A Web-based Tool for Supporting the Management of Outreach Projects and Programs in the University: A Group-based Expert Walkthrough Evaluation

Igor Dalepiane[1], Lucas Fell[1], Matheus Fialho[1],
Aline Mello[1], Fábio Basso[1], Maicon Bernardino[1]

[1]Laboratory of Empirical Studies in Software Engineering (LESSE)
Universidade Federal do Pampa (UNIPAMPA)
Avenida Tiarajú, 810, Bairro Ibirapuitã – 97546-550 – Alegrete – RS – Brazil

{lucasafell, igordalepiane, matheuslf25}@gmail.com,
{alinemello, fabiobasso}@unipampa.edu.br, bernardino@acm.org

***Abstract.** Due to Resolution Nº 7 of 2018 by the National Council of Education (CNE) of Brazil, outreach curricularization is mandatory since 2023. This study aims to evaluate the usability of our tool, which is designed to support the management of academic outreach activities, projects and programs. A Group-based Expert Walkthrough was conducted with potential users from our university's academic community. The goal is present our proposal web-based tool as well as how we evaluating the usability in our tool, while allowing subjects to offer suggestions for improvements and new ideas. Valuable qualitative feedback was obtained, guiding the development of the tool, prioritizing and validating requirements. The usability evaluation provided insights to enhance the tool's learnability and user-friendliness for the academic community.*

1. Introduction

According to Resolution Nº 7/2018 of the National Council of Education (CNE) [CNE 2018], integrating outreach activities into the curriculum became mandatory starting in 2023. This requires all undergraduate courses in Higher Education Institutions (HEIs) to allocate at least 10% of their curriculum's workload to outreach activities. HEIs offer a variety of options for students to engage in external environments and participate in outreach initiatives. Additionally, the [CNE 2018] stipulates that HEIs had up to three years from the document's publication date to implement these requirements. We define an **Outreach Activity (OA)** as an action that integrates the curriculum and research organization, creating an interdisciplinary, political, educational, cultural, scientific, and technological space. It fosters the development and use of knowledge in constant coordination with teaching and research, transforming the HEI's interaction with society.

There are five (5) different modalities for OAs [CNE 2018]: (i) **Program**: a set of actions with medium to long-term deadlines focused on a single objective; (ii) **Project**: associated with a Program, with a clear objective and a defined duration; (iii) **Course and Workshop**: a short-term formative activity; (iv) **Event**: an action with a well-defined artistic, cultural, and scientific character and duration, and; (v) **Service Provision**: an activity or contract performed by third parties (community, company, among others) that is characterized by intangibility, inseparability of process/product, and does not result in the ownership of a tangible good.

In the context of our HEI, the Outreach Coordinator is responsible for preparing and disseminating a semester report detailing the outreach activities performed, validating the OAs, and evaluating the formative nature of the students' participation. The student is responsible for requesting validation of the hours spent on OAs from the academic secretariat. Additionally, it's the professor's role to approve the enrollment of any student expressing interest in an OA with available spots. The process of incorporating the new OAs into the curriculum will be mandatory to be implemented by HEIs in Brazil starting from 2023 [CNE 2018]. However, the program or project coordinators and team members often lack ICT resources or software to support their execution, resulting in manual management in most cases. Consequently, several issues have been identified with this manual method, which can be easily addressed by including a web-based tool to assist in the management process of outreach programs and projects.

This implies that coordinators have to handle everything personally, including elaborating a project, submitting and authorizing it, sending emails, and creating registration forms to make the OAs available for students to participate in and eventually earn their participation certificates. Given the numerous emails students receive from the HEI every day, it is possible for one or more opportunities to go unnoticed. Overall, the process is not optimized and requires a significant amount of time and effort to be completed and controlled properly. As such a valuable resource, it needs to be handled with extreme caution. Currently, there is no solution to meet all the requirements for generating and managing outreach programs and projects, which is why time is driving this initiative.

