



STEAM CAREERS FOR GIRLS: METHODOLOGY PROPOSAL FOR ELEMENTARY SCHOOLS

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ABSTRACT: Gender disparities in STEAM careers remain a global challenge, often reinforced by the lack of female role models in early education. Encouraging girls from a young age to explore these fields is essential to building a more inclusive and diverse professional future. This article presents a methodology designed to introduce elementary school children to STEAM and environmental careers from an egalitarian perspective, using real female professionals as references. The main objective is to promote gender awareness and professional diversity through playful and interdisciplinary activities. The methodology resulted in the development of a multilingual booklet featuring six professions related to civil construction and sustainability, supported by pedagogical theories from Piaget, Montessori, and Freire. Activities were tested with 49 students aged 9 to 10 in a public school in Santa Maria, Brazil. Results indicate high engagement, curiosity, and critical reflection among children, especially in recognizing women's contributions in traditionally male-dominated fields. The findings suggest that gender-inclusive educational strategies aligned with SDGs 4 and 5 can foster interest in STEAM careers and help reshape perceptions of gender roles from an early age.

KEYWORDS: women in science; gender gap; children's booklet; equity in professional careers; gender equality.

RESUMO: As disparidades de gênero nas carreiras STEAM continuam sendo um desafio global, muitas vezes reforçado pela ausência de modelos femininos na educação básica. Estimular meninas desde cedo a explorar essas áreas é essencial para construir um futuro profissional mais inclusivo e diverso. Este artigo apresenta uma metodologia para introduzir crianças do Ensino Fundamental às carreiras STEAM e ambientais com uma perspectiva igualitária, utilizando profissionais mulheres reais como referência. O principal objetivo é promover a conscientização de gênero e a diversidade profissional por meio de atividades lúdicas e interdisciplinares. A metodologia resultou na criação de uma cartilha multilíngue com seis profissões relacionadas à construção civil e à sustentabilidade, fundamentada em teorias pedagógicas de Piaget, Montessori e Freire. As atividades foram aplicadas com 49 estudantes de nove a dez anos em uma escola pública de Santa Maria, Brasil. Os resultados indicam alto engajamento, curiosidade e reflexão crítica por parte das crianças, especialmente no reconhecimento das contribuições femininas em áreas historicamente masculinas. As conclusões apontam que estratégias educacionais inclusivas e alinhadas aos ODS 4 e 5 podem despertar o interesse pelas carreiras STEAM e ajudar a transformar percepções sobre papéis de gênero desde a infância.

PALAVRAS-CHAVE: mulheres na ciência; desigualdade de gênero; cartilha infantil; equidade em carreiras profissionais; igualdade de gênero.

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INTRODUCTION

Throughout history, women have faced difficulties and restrictions in accessing and participating in the STEAM (Science, Technology, Engineering, Arts, and Mathematics) fields. Despite the importance of STEAM-related degrees, a lack of vocations among secondary school students has been evident in recent years, particularly among women, resulting in a decline in enrollment in such fields (Shevtshenko et al., 2017). This underrepresentation is not only a matter of individual choice but also reflects deep-rooted structural barriers, cultural expectations, and the lack of inspiring female role models.

Gender inequality in STEAM is a global phenomenon, but its impacts are especially pronounced in countries like Brazil, marked by profound socioeconomic, racial, and territorial disparities. In addition, characteristics such as ethnicity, nationality, beliefs, disabilities, socioeconomic background, and gender often become discriminatory factors when starting a path in STEAM careers (Karen, 2005; May; Chubin, 2003; Oakes, 1990). This presents the recognized predominant challenge in which references in these areas cite men, thus contributing to a gender-based obstacle that hinders women's access and representation in STEAM areas. Therefore, addressing the issue of social inclusion and its limitations is even more challenging in countries like Brazil, which is characterized by deep-seated structural, economic, and social inequalities.

