

GoGirls: gender equity integrated into digital literacy

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Abstract

This paper presents the GoGirls project, which addresses gender equity in conjunction with digital literacy. The objective is to contribute to the empowerment of girls and boys in elementary school, in extension actions, through activities using Web 2.0 tools. The GoGirls website is built within the concept of learning objects, thus constituting itself as a digital tool to support education. The GoGirls website was evaluated by potential appliers of its contents in projects. The evaluation was about usability and content issues and showed promising results.

Keywords

Gender equality, digital literacy, digital tool

1. Introduction

The United Nations (UN) has created an action plan with 17 Sustainable Development Goals (SDGs) to be achieved by 2030. Among the goals outlined, gender equality is included as the 5th goal, in particular, goal 5.b. stands out. "Increase the use of basic technologies, in particular information and communication technologies, to promote women's empowerment" [1].

In the Brazilian scenario, the Brazilian Computer Society (SBC) promotes the Digital Girls program, created in 2011, whose mission is: "To awaken the interest of girls to follow a career in Information Technology and Communication" [2].

Together, these organizations, UN and SBC, converge to expand the discussion of gender equality, contributing to the recharacterization of inequalities through the use of information and communication technologies.

In this context, to contribute to the transformation of this situation, the project Heroínas Digitais offers workshops using web 2.0 tools for primary school girls, to increase the representation of women in the area of science and technology, as well as to stimulate reflection on gender equity in society [3]. The project is a partner of SBC's Digital Girls program [2], and is also aligned with target 5.b of the UN's 5 SDGs [1].

As part of the actions of the project Heroínas Digitais, the work aimed to build a website, named GoGirls, containing Learning Objects (LOs), for knowledge of web 2.0 tools, seeking


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digital literacy together with interactive activities about gender equity. Subsequently, the website was evaluated by the potential applicators of the proposed practices through a usability test.

The paper is divided as follows: section 2 describes the theoretical basis; section 3 presents the related works; section 4 exposes the applied methodology; section 5 describes the development of the website and other learning objects used; section 6 discusses the results, and section 7 presents the conclusions.

2. Theoretical Foundation

According to Alves [4], "gender equity is essentially a human right issue. But it is also a question of the development of civilizing progress". Thus, as the various actions that guide the process of recharacterization of gender inequalities for an equal society, such as the fifth objective of the UN and the Digital Girls program, this work is also an action that contributes to this conception.

Concerning gender and Information and Communication Technologies (ICTs), the work was guided by the goals, 5.b and 5.5 of UN SDG5, which describe, respectively: increasing the use of ICTs to promote women's empowerment and the need to create opportunities for women in leadership at all levels of decision-making [1].

The inequalities between men and women in Brazil can be seen from Gender Statistics, a social indicators made by the Brazilian Institute of Geography and Statistics (IBGE), which presents differences levels of occupation of women with small children, participation of women in computing graduations, occupation and unequal salaries in leadership positions, time dedicated to domestic chores, occupation in decision-making positions, etc. [5].

Digital literacy is considered in the Reference Curriculum in Technology and Computing [6] as the ability to read, write and interpret information with the use of the computer and/or digital devices, allowing the development of sociocultural practices, as well as reflections, mediated by digital resources. To enable the development of digital literacy, web 2.0 technology can be used, as pointed out by Machado [7]. Machado describes that web 2.0 has a set of characteristics that make the sites and services of the new generation of Internet simple and easy to use.

In addition to supporting the learning process of this technology, digital resources are used that directly interfere with learning, called Learning Objects (LOs) [8]. Examples of LOs are images, videos, hypertexts, simulations, software, among others, in instructional situations.

In this way, this work uses a website, called GoGirls, to organize gender equity activities together with the teaching of web 2.0 tools, in the form of LOs, which, in an integrated way, seek digital literacy and girls' empowerment.

3. Related Work

The works briefly described in this section contribute to elucidate the academic productions in these areas, aiming to produce a consistent website, resulting in a production adapted and singular.

In the study of Marchão [9] the goal was to promote gender equality for preschool children. The applied action research method allowed the development of the process adapted to the

context in question. Thus, the authors claim that, based on knowledge of the concepts of gender equality in the environment, it was possible to adequately characterize some ideas associated with stereotypes.

Balieiro and collaborators describe that promoting the knowledge of digital tools and digitally including women through digital literacy, consequently makes them empowered [10]. The authors use the concept of digital literacy described by Soares [11], "a certain state or condition that acquires those who appropriate the new digital technology and exercise reading and writing practices on the screen" and thus relate digital literacy as a form of empowerment.