In this context, this study aims to develop a web-based tool to support the management process of OAs in outreach programs and projects. For this purpose, the following objectives have been defined for this study: (i) Create a working **Minimum Viable Product (MVP)** of the system which implements at first the most critical collected and refined requirements for the system to become usable by early users to provide feedback for the product's further development [Lenarduzzi and Taibi 2016]; (ii) Conduct a **Group-based Expert Walkthrough** [Pan and Mitchell 2020] study to evaluate the software usability, and gain a better understanding of the needs of the target users; (iii) Analyze the results obtained based on meaningful insights based on user experience in the learnability and ease to use. The study's main contribution is a web application MVP that automates and supports the OA process in HEIs. This evaluation enables a rich exchange of ideas and exploration of diverse viewpoints. Therefore, this usability evaluation aims to improve our solution's learnability and ease of use for the academic community.

This study is organized as follows: Section 2 describes the technical issues and design decisions about the proposed solution. Section 3 describes how the study was evaluated and discusses the analysis of the collected results. Finally, Section 5 presents the final considerations of the study and future work.

2. The Proposed Web-based Tool

In this section, we present the technical aspects of Software Engineering (SE) used in our software development process.

2.1. Requirements Engineering

This sections aims to present in more detail how the requirements were collected and refined throughout the study. There were two (2) steps to the requirements elicitation

stage. The first batch is the result of the **Gray Literature (GL)** [Garousi et al. 2019] systematic review[1]. Our goals for conducting this Gray Literature review were: (i) To find free tools that support outreach management; (ii) To identify features in existing tools; (iii) To validate ideas for features and data to be used in our solution. GL revealed a total of 12 tools and 37 features that were found in the Google search engine. The results were used as a baseline to provide our preliminary requirements list. The second refinement of the requirements was applied after analyzing the **Survey** [Kasunic 2005] results[2]. The survey was responded by 123 subjects among students, professors and Education Administrative Technicians (EAT). We submitted our preliminary requirements list for prioritizing and validating them. Besides, we collect new Software Requirements (SRs) and ideas to guide our software development process. In total, twenty-eight (28) Functional Requirements (FRs) were defined prior to the planning and execution of the survey. [Clarkson and Eckert 2005] explain that FR have the purpose to establish the behavior between inputs and outputs that characterizes a system's or component's function. These requirements were created after analyzing other tools found during the gray literature review, which had similar scope to the system being developed. Out of these requirements, six (6) of them were ruled out for now after discussions among authors, due to some of them being too complex for an MVP or simply out of scope. The remaining twenty-two (22) were prioritized based on what was considered most critical for the application MVP. Software requirements present the list of SR mentioned in the Survey Study Questionnaire, which is presented in Table 1. The columns Must, Should, Could, Won't summarize the values obtained from the scale of MoSCoW method. Besides, to prioritize their relevance, each SR was assigned an Average Rate (AR) that varies between Fibonnaci sequence numbers. Hence, AR is calculated as:

$$AR = (((5 * M) + (3 * S) + (2 * C) + (1 * W))/\Sigma(M, S, C, W)) \qquad (1)$$

where M, S, C, and W are the relative frequencies of using the rates Must Have, Should Have, Could Have, and Won't Have, respectively. In the analysis of the data collected, it is possible to elicit new SR since we had an open question giving the subjects of the study the freedom to indicate new possible functionalities not previously listed in the questionnaire. Figure 1(a) depicts the first 14 FRs and Figure 1(b) the remaining eight. Hence, Table 1 presents the first 22 FRs.

As part of the development process, we track the progress of each functional requirement in our tool. To better visualize and understand the current "Status" of these requirements, we use a three-symbol system represented in Table 1. The full circle ● represents that a functional requirement has been fully implemented in the tool. The half circle ◐ symbolizes that the functional requirement has been partially implemented. Lastly, the empty circle ○ indicates that the functional requirement has not yet been implemented.