The inadequate availability of high-quality STEAM education, underqualified teachers, and a lack of advanced courses, resulting from socioeconomic background and racial disparities, can contribute to the underrepresentation of minority groups and women within the Science, Technology, Engineering, and Mathematics (STEM) workforce (Museus et al., 2011). This situation raises concerns, since the educational initiatives aimed at encouraging students to choose STEAM-related paths in higher education appear to be scarce (Fuesting; Diekman; Hudiburgh, 2017), resulting in an inability to fulfill the nation's demand for professionals in these fields (Jackson et al., 2019). Moreover, the letter 'A' in STEAM was adopted in this work as Arts, to include architecture, urbanism, and landscape, as they were not related to the common STEM acronym.

This context is directly related to the United Nations Sustainable Development Goals, specifically SDG 4 (quality education) and SDG 5 (gender equality), which underscore the importance of providing inclusive, equitable, and empowering educational experiences for girls from an early age. Introducing girls to STEAM



content and female role models during elementary school can help reduce gender gaps in education and foster long-term social change. In this sense, educational institutions face the challenge of understanding students' perspectives on science and guiding them regarding potential careers in the field. To achieve these objectives, it is essential to employ assessments and methodologies capable of developing students' attitudes, experiences, and self-belief in science and science-related professions, ideally starting from the elementary school level.

STEAM education places a strong emphasis on nurturing children's cognitive development, focusing on aspects such as computational thinking, creativity, thought processes, and metacognitive awareness—essential skills for success in the 21st century (Papadakis; Kalogiannakis; Gözüml, 2022). Numerous authors believe that enduring and meaningful learning can only occur when learners actively engage in the learning process (Piaget, 1949, apud Munari, 2010; Schon, 1987). Others affirm that educational methodologies integrated with technology can improve students' STEAM awareness and creative thinking skills in an out-of-school learning environment (Ogegbo; Aina, 2023). Nevertheless, there is still a vast field to be explored regarding activities and methodologies that encourage student participation, especially women, in STEM careers, since only a few authors have developed or applied methodologies to support their participation (Kang et al., 2018).

In light of these challenges, this paper presents a methodology designed to promote STEAM careers among elementary school girls through an educational approach grounded in cognitive development and gender equity. The primary objective of this paper is to develop a methodology for promoting scientific-technical, engineering, arts, mathematics, and technology (STEAM) careers among girls in elementary education. The study outlines four specific goals: a) research women of historical relevance, who have excelled in STEAM professions within six careers (mathematician, architect, landscape architect, urban planner, agronomist and scientist); b) elaboration of a versatile booklet that can be implemented in different countries and cultures with activities to encourage girls to choose these careers; c) implementing the booklet in schools with practical activities related to their curriculum; and d) encourage undergraduate students' participation in projects and development of research, teaching, and outreach skills acquired outside the classroom. Motivated by the aim to disseminate STEAM professions and educate children about the UN's 17 Sustainable Development Goals, with a focus on Goal 5 (gender equality), the paper also addresses aspects related to sustainable communities and clean energy. By aligning the methodology



with pedagogical principles and international development goals, this study seeks to inspire future generations to build a more inclusive and sustainable society.

METHODOLOGY

This exploratory research aimed to develop and apply a methodology to introduce elementary school children to STEAM and environmental careers with a gender-equity perspective. The structure of the methodology is organized into four main and interconnected phases: (1) theoretical foundation and planning, (2) booklet design and production, (3) implementation of activities in schools, and (4) collection and qualitative analysis of perceptions.

Theoretical foundation and planning

This phase focused on understanding the challenges faced by girls in accessing STEAM fields and planning a gender-equity-based educational intervention. The study began with the research question: *How can girls be encouraged to pursue STEAM careers?* To address this topic, the empirical research started with a bibliographical review about women in STEAM. Articles and reports on gender equality in professional careers were reviewed, including those by OECD/ECLAC/CAF (2016), GWNET (2019), Pan et al. (2020), and CFF (2021). Additionally, meetings were held with researchers from other universities to enhance the theoretical foundation of the initiative, supporting the academic development of the group, which included undergraduate and graduate students. These discussions helped to validate conceptual direction and ensure academic consistency in gender and education issues.

