

STEM Quest: Inspiring Future Generations in STEM

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ABSTRACT

This paper presents STEM Quest, an educational initiative designed to inspire future generations, especially young women, to pursue careers in STEM (Science, Technology, Engineering and Mathematics). The activity combines historical insights into women pioneers in science with contemporary female role models who are increasingly visible through social media platforms such as TikTok or Instagram, thus enhancing their accessibility and appeal to younger audiences.

INTRODUCTION

Gamification in education, as highlighted by the Ministry of Education, Vocational Training and Sports blog [1], emerges as an innovative tool that transforms learning into a motivating and meaningful experience. By incorporating playful elements such as challenges and rewards, it encourages active student participation, which is especially beneficial for boosting girls' interest in STEM fields (science, technology, engineering, and mathematics). Initiatives like this connects students with female role models in science and technology, thereby fostering scientific vocations from an early age. These strategies not only enhance motivation and engagement but also help reduce the gender gap in traditionally male-dominated fields, offering girls inspiring role models and enriching educational experiences that strengthen their confidence and aspirations in the scientific domain.

The structure of STEM Quest itself is a proof of how gamification can shape learning experiences: through games like “Who did what?” and “Discover your inner scientist”, participants engage in hands-on activities that make learning about science and female role models interactive. The quiz-based approach and storytelling elements not only provide knowledge but also allow participants to reflect on their own strengths and interests in a fun and supportive environment. By leveraging modern technologies and social media, the initiative also speaks the language of today's youth, making STEM content more accessible, relatable and empowering.

CCS CONCEPTS

• Applied computing → Education • Social and professional topics
→ Gender • Human-centered computing → Interaction design

KEYWORDS

STEM, women in science, education, outreach, gamification, science communication

ACM Reference format:

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1 Who did what?

The first game, informally called “Who did what?”, uses a catchy name to attract the attention of children. It consists of a simple pairing activity that introduces participants to significant achievements by prominent women in science, serving as a starting point to learn about their impact and potential aspirations.

To engage a broader range of interests, this activity includes both historical and contemporary female figures. It is equally important to highlight women who have broken barriers in traditionally male-dominated fields, whether historical or current, and to recognize their contributions.

2 Discover your inner scientist

The second of the games proposed consists of a quiz in which, through some questions related to the different fields of STEM, the participant sees who of the relevant female role model “she is” or is the most similar to her. The functioning of the game uses a simple decision tree to, in first place, reach the investigation field that fits the most the responses the person taking the quiz (whether Science, Tech, Engineering or Mathematics) and afterwards, it divides the questions between some of the subdivisions of each field or even “emotionally” to assemble one of the female role models that can be eligible. In Figure 1 you can see a mock-up of the quiz.

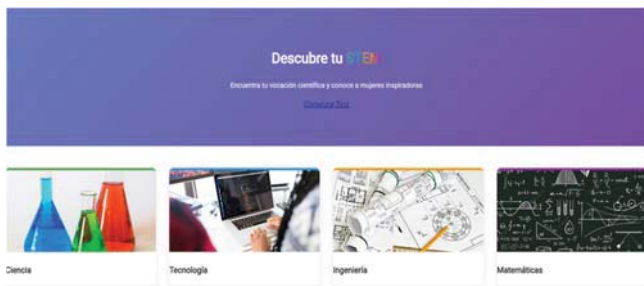


Figure 1. Preview of Discover your inner scientist web app

3 Technical resources

We developed a web-based platform using Python and modern web technologies to host both interactive games. The backend is implemented with Flask, exposing RESTful endpoints to collect and process user responses, while the frontend leverages responsive HTML, CSS, and JavaScript to render the decision tree and matching interfaces. Data from the “Who Did What” and “Discover Your Inner Scientist” activities is stored in an SQLite database and analyzed in real time to generate insights on participant preferences. Modular design ensures easy maintenance and future expansion of the platform.

4 Evaluation of the tests and further investigations

The results of both games can result highly useful not only to arrive to the future generations and teach them about these models, but also for those tasks of redirecting the movements that are being accomplished to boost the STEM fields which could be forgotten or less studied, without leaving behind the fields that are already most wanted.

Although we have not made an observational study to get to know which of the fields need more attention by the moment of writing, it is our intention to launch this initiative to some schools in the area.

However, to show what we are aiming to get with the data we made a simulation of hundreds of games played for each of the proposed. As seen in the Figure 2, science and technology have a larger success rate than the other ones, meaning that in general, nowadays kids know less about what the women of these last fields made for the world. Moreover, the results in Figure 3 show that the fields with the least frequency are the ones that less people relate with, reasons aside. With the results studied, we can observe if a change of perspective is needed to focus more on other fields or to boost ones instead of others.

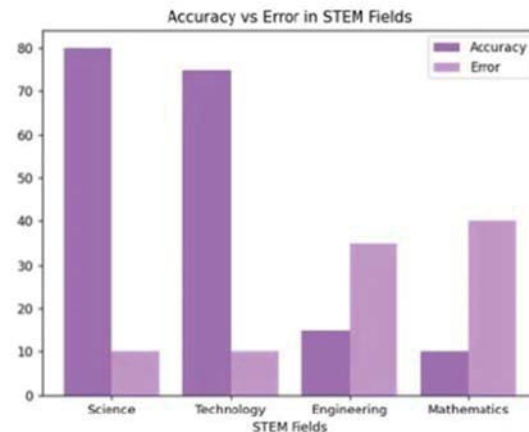


Figure 2. Success rate in Who did what? game per field

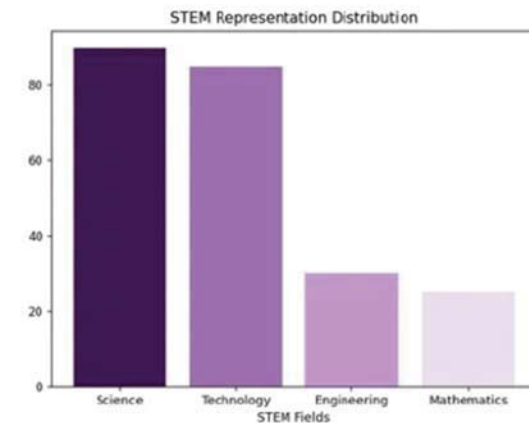


Figure 3. STEM fields frequency in Discover you inner scientist

For further incorporations in the project, we have accessed a list of 100 Spanish women important in the investigation field [2] that could be included in the options eligible.

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