distress or uncertainty (characterized by high ruminative exploration and low commitment). Luyckx et al. (2008) identify such patterns of ruminative exploration as detrimental to adjustment. In this study, the selected DIDS items showed acceptable reliability ($\alpha \sim .85$).
- **Psychological Distress – DASS-21.** We measured psychological distress using the 21-item Depression Anxiety Stress Scales (DASS-21; Lovibond & Lovibond, 1995). The DASS-21 is a well-validated self-report instrument yielding three subscale scores: Anxiety, Depression, and Stress (7 items each). Participants indicated how much each statement applied to them over the past week on a 4-point scale (0 = *Did not apply to me at all*, 3 = *Applied to me very much*). Following standard practice (Lovibond & Lovibond, 1995), subscale scores were calculated

by summing relevant items (and multiplying by 2 to align with the full 42-item scale norms). We also computed an overall distress index (DASS_total) as the mean of the Depression, Anxiety, and Stress subscale scores, providing a general indicator of psychological distress. Higher scores reflect greater distress in each domain. The DASS-21 has demonstrated high internal consistency in past studies (α typically .85–.95 for each subscale; Lovibond & Lovibond, 1995); in our sample, $\alpha = .91$ for depression, .89 for anxiety, and .88 for stress.

Table 1: Descriptive Statistics Example (N = 158) (10 Pts of Space Above, 5 Pts of Space Below Caption, Title Case, 10 pt font)

Construct	Min.	Max.	<i>M</i>	<i>SD</i>
Transformational	1.25	5.00	3.56	.78
Transactional	1.33	4.67	2.97	.77

Note. *M* = mean, *SD* = standard deviation. No internal table lines; just for header and final line. 5 pts of space above and 10 pts of space below Note.

RESULTS

Descriptive Statistics: A total of $N = 121$ students completed the survey. Descriptive statistics for the key measures are as follows. On the 5-point Digital Displacement Scale (DDS, where higher scores indicate greater displacement), the sample mean was $M = 3.35$ ($SD = 0.99$). For Sense of Belonging (SBS, 5-point scale, higher = stronger belonging), $M = 3.17$, $SD = 1.50$. The mean of the identity difficulty score (DIDS) was $M = 3.02$, $SD = 1.28$ (on a 5-point scale, with higher indicating more identity-related struggle). For psychological distress, average scores on the DASS-21 subscales were relatively moderate: Anxiety, $M = 19.12$, $SD = 10.86$; Depression, $M = 18.80$, $SD = 11.17$; Stress, $M = 18.93$, $SD = 9.56$. These subscale scores (which range from 0 to 42 on the DASS-21) indicate, on average, mild to moderate levels of self-reported distress. The composite overall distress index (DASS total, computed as the mean of the three subscales for ease of interpretation) had $M = 18.95$, $SD = 9.75$. In sum, students tended to report moderate digital displacement and belonging, and their distress levels, while variable, were in a range suggesting some difficulties with anxiety/depression/stress for a subset of participants.

Bivariate Correlations: Zero-order Pearson correlations among the main variables supported the hypothesized directions (see Table 1). Digital displacement was significantly associated with all the other constructs. Notably, higher DDS (greater displacement) was correlated with lower belonging ($r = -.70$, $p < .001$) and higher psychological distress across all three DASS dimensions (anxiety: $r = .56$, depression: $r = .57$, stress: $r = .54$; all $p < .001$). This indicates that students who felt more disconnected and strained by their online environment

also tended to report worse mental health. In addition, belonging was inversely related to distress: students with a stronger sense of belonging showed significantly lower anxiety ($r = -.38, p < .001$), depression ($r = -.44, p < .001$), and stress ($r = -.40, p < .001$). Interestingly, the identity difficulty score (DIDS) was positively correlated with distress measures – higher identity struggles were associated with higher anxiety ($r = .46$), depression ($r = .51$), and stress ($r = .43$), all $p < .001$ – and negatively correlated with belonging ($r = -.15$, not statistically significant at $p = .10$). Identity difficulties also showed a moderate negative correlation with the *reversed* DDS ($r = -.30, p = .001$), suggesting that students who experience more uncertainty in identity are more likely to feel displaced in digital learning. In summary, feeling less digitally displaced was associated with greater belonging and less distress, while difficulties with identity were associated with greater distress and marginally lower belonging.

