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<https://doi.org/10.1057/s41599-025-06315-4>

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Cross-cultural service learning in a juvenile correctional school: a qualitative analysis of international medical students' reflections

This study investigates the impact of a service-learning activity on the personal and professional development of 28 international medical students at I-Shou University, focusing on their participation in a service-learning project at a juvenile correctional school in Taiwan. Through the collection and thematic analysis of written reflections, four key themes were identified: cultural competence, empathy development, medical professionalism, and personal and professional growth. The service-learning experience significantly enhanced students' cultural competence by exposing them to cross-cultural challenges, deepening their understanding of the social determinants of health, and reinforcing the importance of communication skills in overcoming language and cultural barriers. This is particularly relevant in diverse healthcare settings where effective communication is essential for patient-centered care. A notable outcome of the activity was the development of empathy, as students reflected on the emotional needs of the juveniles they encountered, highlighting the critical role of non-judgmental, compassionate care in healthcare practice. Furthermore, the experience fostered medical professionalism by confronting students with ethical dilemmas, such as equitable access to healthcare for marginalized populations, thus emphasizing the responsibility of future physicians to advocate for social justice and address healthcare disparities. Personal and professional growth emerged as another significant outcome, with students reporting increased self-awareness and emotional intelligence. The service-learning activity challenged their preconceived notions about marginalized populations, enabling them to recognize and mitigate personal biases, ultimately contributing to more compassionate and ethical patient care. Overall, the study underscores the transformative role of service-learning in medical education, fostering cultural competence, empathy, ethical awareness, and social responsibility—qualities essential for preparing socially responsible physicians to navigate healthcare. These findings collectively bridge theory and practice, illustrating how transformative learning and professional identity formation manifest through experiential service-learning. Accordingly, this study emphasizes integrating service-learning into medical education curricula to bridge theory and practice and equip students for ethical, cultural, and professional challenges. Future research should explore its long-term impact on professional development and broader curricular integration.

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Background

Service learning has emerged as a crucial element in medical education, offering students the opportunity to integrate academic knowledge with hands-on experience in community settings. This approach effectively bridges the gap between classroom learning and practical application, promoting not only academic growth but also the holistic development of future physicians. Through service learning, medical students develop essential competencies such as social responsibility, empathy, and cultural competence—critical skills for effective healthcare practice (Seifer, 1998). Research highlights the positive impact of service learning on academic performance, critical thinking, and writing abilities, while also fostering personal attributes like leadership, self-efficacy, and commitment to social justice and civic responsibility. The reflective aspect of service learning further enhances students' understanding of course material and strengthens their long-term commitment to community service and professional development (Astin et al., 2000).

Moreover, service learning plays a key role in cultivating cultural competence by immersing students in environments where they must navigate and respect diverse cultural norms and practices. This exposure is vital for developing patient-centered care skills, particularly in increasingly multicultural healthcare settings. Studies have shown that medical students who engage in cross-cultural care programs and service-learning opportunities enhance their cultural awareness, communication skills, and empathy toward diverse patient populations (Seifer, 1998). These competencies contribute to stronger patient-provider relationships and improved health outcomes, especially for underserved or minority groups. Additionally, cultural competence gained through these experiences boosts students' confidence and effectiveness in delivering healthcare across diverse cultural contexts (Amanullah et al., 2022; Sherrill et al., 2016).

The integration of service learning into medical curricula aligns with the broader goals of medical education, which aim to prepare physicians who are not only clinically proficient but also socially responsible and deeply committed to the well-being of their communities. Service learning provides medical students with opportunities to engage in real-world health initiatives, fostering a deeper understanding of the social determinants of health and the ethical dimensions of patient care (Seifer, 1998). By integrating project-based learning approaches, as demonstrated in recent adaptations due to COVID-19, medical students can continue to develop critical skills such as interpersonal communication, teamwork, and professionalism, even when face-to-face interactions are limited. These experiences are invaluable in shaping well-rounded physicians who are not only adept at managing clinical complexities but also sensitive to the social and ethical challenges inherent in healthcare delivery. Ultimately, service learning equips future physicians with the skills necessary to navigate the increasingly complex landscape of modern healthcare, ensuring they remain patient-centered and community-focused in their practice (Liao et al., 2023).

The integration of service learning into medical curricula is increasingly critical in today's globalized healthcare environment, where healthcare professionals must not only demonstrate clinical proficiency but also effectively navigate cultural differences and work in diverse settings (Frenk et al., 2010). The School of Medicine for International Students at I-Shou University in Taiwan exemplifies this approach, particularly for international medical students from Pacific and Caribbean countries. These students, many of whom are recipients of full scholarships, receive comprehensive medical training to enhance public health systems and medical infrastructure in their home countries. A key element of this program is the incorporation of service-learning within the medical humanities, which complements clinical

education by actively engaging students in public welfare activities. These activities foster essential qualities such as empathy and social responsibility. One notable example of this approach was the students' visit to a juvenile correctional school in Taiwan on March 12, 2024.

While service-learning has been widely applied in community and clinical contexts, its use in correctional education, particularly with medical students, remains underexplored. Programs involving marginalized populations such as migrant workers, homeless individuals, refugees, and indigenous or incarcerated communities have shown strong educational and social benefits. Civitelli et al. (2021) reported transformative gains in empathy and social responsibility among health science students serving undocumented migrants and homeless patients (Civitelli et al., 2021), while Shadduck-Hernández (2006) highlighted identity development and civic engagement among immigrant and refugee youth (Shadduck-Hernández, 2006). Verjee (2005) demonstrated how women of color resisted dominant narratives through community-based service-learning (Verjee, 2005), and Kulig et al. (2023) emphasized the role of such programs for mobile vulnerable populations, including shelters and Latino migrant communities during COVID-19 (Kulig et al., 2023). Similar outcomes have been noted in education: pre-service teachers in shelters reported improved teaching efficacy and cultural sensitivity (Serra, 2025), and Fields (2020) showed how critical service-learning reimagined pedagogy through engagement with homeless and incarcerated individuals (Fields, 2020). Coffey and Arnold (2022) advanced activist service-learning with refugee families and prison abolitionists (Coffey and Arnold, 2022), while Gillis and Mac Lellan (2010) synthesized evidence of empowerment across underserved groups (Gillis and Mac Lellan, 2010). Jaynes (2017) further applied critical social justice theory to analyze transformative outcomes from immigrant-focused capstone projects (Jaynes, 2017). Collectively, this literature affirms the value of service-learning in marginalized populations, yet medical student engagement with justice-involved youth—especially in correctional schools—remains scarce, offering a unique opportunity to examine impacts on cultural competence, empathy, and professional identity formation (PIF).

