

# A Survey on Understanding of the Matilda Effect Among Guangzhou International High School Students

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**Abstract.** This paper reports on the execution and efficacy of a dual-mode physical exhibition and social media campaign for raising high school student awareness of the Matilda Effect and women scientists' contributions through international communication. The intervention was implemented through a 10-day exhibition with some interactive elements and coordinated content on the WeChat platform. Awareness and understanding regarding students were both tested using the post- and pre-intervention questionnaires, student interviews, and some engagement metrics. Knowledge of the Matilda effect increased from 37.5% to 100% within the target population, with 91.42% being exposed to educational materials and 77.14% of those achieving a clear understanding. The WeChat platform saw 248 unique viewers at its peak engagement time, which was during after-school hours (from 4 to 6 p.m.). The physical exhibition drew approximately 300 visitors and elicited just over 50 reflective student comments. These findings prove that blending traditional formats of exhibitions with social media platforms can effectively engage students in discussion on gender bias concerning scientific recognition. This offers a model that can be followed when similar issues need to be addressed in science education.

**Keywords:** Matilda effect, gender inequality, science education, campus exhibition, social media outreach, high school students.

## 1. Introduction

Though great strides have been made in gender equality, the scientific community seriously continues to experience persistent challenges in recognizing women's efforts. Referred to as the Matilda effect by the historian Margaret Rossiter [1], the systematic underrecognition of female scientific achievement portrays how, when discovered, often go uncredited, or credited with a lesser amount of credit due to their male counterparts by their male colleagues. This, as observed by recent events and statistics, still exists in the modern-day society of scientific recognition [2, 3].

Recent studies reveal very concerning patterns in academic representation and recognition [4, 5]. For data proving that only 15 percent of women hold positions in the research institution with doctoral rights and only 8 percent of full professorships. Throughout history only nine female Nobel laureates in the sciences, often belatedly with their male colleagues [6]. Such figures hardly seem to denote that women's contributions to science are adequately recognized.

Recent events in the Chinese media are another indication that the Matilda effect persists. For example, the 2023 film "I am a High Mountain" shows how women's professional achievements can be reframed through personal narratives. A mainstream portrayal in the film made of her, Zhang Guimei, the founder of the first free all-girls high school in China, shifted the focus from her noted commitment to work for the cause of girls' education to the motive of her personal life. It is an illustration of how, in most cases, female professional feats are perceived through non-professional angles.

Understanding, as well as unveiling the Matilda Effect, is of considerable sound among the younger students in view of constructing the following generation of scientists and researchers. This gap in conceptualization offers a chance for explicit educational interventions. However, this concept and its effect are barely known, especially in high school levels. It is exposed that the perception is very low when it has to be comparable.

To enhance awareness of the Matilda effect, two school approaches will be used on the international high school students in Guangzhou City: a campus exhibition and social media. The following educational initiatives will be implemented:

- Assessment of the current understanding of high school students with respect to the Matilda effect
- Implementation of targeted educational interventions through exhibition and social media platforms
- Evaluation of the effectiveness of the interventions in improving awareness and understanding

The research project is explicitly, though not exclusively, focused on the international high school students in Guangzhou since within this group lies a critical intersection pertaining both to academic development and cultural sensitivity. By exploring how educational interventions influence students' awareness of the Matilda effect, it contributes to the larger work of remedying gender bias in science recognition.

## **2. Methodology**

### **2.1. Study Design and Setting**

The study applied a mixed-method design—the first being a survey through quantitative measures and the second, feedback through qualitative measures by means of a campus exhibition. The research was carried out among the students of an international high school in Guangzhou in the age group of 15 to 18 years. The study implemented two major interventions through a campus exhibition and a WeChat Public Account. Data collection took place between October to December 2023.

### **2.2. Pre-intervention Assessment**

A preliminary questionnaire was administered to evaluate the students' pre-existing knowledge about the contributions of women scientists and the Matilda effect. The awareness of the students about the achievements of specific women scientists will be tested in the questionnaire, along with whether they were previously aware of the Matilda effect and understanding gender bias in scientific recognition.

### **2.3. Educational Interventions**

The campus exhibition was designed and implemented with four main components. The first section, acting as an introduction, was dubbed "The Power of Women." Several informational posters defined the Matilda effect and examples featuring three women scientists—very low in the explanation of the phenomenon and its effects pulled the curtain closed on an interactive message board for student feedback. Placed in the school building's stairway, the exhibition opened students to the maximum, its location chosen on the basis of regular patterns of student traffic and accessibility.

A WeChat public account was launched, under the name "Herstories," to run weekly posts on women scientists' achievements and details about the Matilda effect. Posts were set to go out at times of high visibility, usually between 4-6 PM. for the after-school crowd.