Still, Araújo [12] performs a study that aims to justify the convergence of the concept of digital literacy and the web 2.0, concluding with the argument of d'Andréa [13], that the joint use of these, favors the formation of an individual able to position her/himself about the daily situations mediated by the computer. Finally, Velloso [14] performs a record of the process of using a web 2.0 interface to provide digital literacy skills in a public school.

The selected papers were important to outline the objective of this work. Thus, the present study brings together the interventional activities of gender equity in school, digital literacy through web 2.0 tools in elementary school, and through these, aiming to achieve female empowerment. All these aspects are gathered in a website in a linear way, containing learning objects for teaching web 2.0 tools and the activities to be performed with them.

4. Methodology

For the development of the GoGirls website and its LOs, the INTERA (Intelligence, Educational Technologies, and Accessible Resources) methodology, was considered appropriate, as it is based on software development processes and the ADDIE model for developing digital content used for learning, regardless of size, granularity, and complexity [15].

INTERA has 4 components: phases, roles, stages, and artifacts. The phases are defined by the delivery of part of the LO, usually sequentially, subdivided into initial, intermediate, and transition. The roles refer to the description of people's functions (content designer, etc.) within the project. The artifacts are all types of data, from documents to source codes, generated in the development that contains information. And finally, the stages are a set of activities that are related temporally. The steps, illustrated in Figure 01, of the methodology, are subdivided into:

- **Contextualization:** performs the search for all necessary information for developing the LO, being defined the target audience, learning objective, teaching modality, application scenarios, etc.
- **Requirements:** a survey of expectations regarding the LO, and the technical and pedagogical characteristics.
- **Architecture:** from the requirements analysis it is generated the outline of the LO. At this stage, the technologies and standards suitable for development are also defined.
- **Development:** the LO and all reuse components, user guide, installation manual, etc. are developed. In addition, also, the copyright definition.
- **Testing and quality:** validation of technical characteristics and part of the pedagogical characteristics, and quality check.

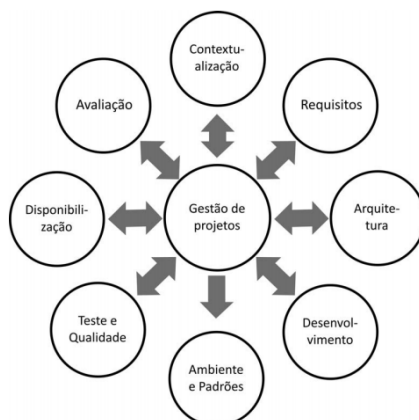


Figure 1: Stages of the INTERA methodology. Source: [15].

- **Availability:** the LO is made available with all the necessary access documents for its use. Usually, it is made available in a repository.
- **Evaluation:** the application of the LO in the instructional context for which it was developed, whose main objective is to evaluate learning.
- **Project management:** coordinates and monitors the development of all stages, the costs involved, the people, and the established schedule.
- **Environment and standards:** control of the development environment of the LO.

Each step above is divided into 3 elements: inputs (information and/or artifacts), practices (techniques in the area of computing and/or education), and outputs (information and/or artifacts generated).

5. Production

In this section, the development of the learning objects constituting the GoGirls website is described, considering the steps of the INTERA methodology: contextualization, requirements, architecture, development, testing and quality, availability, evaluation, project management, and environment and standards. The last two stages without subsections that describe them, because they are part of the other stages analogously, as well as, the availability that is integrated with the development stage.

5.1. Background and Requirements

Firstly it was performed the steps of contextualization and requirements. Thus, the result of the development of this study is intended only for participants of projects similar to the project Heroínas Digitais, which deal with gender in the classroom, partners or not of the Digital Girls program of the SBC, with basic computer knowledge that allows the development and guidance of activities with a computer. Regarding the implementation of the work, we opted for an explanatory site that aims to assist implementers in their projects, which integrate the

gender equality theme. This choice aims to allow the site not to require significant hardware requirements, being able to run on equipment without many resources available. In addition, to provide free access, favoring interaction and collaboration, Google drive was adopted as a web 2.0 tool.

As part of the learning objectives and pedagogical techniques, an exploratory search was conducted for pedagogical materials that addressed the topic of gender equity or equality. Based on this search, the site was divided into three modules: vocational choices, representativeness in leadership and equity, and ICTs.