Although numerous service-learning initiatives in medical education have addressed healthcare disparities among refugees, migrants, homeless individuals, and other community-based populations, research involving justice-involved youth remains strikingly limited. Most studies emphasize community outreach or global health immersion while overlooking correctional or carceral settings as potential transformative learning environments for medical trainees (Chrisman-Khawam and Manzi, 2020b; Dharamsi et al., 2010; Sin et al., 2019). Recent literature in correctional health education has highlighted that structured engagement with incarcerated or justice-involved populations can deepen students' understanding of social determinants of health, empathy, and ethical reasoning (Brooker et al., 2018; Kelly et al., 2025). Moreover, previous research has centered on adult prison populations and senior medical students undertaking clinical placements, whereas little is known about how early-phase medical trainees, particularly those from international and culturally diverse backgrounds, develop empathy, cultural competence, and professional identity through non-clinical, service-oriented engagement (Brooker et al., 2018). The potential of juvenile correctional schools as educational sites for transformative and cross-cultural learning thus remains underexplored.

In contrast to prior service-learning models situated in open community settings, the current study focuses on a juvenile correctional school, providing a distinctive pedagogical context where students confront issues of marginalization, stigma, and

systemic inequities. This perspective expands the current scope of service-learning by demonstrating its potential to cultivate cultural competence, empathy, and PIF through reflective engagement with justice-involved youth—a population rarely represented in existing medical education literature. These experiences can serve as powerful “disorienting dilemmas”, provoking critical reflection and fostering transformation in learners’ professional values (Raikou, 2018). Yet, empirical evidence on how short-term, ethically structured service-learning in correctional settings contributes to medical students’ PIF and intercultural competence—particularly among international cohorts—remains limited (Cipolle, 2010).

To provide a coherent explanatory frame, this study draws on transformative learning and PIF to interpret how justice-oriented service-learning influences medical students’ humanistic growth (Hart et al., 2025; Kovaric and Luk, 2025). To better understand this context, the present study is informed by two complementary theoretical perspectives: transformative learning theory and PIF (Hart et al., 2025; Kovaric and Luk, 2025). Transformative learning theory, first articulated by Mezirow (1991), emphasizes how learners change their frames of reference when encountering disorienting dilemmas, unfamiliar, emotionally complex, or challenging experiences that are followed by critical reflection (Mezirow, 1991). Such processes can promote ethical reasoning, intercultural sensitivity, and social accountability, all of which are highly relevant when medical students engage with marginalized populations in correctional settings. Meanwhile, the framework of PIF describes how medical students gradually internalize the values, norms, and responsibilities of the medical profession. According to Cruess et al. (2019), professional identity is fostered not only by formal curricula but also by experiential and relational learning opportunities in authentic social contexts (Cruess et al., 2019). Service-learning activities in non-traditional environments, such as juvenile correctional schools, can therefore act as powerful catalysts for reflection, empathy, and the integration of professional values.

Building on these theoretical foundations, it is essential to situate the current study within existing empirical research on correctional and carceral education. Understanding how such environments have been previously explored in medical education clarifies both the educational potential and the current limitations of this field. Previous research has underscored the substantial health disparities and unmet service needs among incarcerated adolescents worldwide (Ackerman et al., 2024; Borschmann et al., 2020), as well as the considerable variability in the medical care standards provided within juvenile detention facilities (Kelly et al., 2025). Furthermore, studies examining medical student placements in prison health services suggest that such experiences not only challenge pre-existing stereotypes but also foster professional interest in correctional health (Brooker et al., 2018). However, limited research has addressed how direct engagement with incarcerated youth shapes medical students’ development of cultural competence, empathy, and professionalism. This gap is even more evident for international medical students, whose reflective learning experiences in justice-related settings are rarely documented. To address this gap, the present study explores how participation in a structured 1-day service-learning activity at a juvenile correctional school in Taiwan contributes to the development of cultural competence, empathy, and professional identity among international medical students.

Guided by a qualitative reflective thematic analysis design, this study addressed the following research questions:

RQ1. How does participation in a 1-day service-learning activity in a juvenile correctional school influence international medical students’ cultural competence (awareness, attitudes, and cross-cultural communication strategies)?

RQ2. How do students experience and articulate empathy development and perspective-taking toward incarcerated youth through this experience?

RQ3. In what ways does the activity shape students’ medical professionalism and professional identity (e.g., ethical awareness, social responsibility, justice-oriented reasoning)?

RQ4. How does the experience contribute to students’ personal and professional growth (e.g., self-awareness, emotional regulation, communication skills, and commitment to underserved populations)?

Methods

Study design. This study utilizes a reflective thematic analysis qualitative research design to investigate how participation in a service-learning activity at a juvenile correctional school in Taiwan influenced the professional development of international medical students. These research questions guided the study design and analysis, ensuring alignment between the qualitative approach and the intended outcomes. The central research problem addresses the limited empirical understanding of how such non-traditional, justice-oriented learning environments contribute to the development of cultural competence, empathy, and professional identity in medical trainees, particularly those from international backgrounds. While service-learning is well-studied in community health and clinical settings, its implementation within correctional institutions remains significantly underexplored in medical education literature.

The primary data source comprised reflective narratives written by 28 international medical students following the activity. To analyze these reflections, we employed thematic analysis guided by the six-phase framework proposed by Braun and Clarke (2006). This method allowed for a systematic identification, coding, and interpretation of patterns and recurring themes within the qualitative data. It provided a flexible yet rigorous approach to understanding students’ subjective experiences and the educational impact of direct engagement with marginalized youth. This design enables an in-depth exploration of how such experiences shape students’ values, ethical awareness, and attitudes toward patient care. The findings offer important insights into curriculum design and the integration of low-resource, high-impact service-learning models into international medical education.

Service-learning context and engagement framework. The service-learning activity was led by the Director of the School of Medicine for International Students, a board-certified psychiatrist who has served as a long-term consultant to the juvenile correctional school for over 10 years. His sustained collaboration with the institution enabled the development of an ethically sound and pedagogically relevant program, tailored to the needs and constraints of the correctional environment. Due to the school’s strict access regulations, only authorized faculty were permitted on-site, and he served as the primary facilitator of the experience. A detailed breakdown of the program structure, activities, and communication strategies is provided in Supplementary material S1.