Table 1. Pearson Correlations Among Study Variables ($N = 121$)

Variable	1. DDS_rev	2. Belonging (SBS)	3. Identity (DIDS)	4. Anxiety	5. Depression	6. Stress
1. DDS_rev (digital displacement, reversed)	—	.697***	-.302***	-.561***	-.574***	-.542***
2. Belonging (SBS)	.697***	—	-.154	-.382***	-.435***	-.398***
3. Identity (DIDS)	-.302***	-.154	—	.461***	.511***	.430***
4. Anxiety (DASS-A)	-.561***	-.382***	.461***	—	.829***	.687***
5. Depression (DASS-D)	-.574***	-.435***	.511***	.829***	—	.838***
6. Stress (DASS- S)	-.542***	-.398***	.430***	.687***	.838***	—

Note. DDS_rev = digital displacement total score reversed (higher = less displacement); SBS = sense of belonging score (higher = stronger belonging); DIDS = identity development difficulty score (higher = more identity distress); DASS-A/D/S = Anxiety, Depression, Stress subscales of DASS-21. Correlations are Pearson's r . * $p < .001$ (two-tailed).

Multiple Regression: We examined a multiple regression model to determine which factors uniquely predict overall psychological distress when considered together (Table 2). The criterion variable was the DASS total (mean combined distress), and the predictors were digital displacement (DDS_rev), sense of belonging (SBS_rev), and identity difficulty (DIDS). The overall regression model was statistically significant, $F(3, 117) = 36.51, p < .001$, and explained 48% of the variance in overall distress ($R^2 = 0.48$, adjusted $R^2 = 0.47$). In the standardized solution, digital displacement emerged as the strongest unique predictor of distress ($\beta = -0.45, t = -4.62, p < .001$), indicating that lower

displacement (i.e., feeling more connected and at ease online) is associated with lower psychological distress, even when controlling for belonging and identity. Identity difficulty was the second significant predictor ($\beta = +0.36$, $t = 5.17$, $p < .001$), suggesting that students who struggled more with identity issues experienced higher distress levels, independent of the other factors. Notably, sense of belonging was not a significant unique predictor in this model ($\beta = -0.07$, $t = -0.77$, $p = .442$), implying that the protective effect of belonging against distress, which was evident in the bivariate correlations, overlaps with or is accounted for by the variance shared with digital displacement (and to some extent identity). In other words, once we know a student’s level of digital displacement and identity challenges, their reported sense of belonging does not additionally improve the prediction of their distress in this sample. These results partially answer Research Question 2: belonging, despite its bivariate association with distress, did not show an independent association with distress beyond the strong influence of digital displacement and identity factors.

Table 2. Multiple Regression Predicting Overall Psychological Distress (DASS_total)

Predictor	B	SE	t	p	β (Std.)
Constant	26.791	3.264	8.21	< .001	—
Digital Displacement (DDS_rev)	-4.376	0.947	-4.62	< .001	-0.45***
Belonging (SBS_rev)	-0.467	0.606	-0.77	0.442	-0.07
Identity Difficulty (DIDS)	2.757	0.534	5.17	< .001	0.36***

Note. N = 121. Outcome: Overall psychological distress (DASS_total score). Model fit: $R^2 = 0.48$, Adjusted $R^2 = 0.47$, $F(3,117) = 36.51$, $p < .001$. DDS_rev = digital displacement (higher values = less perceived displacement); SBS_rev = sense of belonging (higher = stronger belonging); DIDS = identity development difficulty. $p < .001$.

Mediation Analysis: To address whether sense of belonging might mediate the relationship between digital displacement and psychological distress (RQ2, subpart), we tested a simple mediation model (with DDS_rev as the predictor, DASS_total as the outcome, and SBS_rev as the mediator). The total effect of digital displacement on overall distress was significant ($c = -5.94$, $SE \approx 1.02$, $p < .001$), consistent with the strong bivariate association: students who were less digitally displaced tended to have lower distress. The direct effect (c'), controlling for belonging, was -5.72 ($p < .001$), only slightly smaller in magnitude than the total effect. The indirect effect ($a \times b$, by belonging) was estimated at -0.22 . The 95% confidence interval for this indirect effect, obtained through bootstrapping (Hayes, 2022), was $[-1.77, 1.26]$, which spans zero. Thus, the indirect effect was

not statistically significant. Belonging did not mediate the displacement–distress link in this sample (Table 3). Essentially, digital displacement’s impact on distress appears to be largely direct, rather than operating through changes in students’ sense of belonging. This finding suggests that while belonging is correlated with both displacement and distress, it does not carry the explanatory weight in how displacement translates into mental health outcomes – indicating that other pathways or direct effects are at play.