A second exploratory search was conducted in which consistent documents with well-defined pedagogical activities were located. Thus, the result of this search was the Guide of Citizenship and Gender 3rd cycle [16], a gender curriculum for high school students, prepared by the initiative Valente Não Violento [17]. This initiative is coordinated by UN Women [18], which contribute with lesson plans on gender inequalities in society, whose objective of this study is to stimulate the change of attitudes and behaviors emphasizing the need to establish equality between women and men. Finally, the support booklet entitled Gender Education in Childhood [19], prepared by the initiative of *Plan International* [20], a non-governmental organization, focused on promoting gender equality. These materials were chosen because of their well-defined practices and adaptive possibility for activities using the computer to meet the learning objective of gender equity and digital literacy.

5.2. Architecture

After the definition of the contextualization and requirements, from the set of activities and plans of the pedagogical sources selected, the 06 activities were constituted, within the 03 corresponding modules, as described below:

Module 01 - Vocational Choices: Use of Labels and Women in Society.

Module 02 - Representativeness in Leadership: Career in the Labor Market and Leadership Skills.

Module 03 - Equity and ICTs: Internet Security and Online Ads.

The GoGirls website, where the distribution of the learning objects is made, is built using WordPress version 5.5.4 with the Astra theme, and a set of free plugins.

To define the technical characteristics that correspond to the learning objectives regarding digital literacy, the google drive tool was chosen. The google tool drive has a set of tools with various functions, which allow collaboration, these being: document editor, presentation editor, forms, and others that support learning, in addition to cloud storage. Thus within the set of tools available on google and that make up google drive, were chosen:

Google Gmail: free email service for communication via asynchronous messaging, among other integrated services. Through this, you can access Drive by creating an individual account.

Google Drive: 15 GB data storage, management, and sharing of files with various formats;

Google Documents: creates and edits text documents in the browser. Edit them collaboratively, with automatic saving.

Google Presentations: creates and edits slide presentations. And it has the same possibility of collaborative editing and saving as editing documents.

Google Forms: create custom forms for surveys and questionnaires, with automatically generated data.

After the steps defined above, the Architecture step determined the types of LOs: hypertexts and videos, which are gathered and made available by the GoGirls website. The hypertexts correspond to the explanatory part of the themes, objectives, and activities. The videos are the explanation of the use of the tool and the activity related to the chosen themes about gender equity. In addition, it was defined the navigation map as shown in Figure 2:

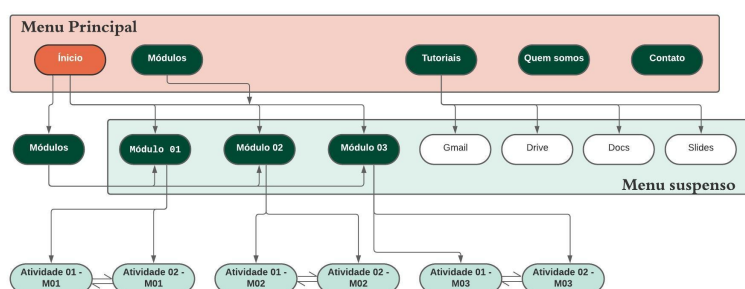


Figure 2: Navigation Map of the GoGirls website.

5.3. Development

In the development stage, relevant adaptations were made based on lesson plan 05 of the Valente Não Violento initiative [17], activities from the Citizenship and Gender Guide 3rd Cycle [16] and also activities from the Plan International activity booklet *Plan International* [20]. For each activity elaborated, the following fields were defined: name of the activity, objectives, tools, materials and suggested time. The activities are described in detail and support materials are available in videos, slides and documents. The description of how the activities should be conducted is divided into parts to facilitate communicability.

Figure 3 shows the *Home* page of the site, with some small explanatory hypertexts to introduce the topics covered and generate interest in the content. This *Home* page contains direct buttons to the activity modules and also to the *Modules* page, which has the conceptualization of gender equality and equity, a brief explanation of what the modules are, who they are for, and how to apply them.

In addition, for the site, was developed a logotype, as part of its visual identity, as shown in Figure 4. In the menu, it contains the items: *Home*, *Modules*, *Tutorials*, *About Us*, and *Contact*. The item *Modules* has a drop-down menu with 3 items that lead to the other 3 pages of modules 1, 2, and 3. Similarly, the *Tutorials* item has a drop-down item with tutorials 1, 2, 3, and 4, about Gmail, Drive, Documents, and Presentations, respectively.

For all modules, the same information and buttons layout was used, according to Figure 5, besides free illustrations from icons8.com. The footer contains the copyright of the page, the personal website address of the main author, the website address of the research group, from which the work originates, and the reference address of the illustrations used.

On the tutorial pages, the OBS studio (obsproject.com/pt-br/download) tool were used to



Figure 3: GoGirls website home screen.