Booklet design and development

The second phase focused on developing the educational material used during the intervention: a booklet presenting female role models in STEAM careers through accessible language and creative activities. The methodology for elaborating the booklet was rooted in principles of learning and education, particularly those from Piaget's cognitive development theory (Piaget, 1985). Four key factors were considered:



1. Biological maturation, guiding the selection of children aged 7–10 years.
2. Experience, through practical activities.
3. Social interaction with undergrads and STEAM professionals conducted by the research group.
4. Equilibration of cognitive structures, expected to continue through future school and life experiences in the use of the booklet with observation, drawing, painting, and researching about other professions to create a new activity in the booklet.

In addition to Piaget's approach, Montessori principles were applied to encourage exploratory learning (Lillard; Else-Quest, 2006). Adults stepped back to allow children freedom to explore at their own pace, and researchers gained new perspectives by engaging closely with children's learning processes. Paulo Freire's perspective (Carnicelli; Bolik, 2017) also influenced this dimension, emphasizing social awareness through direct experience. Six careers were selected—Mathematician, Architect, Landscape Architect, Urban Planner, Agronomist, and Scientist—due to their relevance to civil construction and sustainability, aligned with the UN Sustainable Development Goals. Female role models were chosen to represent each field, including global historical figures, Latin women, immigrants, and contemporary professionals. This deliberate selection aimed to increase identification and reduce gender and ethnic stereotypes.

The booklet was structured to include:

- A short biography of each woman.
- An explanation of a technical topic.
- A classroom activity (not included in the booklet).
- A related homework task.

It was designed to be used independently by teachers or caregivers, with or without the participation of the research group. Additionally, it was translated into English and Italian to promote broader dissemination and applicability across cultures.

**Table 1 – Materials and methods used to produce the booklet for kids**

Stages and goals	Materials	Methodology
1. Studies about gender equality in professions	Articles and reports, meetings	a) researching related literature; b) engaging with external experts in the field to enhance the theoretical foundation of the research.
2.1 Design of activities	Graphic software	a) definition of careers; b) selection of role models; c) topic explanation; d) activity creation; e) proposal of hands-on activities.
2.2 Booklet creation	Graphic software and printers	a) compilation of activities; b) writing of introduction and conclusion to enable autonomous use.

Implementation of school activities

The third phase involved applying the booklet activities in a public school, conducted over five sessions by the research group. The intervention took place in a public elementary school located near UFSM. A total of 49 children, aged 9 and 10, participated: one class of 28 students in 2022 and another of 21 students in 2023. The selection of the school was based on prior partnerships and proximity, and the activities involved entire classes, including both boys and girls, in line with the project's inclusive goals.

Table 2 – Gender distribution per activity

Participants	Public elementary school 2022	Public elementary school 2023
Age	9 to 10	9 to 10
Number of participants	28	21
Boys	11	6



Girls	17	15
Number of activities developed	4	1

All activities were conducted during regular class periods and lasted approximately one hour. Each session included: (1) A short lecture about the profession and the selected woman; (2) an Explanation of the technical topic; (3) a Group discussion; (4) Delivery of the booklet and homework instructions; (5) A hands-on activity led by the research group, not included in the booklet.

Table 3 – Activities conducted during class periods

Stages and goals	Materials	Methodology
School lesson – phase 1	Posters, maps, a booklet, a blackboard, and paint	a) lecture by the research group; b) discussion and activity; c) distribution of booklet; d) internal feedback meetings
Booklet distribution	Booklet, mailing	a) delivery to UFSM extension projects and external partners
School lesson – phase 2	Booklet and quiz	a) alternative class activity using the booklet
Project evaluation and perceptions discussion	Group meeting and conversation with the teacher	a) team reflection after sessions; b) informal conversation with the teacher

A professor from the postgraduate program in Architecture and the undergraduate programs in Architecture and Civil Engineering at UFSM coordinated the project. The research group, created as an extension initiative, included one professor of Architecture, one of Civil Engineering, three master's students (Architecture), and six undergraduate students — all of them women. A Ph.D. student from UFRGS also participated, assisting with student coordination.