In the context of our tool, partial implementation refers to the scenario where the requirement has been addressed, but is not completely functional or integrated into the application. The reasons for partial implementation of a requirement can vary and are explained individually as follows: **FR10:** We created a repository and external page for system functionalities and FAQs, but many features remain undocumented, marking the

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[1]Gray Literature: `https://doi.org/10.5281/zenodo.8098553`

[2]Survey: `https://doi.org/10.5281/zenodo.7931976`
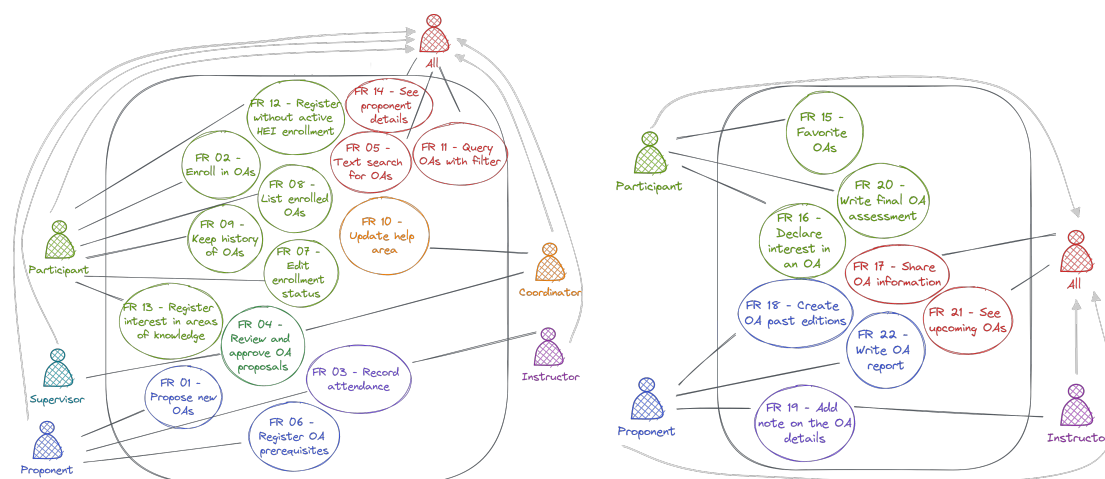
(a) User Roles on the First 14 FRs.

(b) User Roles on the Last 8 FRs.

Figure 1. Use case diagrams of the proposed tool

Table 1. Validation and prioritization of evaluated FRs.

ID	Requirement	Must	Should	Could	Won't	AR	Status
FR01	Suggest new OAs	29	8	1	3	4.2439	●
FR02	Allow OA registrations	38	31	10	1	3.8000	●
FR03	Record participant attendance	26	12	1	2	4.1463	●
FR04	Analyze and approve OA proposals	11	22	5	1	3.3846	●
FR05	OA search by text	54	26	2	0	4.2927	●
FR06	Register prerequisites for OA	8	14	13	6	2.7805	●
FR07	Edit OA registration status	44	28	9	1	3.9390	●
FR08	List OAs user is registered to	53	20	7	2	4.1585	●
FR09	Maintain OA participation history	53	20	7	2	4.1585	●
FR10	Help area (FAQs, manuals)	44	31	6	1	3.9756	◑
FR11	Consult OAs with filters	54	26	2	0	4.2927	●
FR12	Register external users	14	15	26	27	2.3659	●
FR13	Register interest in knowledge areas	47	22	9	4	3.9390	○
FR14	Show proponent details	10	21	6	4	3.1463	●
FR15	OA favorites list	39	28	12	3	3.7317	○
FR16	Declare interest in an AE	47	25	9	1	4.0122	○
FR17	Share OA information	27	33	15	7	3.3049	◑
FR18	History of past OA versions	18	13	8	2	3.5854	○
FR19	Professor annotations in the OA's details	9	22	8	2	3.1463	●
FR20	OA feedback by the enrolled user	20	27	22	13	2.9024	●
FR21	Detailed OAs schedule	46	25	8	3	3.9512	●
FR22	Pre-fill OA final report	12	15	11	3	3.1707	○

Legend: ○: Not Developed | ◑: Partially Developed | ●: Fully Developed

Help Area as partially implemented; **FR17:** Users can currently share OA information by copying links. This is partially implemented, with plans to add direct sharing buttons for social media and messaging apps to streamline the process.

