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Special Issue – Women in Sciences: Historiography of Science and History of Science – on the Work of Women in Sciences and Philosophy

Girls of Today and Women from the Past: When the History of Female Scientists is Used to Engage Girls with Science

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Abstract:

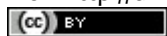
“Girls in the Museum” is a project aimed at school students to encourage them to explore scientific careers and engage with science. To achieve its goals, the project uses a variety of methodologies during the training sessions, always emphasizing the contributions of women to science and society throughout history. In one activity, the participants had to select 14 scientists and philosophers and compile their contributions in a talk that they presented in various Museum events. 1,5 years after the first presentation, we have interviewed and analysed the impressions and memories of the girls on this activity. The results show that the participants could still remember the history of the selected scientists and understand their scientific work because they felt represented. We argue that the historiography of women in sciences is a valuable resource that can be used in all educational levels as well as museums.

Keywords:

Women in STEM; Science Education; Science Communication; History Education; Science Museums

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Introduction

In the past 50 years, the access of women to education and their participation in the production of knowledge has increased substantially compared with previous epochs.

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However, what it might seem like a definite triumph of the feminist struggles since the XIX century, has unfolded three simultaneous side effects.

In the first place, the realization that equal education does not lead to equal status, authority and even recognition in working environments. Secondly, the prejudice against women's intellectual abilities has not disappeared as a consequence of their more significant presence, on the contrary, women standing out in any field of knowledge must continuously show their credentials to be accepted and valued within that field. Thirdly, even women who achieve success and have their work recognized at a particular time, do not enter into the common imaginary and symbolic capital (Marini 1993). In general, they continue to be associated with the subjective and the feminine, and not the universal, represented by the masculine (Beauvoir 2016, 12). Therefore, most of their production is forgotten and does not linger for the next generations.

Indeed, the historical contribution and impact of women in areas such as science, philosophy, politics, literature and arts, is usually explored in specific courses named as "Women studies" or "Women in (any area)". While the historical significance of men is called "History" and it is learned by us all since the early stages of primary education (Maggs 2017, 10).

We observe this very clearly in the textbooks used in formal education systems worldwide. The references to women in didactic books account for only 13% and this number even drops to 7% when considering science textbooks (Lopez-Navajas 2012).

Other non-school spaces of education, culture and memory, such as museums and cultural centers, may also materialize through their choices of expography, reproductions and perpetuation of a specific history of women, associated with traditional roles, that quenches the contribution of women as thinkers and leaders. Museums, as institutions of memory, may impose "representations on the past through the selection of what should be preserved as part of the past" (Gevher 2017, 12).

The Awakening of the Hidden Figures

In the last years, there seems to be a rising interest by society in the figures of female scientists and intellectuals who had been ignored or hidden in the trunk of memories for a long time. The foundations of this interest may rest on the many resources that have now addressed the obliteration of women and are oriented to various audiences. For instance, several films, books, media channels have brought the attention to the scandalous absence of women in the history of science, philosophy, literature or art, despite of having being responsible for crucial contributions (e.g. Ignatofsky 2016; Evans 2017). Thanks to these resources some sectors of society have become aware of the invisibility process women philosophers, scientists, writers and artists have been subjected to, at the same time that demand the proper credit for them.

Preceding this movement that now pervades the non-academic audiences, the debate of gender in the sciences have emerged in formal (schools, universities) and informal education spaces (museums, science and cultural centres), often motivated and pressured by public policies. In this regard, the Millenium Goal number three of United Nations that targeted the elimination of "gender disparity in primary and secondary education, preferably by 2005, and in all levels of education no later than 2015",³ had played an important role to

³ Millennium Goals were signed in the year of 2000, as a commitment among world leaders to defeat poverty, hunger, disease, illiteracy, environmental degradation, and discrimination against women: <http://www.un.org/millenniumgoals/gender.shtml>. In 2015, United Nations member states adopted the 2030 agenda, which replaced the 8 Millennium Goals for the 17 Sustainable Development Goals.

promote the inclusion of more girls in science careers and more welcoming and equitable workplaces in universities.

In December 2015, the United Nations General Assembly established an annual International Day, 11 of February, to acknowledge and celebrate the contribution of female scientists to progress and society. Implemented by UNESCO and the United Nations – Women, the celebration has the goal to promote full and equal access to and participation in science for women and girls.

With these spurs, universities, research institutions and scientific societies slowly started to revise their habits related to the visibility and recognition given to former and current female researchers.