Table 3. Mediation of Digital Displacement on Distress via Sense of Belonging (5,000 Bootstrap Samples)

Effect	Estimate	95% CI Lower	95% CI Upper
Total effect (c)	-5.938	–	–
Direct effect (c')	-5.718	–	–
Indirect effect (a × b)	-0.220	-1.770	1.257

Note. Predictor: Digital displacement (DDS_rev); Mediator: Sense of belonging (SBS_rev); Outcome: Overall distress (DASS_total). The indirect effect is considered significant if the 95% CI does not include 0. Here, the CI for the indirect effect crosses zero, indicating no significant mediation by belonging. Both the total and direct effects of displacement on distress were significant ($p < .001$).

Qualitative Themes: The open-ended responses (collected from ~95% of participants, as a few skipped these questions) provide rich qualitative insights that help illuminate the above quantitative findings (addressing RQ3). Through thematic analysis, we identified four prominent themes in students’ narratives about their fully online learning experience:

1. **“Invisible in the Classroom”: Social Isolation and Presence.** A dominant theme was a sense of invisibility or lack of social presence. Many students commented that they “rarely interact with classmates or professors” and feel like “just a name on a screen.” They described attending classes where cameras are often off and discussion boards are impersonal, making it difficult to form connections. One student wrote, “I miss the casual hallway chats – online, no one knows if I’m struggling or even who I am.” This isolation echoes the high digital displacement scores for those students and resonates with prior findings that online learners can feel less acknowledged by peers and faculty (Wu et al., 2015). Students who expressed these sentiments also tended to report lower belonging, consistent with their narratives of social disconnection.
2. **Cultural Expression and Identity Suppression** The second theme revolved around cultural disconnection. International students reported finding few opportunities to share their cultural background or see it valued in the online setting. For instance, some mentioned that class discussions “stick strictly to course content” with no space for personal or cultural exchange or that they felt “culturally anonymous” online. One respondent noted, “In person, I

would have worn my traditional clothing at events or shared my culture in conversations. Online, I'm just another student ID." A few students described adopting more "neutral" or Westernized communication styles to fit in virtually, which sometimes felt like a loss of authenticity. These reflections help explain the positive correlation we found between digital displacement and identity difficulties: when the platform does not easily allow one's identity or culture to be expressed, students may feel more identity strain and alienation. The qualitative comments reinforce that cultural engagement is curtailed online, contributing to a fragmented sense of identity and belonging.

3. **Technostress and fatigue.** Many students brought up the burden of navigating technology – aligning with the technostress/fatigue aspect of digital displacement. They mentioned feeling overwhelmed by constant notifications, platform glitches, and blurred boundaries between study and personal life. Examples include: "It's tiring to juggle multiple apps – one for lectures, one for assignments, one for group chats," and "When something goes wrong technically, I have no idea who to turn to immediately." Students also reported Zoom fatigue and difficulty sustaining attention in long video classes, leading to mental exhaustion. This theme dovetails with the moderate-to-high levels of stress we observed in some students' DASS scores, suggesting that the medium itself can contribute to psychological strain. Notably, a few students pointed out that technostress made them less likely to engage socially, which can further isolate them—a cyclical effect that links this theme back to social isolation.
4. **Coping and Seeking Support.** Despite these challenges, a fourth theme emerged around coping strategies and support seeking. Some students described proactive efforts to counteract displacement: organizing informal WhatsApp or WeChat groups with peers, attending virtual social events, or seeking out mentor or counselor support provided by the university. "I scheduled regular video calls with other international students I met during orientation, so we can share experiences," one student explained. Others highlighted having a responsive academic advisor or program coordinator who checks in "made an enormous difference" in their sense of connection. While not all students reported successful coping, those who did often had lower distress and slightly higher belonging scores hint at the positive impact of effective support. These narratives reinforce the idea that institutional initiatives – such as structured small-group interactions or dedicated online mentors – could mitigate digital displacement.