During this stage of development, the non-implemented FRs were given lower priority as they were deemed non-essential to the core features of the tool. The intricate nature of our application, with its multitude of business rules, made it challenging to implement every feature within the given timeframe. Consequently, we made the strategic decision to concentrate our efforts on refining and optimizing the key features that provide the greatest value to users. In future updates, we intend to address these non-implemented FRs to further enhance the tool's functionality and expand its capabilities.

2.2. User Roles

We designed the web-based tool with multiple user roles, or actors, in mind, including the back-end service. According to [Fowler et al. 2020], an actor's UML designates a function performed by a user or any other system that interacts with the subject. In our case, we refer to these actors as users. This necessity was identified early on, as the OA ecosystem in HEIs involves many actors. The roles are as follows: **Participant**: A listener who enrolls to passively participate in the activity; **Instructor**: A speaker who presents or teaches something to participants; **Proponent**: The individual, usually a professor, who proposes the OA; **Coordinator**: The role responsible for reviewing and approving proposed activities for a campus; **Supervisor**: Typically not involved in the process, but can monitor the system as a whole, accessing OAs across multiple *campi*.

2.3. Design Decisions

The decisions made regarding the development of the goal product are discussed here.

DD1. **Programming Language**: We chose TypeScript (TS) for its extensive tool and technology ecosystem. It enhances JavaScript, a dynamic language, by introducing type enforcement, which increases robustness and predictability [Bierman et al. 2014];

DD2. **Software Architecture**: We evolved the tool's architecture to meet changing technological requirements. Originally built with NextJS and React, it has now transitioned to Svelte and SvelteKit. This approach improves dependency management, code sharing, and testing [Borel 2020]. While React offers reusability and simplification, it relies on Client Side Rendering (CSR), which can have limitations such as security risks and longer page load times [Doyle and Lopes 2008, Thakkar 2020]. In contrast, Svelte compiles components into efficient imperative code, resulting in faster load times and a simplified development process [Harris 2020]. The adoption of SvelteKit also enables Server Side Rendering (SSR), enhancing performance and supporting users without JavaScript [Kaplan 2022]. We migrated to Svelte and SvelteKit due to their simpler syntax, development efficiency, and alignment with our objectives. To facilitate communication between front-end and back-end servers, we utilized Type-safe Remote Procedure Calls (TRPC), enhancing type safety and system reliability [Hellström 2022].

DD3. **Multiple Languages**: The application will support multiple languages, starting with Portuguese and English. While the immediate focus is on serving the local Portuguese-speaking community, considering this aspect from the beginning will save time in the future if the software expands globally [Reynolds 2020].

2.4. Software Snapshot

In this section, we present a visual depiction of the our proposed tool through two of its primary interfaces. The screenshot (Figure 2) represents the Activity Listing Page. This interface allows users to browse various activities available on the platform. It includes a text search feature for finding specific activities and a filter for refined browsing. The activities are shown in a card layout, exhibiting the most crucial details about each activity. Additionally, the Activity Listing Page allows various actions, such as enrolling

Figure 2. Activity Listing Page

in an activity, managing subscriptions, or accessing more in-depth information about a particular activity.

The second screenshot, which can be seen in Figure 3, showcases the My Activities Page, which is partitioned into three tabs for different purposes. The first tab caters to the pending reviews for newly proposed activities. The second tab displays the activities proposed by the user, and the third tab highlights the activities in which the user is enrolled. Each tab is designed to present essential information in a streamlined manner for efficiency. These interfaces not only underscore the tool's functionality and ease of use but also reflect the meticulous attention to detail and user-centric design approach followed in ExtensiPro[3]'s development.