Participants. This study involved 28 first-year and second-year medical students from the School of Medicine for International Students at I-Shou University, all of whom participated in the service-learning activity. These students were enrolled in the school’s mandatory service-learning program, which is integrated into the early-phase medical humanities curriculum. The program is intentionally positioned during the formative stages of medical training to cultivate foundational competencies such as

empathy, cultural awareness, and social responsibility—key elements of PIF and directly aligned with the objectives of this study.

The students represented a diverse cohort in terms of nationality, linguistic background, and prior exposure to various cultural and social environments, reflecting the international composition of the program. The service-learning activity occurred on March 12, 2024, at a juvenile correctional school in southern Taiwan. The students engaged with adolescents from the facility through structured, faculty-facilitated interactions designed to promote cultural exchange, empathy, and ethical reflection. While the medical students were fluent in English, the juveniles primarily spoke Mandarin or Taiwanese. Given this linguistic difference, verbal communication was supported through informal interpretation by bilingual staff and educators. Additionally, students relied heavily on non-verbal communication strategies—such as gestures, facial expressions, tone of voice, and active listening—to build rapport and foster mutual understanding. These interactions encouraged the development of cross-cultural communication skills and emphasized the value of empathy and adaptability in healthcare communication.

Only students who completed the entire service-learning activity and submitted a written reflection were included in the qualitative analysis. All participants provided informed consent, and identifying information was removed to ensure confidentiality.

Data collection. Data were retrieved from written reflections submitted by students following their participation in the service-learning activity. The post-activity reflections were guided by structured prompts developed by a faculty member responsible for medical humanities instruction. This faculty member also teaches reflective practice and professionalism within the curriculum and designed the prompts to align with the core objectives of service-learning. The prompts encouraged students to critically explore cultural and social competence, emotional responses, ethical considerations, and personal and professional growth resulting from the encounter. This structured reflective process was intended to facilitate deeper integration of experiential learning with the development of professional identity. A detailed list of the reflection prompts is provided in Supplementary material S2.

Students were instructed to reflect on their experiences at the juvenile correctional school, with specific guidance to address the following areas:

1. The cultural and social challenges encountered during the visit.
2. Their emotional responses to interactions with the juveniles.
3. Insights gained regarding the healthcare needs of marginalized populations.
4. The impact of the experience on their understanding of medical professionalism and social responsibility.
5. The perceived influence of the experience on their personal and professional development.

Students submitted their written reflections 1 week after the service-learning activity, providing sufficient time for thoughtful reflection. Each reflection ranged from 500 to 1000 words, allowing students to explore their experiences in depth. To ensure confidentiality, all reflections were anonymized, protecting the identities of the participants.

Data analysis. Thematic analysis was conducted to identify recurring patterns and key themes in the students' written reflections, following the procedural guidelines outlined by Braun

and Clarke (2006). The analysis, with a six-phase framework, was inductive and iterative, allowing themes to emerge organically from the data rather than being constrained by pre-existing categories. This analytic approach was chosen to ensure structural alignment between the theoretical framework, research questions, and emergent themes. This approach enabled an in-depth exploration of the students' experiences and insights related to the service-learning activity. To ensure analytic transparency and rigor, the six-phase framework proposed by Braun and Clarke (2006) was operationalized in a step-by-step manner (Braun and Clarke, 2006). Two trained researchers independently reviewed and coded all reflections, applying *in vivo* codes to preserve participants' authentic voices. Coding discrepancies were reconciled through iterative consensus meetings, and an external qualitative researcher adjudicated unresolved differences. The analytic workflow was documented in detail to allow replication and confirm dependability.

To preserve the authenticity of participants' voices, we primarily used *in vivo* codes, drawn directly from the students' language in their reflections. The analysis was conducted independently by two researchers, each of whom reviewed all reflections and generated initial codes. To ensure analytic rigor and consistency, we held iterative consensus meetings to reconcile discrepancies, refine the codebook, and agree on the final thematic structure. Any differences in coding or theme assignment were resolved through collaborative discussion and re-examination of the raw data, thereby enhancing the credibility and trustworthiness of the findings. Sample adequacy was justified using the "information power" principle (Malterud et al., 2016), emphasizing that sample sufficiency depends on study aim focus, data richness, and analytic depth. Thematic saturation was reached early, and subsequent data primarily enhanced interpretation rather than generating new codes.

The analytic process involved the following six steps:

Step 1: Familiarization with the data. The initial stage involved becoming thoroughly familiar with the data. The written reflections were read and re-read to ensure a comprehensive understanding of the content. Initial observations were documented, and recurring patterns, as well as noteworthy quotes, were highlighted for further analysis.

Step 2: Coding. In the second stage, the data were systematically coded. Each segment of the text was assigned a code that encapsulated the core meaning of the reflection. These codes acted as descriptive labels that highlighted key elements of the students' experiences. Examples of initial codes included "cultural challenges," "empathy development," "medical professionalism," and "emotional responses."

Step 3: Identifying themes. Once the data were coded, the next step involved examining the codes for patterns and grouping them into broader themes. These themes represented higher-order concepts that captured the central ideas emerging from the students' reflections. For instance, codes such as "cultural challenges" and "cross-cultural understanding" were categorized under the theme "Cultural competence," while codes like "empathy development" and "emotional responses" were consolidated under the theme "Empathy."

Step 4: Reviewing themes. The identified themes were then reviewed to ensure that they accurately represented the data. This process involved cross-checking the themes against the original reflections to verify that all significant information was captured.

Any inconsistencies or ambiguities were addressed by revisiting the coded data and refining the themes as needed.

Step 5: Defining and naming themes. In the final stage, each theme was clearly defined and named. The definitions succinctly captured the essence of each theme. For example, the theme “Cultural competence” was defined as “the ability to understand, appreciate, and interact effectively with people from cultures or belief systems different from one’s own.” The themes were then organized into a coherent narrative, reflecting the overall findings of the study.

Step 6: Producing the report. The final themes were synthesized into a coherent narrative aligned with the study’s objectives. Representative quotations were selected to illustrate each theme and highlight the depth and diversity of the students’ reflections.

Coders’ backgrounds and reflexivity. A separate reflexivity statement was incorporated to further clarify the researchers’ positionality and the measures undertaken to ensure credibility and confirmability. The coding team comprised two researchers with complementary expertise. One was formally trained in medical education and qualitative methodology, while the other had extensive experience in clinical education and cross-cultural pedagogy. Both coders received structured preparation in Braun and Clarke’s six-phase thematic analysis framework prior to analysis to ensure analytic rigor and consistency. Coding and data organization were supported by ATLAS.ti (version 24, Scientific Software Development GmbH), which facilitated systematic coding and retrieval.