Graduate students assumed responsibilities such as organizing school visits, managing project logistics (including printing, materials, and budget), and leading activities. Architecture students were responsible for content development and presentations. These roles offered valuable opportunities for skill development and professional experience.

Distribution and qualitative analysis of perceptions

The final phase extended the dissemination of the booklet and evaluated its impact based on informal feedback and observation. In addition to the classroom activities, the booklet was distributed to other UFSM extension projects and partner organizations. Approximately 1,000 copies were disseminated across Brazil, and the material was also published online (under blind review conditions) and translated into English and Italian. Perceptions were collected through observation and informal conversations with students, the schoolteacher, and the research group, without structured questionnaires or direct interviews. The children's reactions were noted during the sessions; the teacher shared insights in informal debriefings; and the research group held reflective meetings after each school visit. These qualitative insights enabled the team to assess the engagement, interest, and learning outcomes of the participants, particularly in terms of their perceptions of gender and professional opportunities. Based on this informal assessment, the team decided to maintain the booklet for the following year while adjusting the accompanying activities to address new topics in the field.

RESULTS

Procedures

The researchers conducted background studies on gender equality in professions, including a simplified review of key reports (OECD/CELAC/CAF, 2016; GWNET, 2019; Pan et al., 2020; CFF, 2021). Additionally, online meetings were held with researchers from other universities to enhance the theoretical foundation and to reflect on the relationship between gender and early education. This phase supported the preparation of activities and the booklet by a group comprising professors and undergraduate and graduate students. The booklet was developed considering the STEAM careers and female role models to be featured, the different



fields of knowledge and the diversity of the women, including historical, Latin American, immigrant, and currently active professionals. Furthermore, it was proposed class activities and homework assignments aligned with the students' learning level and curriculum, aiming to encourage reflection and family involvement. Finally, the activities were implemented and qualitatively analyzed based on the perceptions of the participating children, the schoolteacher, and the researchers.

Booklet activities

The booklet began with an introductory section explaining the concept of STEAM careers and their significance in contemporary society. Its main goal is to raise awareness and promote interest among children, especially girls. To extend its reach, the content was translated from Portuguese into English and Italian. This multilingual effort was not only intended to expand international dissemination but also to highlight the role of Latina and immigrant women in STEAM. Therefore, the material could be used in foreign language classes in Brazilian schools and diverse cultural contexts abroad.

Each chapter of the booklet focused on a specific profession and a remarkable woman within that field. Hands-on classroom activities were followed by homework assignments designed to deepen students' engagement and promote dialogue with family and community members.

The first activity introduced Hypatia of Alexandria, recognized as the first female mathematician in history. She was chosen to provide a classical historical reference from the 4th century. The content explored measurement units and graphic scales related to the human body. For homework, children were asked to measure household items, such as the door or a sofa, and to record their findings.

The second activity centered on urban planning and featured the Brazilian Urbanist Raquel Rolnik. This activity aimed to challenge gender stereotypes in a field traditionally associated with male figures. Students were introduced to cardinal directions and spatial orientation. As homework, they were instructed to choose a window in their home, identify its solar orientation, and draw the view seen from that window.

The third activity addressed landscape architecture through the work of Rosa Grena Kliass, a Brazilian Landscape Architect known for her public park designs. The theoretical portion focused on the natural environment and its importance. For



homework, students were instructed to select a plant, draw it, and identify both its scientific and common names.