Figure 4: Logotype created for the site.



Figure 5: Representation of the Modules, exemplified by Module 01.

record the explanatory videos, which were then uploaded to the YouTube streaming platform account of the research group.

On the *About Us* page, the Heroínas Digitais project is described, partner of the Digital Girls program of the SBC. which coordinates the GoGirls site, and the Ponte group, to which the project belongs. The *Contact* page consists of a form with required fields: name, surname, e-mail, institution or company, subject and description.

The availability of the site is active at the domain: <https://gogirls.ponteducacional.com.br/>

5.4. Testing and quality

In this stage, it was evaluated the technical characteristics of usability and content of the website. For such, it was prepared a form that brings together a set of 16 questions. In addition, there were 5 questions for identification of the evaluators and another 4 open-ended opinionated questions.

To evaluate usability, 9 questions were included:

1. If you have performed the tasks on both devices: the site is responsive, i.e. it suits different devices.
2. The site has good readability, i.e. it is easy to read.
3. No specific knowledge about any subject is required to use the site.
4. I was able to find what I was looking for without difficulty.
5. I was able to find a means of contact without difficulty.
6. The site has a pleasant interface.
7. The site is self-descriptive, meaning that the information contained informs the purpose of the site.
8. The site presented normal behavior, without any unexpected behavior while performing any task.
9. I felt satisfied in performing the tasks on the site.

For evaluation of usability issues, a set of tasks were listed to be performed from the provision of site access:

- Read the home page and then go to the 'Modules' page.
- From the 'Modules' page, go to activity 02 - Module 01.
- Access activity 01, from Module 03.
- From some activities, access some tutorials.
- Search for another tutorial.
- Read the 'About Us' page.
- Send us a message using the form on the 'Contact' page.
- If you have run the tasks on a desktop/notebook, run them again (if possible) on a smartphone/tablet.

To understand perspectives related to the content, 7 questions were composed:

1. I know the 5th SDG (Sustainable Development Goal) - Gender equality.
2. The work contributes to the gender equality objective of the 5th SDG
3. The chosen topics of the modules are relevant.
4. The Format (Module, Activities and Tutorials) is consistent with the proposal of the site.
5. The google content in tutorial form is relevant and necessary.
6. I would use it in the project (Digital Girls Program partner) in which I participate.
7. I would recommend the site to someone.

The open-ended opinionated questions, which aim to contribute to the improvement of the website, were:

1. Have you ever known any similar work for the web? If yes, which one?
2. Did you experience any difficulty in understanding what is being proposed in any activity?
If yes, which ones?
3. Have you encountered any problems with the site? If so, please report it here.
4. Let's get better! Suggestions for site improvement? Share them with us.

5.5. Evaluation

The evaluation, which consists of the application of the LOs in an instructional context, carried out in face-to-face workshops in a school. Due to the global pandemic of coronavirus, this step was not performed. However, it is a proposal to be considered in future works, due to its importance to corroborate the objective of the developed website.

6. Results

The results correspond to the testing stage and have the purpose of validating the technical characteristics and part of the content characteristics. Thus, it was assembled a form with an evaluation of the questions contained through the Likert scale from 1 to 5 in agreement, being 1, I totally disagree and 5, I totally agree, with exposed statements. The online form obtained a total of 16 responses. Of which 93,7% of respondents are linked to a Higher Education Institution and 6,3% to an educational group. Regarding the role played, 43,8% are teachers and 56,3% are students. Of these, 31,3% are part of a partner project of the Digital Girls program of SBC. In terms of geographical space of origin of the participants in Brazil, 43,8% were from the South region, 18,7% from the Southeast region, 12,5% for the Midwest and Northeast regions, each. In addition, 6,3% of the participants are from Spain, and the same percentage for an undefined location.

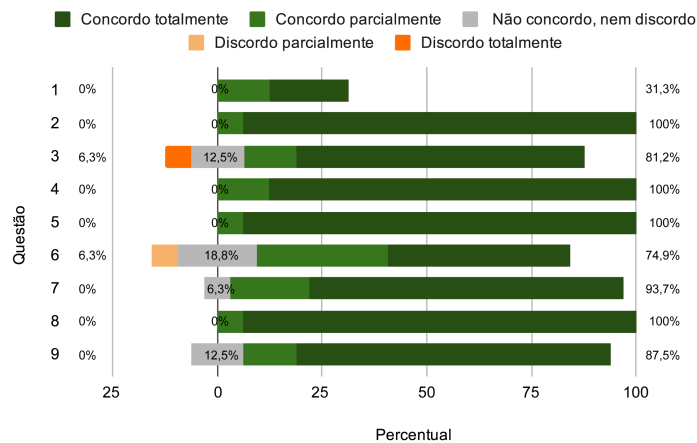


Figure 6: Result of the evaluation of the 9 questions associated with usability.