Regarding sample size, all 28 student reflections were included in the analysis. This number was considered adequate based on the principle of information power (Malterud et al., 2016), which emphasizes that sample adequacy in qualitative research depends on study aim focus, sample specificity, data richness, and analytic depth. Thematic adequacy was reached early in the analysis as no new codes or categories emerged in later stages; subsequent data primarily deepened interpretation rather than generating new themes. Throughout the analytic process, reflexivity was maintained through continuous team reflection on positionality, periodic peer debriefing, and member-checking with a subset of participants to ensure that the final themes authentically represented their experiences.

Reflexivity was explicitly maintained throughout the analytic process. The researchers acknowledged their dual roles as educators and facilitators within the service-learning program, recognizing that such positionality might influence interpretation. To mitigate potential bias, strategies such as team-based coding, iterative consensus discussions, peer debriefing, and consultation with an external adjudicator were employed. These steps enhanced the credibility, trustworthiness, and transparency of the findings.

Themes and subthemes. To ensure the trustworthiness of the findings, several rigorous strategies were employed. First, peer debriefing was utilized, allowing researchers to discuss emerging themes and interpretations with colleagues experienced in qualitative research and medical education. This collaborative process ensured that the themes were credible and accurately represented the data. Additionally, member checking was conducted by sharing preliminary findings with a subset of participants to verify that the themes resonated with their experiences and perspectives. Reflexivity was also maintained throughout the analysis, with researchers continuously reflecting on their own potential biases and assumptions related to the students’ experiences.

Table 1 Age distribution by school year, nationality, and gender.

| Year | Nationality | Gender | Age (as of 2024-03-12) |
|--------|------------------------------|--------|------------------------|
| First | Belize | Female | 27 |
| First | St. Lucia | Female | 26 |
| First | St. Lucia | Female | 20 |
| First | St. Lucia | Female | 18 |
| First | St. Lucia | Female | 22 |
| First | St. Lucia | Female | 25 |
| First | St. Lucia | Female | 23 |
| First | St. Lucia | Male | 27 |
| First | St. Lucia | Male | 33 |
| First | St. Vincent & the Grenadines | Female | 24 |
| First | Tuvalu | Male | 30 |
| Second | Belize | Female | 24 |
| Second | Belize | Female | 23 |
| Second | Belize | Female | 23 |
| Second | Belize | Female | 25 |
| Second | Belize | Female | 27 |
| Second | Belize | Male | 31 |
| Second | Belize | Male | 24 |
| Second | Belize | Male | 27 |
| Second | St. Lucia | Female | 20 |
| Second | St. Lucia | Female | 21 |
| Second | St. Lucia | Female | 30 |
| Second | St. Lucia | Female | 28 |
| Second | St. Lucia | Female | 28 |
| Second | St. Lucia | Female | 34 |
| Second | St. Lucia | Female | 28 |
| Second | St. Lucia | Female | 23 |
| Second | St. Lucia | Male | 31 |

Findings. The demographic characteristics of the 28 international medical students who participated in the service-learning activity are summarized in Table 1, with ages calculated as of March 12, 2024. Participants ranged in age from 18 to 34 years, reflecting notable generational and experiential diversity. The cohort included 20 female and 8 male students. Female students were more represented in both year levels and across nationalities. Most first-year students were in their early twenties, while several second-year students were in their late twenties to early thirties. The oldest participants were male students from St. Lucia and Belize, aged 31–34, who had prior academic or work experience before entering medical school.

Thematic analysis was conducted on students’ reflective narratives to address the research questions. To ensure coherence with theoretical framing, the themes are presented in an order reflecting the progressive development from cultural awareness to empathy, professionalism, and holistic growth. Table 2 presents the themes and subthemes, organized to align with the study’s aims: cultural competence (RQ1), empathy development (RQ2), medical professionalism and identity formation (RQ3), and personal/professional growth (RQ4). The identified themes highlight critical areas of personal and professional growth, including cultural competence, empathy development, medical professionalism, and overall development, all of which are essential in medical education. The reflections offer qualitative evidence, illustrating how these experiences shaped students’ perspectives on patient care, ethical responsibilities, and their roles as future healthcare professionals.

Theme 1. Cultural competence (RQ1)

Cultural competence emerged as a dominant theme from the students’ reflections. Given the diverse cultural backgrounds of

Table 2 Thematic analysis of international medical students' reflections on service-learning experience at a Juvenile Correctional School in Taiwan.

| Theme | Subtheme | Description | Example reflections |
|---|---|---|--|
| Cultural competence (RQ1) | Broadening Perspectives through Cross-cultural Encounters | Students reframed cultural differences as opportunities to deepen understanding and cultivate humility in healthcare. | "Cultural competence is more than just knowledge of customs; it's about understanding the life circumstances that shape a person's reality." "The students were curious and respectful, reminding me how vital cultural sensitivity is in medicine." |
| | Transforming Language Barriers into Creative Communication Strategies | Language challenges prompted students to rely on empathy, listening, and non-verbal strategies, reinforcing adaptability in clinical communication. | "Overcoming language barriers showed me that empathy, listening, and non-verbal communication are essential in patient care." |
| Empathy development (RQ2) | Emotional Encounters as a Pathway to Empathy | Emotional engagement with incarcerated youth helped students challenge preconceptions and recognize empathy as central to medical practice. | "I realized that as a future doctor, I cannot only focus on physical ailments. Patients carry stories of hardship and resilience that deserve to be heard." |
| | Recognizing Marginalization to Deepen Compassion | Students developed awareness of social determinants of health and strengthened their commitment to caring for marginalized populations. | "Seeing the students' resilience taught me the value of second chances in healthcare." |
| Medical professionalism (RQ3) | Confronting Ethical Dilemmas in Marginalized Contexts | Students reflected on fairness, justice, and the ethical obligation to provide equitable care. | "As doctors, we must treat every patient with equal care and respect, regardless of their background." |
| | Embracing Social Responsibility as Future Physicians | The activity reinforced students' sense of advocacy and responsibility toward underserved communities. | "This experience reinforced that social responsibility is integral to my role as a future physician." |
| Personal and professional development (RQ4) | Challenging Biases to Foster Self-awareness | Students recognized and confronted their biases, developing greater humility and compassion. | "This experience helped me become more self-aware and challenged me to be more compassionate and understanding." |
| | Strengthening Communication through Cultural and Social Challenges | Students reported enhanced communication skills, particularly in navigating intercultural interactions. | "This experience taught me the importance of clear communication in healthcare, especially when there are language and cultural barriers." |

the students and the unique cultural context of the correctional school, students encountered both challenges and opportunities in navigating cross-cultural interactions. These experiences fostered a deeper understanding of cultural differences and equipped students with skills necessary for engaging with diverse patient populations in their future medical practice.

