Empowering Minds: Science Lessons Fostering Peace, Gender Equity, and Well-being

María Magdalena Montsserrat Contreras Turrubiartes, Universidad Autónoma de San Luis Potosí, México
Jorge Amaro Reyes, Universidad Autónoma de San Luis Potosí, México

The Paris Conference on Education 2025
Official Conference Proceedings

Abstract

This study explores the integration of peace culture, gender equality and mental wellbeing in science curricula in higher education, specifically in the psychopedagogy degree program at the Universidad Autónoma de San Luis Potosí. The research proposes a transformative educational model that integrates socioemotional dimensions in traditional science education, with emphasis on peaceful conflict resolution techniques, deconstruction of gender stereotypes and mental health promotion. Work was carried out with 40 students through the design of didactic materials with a gender focus and the implementation of practical activities that foster dialogue, emotional self-care and critical analysis of gender roles in scientific contexts. At the end of the course, surveys were administered that revealed a positive impact on scientific conceptual understanding, the fostering of collaborative environments and student perception of the social relevance of science. The results demonstrate that this comprehensive approach significantly improves the academic learning and professional training of future educators, who can implement these strategies to create lasting changes in educational environments, advocating for a holistic educational paradigm that prioritizes both cognitive and socioemotional development within the scientific domain.

Keywords: peace education, gender equality, mental health, higher education, socioemotional learning

iafor
The International Academic Forum
www.iafor.org

Introduction

Currently, higher education is facing the challenge of training professionals who not only master scientific knowledge but also develop socioemotional competencies that allow them to have a positive impact on diverse educational and social environments. In the field of science education, which has traditionally focused on cognitive development, there is a need to reconfigure it to incorporate ethical, emotional and social dimensions to respond to current issues such as structural violence, gender inequality and the mental health crisis.

In this context, integrating a culture of peace as part of science education is not only desirable, but necessary. The United Nations Educational, Scientific and Cultural Organization (UNESCO, 2024) stresses that education should promote values, attitudes and behaviors that reject violence and resolve conflicts through dialogue and cooperation. By actively including these principles in the science classroom, we contribute to redefining knowledge as a tool for the common good, strengthening empathy, critical thinking and co-responsibility in the production of knowledge.

On the other hand, gender equality continues to be a priority in educational processes. Although progress has been made in female participation in scientific disciplines, there are still gender stereotypes that affect the academic and professional careers of women in these areas (Frontiers in Education, 2021). A critical approach to these stereotypes from a curricular perspective allows students to recognize and question the dynamics of exclusion that permeate science, and fosters more equitable and inclusive environments.

When talking about comprehensive education, we cannot leave aside the mental well-being of students, which has become a highly relevant issue for higher education institutions. Recent studies show that academic overload, professional uncertainty and social isolation have significantly increased the levels of anxiety, depression and burnout in young university students (Zhang & Wang, 2025). Promoting emotional self-regulation, self-care, and resilience strategies within the science curriculum can not only improve academic performance but also strengthen students' sense of belonging and purpose.

This work was developed in the bachelor’s degree in Psychopedagogy at the Universidad Autónoma de San Luis Potosí and proposes a comprehensive educational model that articulates the teaching of science with three fundamental axes: culture of peace, gender equality and mental wellbeing. Through the elaboration of didactic materials with a gender approach and the implementation of practical activities oriented to dialogue, empathy and critical analysis of gender roles in scientific contexts, a pedagogical experience with a transforming impact was designed. The results obtained suggest significant improvements in the understanding of science, the generation of collaborative environments and the perception of science as a socially relevant tool.

By considering a comprehensive approach, a viable and relevant alternative is offered for the training of professionals who, from a humanistic and critical perspective, can influence the construction of more inclusive, peaceful and emotionally healthy educational spaces.

Literature Review

The integration of the culture of peace, gender equality and mental well-being in higher education has been recognized as a fundamental axis for the development of more just and

resilient societies (UNESCO, 2024). Several studies have evidenced that peace education, when incorporated in scientific contexts, promotes peaceful conflict resolution and the development of socioemotional skills (Harris, 2018). An example is the implementation of restorative practices in the scientific classroom, which has been shown to reduce the incidence of conflicts and improve group cohesion (García-Carrión et al., 2020).