### **2.4. Data Collection**

Data were collected at various points throughout the study. Attendance at the exhibition was monitored by manual counting over the 10 days of the display period; feedback from the message board was collected daily by staff members. Total view counts for WeChat, which reached 248 viewers, as well as peak times for views and user engagement via comments, were data. The post-intervention assessment included a second questionnaire to assess changes in understanding, brief interviews with student representatives (male and female), and written feedback collected from the message board.

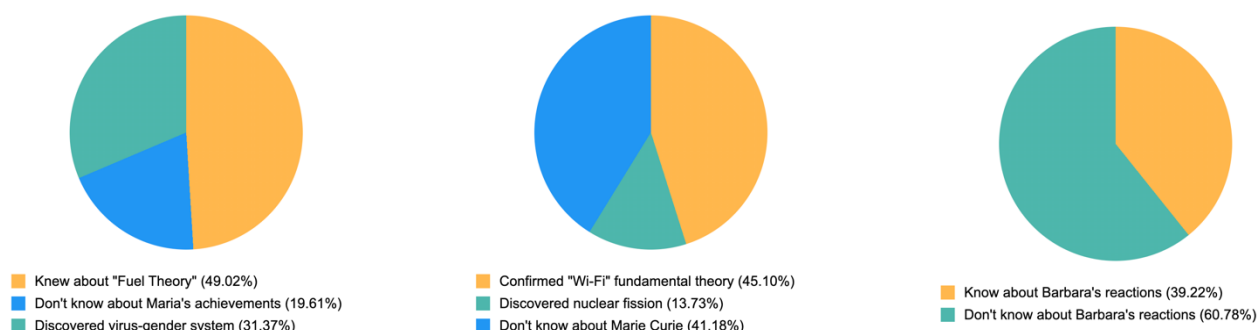
## 2.5. Ethical Considerations

The study was conducted with approval from school administration. Student participation was voluntary, and all feedback was collected anonymously through the message board and surveys.

## 3. Results

### 3.1. Pre-intervention Assessment

Results from the first survey highlighted colossal differences in student awareness of contributions made by female scientists (Figure 1). Data also reveal how awareness cuts across different scientific achievements. For instance, "Fuel Theory" was somewhat known by 49.02% of the respondents while Maria's achievements in the field were known by only 19.61%. Of the students, 41.18% indicated that they did not know who Marie Curie was, and yet she is a historical figure. Particularly abysmal was knowledge about Barbara's reactions since 60.78% of the respondents said that they did not know what she has done.



**Figure 1.** Pre-intervention survey results showing students' awareness of various women scientists' achievements. The three pie charts represent knowledge distribution across different scientific contributions: (left) awareness of Fuel Theory and Maria's achievements; (middle) Wi-Fi theory and Marie Curie's work; and (right) Barbara's reactions

### 3.2. Exhibition Engagement

The campus exhibition drew about 300 viewers over 10 days. Student engagement was recorded through the interactive message board collecting qualitative feedback. Students often noted that they were surprised by the historical circumstances regarding the Matilda effect and shared some personal ruminations on the topic of gender bias in science. Feedback comments, for instance, mostly comprise descriptions, such as "I never knew about the contributions of women scientists" with many stating they now wanted to learn more about specific cases. A few responses related the experience of being a target of gender bias to their experiences in academics.

### 3.3. Social Media Impact

The WeChat public account "Herstories" showed some serious engagement, reaching 248 unique viewers over the study's course. Peak engagement was always in the afternoons, specifically between 4-6 PM, when regular classes had let out for the day. Content analysis found that posts including an example from history related to the Matilda effect attracted the highest viewership. There was a particular engagement pattern of students interacting with posts connecting past information to present-day examples of gender bias in scientific recognition.

### 3.4. Post-intervention Outcomes

#### 3.4.1 WeChat Implementation and Engagement

The WeChat public account implementation was a strategic three-step process. First, a researcher would identify the viewing patterns, with 4-6 p.m. specifically standing out as when international

high school students were most actively engaging. The post at 5 p.m. for that day received 170 views. Second, researcher retweeting would bring it to 80% more views from strong target-population support. Third, the researcher, then having gained some steady engagement, would set up the publication on a weekly basis from then on to ensure consistency for profiles on notable women scientists.

### **3.4.2 Quantitative Assessment**

Results of the comparative analysis of pre- and post-intervention questionnaires students determined changes understanding (in a statistically significant way). Knowledge about the Matilda effect soared from 37.5% in the target group to 100%. In the post-intervention questionnaire, it was stated that 91.42% of students used the developed educational materials, and 77.14% understood the Matilda effect clear.

