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SHE-TIMELINE: To the Rescue of the (in)visible pioneers of technology

SHE-TIMELINE: Rescatando a las pioneras (in)visibles de la tecnología

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ABSTRACT

By reviewing the inauguration data of universities around the world, it is easy to see that access has been very different for men and women. Sometimes, this difference is a few decades but centuries in some cases between university inauguration data and when, for the first time, a woman in classroom. By checking about pioneer women in technology, when compared with first men in technology, the differences are much more remarkable.

Currently, there are men and women in engineering, all over the world, but population data are still far from-peer percentages. From the data collected in a survey about the first women graduates in STEAM (Science, Technology, Engineering, Arts-

Architecture, Math) an animated time line allow to visualize the location of these pioneers over time. With this exercise, it should be possible to visualize how inclusive or conservative our universities have been, when compared with its homonyms from all over the world. When everything is done, everything is still to be done...

Keywords: gender gap, equality policies, women pioneer in engineering

RESUMEN

Al revisar los datos de inauguración de las universidades de todo el mundo, es fácil ver que el acceso ha sido muy diferente para hombres y mujeres. A veces, esta diferencia es, en muchas ocasiones, de algunas décadas, pero en algunos casos han pasado siglos entre la fecha de inauguración de la universidad y el momento en que, por primera vez, una mujer está en sus aulas. En cuanto a las pioneras de la tecnología, al compararlas con los primeros hombres de tecnología, las diferencias son mucho más notables.

Actualmente, hay hombres y mujeres en ingeniería en todo el mundo, pero los datos de población aún están lejos de ser paritarios. A partir de los datos recopilados en una encuesta sobre las primeras mujeres graduadas en STEAM (Ciencia, Tecnología, Ingeniería, Diseño-Arquitectura y Matemáticas), una línea temporal animada permite visualizar la ubicación de estas pioneras a lo largo del tiempo. Con este ejercicio, debería ser posible visualizar qué tan inclusivas o conservadoras han sido nuestras universidades, en comparación con sus homónimas de todo el mundo. Cuando todo está hecho, todo está por hacer...

Palabras clave: brecha de género, políticas de igualdad, pioneras en ingeniería

Introduction

The lack of models is closely related with the lack of vocations. The engineering models in textbooks are mostly male, that's the main reason about traditional loss of female talent, since young people surely know hundreds of engineering/technology examples in which the role play (those who explain technology, those who have created things and/or patents, those who appear in the books, those who tell the history of technology) is carried out by men (1-4).

By asking an audience of 10-12 years about what engineering is, more or less accurate answers should be get, but someone always relates engineering to patents and/or problem solving. In same scenario, by asking the name of an inventor, it is easy to get names like Edison, Guttenberg, Franklin, Zuckerberg, Gates, Jobs, etc... They will be more or less successful, but usually first name of all provided surnames it's from a man. By asking explicitly about a female inventor's name, Marie Curie will clearly be the winner (and then, it's time to expose the difference between Science and Technology¹) and a very

¹ Theodore Von Karman: "Scientists discover the world that exists; engineers create the world that never was."

common situation is about they cannot give any female name associated with a patent or technological creation.

This is happening in 2019.

In the field of games for children under 15 years old, male models are also common and this situation has been tried to regularize in last years. Thus, LEGO® has been introducing female figures in its games while other brands, such as Playmobil®, have resisted this change more, citing “commercial reasons” (Fig. 1).

Figure 1. Female characters in LEGO® and Playmobil®



5 NASA women in LEGO® characters: from left to right, Margaret Hamilton, Katharine Johnson, Sally Ride, Nancy Grace Roman y Mae Jemison¹.

Playmobil® characters created by TeatroClick as a complaint in the absence of female models in commercial games²

A case to be highlighted is TimeLine® game, consisting of an activity card set related to events, inventions or historical topics, among others, in which cards must be placed chronologically ordered. In three travel editions shown in Fig. 2, cards with human representation have been selected, and under each version, how many of the cards include an unequivocally female model/figure has been indicated. Optimal case is 5 and worst case is 0.

² <https://www.elperiodico.com/es/extra/20170302/lego-homenaje-mujeres-nasa-5871547>

³ https://www.playgroundmag.net/now/La_22668234.html

Figure 2. Female characters in 3 Timeline® card set travel editions



“Classics” edition card set, in which, from 55 cards, only 5 got female characters.

“Events” edition card set, in which, from 55 cards, only 5 got female characters.

“Invention” edition card set, in which, from 55 cards, none of them got female characters.

In this context, historical Timelines already existing in networks have been consulted, and it has been appreciated that the models are mostly male in all cases (Fig. 3).

Figure 3. Historical characters timeline

Instructions: Click on each image to reveal additional information.

					
1405	1460	1498	1559	1580	1594
					
1614	1660	1670	1730	1780	1790
					
1870	1880	1890	1903	1911	1950

Timeline proposal

By consulting www.histropedia.com website, more than 3000 Timeline based on a multitude of topics have been identified, and in between there is one based on famous scientists, mostly formed, again, by male models. (Fig. 4).