3. Usability Evaluation

In this section, we describe the individuals involved, the objectives pursued, the location and timing of the usability evaluation, as well as the results behind its performance.

3.1. Protocol

We conducted the evaluation using the "Group-based Expert Walkthrough" methodology [Følstad 2007]. This methodology involved creating realistic usage scenarios of the tool that were executed by the experts, who in this case were the subjects of the action research [Mills 2014]. It's worth highlighting that we decided to choose this usability evaluation method after analyzing a large repository of UX and Usability methods based on **Exp**erience **Res**earch **So**ciety [EXPRESSO 2023]. Due to space limitations, we made the other instruments of the study protocol available in the open repository[4].

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[3]ExtensiPro: https://extensipro.com/

[4]Group-based Expert Walkthrough: https://doi.org/10.5281/zenodo.8128672

Figure 3. My Activities Page

We have invited subjects who fulfill primarily two roles: (i) **Coordinator of Outreach Programs and Projects**: (1) Create new outreach programs and projects; (2) Review, suspend, reject, and approve proposed outreach activities for your projects; (3) Create activities within your own projects without undergoing the review process; (4) Approve or reject new professors in the tool. (ii) **Applicant/Potential Participant**: (1) Register for proposed outreach activities; (2) Propose new activities for the available programs and projects at your university on the platform; (3) Manage attendance in your activities; (4) Receive completion certificates for eligible activities.

During the execution of these scenarios, the experts identified and discussed potential usability issues. It should be noted that this was not an individual usability test in the traditional sense, where the user is observed while using the system. Instead, it was a group discussion where experts navigated the system together through different scenarios.

The scenarios were used as a guide to ensure that all important parts of the system were explored and that the evaluation was effective. After the execution of each scenario, feedback was collected through a questionnaire and documented for future analysis. Preconfigured user accounts were provided at the beginning of the evaluation to match each user's role in the tool. No demo of the tool was provided prior to the evaluation. This gave us insights into the current workflows of the tool and allowed us to identify areas for improvement for the users. Next, the scenarios (Table 2) to be executed by each subject were listed, divided by the roles. Each scenario had a maximum time of 5 minutes to be completed, plus an additional 5 minutes for the subject to answer the evaluation questions about the scenario, totaling 10 minutes per scenario.

The Program and Project Coordinator role executed the initial seven (7) scenarios, while the Applicant/Potential Participant role executed the subsequent scenarios in the following order: SC1, SC8, SC9, SC5, SC6, and SC7. During the evaluation sessions, we asked the subjects to interact with the tool as they would normally in their respective

Table 2. Scenarios

ID	Scenario (Related FRs)
SC1.	**First Access**: Access the platform with the provided user account and navigate through it to familiarize yourself with its functions and features. Identify where you can view or edit your profile settings.
SC2.	**Creating a Program and a Project**: Register a new program and then a project within this program.
SC3.	**Reviewing a Proposed Activity**: Find and review pending activities, and choose to approve, reject, or request changes. (**FR04, FR07**)
SC4.	**Approving a Fellow Professor**: Find and approve the registration request of another professor.
SC5.	**Creating an Activity**: Register a new activity within your project or another professor's project. (**FR01, FR06, FR14, FR21**)
SC6.	**Managing Registrations in Your Activity**: Review registrations for your activity and approve or reject relevant ones. (**FR07**)
SC7.	**Managing Attendance in Your Activity**: Record and monitor participant attendance in your ongoing activity. (**FR03**)
SC8.	**Registering for an Activity**: Explore and join activities by registering as a participant. (**FR02, FR08, FR09**)
SC9.	**Removing Registration from an Activity**: Remove your registration from an activity if needed. (**FR07, FR08**)

roles. They were instructed to pay attention to the tool's functionality, ease of use, and whether it met their needs. We encouraged them to take note of any issues encountered and provide suggestions for improving the tool. At the beginning of the evaluation, we provided pre-configured user accounts corresponding to their respective roles in the tool. Additionally, we were available to assist them at any time if needed.