In 2013, the National Council for Scientific and Technological Development (CNPq, in the Portuguese acronym) in Brazil, launched the program Pioneers in Science dedicated to present the work of 19 Brazilian female scientists who have contributed to the establishment of various fields of research in the country. The content of the program also gave birth to a travelling exhibition. Since then, every year, CNPq posts a new series of scientists in the program webpage.

Another example was the last edition of the *Paralajes* scientific magazine produced by the Institute of Astrophysics of the Canary Island (IAC) in Spain.⁴ The issue was dedicated to honoring the figures and discoveries of great female figures in the history of Astronomy, such as, Henrietta Leavitt, Williamina Fleming and Cecilia Payne, as well as to make visible their current female employees, highlighting their scientific contributions.

The History of Women in the Sciences: An Available Resource

Gender studies show that from the earliest years of schooling, girls are little encouraged to like science disciplines, which eventually causes the lower concentration of women in scientific careers (Olinto 2011; Vasconcellos and Brisolla 2009; Bian, Leslie and Cimpian 2017). Stereotypes, particularly stronger in science fields, reinforce the idea that women have no equal intellectual capacity as men, logic reasoning, nor talent for scientific work. The scarcity of models to be emulated by girls in these fields stands out as another fundamental problem in perpetuating this segregation (Viegas 2013).

These ideas accompany girls throughout elementary and middle school and, in the crucial phase of career decision-making, many ends up choosing courses traditionally associated with a socially constructed feminine vocation, like nursing or teaching (Sainz & Upadaya 2016). Which, simultaneously, produces a systematic devaluation of these highly “feminine” professions in the labor market (Olinto 2011).

The influence of the closest environment on female teenagers also impacts their career choices. For a girl to choose to pursue a career in sciences and engineering, it is crucial that both parents have a tertiary educational level and especially, that the mother has been to university (Vasconcellos & Brisolla 2009). This highlights the importance of role models for girls to inspire them to become future scientists.

The lack of references of female scientists and philosophers in textbooks, the difficulty for girls to meet actual scientists and mentors that they can identify with, the absence of women as important characters to society in memory spaces like museums, and the long-standing biases and gender stereotypes socially constructed that surface the science careers steers girls away from professions that will have to deal with logical reasoning.

⁴ http://www.iac.es/adjuntos/prensa/Paralajes_Mujeres_en_Astro.pdf

In this paper, we discuss how we used the historiography of women in sciences and philosophy as a thematic topic in a project aimed at female teenagers ran by the Museum of Astronomy and Related Sciences (MAST, in the Portuguese acronym) in Rio de Janeiro, Brazil. The project had the goal of encouraging girls to explore scientific career paths and engage with science. It was coordinated and supervised by three scientists of MAST Education Department.

The project conception was based on a broad theoretical framework in the areas of science education and gender in sciences, as well as education and communication in museums. In particular, we ascribe to the vision that science museums are institutions that have as a mission to expand society's access to scientific knowledge and encourage the excitement of discovery. They cannot be places that legitimate the obliteration of the important contributions women have done to the science. In this context, models become important, not just models of current female scientists, but historical figures who have contributed to the construction of a particular field. In the case of MAST, this is very important since the institutions is a science and a history of science museum.

To assess whether the project's goals have been met, an evaluation study was conducted during the 18 months that the project was run. Various activities were evaluated, in particular, the one in which the participant girls conducted studies on the history of various female intellectuals and scientists in different periods of world's history. In this article, we present the analysis of the discourse of the participant girls on the thematic and discuss the importance of such resources for educational activities in museums.

Women at the Forefront: Discoveries by the Youth

“Girls in the Museum” is a science education program that seeks to motivate female high school students into liking science and train them as science museum mediators.⁵ The project uses Astronomy as a tool and a gateway to other science subjects like physics, chemistry, mathematics, geology and computing sciences to motivate and involve the participant students in scientific practices. Ultimately, it aims at presenting different possibilities available to the students, who will soon have to decide about their future.

The project, to achieve its goals, uses a variety of methodologies during the training meetings, from theoretical classes with renowned scientists and educators, to hands-on science activities, a museum dedicated tours and movie screenings. Besides, the contributions of women to science and society throughout history has always been an active part of the sessions.

Concurrently with the meetings, a study was conducted to evaluate the project and verify possible changes in the students' viewpoints and the perceptions towards science. Interviews and focal groups were carried out in specific training sessions to document the relevant experiences lived and survey the attitudes of the participants. After the conclusion of the project, interviews have also been conducted to follow-up the participants.