The fourth activity featured Ana Maria Primavesi, a pioneering Brazilian Agronomist Engineer who advocated for agroecology. The booklet covered the basic parts of a plant, and the children were asked to choose a plant and illustrate its parts (roots, stem, leaves, etc.), reinforcing their understanding of botanical systems.

The fifth activity introduced Maria Telkes, a Hungarian-American Engineer and inventor known for her work in solar energy technologies. Children were introduced to the concept of using solar energy in houses and were invited to imagine and illustrate an alternative energy source, explaining how it would function.

The sixth activity featured Lina Bo Bardi, a modernist Architect of Italian origin who became a central figure in Brazilian architecture. The topic addressed architectural floor plans and spatial representation. For homework, children were invited to draw a room from a top-view floor plan of a room in their home, either realistically or imaginatively.

To conclude the experience, the final section of the booklet encouraged students to create their activity: selecting another STEAM career, proposing content, and creating a related assignment.

School lesson

The implementation of the booklet activities began on July 7, 2022, marking the first direct engagement between the research group and the children. This initial session involved 28 students aged 9 to 10, divided into four groups. Each session was structured around one of the booklet's activities. Researchers began by presenting the featured professional and explaining her work and the theoretical content related to it. A hands-on practice session followed this. Afterwards, students received the booklet activities as homework, which the teacher later reviewed (by taking pictures) and collected the children's impressions about the lesson.

The first lesson, which used the Hypatia of Alexandria topic, involved splitting the class into groups of 4 to 5, drawing a full-scale outline of a classmate's body, and measuring specific body parts using brown paper, markers, and rulers. The second activity, on August 2, 2022, introduced the profession of urban planner Raquel Rolnik. Students worked in pairs or small groups to draw significant façades from their neighborhood and used them to locate them on a map, creating a city model of the school neighborhood. The third activity, held on September 13, 2022, was a visit



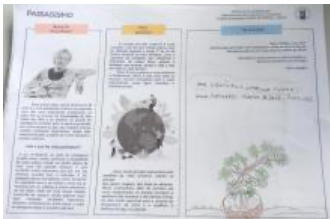







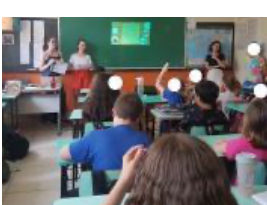

to the UFSM botanical garden, linked to the career of landscape architect Rosa Grena Kliass. The garden staff accompanied the group through various environmental sectors. After the visit, children received homework about local plants, and the team collected their impressions. The fourth activity, on November 1, 2022, involved painting murals representing Brazilian biomes (Amazon, Cerrado, Pantanal, Atlantic Forest, Caatinga, and Pampa) on the school's external walls, related to Ana Maria Primavesi's work on environmental preservation. Organized into seven groups, the 28 students used paint kits, brushes, and printed references to create their murals. Leftover paint was later used to renovate the school's vegetable garden, reinforcing environmental values. A fifth activity, a visit to the UFSM Model Efficient House, was initially planned but had to be cancelled due to logistical issues. Nevertheless, the homework on scientist Maria Telkes and renewable energy sources was distributed during the previous session, ensuring that the theme remained integrated. The final session, held on December 1, 2022, featured the Architect Lina Bo Bardi. Children worked individually to draw a floor plan of the school from a top view, using sulfite paper, pencils, colored pencils, and pens. Researchers used a projector to explain architectural drawings and Bardi's work.

The activities described above are summarized in Table 4, which presents the STEAM profession, the proposed task, the classroom implementation, and the students' responses.

Table 4 – Application of activities

PROFESSION	ACTIVITY	SCHOOL LESSON	STUDENTS RESPONSE
Mathematician - Hypatia of Alexandria			
Urban Planner - Raquel Rolnik			



Landscape Architect - Rosa Grena Kliass			
Agronomist Engineer - Ana Maria Primavesi			
Scientist and Inventor - Maria Telkes			
Architect - Lina Bo Bardi			

Project evaluation

To identify the different perspectives on the application of the activities, the analyses were subdivided into the children's perspective (collected by their teacher), the schoolteacher's perspective (detailed in a report), and the researchers' perspective (collected in a feedback group meeting).