### **3.4.3 Qualitative Feedback**

Post-intervention feedback showed that there was better awareness of the Matilda effect among students after the intervention. The message board received over 50 comments from students during the period of the exhibition, showing active interaction with the material. Some common themes that ran across the responses from the students included more recognition in the area of scientific attribution regarding gender bias and increased awareness of the work these specific women scientists did. Several posted thoughtful reflections on gender equality within academic settings.

Student interviews provided valuable insight into the impact of the intervention. Both female and male students noted that they had gained a better understanding of gender bias in scientific recognition. Comments from the discussion board included students stating that they had not previously known about women's contributions to WiFi technology but now do, saying their opinions on science history have changed, and commenting on how the museum transformed their views on scientific achievement recognition.

## **4. Discussion**

### **4.1. Key Findings**

It has been proved through this study that merging the physical exhibitions with the social media platforms can increase exposure regarding the Matilda effect and women scientists. The most powerful evidence of the success of the intervention was that student awareness of the Matilda effect rose from 37.5% to 100%, with 77.14% of them claiming clear understanding of the concept. Very high rates of engagement with the educational materials (91.42%) indicated that the format of the intervention was very effective in drawing students' interests. These quantitative improvements were accompanied by qualitative observations made at the exhibition, which drew about 300 visitors, and on the WeChat platform, which drew in 248 unique viewers.

### **4.2. Impact of Exhibition Format**

It is located in the high-traffic stairway area and thus maximizes student exposure. The interactive message board worked best to get students engaged in thinking. Being there in person opened opportunities for impromptu student-to-student discussions and thus more peer-to-peer learning on gender bias in scientific recognition. The visual elements of the exhibition conveyed complex historical information. In a very approachable format, this made the Matilda effect much more real for the students.

### **4.3. Social Media Effectiveness**

The fact that the WeChat platform drew 248 viewers indicates that high school students regard digital platforms as valuable in connecting them with initiatives that are run by or are run by educational initiatives. The time of peak engagement, after school (4-6 PM), suggests that students

were actively seeking this content during their free time. Interactive features of the platform allowed the discussion to go on after the limits of the physical exhibition in a manner that ensures sustained dialogue on the topic of discussion about women's contributions to science.

#### 4.4. Educational Implications

The implications of the study's outcomes for science education are as follows. First, historical instances of gender bias may help raise awareness in a very focused way of some current problems in scientific recognition. Second, blended learning seems to be particularly effective among the most modern students. Third, blending interactive elements is important in drawing students into more reflective, personal engagement with course materials.

#### 4.5. Limitations and Future Directions

Some of the limitations that should be considered in the interpretation of these results are that this study, based in one school, may lack applicability elsewhere in different educational settings. The short-term intervention period for the exhibition to begin with only 10 days probably impeded the possibility of access to the long-term impacts that could have accrued. The awareness changes hence over time could be built on by

- Execution of longitudinal studies to measure long-term sustainability in awareness changes
- Scaling up to several schools to ascertain general effectiveness within different educational settings
- Construction of more formal assessment tools for tracking changes in awareness of gender bias
- Integration of additional interactive elements to further enhance student engagement

#### 4.6. Practical Recommendations

Practical recommendations for fostering gender bias awareness in education and other information settings that arise from this study's findings include:

- Develop multimodal approaches with both traditional displays and digital platforms
- Place in high-traffic areas for maximum exposure
- Include interactive elements for student engagement and reflection
- Release digital content at times of peak student engagement
- Offer historical and current examples to show that this bias continues to exist and is relevant in science

These findings add to the literature on solutions for gender bias in science education and, more significantly, to specific recommendations that can be useful for future educational initiatives.

### 5. Conclusion

This study contributes to the effectiveness of multi-modal intervention for awareness raising on Matilda effect among international high school students. It was proven that the combination of physical exhibition and WeChat platform engagement works best, with the drastic increase in the percentage of students aware of Matilda effect, from 37.5% to 100%. High engagement, with 91.42% of students having accessed the educational materials and 77.14% having achieved clear understanding, speaks to the effectiveness of the intervention.

It maintained student engagement by having the strategic timing of WeChat content delivery during after-school hours and weekly features concerning women scientists. Other than that, a lot of interactive elements in the physical exhibition especially on the message board prompted meaningful reflection and discussion from the students on gender bias in scientific recognition.

It adds to the body of literature on ways to reduce gender bias in science education and also makes recommendations for future educational initiatives based on what will or will not work. The successful implementation of this intervention proved that, to engage students of today in meaningful

discussions on gender equity in science, newer social media platforms need to work hand in hand with traditional exhibition formats.

Further research, using multiple schools, may longitudinally assess the long-term effects. In addition, the approach developed in this study can be utilized to reduce other types of bias and inequality in scientific recognition.

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