“Girls in the Museum” group consisted of seven female high school students from the city of Rio de Janeiro, with ages between 15-18 years. Four of them were selected by a collaborating teacher, attending a state (public) high school, located in the central area of

⁵ Mediators are the professionals responsible for welcoming the public and carrying out activities in museums, such as guided tours or practical activities. They allow the visitors to deepen their understanding on the themes presented and make their experience more significant. Other names can be found in the literature for these professionals such as educators, monitors, presenters, guides, explainers.

Rio de Janeiro. Two participants studied at the Technical College of the federal rural University, in the western part of the city. One of them knew about the project after participating in a Museum event dedicated to girls. The other student had already been a summer intern at the Museum, six months before the project was launched. One student went to a private school, not very uncommon in Brazil. The school was located in southern Rio, the wealthier part of the city. She has learned about the project while visiting the Museum with her family. The latter three students had a manifest interest in science, and in particular in Astronomy, before the beginning of the project.

The first edition of “Girls in the Museum” took place between July 2016 and December 2017. During that period, the participant students engaged in a series of talks and practical workshops not only about science, but on the social aspects of science. Scientists and educators of various institutions were put in contact with the participating girls who attended the activities twice a month.

Along the process, the students had to design and develop their own educational activities and experiments, always supervised by senior female scientists, and present at science communication events offered to the general public by MAST. They also acted as Museum mediators once a month and in special events coordinated by the Museum Education department.

One of the activities the participants were actively engaged was the talk presentation entitled “Incredible Unknown Female Scientists”, that highlighted the contributions of fourteen female scientists and philosophers from various periods in world history. The talk was fully elaborated by the participant girls and the idea for the theme came after a meeting where students became aware of the very few names of female scientists they, and their colleagues back at school, actually knew of.

To help the participants to realise the activity, the supervisors of the project provided them various texts on female scientists who have worked or are currently working on different fields. Choosing this reference material has proven rather challenging, provided that the historiography of many women in the sciences are restricted to academic journals. Different education material compatible with the education level of the participant girls tended to highlight the same scientists. For instance, Madame Marie Curie has her presence assured on all texts about female scientists. Finally, the girls were advised to use the following references (all in Portuguese):

- De Melo, H. P. & Rodrigues, L.M.C.S. *Pioneiras da Ciência no Brasil*. [Pioneers of Science in Brazil]. Sociedade Brasileira para o Progresso da Ciência. 2006.
- Do Nascimento, J. B. *Algumas Mulheres Da História da Matemática*. [Some Women From The History Of Mathematics]. ICEN/UFPa. 2016.
- Tosi, L. *Mulher e Ciência: a revolução científica, a caça às bruxas e a ciência moderna*. [Woman and Science: the scientific revolution, the witch-hunt and the modern science]. Cadernos Pagu, vol 10, p. 369-397. 1998.
- Sousa, L. P., Sombrio, M. M. O & Lopes, M.M. *Para ler Bertha Lutz*. [To read Berta Lutz]. Cadernos Pagu, vol 24, p. 315-325. 2005.
- Article from Scientific American Brazil “A história das ‘estrelas além do tempo’ reais da NASA” [“The history of the real ‘Hidden Figures’ of NASA”].
- Movie about Nise da Silveira: “Nise: The Heart of Madness” 2015.

Participants also looked for additional information on the internet, selecting the scientists they found life and work more interesting. Later, they prepared one slide per scientist highlighting the work, professional trajectory and main accomplishments. They also included in the presentation the difficulties those women had throughout their scientific careers, having to face severe discrimination, humiliation, retaliation and sometimes even death.

The selected scientists by the participants were:

- Hypatia (Greek mathematician, astronomer and philosopher, 5th century),
- Hildegard von Bingen (German abbess, writer, philosopher and anatomist, 12th century),
- Marie Meurdrac (French chemist, 17th century),
- Laura Maria Caterina Bassi (Italian physicist, 18th century),
- Mary Anning (British palaeontologist, 19th century),
- Rosalind Elsie Franklin (British biophysicist, 20th century),
- Cecilia Helena Payne-Gaposchkin (British-born American astrophysicist, 20th century),
- Katherine Coleman Goble Johnson (American mathematician, 20th century),
- Vera Florence Cooper Rubin (American astrophysicist, 20th century),
- Wendy Laurel Freedman (Canadian-American astrophysicist, 20th century)
- Joana D'arc Félix de Souza (Brazilian chemist, 20th century),
- Nise da Silveira (Brazilian psychiatrist, 20th century),
- Graziela Maciel Barroso (Brazilian botanist, 20th century),
- Bertha Maria Júlia Lutz (Brazilian zoologist, politician and diplomat, 20th century).