From children's perspective

The educational activities spotlighting women in STEAM careers evoked a remarkable level of motivation and enthusiasm among the children. Witnessing women succeed in traditionally male-dominated fields ignited their curiosity and inspired them deeply. Throughout debates and hands-on tasks, the children displayed a sense of empowerment, acknowledging that gender should never



hinder one's aspirations. While occupations like mathematician, scientist, and agronomist seemed familiar, urban planner, landscape architect, and architect appeared more distant from their daily reality. Despite this perceived distance, the children exhibited significant curiosity and interest in exploring these professions. Their eagerness to delve into novel domains underscored their receptiveness to new knowledge, showcasing their expanding perspectives beyond immediate experiences.

From the schoolteacher's point of view

According to the teacher responsible for the school's elementary class, the students showed interest in the project. Through their speeches and behaviors, they demonstrated a great deal of interest in the activities, even asking the teacher when the subsequent meetings with the researchers would be. They were anxious and had high expectations about the new themes. Regarding the content covered by the project, it was possible to relate it to the curricular themes of the year and provide complementarity and interdisciplinarity. Students were able to reflect and develop new skills, such as valuing the school's physical spaces, including the classroom and the collective vegetable garden.

The first activity about mathematics allowed them to expand their knowledge of their bodies. In the second activity, using the 3D model, the class experienced the location of their houses, the school, and commercial points, as well as the design of the façades of these places. This allowed for the visualization of distances between locations and the school, as well as improved urban spatial orientation. The visit to the UFSM botanical garden was important, as it allowed the students to discover various plant species. This topic continued to be addressed in the classroom through research and development of a podcast proposal on the topic. From the teacher's perspective, the activity about the landscape architect profession and the professional Rosa Grena Kliass was interesting because the theme carried on with activities such as planting and valuing the previous school's vegetable garden. Activities related to the natural environment continued with the creation of cardboard boxes to collect organic waste and utilize it in the garden, promoting sustainable practices among students.

In the fourth activity, where the school walls were painted with images of the Brazilian biomes, it was possible to link the use of art, teamwork, and appreciation of the school space. The teacher said that "the proposal for the artistic murals will be etched in the students' memories". In summary, the teacher noted that working



in partnership with UFSM contributes to their classroom work. It also highlighted the importance of bringing UFSM undergraduate students to elementary schools to experience this social reality. All topics, from what an architect does to environmental issues, were made possible to bring into the students' daily lives. Additionally, the teacher noted that the activities had a positive impact, adding knowledge to students about various professions and areas of work, while also fostering a greater collective sense of awareness about the role of women in society.

From the researchers' perspective

The research group evaluation was made in a meeting after each lesson and in a final group meeting after all lessons had been applied. As the activities unfolded, it became apparent that the children were committed and motivated to complete the proposed tasks, surpassing their engagement in regular school classes. Based on the clear acceptance and enthusiasm of the children towards the activities, the participants felt motivated to continue proposing the dynamics. It was a challenge for the undergrads to translate the knowledge they acquired during architecture courses in a way that a young age group could understand and enjoy. Although this experience was challenging, it was also extremely rewarding to see how committed the children were to carry out the activities and how the content was indeed understood by the students in general.

Through the project, it was possible to understand the vulnerabilities and discrepancies of children in society. On the one hand, some children grasped the covered content with extreme ease, having been exposed to similar topics. On the other hand, it highlighted the difficulty some children experience with certain skills and content that should be simple for their age group. Another perception encountered by the research group was the strong sense of awareness among the children about emergent curriculum in education. In various situations, the children showed empathy for the discussed subject and expressed care for the environment and gender equity. The project had an impact on the team's lives by bringing them closer to the social situation in which many children currently find themselves in Brazil. This experience sets apart and enriches the academic period in a way that no Professor could convey in the classroom. It was of utmost importance for the project participants because eventually, these same students will be professionals who need to meet the demands of society, requiring a profound understanding of it.