Broadening perspectives through cross-cultural understanding. Students reflected on the difficulties they encountered when interacting with juveniles from diverse cultural and social backgrounds. Students consistently expressed that the service-learning experience broadened their understanding of the cultural and social contexts influencing the lives of the correctional school students. Initially, many students anticipated challenges or resistance from the adolescents. However, they were pleasantly surprised to find the students open, inquisitive, and eager to engage with them, despite cultural and social differences. They emphasized the importance of understanding the broader social and cultural context of the juveniles' lives, which deepened their appreciation for cultural diversity in healthcare settings.

One student described their surprise at the receptiveness of the correctional students: *"Interacting with these students taught me that cultural competence is more than just knowing customs; it's about understanding the life circumstances that shape a person's reality."* This realization underscored the importance of cultural humility in healthcare, as understanding a patient's background is essential for providing compassionate and effective care.

Another student echoed this sentiment, acknowledging the challenge of navigating an unfamiliar environment but

recognizing how the experience enhanced their adaptability: *"The environment was unlike anything I've experienced before, but the students' curiosity made the exchange meaningful. It was an eye-opener to how crucial cultural sensitivity is in my future profession."*

Transforming language barriers into creative communication strategies. Students described the emotional impact of interacting with juveniles in a correctional facility. They expressed feelings of empathy and compassion, acknowledging the juveniles' vulnerabilities and emphasizing the importance of providing non-judgmental care. Language barriers were frequently mentioned as a challenge, but rather than hindering the interactions, they provided opportunities for creative problem-solving. Students often had to rely on non-verbal communication, active listening, and empathy to overcome these barriers, which highlighted the importance of these skills in medical practice.

One student reflected on this challenge, noting that despite limited verbal communication, they were able to build rapport through gestures, tone of voice, and active listening. *"Even though we couldn't always understand each other's words, the students could feel that we genuinely cared. This experience taught me that in healthcare, it's not just about the words we use but the way we show care and concern."*

This experience reinforced the idea that effective communication in healthcare transcends language proficiency. The ability to connect with patients, particularly those from different cultural or linguistic backgrounds, is a fundamental

skill, which the students began cultivating through their service-learning experience.

Theme 2. Empathy development (RQ2)

Empathy emerged as a central theme from the students' reflections, particularly as they engaged with the students at the correctional school. Many medical students initially entered the experience with preconceived notions about the young individuals in the correctional system. However, after interacting with them, these perceptions were challenged, leading to profound reflections on the importance of empathy in their future medical practice.

Emotional encounters as a pathway to empathy. Several students described the emotional intensity of their interactions with the correctional students. They expressed feelings of empathy and compassion, recognizing the juveniles' vulnerabilities and the importance of providing non-judgmental care. As they engaged with these young individuals, they became more aware of the complex social and emotional challenges faced by this population. This experience fostered a deep sense of empathy, which the students recognized as crucial in their future roles as physicians.

One student's reflection poignantly captured this realization, stating, *"Witnessing the resilience and hope in these adolescents made me reconsider my approach to patient care. I realized that as a future doctor, I cannot solely focus on physical ailments. Patients bring with them stories of hardship and resilience that deserve to be heard. This experience reinforced the importance of empathy in my clinical practice."*

Another student reflected on the compassion and patience demonstrated by the correctional schoolteachers, noting how their gentle, non-judgmental approach served as a powerful model for facilitating healing and positive behavioral change. *"It was clear that the teachers' supportive attitude was a key factor in the students' transformation. This made me reflect on how I, too, need to be compassionate, especially when working with patients facing difficult life circumstances,"* the student shared.

Recognizing marginalization to deepen compassion. This service-learning experience also provided students with a more nuanced understanding of marginalization and its profound implications for healthcare. Many students reflected on how social factors—such as poverty, lack of access to education, and systemic inequalities—contribute to the challenges faced by juveniles. The experience heightened students' awareness of the healthcare needs of marginalized populations, particularly how social determinants influence health outcomes. This understanding was viewed as essential for their future roles as physicians, underscoring the necessity of addressing both medical and socio-emotional needs in patient care.

One student reflected, *"For the first time, I truly saw how deeply social circumstances can impact an individual's health and well-being. These adolescents were not just dealing with the consequences of their actions but also with the system's failure to support them. It made me realize the importance of doctors considering the whole person, including the social context in which they live."*

Another student emphasized how the experience reinforced their commitment to working with marginalized populations. *"This experience made me realize that marginalized groups are often those most in need of our help. I aspire to be a physician who not only treats illnesses but also advocates for vulnerable individuals and addresses the broader social issues affecting health,"* the student concluded.

Theme 3. Medical professionalism and identity formation (RQ3)

Medical professionalism emerged as a key theme in the students' reflections, highlighting their growing awareness of ethical responsibilities and their role in advocating for equity in healthcare. The service-learning experience provided an opportunity for students to reflect on their future roles as healthcare providers, particularly concerning issues of fairness, justice, and access to care.

Confronting ethical dilemmas in marginalized contexts. The service-learning activity prompted students to reflect on ethical issues in healthcare, particularly in marginalized settings. They grappled with questions of social justice and fairness, especially regarding equitable access to healthcare for vulnerable populations. Students' reflections frequently focused on ethical questions surrounding fairness and social justice. Interactions with the correctional school students prompted them to deeply consider the ethical obligations of physicians, especially in advocating for equitable healthcare.