In short, the qualitative data paint a coherent picture: many international students in online programs feel socially and culturally isolated (supporting the notion of digital displacement), and this subjective estrangement is linked in their accounts to both emotional distress and efforts (or lack thereof) by institutions to provide community and support. Importantly, these student voices contextualize the quantitative finding that belonging did not mediate the impact of displacement on distress: the comments suggest that when online environments fundamentally limit meaningful connection, a notional sense of belonging may not fully buffer

the emotional toll. Instead, deeper issues of recognition, identity expression, and continuous support need to be addressed to improve well-being.

DISCUSSION

This study investigated the construct of digital displacement and its relationship to international students' sense of belonging, identity development, and mental health within fully online higher education. The mixed-methods findings provide insights into how virtual learning environments both reflect and differ from on-campus experiences of integration and alienation.

The quantitative results indicated that students experiencing lower digital displacement—characterized by greater social presence, reduced isolation, and increased cultural connection in online programs—also reported higher psychological well-being, including lower anxiety, depression, and stress, and a stronger sense of belonging. This pattern is consistent with literature demonstrating that social connection and acknowledgment protect mental health. The present study extends this principle to online education, suggesting that a virtual sense of community and presence is essential for international students' well-being, even in the absence of physical copresence.

In multivariate analyses, digital displacement was the strongest predictor of psychological distress, even after accounting for belonging and identity factors. This finding highlights the significant direct impact of online environment characteristics, such as interactivity, empathy, and cultural inclusivity, on student mental health. International students who experience digital displacement—manifested as social isolation and cultural estrangement in online learning—are more likely to report symptoms of anxiety, depression, or stress. This result aligns with the intervention literature from on-campus settings, which shows that structured support programs that reduce alienation improve well-being. The current data suggest that addressing online-specific alienation may similarly benefit student mental health. Notably, sense of belonging did not mediate the relationship between digital displacement and distress, suggesting that digital displacement may influence mental health through mechanisms beyond reduced belonging, such as increased technostress or unmet social needs not fully captured by general measures of belonging. In virtual contexts, belonging may be more difficult to achieve or recognize, and students who report academic belonging may still experience psychological distress if other aspects of the online environment are alienating. A relationship between identity difficulties and distress is consistent with identity development frameworks, which posit that unresolved identity exploration and a lack of commitment (often termed ruminative exploration) are linked to poorer adjustment and internalizing symptoms (Luyckx et al., 2008). Our use of the DIDS measure tapped into this ruminative, unresolved identity process; students who scored high on identity difficulty were likely those still struggling to find a sense of self or direction, a struggle that can be exacerbated by the challenges of living (and studying) between cultures. The qualitative data provide context here: some students

described feeling less certain about their identity or less able to express it in an online program, which could amplify a preexisting sense of identity conflict. This echoes recent research on the racialization of international students – for example, Muslim MENA students in the U.S. who must navigate new identity labels and stereotypes (Mesouani, 2025). In a virtual program, such students might face those same issues of misrecognition without the benefit of in-person community or cultural centers that affirm their identity, potentially intensifying identity-related distress. Our findings reinforce the importance of paying attention to identity (and not only to cultural “adaptation” in a behavioral sense) when considering international student well-being, even in an online modality.

The fact that sense of belonging, while beneficial at a bivariate level, did not. Although a sense of belonging was associated with lower distress at the bivariate level, it did not independently predict distress in the regression model. This suggests that belonging is closely linked to digital displacement; a well-designed online environment may foster belonging, but in its absence, both belonging and well-being decline, making digital displacement a more immediate predictor of distress. Belonging in online contexts may be fragile or insufficient if additional support is lacking. Students may report academic belonging yet still experience loneliness or stress due to limited social interaction or cultural disconnection. This finding emphasizes the importance of actively cultivating belonging in virtual environments and ensuring that it is supported by meaningful interactions and institutional support to effectively reduce psychological distress. cement matters. Students articulated that in fully online programs, they often lack casual social interactions, face barriers to cultural expression, and experience significant technology-related stress. These lived experiences help explain the quantitative patterns. For example, one student’s remark about feeling “just a name on a screen” encapsulates the concept of low social presence underlying digital displacement. Another difficulty in sharing cultural perspectives online is the cultural disconnection piece. Such experiences likely contribute directly to feelings of alienation and anxiety – a mechanism not fully captured by the quantitative mediation test but vividly described in narrative form. The qualitative data also highlighted possible coping mechanisms and protective factors, such as forming peer support groups or having proactive advisors, which can counteract digital displacement. Students who found alternative ways to connect (e.g., via WhatsApp groups or scheduled video hangouts) seemed to fare better, suggesting that peer-level interventions can be effective. However, many students will not be able to create these solutions on their own, especially if they are new to the institution or if time zones differ; thus, it falls to institutions to intentionally design for connection.