The participants of the project selected the scientists based on their historiography. They have organised and compiled the relevant information, designed the talk and chosen the title. The “Incredible Unknown Female Scientist” talk was first presented at the “III Girls Day” organised by MAST and, afterwards, was replicated during the Brazilian National Science Week in several venues, as well as at schools. It was presented to various audiences throughout the year of 2017. Figure 1 shows the first presentation of the talk.

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Fig. 1



Fig. 2



Fig. 3

Figs. 1, 2 and 3:
III Girls' Day event organized by MAST. Four "Girls in the Museum" presents their favorite scientist to a broad audience. Credits: MAST.

Incredible Unknown Female Scientists: The Discourse Analysis

As part of the study conducted to evaluate “Girls in the Museum”, six months after the project ended (nearly 1,5 years after the first presentation of the talk), we interviewed the participants. Questions were addressed to understand how they liked the activity “Incredible Unknown Female Scientists”, how they felt about having to present to a broad audience the life and, specially, the scientific work of the selected scientists, and which of them they could still remember.

The answers of the participants were transcribed and analysed based on the Discourse of the Collective Subject methodology (Lefèvre 2003). The technique uses the individual answers of each participant, grouping sentences that belong to the same idea. Sentences from all participants that match the same idea are used to create a unique discourse/speech, as if it was given by the social group the participants represent (in our case, teenagers from Rio de Janeiro). This unique discourse/speech incorporates the beliefs and opinions on a specific topic of that particular social group.

In brief, this is done by classifying the sentences of each individual answer (aka. *key expressions*) into conceptual categories (aka. *central ideas*) and quantifying the number of times that specific category appears in the discourses (aka. *intensity*). The answer of a participant may contain more than one central idea, for example, when there is a contradiction in the answer. The researcher is responsible for building a unique discourse to each central ideas, or the so-called, discourse of the collective subject (DSC). To finalize, the researcher may introduce a few adjustments (for instance, by inserting connectors or missing words) so to bring the DSC to fruition. The DSC is written in first-person.

The Discourse of the Collective Subject has been widely used in social sciences in an attempt to unveil the ideologies underlying the perceptions of different social groups composing our society and complement the qualitative analysis of the discourse with a way of quantifying the intrinsic ideas found in them.

Results

In this section, we present the discourses obtained from the interviews about the “Incredible Unknown Female Scientists” activity, conducted six months after the end of the “Girls in the Museum” project. Six of the seven female students responded to questions, as did the only male participant of the project. We have decided to include his opinions because they reflect how the historiography of women in science can inspire both girls and boys into liking science.

In the following, we show the conceptual categories found for every question and their associated intensity. This number indicates the frequency with which that particular idea appeared in the answers given by the students. The discourses are then transcribed separately for each of these central ideas.

The first question was: *What did you think about the activity “Incredible Unknown Female Scientists” that we organized for the Ill Girl’s day at MAST and also used at other events?*

In Table 1 we list the five different central ideas found in the replies to this question. We observe that, in general, the activity was well-liked as well as it inspired the students, expanding their vision and even exposing their own prejudices. Particular emphasis was given to the topic of the activity itself. All the participants agreed that the subject was very interesting and important to be addressed. Specifically, four of the students stated the relevance of presenting these female scientists to a broad audience and to make visible the participation of women in science (in the past and the present).

Table 1: Central ideas obtained for the first question

Central Idea	Intensity
1.1 I liked it	5
1.2 It inspired me	3
1.3 Interesting and important topic	8
1.4 Importance to convey to others	4
1.5 I was afraid of speaking in public	2

Central Idea 1.1 “I liked it” (Intensity = 5)

[I thought it was incredible, I really liked it. I found the talk (we have created and presented) was great, wonderful and I loved preparing the slides. Best lecture ever.]

Central Idea 1.2 “It inspired me” (Intensity = 3)

[I felt very motivated and excited studying about several incredible women and discovering that their lives were not easy, but that they did not give up their career. This activity opened my eyes, helped me greatly to expand my vision (since), like many, I used to believe that the great discoveries came only from men, that they were responsible for everything.]