One student expressed that the experience heightened their awareness of the ethical dilemmas they might encounter in practice: *"As I spent time with these adolescents, I realized that my role as a doctor will extend beyond diagnosing and treating illnesses. I will need to be an advocate for fairness and justice, particularly when working with vulnerable populations."*

Another student reflected on how the experience reinforced core principles of medical ethics, particularly the need to avoid judgments based on a patient's background: *"This experience reinforced the idea that, as doctors, we must treat every patient with the same level of care and respect, regardless of their social or personal history. It is our ethical duty to ensure that all individuals receive compassionate and equitable healthcare."*

Embracing social responsibility as future physicians. Students recognized the critical importance of social responsibility in their future roles as physicians. The experience reinforced the notion that healthcare professionals must advocate for and deliver care to all individuals, regardless of social or cultural backgrounds. Many recognized that, as future healthcare providers, they have a duty not only to treat individuals but also to advocate for broader social change. The service-learning experience at the correctional school underscored the importance of physicians being socially conscious and active in promoting health equity.

One student articulated how the service-learning experience strengthened their commitment to socially responsible medical practice: *"This experience reminded me that medicine is not just about treating diseases; it's about caring for people, particularly those who are marginalized and underserved. I aspire to be a doctor who uses my position to address social inequities and improve the health of my community."*

Theme 4. Personal and professional development (RQ4)

A prominent theme in the students' reflections was their personal and professional development, with many highlighting the significant impact of the service-learning experience. The activity fostered growth in areas such as self-awareness, communication skills, and emotional intelligence, all of which are critical for medical professionals.

Challenging biases to foster self-awareness. Several students noted that the experience greatly enhanced their self-awareness, particularly in recognizing and challenging their biases and assumptions. By becoming more conscious of their own biases and assumptions, they developed a more compassionate approach

to patient care. Interacting with the correctional students allowed them to confront preconceived notions, fostering a more open and compassionate perspective.

One student reflected, *"Before this experience, I didn't realize how much I had been carrying certain biases. But after spending time with these students, I realized that everyone deserves to be treated with dignity and respect, no matter what their background. This experience helped me become more self-aware and challenged me to be a more compassionate and understanding person."*

Strengthening communication through cultural and social challenges. The service-learning activity also provided a platform for students to enhance their communication skills, particularly in navigating interactions with individuals from diverse cultural and social backgrounds. This development was vital for their future roles in patient care, where effective communication is essential. Many students acknowledged that these communication skills would be essential in their future medical practice, where they will interact with a diverse patient population.

One student remarked, *"This experience taught me the importance of clear communication in healthcare, especially when there are language and cultural barriers. I learned that empathy and active listening are essential skills that transcend language and help build trust with patients."*

Discussion

This study provides both theoretical and practical insights into the role of service-learning in early medical education. Based on rigorous thematic analysis of students' reflective narratives, four key themes emerged: cultural competence, empathy development, medical professionalism, and personal and professional growth. These interrelated domains reveal how a structured, immersive service-learning experience can cultivate core humanistic and ethical competencies in medical students. Specifically, students demonstrated increased cultural awareness, enhanced capacity for empathetic engagement, a deepened understanding of professional responsibilities, and greater self-awareness, attributes that are essential for delivering patient-centered, socially responsive care in diverse healthcare environments. These results resonate with transformative learning theory and PIF, linking experiential encounters with deeper moral and empathic understanding.

From a theoretical standpoint, these findings support existing models of transformative learning and PIF, illustrating how exposure to unfamiliar, emotionally complex environments, combined with critical reflection, can stimulate growth in ethical reasoning, social accountability, and intercultural sensitivity. Extending from this theoretical basis, the present study underscores four central contributions: the development of cultural competence, the enhancement of empathy, the strengthening of medical professionalism, and the advancement of personal and professional growth. Each of these domains is interpreted through established theoretical frameworks and corroborated by empirical research. For example, the observed gains in cultural competence expand current models of intercultural sensitivity into justice-involved contexts, while students' empathy development resonates with transformative learning theory, which highlights the role of emotionally challenging experiences in promoting ethical reflection and perspective-taking.

Students' reflections on professionalism and role identity align with scholarship on PIF, showing how service-learning in marginalized settings uniquely contributes to the internalization of professional values. Finally, the emphasis on self-awareness, communication, and emotional regulation highlights the significance of personal and professional growth, reinforcing literature on reflective practice and emotional intelligence in

medical education. By framing these findings within broader theoretical and empirical discourses, this study moves beyond description to offer an integrated interpretive synthesis of how correctional service-learning can enrich international medical education. From a practical perspective, this study offers a replicable, low-resource model for high-impact educational intervention. The program emphasizes empathy, reflection, and intercultural engagement without requiring advanced clinical infrastructure, making it especially relevant for international or resource-limited medical schools seeking to strengthen the humanistic formation of their students. By engaging directly with marginalized youth in a correctional setting, students were able to connect theoretical concepts, such as social determinants of health and health equity, with lived experiences, thereby bridging the gap between classroom instruction and real-world medical complexity.

Cultural competence in medical education. Cultural competence has become an essential component of medical education as patient populations continue to diversify globally. Research underscores the need for healthcare professionals to be adept at communicating with and providing care for individuals from various cultural and socioeconomic backgrounds. Incorporating cultural competence into medical curricula has demonstrated significant benefits, including improved patient satisfaction and treatment adherence. These competencies are crucial in addressing health disparities, particularly those related to race, ethnicity, and multiculturalism (Bottenfield et al., 2024).

As previous studies have shown, immersive experiences, such as service-learning, are highly effective in dismantling preconceived notions and stereotypes, and fostering the development of cultural humility—a concept that emphasizes continuous learning and reflection on cultural contexts (Deliz et al., 2020). For example, students' reflections on their service learning at a juvenile correctional school in Taiwan revealed that their initial assumptions about the juveniles were quickly dispelled through direct interaction. This observation mirrors findings from other research, demonstrating that experiential learning in cross-cultural settings is particularly effective in challenging stereotypes and fostering cultural humility (Deliz et al., 2020). Initially, many students anticipated difficulties in connecting with the juveniles due to perceived cultural and social differences; however, their interactions revealed the juveniles' openness, curiosity, and mutual respect. This experience deepened the students' understanding of cultural competence in healthcare and underscored the importance of adaptability and empathy when navigating patient care in diverse environments (Matsunaga et al., 2003).

Additionally, cultural humility, distinct from cultural competence, requires a lifelong commitment to self-reflection and continuous learning (Tervalon and Murray-Garcia, 1998). This distinction is particularly critical in healthcare, where practitioners frequently engage with patients from various cultural backgrounds (Lombardero et al., 2023).