Concerning the gender perspective, the literature indicates that gender stereotypes and biases persist in STEM disciplines, affecting the participation and performance of women (Moss-Racusin et al.). The review by Archer et al. (2023) suggests that actively deconstructing these stereotypes through critical analysis and inclusive teaching materials fosters more equitable environments. In addition, the inclusion of historical and current examples of women and minority groups in science contributes to student identification and motivation (Bian et al., 2017).

About mental well-being, evidence shows that academic stress, career uncertainty, and social isolation have increased levels of anxiety and depression in college students (Zhang & Wang, 2025). Interventions based on social-emotional learning and self-care have been shown to be effective in reducing these symptoms and improving academic performance (Durlak et al., 2011). Recent studies highlight the importance of integrating emotional regulation and resilience strategies into university curricula (Taylor et al., 2017).

The convergence of these three axes; peace, gender and well-being in science education responds to the need for a more comprehensive, critical and transformative education (Freire, 1970). Therefore, the present study is based on international and national evidence that supports the urgency of educational models that prioritize both cognitive and socioemotional development (OECD, 2021).

Methodology

Design and Participants

A mixed design with a quantitative-qualitative approach was used. Forty students from the fourth semester of the Bachelor's Degree in Psychopedagogy at the Universidad Autónoma de San Luis Potosí participated. The project was developed for 12 weeks, structured in three phases: initial diagnosis, implementation of strategies and final evaluation.

Instruments

- Socioemotional Competencies in Science Questionnaire ($\alpha = 0.87$), adapted from the scale of Durlak et al. (2011).
- Gendered Materials Analysis Rubric, based on Moss-Racusin et al. (2012).
- Emotional Self-Care Reflective Diaries.
- Survey of Perceptions of Social Relevance of Science.

Didactic Strategies

The didactic strategies were structured around three core components: peace culture, gender equality, and mental well-being. These components were articulated through a set of interdisciplinary and participatory activities designed to connect scientific concepts with socioemotional competencies.

- Peace-Building Through Scientific Dialogue Students participated in structured dialogic sessions where they discussed scientific controversies using protocols for respectful communication, conflict resolution, and consensus-building. These sessions aimed to foster empathy, active listening, and cooperation.
- Gender-Inclusive Scientific Analysis Students engaged in critical content analysis of textbooks, media articles, and scientific biographies, applying a rubric based on gender perspective. They also designed science class infographics that highlighted contributions of women and non-binary scientists, encouraging visibility and challenging traditional role models.
- Emotional Self-Care Journals Weekly reflective journals were used to monitor students' emotional states during science learning. Prompts included questions on stressors, positive experiences, and strategies for emotional regulation. These were discussed anonymously in class, fostering group support and normalizing emotional expression.
- Collaborative Problem-Solving Tasks Small groups addressed real-life scientific problems using the STEM-SEL model (Science, Technology, Engineering, Mathematics + Social Emotional Learning), emphasizing team collaboration, inclusive decision-making, and ethical reasoning.
- Wellness Micro-Workshops Three brief workshops were embedded into class sessions: “Mindful Focus for Scientific Inquiry”, “Science of Sleep and Academic Performance”, and “Emotional Intelligence in Scientific Professions”. These workshops provided tools for managing anxiety, improving sleep hygiene, and promoting emotional awareness.
- Storytelling of Scientific Identity Students created digital storytelling projects where they narrated their relationship with science, including barriers, aspirations, and gendered experiences. This activity enhanced self-reflection, empowerment, and the deconstruction of internalized stereotypes.

Results and Discussion

The pre- and post-intervention measurements indicated significant improvements in several dimensions:

- *Socioemotional Competence:* There was a 21% average increase in scores on the adapted Durlak et al. (2011) scale. Students demonstrated better conflict resolution, empathy, and emotional regulation skills during group activities.
- *Gender Awareness in Science:* The rubric evaluations showed a shift from neutral to critically inclusive language and content in students’ scientific work. 85% of students included non-male scientist references in their materials, compared to 12% at baseline.
- *Perceived Relevance of Science:* Survey results indicated that 90% of students agreed that science could be a tool for social transformation, up from 63% before the intervention.
- *Emotional Well-being:* Journal analysis showed recurring improvements in emotional tone and increased use of self-care strategies. Students reported feeling “heard,” “respected,” and “motivated” in a science classroom for the first time.