Central Idea 1.3 “Interesting and important topic” (Intensity = 8)

[The two (times we have given the) talks were amazing and interesting in different ways. I found it very interesting using the opportunity to discuss such an important content, because it is a topic that is not usually addressed.]

Central Idea 1.4 “Importance to convey to others” (Intensity = 4)

[I found the presentation very appropriate for the public. We managed to show women over a historical perspective, from ancient times to the present day. Aside from studying them, we were able to tell other people about them, which I think is great. Being able to present (them) at other events allowed me to believe that our first performance was worth it. I hope (it opened) the eyes of several other people to the fact that women's participation in science was not and is not small.]

Central Idea 1.5 “I was afraid of speaking in public” (Intensity = 2)

[(It was) a somewhat challenging experience, because I had to overcome my shyness and my speaking too fast. I still had a fear of saying something out of context (but) I loved being part of some of the presentations.]

Two students referred to personal difficulty when speaking in front of a large audience. A fear that also appeared in the discourses derived from the second question when was asked: *How was the process of preparing and studying the talk?*

In Table 2, we can read the central ideas found for this question. Four students explicitly said they struggled to remain calm before the talk, though at the end they managed to get through it and were able to present in front of the public.

Most of the students found the process of preparation and studying satisfactory and easy, expressing that they really enjoyed learning about female scientists. As in the first discourses, the topic again was an incentive for this phase. We observe that they actually “got attached” to the female scientists they chose to present and were genuinely interested in their lives and scientific work. This highlights the importance of having access to role models the students can identify with.

Table 2: Central ideas obtained for the second question

Central Idea	Intensity
2.1 I was afraid of speaking in public	4
2.2 Satisfactory	5
2.3 Easy	3
2.4 The topic helped	4
2.5 Difficult	2
2.6 Preparation method	1

Central Idea 2.1 “I was afraid of speaking in public” (Intensity = 4)

[The difficult part was that the presentation itself, I had to deal with my nerves. The minutes before the performances were intense, the shyness spoke louder. I was really nervous. One cannot avoid feeling the jitters and the adrenaline when talking about something, especially something that few people know about.]

Central Idea 2.2 “Satisfactory” (Intensity = 5)

[The overall preparation process was pretty cool and the study part was great. (It was a) good learning experience because I did not know much about the

female scientists. After presenting the talk, I was very pleased to have been able to show this to some people. And everything went very well and that's what matters.]

Central Idea 2.3 “Easy” (Intensity = 3)

[It was easy. Studying to present (the lecture) was more enjoyable than laborious.]

Central Idea 2.4 “The topic helped” (Intensity = 4)

[There was a real interest in knowing the lives of those female scientists. I got attached to them, something that helped me to know more and feel better prepared for the presentation. I got quite excited while making the slides and learned a lot by looking up about each scientist. They all did incredible findings and discoveries so I wanted to know and speak a little about them all. The theme of the talk was wonderful, (I had) the feeling of “I have to show these women to the world”.]

Central Idea 2.5 “Difficult” (Intensity = 2)

[The process for me was a bit difficult, as I have a slight tendency of losing focus, but the harder part was to choose which scientists to talk about.]

Central Idea 2.6 “Preparation method” (Intensity = 1)

[I read the texts they (the advisors) sent me and tried to find more information on the internet. (Also) I rehearsed and explained my part to my mother.]

Two participants found some difficulty in the preparation phase, but overcame it without further problems.

We also notice that one participant declared that she rehearsed her part of the presentation together with her mother, which again refers to the significance of closeby models for teen girls (especially the mother).

Finally, the students were asked if they remembered any of the scientists they had presented six months ago as well as if they could give names and reasons for recalling those scientists.

Table 3 summarizes the central ideas associated with this question. All students could remember at least one of the female scientists and three of them could remember up to three different scientists. The ones that were most cited by students were Hypatia and Nise da Silveira, both of them being mentioned three times. Joana D’arc Félix de Souza was cited twice and Graziela Maciel Barroso, Rosalind Franklin, Cecilia Payne, Mary Anning and Laura Bassi were quoted one time in the interviews.

Among the reasons given for remembering a particular researcher, the most recurrent concerned the experiences these women lived throughout their lives and specially the struggles to pursue their dream of a scientific career and the prejudices they encountered. Clearly, the tragic final of Hypatia had an emotional impact on the students, since it appeared repeatedly in the answers.