In terms of personal impact, the project also contributed to the development of social skills, including communication, leadership, coordination, and organization. It allowed participants to engage with the issue of gender inequality, promote STEAM careers that are still predominantly male, and raise awareness among boys about the presence of women in these professional areas. As students and individuals in formation, the "Empowered Girls" project contributed to the team's development in social and behavioral aspects. Additionally, it was noted that the distribution of the interactive booklet elicited positive reactions from both children and caregivers, as indicated by the comments received from those who met the research group (approximately 10). It was invaluable to gain insight into the challenges faced by the city's primary schools.

Furthermore, the distribution of interactive booklets garnered positive feedback from both children and caregivers, reflecting the materials' efficacy in addressing educational topics. Disseminating approximately 1,000 booklets across multiple institutions, including universities, hospitals, planetariums, and primary schools, underscored their far-reaching impact and transformative potential, shaping perspectives and sowing seeds of inspiration among the younger generation. Looking ahead, future investigations will explore STEAM interests among secondary school students, aiming to broaden engagement and awareness of these crucial topics.

CONCLUSIONS

This study demonstrated that educational initiatives centered on gender equity and STEAM careers can foster meaningful engagement among children in Brazilian public schools. The proposed activities stimulated interest, especially when women's role models were presented in fields historically dominated by men. The use of a multilingual booklet, which integrated playful and curriculum-aligned content, allowed for broader dissemination while supporting teachers and families in encouraging girls' aspirations in science, technology, engineering, arts, and mathematics.

The implementation of the project in the classroom revealed that students, regardless of gender, responded with enthusiasm, curiosity, and critical thinking. Activities such as mural painting, environmental exploration, and drawing exercises based on architectural concepts not only complement curricular goals but also promote interdisciplinary learning, aligning directly with the principles of SDG 4



(Quality Education). Moreover, the focus on female professionals—many of them Latin American or immigrants—contributed to SDG 5 (Gender Equality) by broadening children's perceptions of who can occupy leadership and innovation roles in society.

The experience also yielded valuable outcomes for the undergraduate and graduate students involved in the project. Their interaction with schoolchildren strengthened their soft skills, including communication, leadership, adaptability, and empathy, while exposing them to the social inequalities and educational disparities present in the public system. For many, this was one of the few opportunities to apply academic knowledge in a real-world social context, thereby reinforcing the civic and ethical dimensions of higher education.

Although the booklet was distributed to more than 1,000 individuals and institutions, including schools, universities, and museums, no formal evaluation was applied to measure its effectiveness outside the classroom. Future studies should address this limitation by developing impact assessment tools, especially for remote or autonomous use of the material.

Finally, the initiative opens avenues for future work, such as adapting the content for older students, expanding the number of featured professions, and incorporating more structured follow-up with educators. The high level of interest observed suggests that today's children may already be developing more inclusive views of gender and work. Whether these perceptions will endure or be reshaped by social conditioning as they grow older remains an open question—one that calls for longitudinal and intersectional research to understand how young generations construct their professional identities in the face of persistent gender gaps.

REFERENCES

- CARNICELLI, S.; BOLUK, K. The promotion of social justice: Service learning for transformative education. **Journal of Hospitality, Leisure, Sport & Tourism Education**, [S.L.], v. 21, p. 126-134, nov. 2017.
- CFF. Energia solar no Brasil: quais são as barreiras e oportunidades para as profissionais mulheres no setor. **C40 Cities Finance Facility**. Brasília, 2021.
- DEL-BURGO, J. F. *et al.* Exploratory study on didactic aspects used in scientific-technical (STEM) dissemination conferences for students of secondary education. **Journal of Technology and Science Education**, [S.L.], v. 12, n. 1, p. 86, 10 fev. 2022.
- FUESTING, M.; DIEKMAN, A. B.; HUDIBURGH, L. From classroom to career: the unique role of communal processes in predicting interest in STEM careers. **Social Psychology of Education**, [S.L.], v. 20, n. 4, p. 875-896, 8 set. 2017.