Figure 6 illustrates the responses associated with usability. It can be observed that 31.3% who used devices of different screen proportions, answered the first question about the responsiveness of the site with 100% agreement. In questions 2, 4, 5, and 8, about readability, ease, contact information, and expected behaviors, respectively, obtained 100% agreement. In questions 3, 6, 7, and 9, which correspond to specific knowledge, interface, description of information, and satisfaction, respectively, obtained 81.2%, 74.9%, 93.7%, and 87.5% of agreement and disagreement in 3 and 6, with 6.3% each. Thus, according to the answers provided by the participants, one can conclude that the website has adequate usability for use.

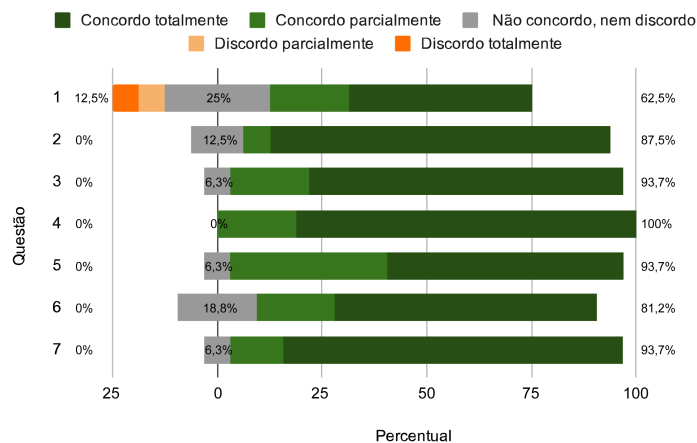


Figure 7: Result of the evaluation of the 7 questions associated with the content.

In Figure 7, whose representation is associated with the website content, in question 1, there was 62.5% of agreement regarding the knowledge of the 5th UN goal, gender equality, and 12.5% responded in disagreement with it. In questions 2 and 6, corresponding to the contribution of the work aligned to that objective of question 1 and on the potential use of the site, it was obtained 87.5% and 81.2%, respectively. About the coherence of the format in Module, activities, and tutorials, in question 4, it was obtained 100% of agreement. In questions 3, 5, and 7, about the relevance of the themes, tutorials in google video, and a potential indication of the site for other people, it was obtained an equal agreement of 93.7%, each, in the answers. Thus, it can be concluded that from the participants' answers, the content has positive relevance.

Question 6 about the use in partner projects of the Digital Girls program of which the participants of the questionnaire participate, the percentage of agreement (in green on the graph), does not correspond to the percentage of participants who said they participate in partner projects, 31.3%. Thus, hypothetically, the responses in agreement in question 6 may be associated with the use of the site in any projects, not necessarily partner, or the future use in any other projects.

In the responses of open-ended opinionated questions, in question 1, about knowledge of similar work, all responses were negative. In questions 2 and 3, about difficulties in understanding the activities and potential problems in the website, most participants answered "No". About the videos in the tutorial, the following comment stands out: "The video of Tutorial 2 presents the instructor's voice without quality. Could re-record. Use translation into Brazilian Sign Language, if the institution has a translator would be interesting." which will be considered in future updates.

In addition, in the last question in which it is asked about possible suggestions for improvement, two answers that stood out, about the use of 'G', referring to Google, on the home page in the lower background in a repeated manner, mentioned: "(...)for me the less information the better, cause if there is a lot of things calling the attention I lose the focus, I have ADHD (Attention deficit hyperactivity disorder) (...)", was also updated, according to the suggestions.

And the other about the definition of gender stated: "I think it is important to put a definition of gender as a category of social representation. This way we avoid the frequent misunderstanding of confusing gender with biological sex", this suggestion will be considered in the inclusion of work in multidisciplinary groups to broaden the view of the meaning of gender in society.

7. Conclusions

According to the participants of the testing stage, the work can be considered relevant to be applied in an instructional context, as materials that help participants of projects that work with women and computing. It is noteworthy that the GoGirls website aims to contribute socially to gender issues in society.

As future works, it is intended to evaluate GoGirls with students in a school, as soon as possible. Finally, it is important to conceive that the website can and must be constantly updated to meet the objectives for which it was created. The proposal for future works is that the site updates are made from a multidisciplinary research group, contemplating different areas and making relevant provocations for the project evolution.

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