Furthermore, two students mentioned the personal gain in their education from having learned about these scientists. Also, two students pointed out the historical relevance of these figures who deserved both credit and recognition. One mentioned that the historical epoch was of great appealing to her.

Table 3: Central ideas obtained for the third question

Central Idea	Intensity
3.1 Yes, I do	7
3.2 Because of their lived experience	6
3.3 Because they contributed to my personal learning/background/education	2
3.4 Because they were Brazilians	2
3.5 Because they were great women	2
3.6 Because of the historical epoch	1

Central Idea 3.2 “Because of their lived experience” (Intensity = 6)

[The ones that impressed me the most were because of the history that each one lived or for having suffered a lot of prejudice at the time. The story (of Joana D’arc Félix de Souza) was one of those that moved me, the most for so many things that she endured throughout her life. (Hypatia was) a woman ahead of her time who, due to the fear of the society of an independent and strong woman like her, was murdered in a terrible way. (Rosalind Franklin) had her research stolen (by a colleague), and the guy still won a Nobel for her work.]

Central Idea 3.3 “Because they contributed to my personal learning/background/education” (Intensity = 2)

[They were great scientists and contributed a great deal to my education and my way of seeing the world and the people. They all helped to model the person I am today: the person who sees the greatness of women who have been killed, humiliated, and forgotten throughout history to defend what they loved.]

Central Idea 3.4 “Because they were Brazilians” (Intensity = 2)

[They were Brazilian and part of the history of our country.]

We identify that three out of four of the Brazilian scientists were remembered by the students. Also, two students declared that the reason for remembering some of the

scientists was because they were Brazilians. This shows the importance of also providing *local* reference models from the participants' country in order to challenge the myth that important scientific discoveries have only been made in western countries.

Central Idea 3.5 “Because they were great women” (Intensity = 2)

[They made history, not just the ones I quoted or talked about in the talks. All of them contributed to science in general. All deserve recognition and respect. (For example, Nise da Silveira) was a great woman not only in her research but also in life.]

Central Idea 3.6 “Because of the historical epoch” (Intensity = 1)

[(She was) from a historical epoch that I appreciate very much.]

It is also worth to mention that after the presentation at the different venues where the students participated, several teachers approached the coordinators of the project and expressed their interest about the activity and their willingness to reproduce it with their own students. Also many youngsters who attended the “Incredible Unknown Female Scientists” presentation asked more about these scientists and were very interested in the subject.

Conclusions

The absence of women's memory and cultural heritage in human History is being gradually addressed and reversed, though we still face a considerable lack of female figures in almost every field of knowledge, particularly in scientific areas. This exclusion perpetuates the inequalities that exist in modern society and is especially negative for young generations, who are being educated without learning about women's legacy and crucial contributions to philosophy, art, science and literature.

In this paper, we presented an education project aimed at female teenagers ran by the MAST in Rio de Janeiro, Brazil. While the project had a broader scope of encouraging girls to engage with science, a central part of it related to the historiography of women in sciences and philosophy.

The activity “Incredible Unknown Female Scientists” consisted on a one-hour talk on the life and work of 14 female scientists from different epochs of history. The slides were prepared by the students, who were also responsible for choosing the female figures, researching about them and presenting them to the general public attending several outreach events at MAST and other venues.

The project as a whole was evaluated by conducting interviews and focal groups during the full period it runs at MAST (18 months). Specifically, the impact of the “Incredible Unknown Female Scientists” activity was assessed via a short interview six months after the end of the project. The answers were analysed using the Discourse of the Collective Subject methodology, that allows to extract the main ideas from the replies, create a single discourse for each of those ideas and quantify their recurrence by means of the parameter intensity. The created discourses represent the social group's beliefs and opinions about a particular topic or central idea.

Our results point to a major trend: the students felt encouraged to study these scientists and understand their scientific work, because they felt represented. They

repeatedly mentioned that it was very interesting learning about women doing this kind of job in the past and now, and that they felt proud to be able to present them to the public and, in their own words, “to restore” their role in science. The participants revealed that they felt represented, especially because they have analysed the historiography of Brazilian and Afro-American female scientists. Moreover, they not only felt inspired by the history and experience of those female scientists, but they also looked up to them as models they could identify with. The impact these women had in the students’ lives can be expressed in the student’s own words: “they helped to model the person I am today”.

An immense potential lays in the history of women in science to encourage new generations of students to approach and be motivated by science. We argue that the historiography of women in sciences is a valuable resource that can be used in all educational levels in schools, universities, science museums and even professional conferences.

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