Language barriers presented a notable challenge during the students' service-learning experience. Rather than hindering communication, these barriers provided opportunities for the students to enhance their non-verbal communication skills. Body language, tone of voice, and active listening became critical in building rapport and trust with the juveniles. One student observed that despite the language barrier, the juveniles could still sense the students' genuine care and concern. This aligns with the literature on non-verbal communication, which highlights its importance in clinical settings (Ismail et al., 2024), particularly when verbal communication is limited due to language differences. Studies indicate that non-verbal cues are crucial in

establishing effective patient-provider relationships, rather than verbal communication (Vogel et al., 2018), enhancing patient satisfaction, and fostering understanding in multicultural environments where language differences exist (Collins et al., 2011).

Empathy development: fostering compassionate care. A key finding in the students' reflections was the depth of empathy they expressed toward the juveniles they encountered, many of whom had faced significant life challenges. Several students noted that their initial assumptions about the juveniles—shaped by pre-conceived notions about correctional facilities—were challenged through personal interactions. This finding aligns with previous research, which demonstrates that experiential learning in underserved communities can significantly enhance medical students' empathy and their understanding of the social determinants of health. For instance, studies have shown that medical students involved in service-learning programs develop a deeper awareness of how factors such as poverty and access to healthcare influence patient outcomes (Denizard-Thompson et al., 2021).

Empathy is particularly crucial when treating marginalized or vulnerable populations, who often face stigma or discrimination in healthcare settings. Students reflected on the importance of providing non-judgmental, patient-centered care that preserves each patient's dignity and respect, a principle central to patient-centered care practices found in the literature (Denizard-Thompson et al., 2021). Additionally, research has consistently demonstrated that empathy and cultural competence are essential for delivering effective care to diverse populations (Leaune et al., 2021).

Service-learning has proven to be a powerful pedagogical tool for fostering empathy in medical students (Chrisman-Khawam and Manzi, 2020a; Liao et al., 2023; Sin et al., 2019). By placing students in real-world healthcare settings with underserved populations, service-learning bridges the gap between theoretical knowledge and practical experience. The students' reflections in this study support existing research, suggesting that service-learning can significantly enhance empathy and reinforce the value of holistic, compassionate care (Denizard-Thompson et al., 2021; Leaune et al., 2021). Importantly, empathy is not a static trait but a skill that can be cultivated and strengthened over time. While research indicates that empathy tends to decline during medical training as students increasingly focus on clinical and technical skills, programs incorporating service learning and reflective practice have been shown to counteract this decline. By creating opportunities for meaningful, empathetic engagement with patients, service-learning plays a vital role in ensuring that future healthcare providers maintain a patient-centered approach throughout their careers (Yang et al., 2021).

Medical professionalism: ethical awareness and social responsibility. Medical professionalism, a cornerstone of medical education, integrates ethical awareness, social responsibility, and a commitment to lifelong learning (Andersson et al., 2022). These components are critical in shaping healthcare providers' professional behaviors and attitudes. In this study, students' reflections indicate an enhanced awareness of their ethical duties, particularly in caring for marginalized populations, such as juveniles in correctional facilities. This finding aligns with existing literature that underscores the importance of ethical competence in medical practice, which entails navigating conflicting interests while prioritizing patient welfare (Branch and George, 2017; Mi et al., 2014). Addressing ethical challenges when treating underserved populations highlights the value of reflective learning, a vital element of PIF in medical education (Mi et al., 2014).

Service learning, as demonstrated in this study, provides students with opportunities to confront real-world ethical dilemmas, thereby deepening their understanding of justice and fairness in healthcare. Through interactions with marginalized juveniles, students gained a deeper appreciation of social justice, a fundamental aspect of ethical medical practice (de Vries et al., 2020). Their reflections illustrate how service-learning fosters ethical awareness by immersing students in the complexities of healthcare delivery for underserved populations, cultivating a stronger sense of social responsibility and a commitment to addressing health disparities (Dharamsi et al., 2010).

Social responsibility, another integral dimension of medical professionalism, is closely tied to the ethical duties of healthcare providers. Medical educators emphasize the cultivation of this responsibility by encouraging students to engage not only in patient care but also in broader societal reforms. Through service-learning, students reflect on social determinants of health and recognize the necessity of structural changes to combat health inequities (Dharamsi et al., 2010). The students' reflections in this study echo findings in the literature that service-learning experiences foster a deeper understanding of their role in promoting social justice within healthcare.

Ethical awareness is particularly crucial for healthcare providers, as they often encounter complex decisions that require balancing competing interests and maintaining a focus on patient welfare. In this study, students acknowledged their ethical responsibility to advocate for fairness in healthcare, ensuring that all individuals, regardless of background, receive equitable care. One student reflected on the ethical obligation of healthcare providers to uphold justice and dignity in the treatment of all patients, which aligns with the broader ethical principles guiding medical practice (Branch and George, 2017).

The service-learning experience not only enhanced students' comprehension of ethical responsibilities but also reinforced the importance of social responsibility in their future roles as healthcare providers. Many students recognized that their duties extend beyond individual patient care to advocating for broader societal changes to address the root causes of health disparities. Their reflections suggest that exposure to underserved populations through service-learning nurtured a commitment to compassionate care and a resolve to confront inequities in healthcare delivery. This finding is consistent with literature emphasizing the significance of addressing social determinants of health in shaping socially responsible healthcare professionals (Dharamsi et al., 2010; Mi et al., 2014).

Personal and professional development. Service-learning in medical education not only fosters cultural competence, empathy, and ethical awareness but also significantly enhances personal and professional development. One of the key outcomes of such experiences is the cultivation of self-awareness, a critical trait for healthcare providers. Through reflective practices such as writing and discussions, students are encouraged to explore their biases and emotional responses, which leads to a deeper understanding of patient care. Research consistently demonstrates that reflective exercises substantially increase students' self-awareness, helping them identify preconceived notions about vulnerable populations and enabling them to make more compassionate and informed clinical decisions (Artioli et al., 2021).

Another important outcome of service-learning is the development of communication skills. By engaging with diverse populations, students refine their ability to communicate effectively across cultural and linguistic barriers—an essential competency for establishing trust with patients and improving healthcare outcomes. Studies emphasize that experiential learning, when

integrated with theoretical knowledge, enhances students' ability to manage complex patient interactions, particularly in challenging circumstances (Mata et al., 2021). This ability is vital in today's increasingly diverse healthcare environments, where effective communication is key to delivering equitable care.