Figure 4. Timeline of Famous Scientist in which 100% of models are carried out by a man (www.histropedia.com)



This website includes a women of science Timeline, that redirects to “women in science⁴” Wikipedia, but none on women of technology (engineering, inventions, patents) has been found. Hence, in this work, SHE-TIMELINE development has been proposed, consisting on an interactive timeline in which the names women involved in science and technology history, as well as pioneers in technology, from universities around the world (first graduates, first full professors, etc.) will be showed.

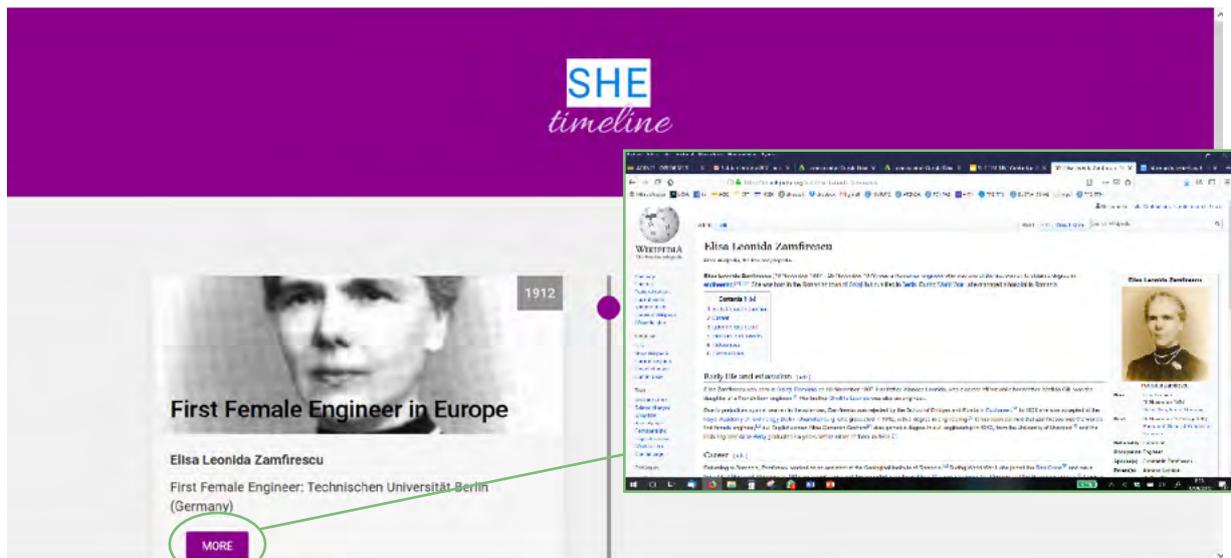
At the starting point on the search of contents, difficulty of locating that women name who should configure this SHE-TEAMLIN, by a conventional search (google, networks, even on universities websites), arises as an evidence, since many of these names are not known or published.

That is the reason why a google-form design has been considered⁵, asking about pioneers, inventors and relevant women nominated to be included in SHE-TEAMLIN, and this form would be sent to as many universities as possible, all over the world, so that they contribute to give visibility to women from their respective environments.

The form has been prepared in such a way that the results are automatically published in a digital version, so that the feedback is immediate and the results of the collaboration are appreciated immediately. In all the cases, Wikipedia link of woman character is included in timeline (Fig. 5).

⁴ https://en.wikipedia.org/wiki/Women_in_science

⁵ <https://forms.gle/yTE69ogdm8bN1GTw9>

Figure 5. SHE-TEAMLINe with link to character Wikipedia

SHE-TIMELINE's approach is to collect data collaboratively, it means, from the contributions that are incorporated by supporters from anywhere. In order to encourage participation, it is offered to give visibility to the names of the collaborators, if they adopt a role of SHE-TEAMLINe's ambassadors with different levels (bronze: if they nominate between 1 and 5 women, silver if they nominate between 6 and 10 women, gold if they nominate between 10 and 25 women, platinum if they nominate more than 25 women). They can also adopt just a collaborator role, if they prefer anonymous collaboration, without their name being recorded.

By giving visibility to these women, conveyed message is "women have ALSO been important in engineering and technology development", and "women achievements have ALSO been worth noting", even though their presence have been denied in textbooks and/or in the relationship of historical figures. With this visibility, in addition to doing justice, to attract female talent is pursued, because, until now, any girl who had an interest in a technological path could only have access to engineering from models of example and/or success mostly male (5,6).

The data published in SHE-TIMELINE can be segregated by STEAM areas, or by countries, or by other topics, and can be used for a variety of purposes, such as for study promotion activities, for gamification or for dissemination.

The main advantage of SHE-TEAMLINe's "on-line" is the possibility of women contribution increasing in real time and at any time, without the need to accumulate data for updates.

Conclusions

The historical invisibility of women of science and technology has been the main reason why many generations of women have not considered this option as a possible future life.

The subliminal message of this invisibility has been that science, and especially technology, was not suitable for women.

By rescuing the names of women who have contributed significantly to current technology, in one way or another, it provides, in addition to historical justice, a necessary visibility so that they can be part of the examples of future generations.

SHE-TEAMLINe is, in addition to a timeline, a stage from which to put a voice and a place in history that, in many cases, up to now, has been denied.

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