- GWNENET. GLOBAL WOMEN'S NETWORK FOR THE ENERGY TRANSITION. **Women for Sustainable Energy: Strategies to Foster Women's Talent for Transformational Change**, 2019. In Portuguese. Available at: <https://www.globalwomennet.org/women-for-sustainable-energy/>. Accessed 14 sep. 2024.
- JACKSON, M. C. *et al.* Talking about science interests: the importance of social recognition when students talk about their interests in STEM. **Social Psychology of Education**, 22(1), 149–167, 2019. [S.L.], v. 22, n. 1, p. 149-167, 31 out. 2018. Springer Science and Business Media LLC.
- KANG, H. *et al.* How do middle school girls of color develop STEM identities? Middle school girls' participation in science activities and identification with STEM careers. **Science Education**, [S.L.], v. 103, n. 2, p. 418-439, 31 dez. 2018.
- KAREN, D. No Child Left Behind? Sociology Ignored! **Sociology of Education**, [S.L.], v. 78, n. 2, p. 165-169, 2005.
- LILLARD, A. S.; ELSE-QUEST, N. M. Evaluating Montessori Education. **Science**, [S.L.], v. 313, n. 5795, p. 1893-1894. 2006.
- MAY, G.; CHUBIN, D. E. A retrospective on undergraduate engineering success for underrepresented Minority students. **Journal Of Engineering Education**, [S.L.], v. 92, n. 1, p. 27-39, 2003.
- MUNARI, A. **Jean Piaget**. Org.: Daniele Saheb. Recife: Fundação Joaquim Nabuco, Editora Massangana, 2010.
- MUSEUS, S. D. **Special issue: Racial and Ethnic Minority Students' Success in STEM Education**. (n.d.). <https://eric.ed.gov/?id=EJ919997>.
- OAKES, J. **Lost talent: the underrepresentation of women, minorities, and disabled persons in science**. Santa Monica (CA): Rand Publishers, 1990.
- OECD/ECLAC/CAF. **Latin American Economic Outlook 2017: Youth, Skills and Entrepreneurship**, OECD Publishing. Paris, 2016.
- OGEGBO, A.A.; AINA, A.Y. Exploring young students' attitude towards coding and its relationship with STEM career interest. **Education And Information Technologies**, [S.L.], p. 365-1314, 2023. Springer Science and Business Media LLC. <http://dx.doi.org/10.1007/s10639-023-12133-5>.
- PAN, A. C. *et al.* A realidade das mulheres no setor da energia solar. **Revista 3 S - Solar, Sustainable Solutions**, 1ª edição - Vol.1, p. 35-39, 2020.
- PAPADAKIS, S., KALOGIANNAKIS, M., GÖZÜM, A.I.C. Editorial: stem, steam, computational thinking, and coding. **Frontiers In Psychology**, [S.L.], v. 13, 2022. Frontiers Media SA.
- PIAGET, J. **The Equilibration of Cognitive Structures: The Central Problem of Intellectual Development**. Chicago and London: University of Chicago Press, 1985.
- SCHÖN, D. A. **Educating the reflective practitioner: Toward a new design for teaching and learning in the professions**. Jossey-Bass, 1987.
- SHEVTSHENKO, E. *et al.* Dissemination of Engineering Education at Schools and its Adjustment to Needs of Enterprises. **Daaam Proceedings**, [S.L.], p. 0044-0053, 2017. DAAAM International Vienna.
- UFSM. Federal University of Santa Maria. **SAI - International support bureau**. 2023. Available at: <https://www.ufsm.br/orgaos-de-apoio/sai>. Accessed 14 sep. 2024.