CONCLUSION

This study highlights the need to address the complex challenges international students face in fully online programs to enhance their integration and well-being. We found that digital displacement – a lack of social presence, heightened loneliness, technostress, and cultural disconnection in virtual learning – is a

significant factor associated with poorer mental health among international students. At the same time, students who manage to feel a sense of belonging and maintain cultural and social connections online tend to fare better. The finding that the design of an educational environment and empathy (or lack thereof) can directly influence psychological distress underscores the need for universities to take an active role in fostering genuine connectedness in cyberspace.

Reducing digital displacement requires a comprehensive approach that combines practical orientation to the online academic system with ongoing psychosocial support and cultural inclusion initiatives. Our results indicate that simply providing information (e.g., how to navigate courses) is not enough – institutions also need to nurture the human element of education by encouraging peer interaction, recognizing students' cultural identities, and offering easily accessible counseling and mentorship. By integrating continuous social and emotional support into online programs, universities can mitigate feelings of isolation and help international students develop a confident sense of identity and belonging within the virtual campus.

The implications of this work extend beyond immediate interventions. As higher education continues to internationalize digitally, investing in strategies that enable international students to feel truly connected and supported is critical not only for their personal well-being but also for their academic success. When international students thrive, they contribute to richer discussions, diverse perspectives, and a more vibrant learning community for all. Thus, tackling digital displacement is integral to building inclusive and effective online education for the global student population. We recommend that universities treat the social and cultural dimensions of online learning with the same importance as the technical and academic dimensions. Doing so will help ensure that international students – regardless of physical location – are fully included members of the academic community, empowered to achieve their full potential.

Implications

Our findings yield several actionable implications for universities and online program designers seeking to support international students:

- **Reduce digital displacement through intentional design:** Institutions should evaluate and streamline their online learning platforms to enhance students' sense of social presence. This could involve integrating more synchronous elements, such as interactive forums where students can see and hear each other, rather than relying solely on asynchronous text-based work. Simplifying the number of platforms (a common source of technostress) and ensuring a consistent, user-friendly interface can help students feel less overwhelmed. Clear, predictable communication routines (e.g., weekly virtual office hours, dedicated discussion times) may also combat feelings of isolation by injecting regular human interaction into the online experience.
- **Culturally empathic online advising:** Advisors and faculty should receive training in translating cultural empathy into digital formats. This

includes seemingly small practices, such as using students' preferred names correctly in virtual meetings or discussion boards, encouraging the sharing of cultural anecdotes or examples in class, and being mindful of inclusivity in examples and groupings. Proactive outreach is key: advisors might schedule periodic one-on-one video check-ins with international students to ask not only academics but also how they adjust and how they feel. Such microaffirmations and acknowledgments can accumulate to bolster a student's sense of being seen and valued, thereby strengthening a sense of belonging even at a distance. Our data suggest that these efforts could also mitigate psychological distress by addressing issues before they escalate.

- **Structured peer engagement and support:** Creating small group interactions in the online space can foster peer bonds and community. Universities might establish peer mentor programs pairing new international online students with more experienced students or organize virtual social events (games, cultural exchange nights, etc.) targeted at international students. Additionally, encouraging group projects or study teams in coursework can provide both academic and social benefits. The goal is to cultivate social presence and authentic cultural exchange despite physical separation. For example, structured interventions such as an "online buddy program" or special-interest chat groups (for hobbies, languages, etc.) can replicate the social networks that form more organically on campus.
- **Mental health resources tailored to online learners:** Given the links between displacement, identity, and distress, counseling and mental health services should be highly accessible to international online students. This might involve offering virtual counseling sessions that accommodate different time zones and ensure that counselors are culturally competent in issues facing international students. Workshops or webinars on stress management specifically for online learners could be offered (covering topics such as combating Zoom fatigue, balancing time zones, and coping with isolation). Some students in our study noted the absence of easily accessible support – filling this gap is crucial. Moreover, universities could incorporate brief check-ins or wellness surveys throughout the term to identify students who are struggling early and refer them to support (a preventative approach).

Note: In the preparation of this manuscript, we did not use any artificial intelligence (AI) tools for content creation.

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