Finally, emotional intelligence (EI) is crucial for handling the emotional demands of medical practice. EI involves recognizing and managing one's own emotions while also understanding and empathizing with the emotions of others—skills that are essential for maintaining professional well-being. Service-learning, with its focus on reflective practice, allows students to develop EI by analyzing their emotional reactions to patient care. Research, particularly from programs like SELECT (Scholarly Excellence, Leadership Experiences, Collaborative Training), shows that EI training significantly improves students' abilities to manage stress, foster teamwork, and provide patient-centered care. These improvements contribute to greater resilience and professional satisfaction in their future practice (Monroe and English, 2013).

Limitations

This study offers initial insights into the reflective experiences of international medical students participating in a 1-day service-learning activity at a juvenile correctional institution. However, several limitations must be acknowledged.

First, it is based on a single, short-term intervention, which restricts the generalizability of the findings. A 1-day activity may not fully represent the depth and complexity of transformative learning typically associated with extended service-learning engagements. Consequently, the observed outcomes should be interpreted as preliminary rather than definitive.

Second, the data were collected solely through written reflections. While reflective writing can yield valuable insights, it may not fully capture the complexity and depth of the students' experiences. Written reflections are susceptible to recall bias, and students might have simplified or omitted certain details. Moreover, the reflection process may favor students who are more proficient in expressing their thoughts in writing, potentially leading to skewed data. In addition, as the analysis focused exclusively on student narratives, it reflects the learners' perspective rather than a multi-stakeholder view of the service-learning process. Including perspectives from faculty facilitators or correctional-school staff in future studies could help provide a more balanced and contextualized understanding of reciprocal learning experiences.

Third, the study lacks a longitudinal perspective, focusing only on the immediate impacts of the service-learning experience without assessing its long-term effects on personal and professional development. Future research could benefit from incorporating interviews or focus groups to gather richer, more nuanced data, as well as longitudinal studies to evaluate the lasting influence of service-learning on students' growth.

Fourth, the analysis relied primarily on students' perspectives, without triangulation from faculty facilitators, program directors, or correctional institution staff. This absence limited the depth and diversity of interpretations. Future studies could be enriched by integrating multiple stakeholder perspectives, which would allow for a more holistic understanding of the service-learning process and highlight reciprocal benefits for both students and the host community.

Lastly, perspectives from other key stakeholders, particularly the juveniles who participated in the activity and the faculty facilitators, were not included. This absence limits the ability to assess the reciprocal value and cross-cultural dimensions of the experience. To strengthen future research, we recommend incorporating qualitative data from multiple stakeholders and

employing participatory approaches that can holistically evaluate the service-learning process and its mutual benefits.

Conclusion

This study highlights the potential service-learning to foster personal and professional development in international medical students, particularly in areas such as empathy, cultural competence, ethical reasoning, and social accountability. Engaging with marginalized youth in a correctional setting provided a unique and impactful context for students to confront social determinants of health and reflect on their roles as future healthcare providers. However, the transformative impact of such experiences depends on thoughtful curricular integration and sustained engagement. Future research should incorporate longitudinal follow-up and include perspectives from all stakeholders, particularly the youth and faculty, to more comprehensively assess mutual benefit and cross-cultural learning outcomes. Collectively, the study demonstrates how theoretical insights are translated into practical educational implications through structured, justice-oriented service-learning. These steps are essential to advancing evidence-informed service-learning models in global medical education.

Data availability

The qualitative reflection data supporting this study's findings are not publicly available due to privacy and ethical restrictions associated with the correctional school setting. De-identified data may be made available upon reasonable request to the corresponding author and with approval from the Institutional Review Board of I-Shou University.

Received: 5 October 2024; Accepted: 12 November 2025;

Published online: 22 January 2026

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Acknowledgements

We sincerely thank Ming Yang High School (Juvenile Correctional School) for their collaboration in organizing this service-learning activity. We are especially grateful to the school administrators and educators for their warm hospitality and for providing a meaningful and structured environment that enabled intercultural exchange and reflection. We are indebted to Dr. Yung-Chieh Yen, Chair of the School of Medicine for International Students, for his thoughtful review of the thematic analysis and invaluable feedback. Special thanks to Dr. Hsing-Yen Hsieh, an expert in the medical humanities, whose rigorous guidance greatly enhanced the external validity and reliability of this qualitative study. We also extend sincere appreciation to Ms. Shirley Chou, ICDF Manager, for her steadfast support in student affairs and administrative coordination, and to Ms. Abby Chen for her assistance with institutional logistics and academic arrangements. Their contributions were instrumental in the success of this educational project.

Author contributions

Hsiang-Chin Hsu: conceptualization, methodology, supervision, project administration, resources, writing—review and editing. Tzu-Ching Sung: conceptualization, methodology, formal analysis, investigation, data curation, visualization, writing—original draft, writing—review and editing, validation. Both authors contributed substantially to the conception and design of the study, data analysis and interpretation, and manuscript preparation. All authors reviewed and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

Competing interests

The authors declare no competing interests.

Ethical approval

This study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki and received approval from the Institutional Review Board of I-Shou University, Taiwan (Approval No. IRB 2024025; Approval Date: January 25, 2024). The approval encompassed the collection and qualitative analysis of anonymized written reflections from international medical students who participated in a one-day service-learning activity at a juvenile correctional school in southern Taiwan on March 12, 2024. The facility operates under the supervision of the Correctional Agency, Ministry of Justice, Taiwan, and all on-site procedures adhere to strict institutional privacy and security regulations. No recording devices, such as mobile phones, cameras, or audio recorders, were permitted during the activity, and access was limited to authorized faculty members accompanied by official staff. The approved protocol covered study design, data collection, and the handling of anonymized student reflections, ensuring that no identifiable information concerning juveniles was collected or analyzed.

Informed consent

All participating international medical students were fully informed about the study's objectives, procedures, and confidentiality safeguards before the service-learning activity. Participation was entirely voluntary, and each student provided written informed consent on March 11, 2024, before the activity. Students were assured that choosing not to participate would have no impact on their coursework, evaluations, or academic standing. The consent process was implemented by the course faculty and research team as described in Supplementary Material S1 (Program context: structure of the

service-learning activity) and Supplementary Material S2 (Reflection prompts for student participants). The written reflections were collected solely for research purposes and were anonymized before analysis to ensure the protection of personal identity and confidentiality. The data contained no identifiable information about the students or the juveniles they interacted with during the activity. These measures upheld the principles of voluntary participation, autonomy, and data protection throughout the research process.

Additional information

Supplementary information The online version contains supplementary material available at <https://doi.org/10.1057/s41599-025-06315-4>.

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