Qualitative feedback emphasized that integrating emotions and justice into science education fostered a safe, engaging environment that boosted motivation and learning retention.

Summary

This study demonstrates that science education enriched with peace culture, gender inclusivity, and emotional well-being can substantially enhance student engagement, equity, and socioemotional growth. The intervention proved effective not only in transmitting scientific content but also in transforming attitudes, emotional skills, and social awareness among future educators.

Recommendations

- Curricular Integration: Institutions should incorporate socioemotional and gender-sensitive content systematically within science education programs.
- Faculty Training: University educators require support to implement peace-building, emotional care, and inclusive practices in their teaching.
- Policy Advocacy: National and regional policies should promote comprehensive science education as a tool for peace and equality.
- Further Research: Longitudinal studies could evaluate the long-term impact of this model on professional practice and student wellbeing.

Conclusion

Integrating peace, gender, and emotional well-being into science education is not only feasible but imperative in contemporary higher education. The results of this study affirm that such integration fosters more humanized, critical, and effective science teaching. Educators trained under this model can become agents of change who promote inclusive and emotionally healthy learning environments, reinforcing the role of science as a discipline in service of humanity.

References

Archer, L., Moote, J., Francis, B., DeWitt, J., & Yeomans, L. (2023). The impact of gender stereotypes in science education. *Journal of Research in Science Teaching, 60*(2), 157–180. https://doi.org/10.1002/tea.21802

Bian, L., Leslie, S. J., & Cimpian, A. (2017). Gender stereotypes about intellectual ability emerge early and influence children's interests. *Science, 355*(6323), 389–391. https://doi.org/10.1126/science.aah6524

Durlak, J. A., Domitrovich, C. E., Weissberg, R. P., & Gullotta, T. P. (2011). *Handbook of social and emotional learning: Research and practice*. Guilford Press.

Freire, P. (1970). *Pedagogy of the oppressed*. Herder and Herder.

Frontiers in Education. (2021). Gender stereotypes and expected backlash for female STEM students. *Frontiers in Education, 6*, Article 793486. https://doi.org/10.3389/feduc.2021.793486

García-Carrión, R., Molina-Luque, F., & Molina-Roldán, S. (2020). Dialogic teaching and restorative practices: A tool for peacebuilding in educational settings. *International Journal of Educational Research Open, 1*, Article 100015. https://doi.org/10.1016/j.ijedro.2020.100015

Harris, I. M. (2018). *Peace education: Theory and practice*. McFarland.

Moss-Racusin, C. A., Dovidio, J. F., Brescoll, V. L., Graham, M. J., & Handelsman, J. (2012). Science faculty's subtle gender biases favor male students. *Proceedings of the National Academy of Sciences, 109*(41), 16474–16479. https://doi.org/10.1073/pnas.1211286109

OECD. (2021). *The State of Global Education: 18 months into the pandemic*. OECD Publishing. https://doi.org/10.1787/1a23bb23-en

Taylor, R. D., Oberle, E., Durlak, J. A., & Weissberg, R. P. (2017). Promoting positive youth development through school-based social and emotional learning interventions: A meta-analysis of follow-up effects. *Child Development, 88*(4), 1156–1171. https://doi.org/10.1111/cdev.12864

UNESCO. (2024). *What you need to know about UNESCO's Recommendation on Education for Peace, Human Rights and Sustainable Development*. https://www.unesco.org/en/articles/what-you-need-know-about-unescos-recommendation-education-peace-human-rights-and-sustainable

Zhang, Y., & Wang, H. (2025). Mental health-promoting intervention models in university students: A systematic review. *Journal of Affective Disorders, 312*, 45–56. https://doi.org/10.1016/j.jad.2024.12.045

Contact email: montsset90@gmail.com