We evaluated the questionnaire based on the following criteria (Table 3):

Table 3. Questions per Scenario

Criteria	Question
Ease of Use	Was this scenario easy to complete? If not, what aspects were difficult or confusing?
Consistency	Was the interface consistent throughout the scenario? If not, which parts were inconsistent?
Satisfaction	How satisfied would you feel performing this scenario in a real situation? What could enhance your satisfaction?
Feedback	Did the system provide sufficient and timely feedback during the scenario execution?
Improvements	What changes would you suggest to improve the user experience in this scenario?

After all the scenarios had been completed, a group discussion session was held. Each subject was kindly asked to share their answers and experiences. Particular interest was given to hearing about the challenges they encountered and any suggestions they had. This step was essential for the group-based expert walkthrough method [Følstad 2007], as it allowed for an exchange of perspectives among the experts. During this stage, subjects were encouraged to explore the tool in any way they wanted, even uncovering points that were not covered during the scenario execution. Before concluding the session, an objective form was provided to each subject to individually fill out, containing questions about the usability and functionalities provided by the system.

3.2. Execution

The evaluation was divided into 4 sections:

Session 1: It was dedicated to Program and Project Coordinators, mainly professors. Initially, three professors participated in this session. However, due to technical issues, one professor had to leave before completing all the scenarios, and therefore, they did not complete the questionnaire; This session lasted for 122 minutes and was conducted on 06/19/2023;

Session 2: It was a private session with only one professor in attendance. The session lasted for 89 minutes and was conducted on 06/19/2023;

Session 3: Another private session was held with only one professor participating. The session lasted for 66 minutes and was conducted on 06/20/2023;

Session 4: It was designed for Applicant/Potential Participant subjects, namely students. For this session, we had four subjects. The session lasted for 93 minutes and was conducted on 06/21/2023.

In total, 8 subjects participated, consisting of 4 professors and 4 students. All sessions were conducted remotely and recorded using Google Meet. Prior to the evaluation, the potential subjects were asked to provide their availability, and based on that, the researchers sent invitations considering the best schedule for the majority. It is worth highlighting that the subjects were invited for their convenience.

3.3. Result Analysis

This section presents the results from the data collected in thematic qualitative analysis.

3.3.1. Qualitative Analysis

Table 4 summarizes some statistics related to the responses to the open-ended question, including the number of students who invited and answered, and the size of their responses. While some subjects were concise in their comments, others provided more detailed and elaborate answers. The average response size was 275.15 words per scenario. For qualitative analysis, we used the QAnubis tool developed by our research group.

Table 4. Basic statistics of subjects' responses.

# Number of people invited	12
# Number of responses	8
σ Total number of words	3577
μ Average number of words per response	447.12
μ Average number of words per scenario	275.15
> Number of words in longest response	151
< Number of words in shortest response	1

Table 5. Statistics related to the codes and quotes.

# Number of coded quotes	355
# Number of positive coded quotes	287
# Number of negative coded quotes	68
# Number of codes	16
# Number of themes	7
μ Average number quotes per code	22.18

Besides, Table 5 presents a summary of relevant quantities related to the conducted thematic analysis. A coded quote is a sentence or part of a sentence containing a clear idea that can be attributed to a specific code. During the analysis of subjects' responses, we identified a total of 355 coded quotes. We identified 16 codes, and grouped them into 7 themes. Figure 4 presents the identified code and themes tree. Highlights for the themes Usability and Improvements that received 117 and 73 quotes each. The former is distributed in User Interface (66), Intuitiveness (30) and Navigation (21) codes. The latter is spread out into Existing Features (59) and New Features (14).

In our quote analysis, it is noteworthy that the subjects were identified by their role C (Coordinator) and A (Applicant). Therefore, we emphasize a selection of significant quotes related to each theme, outlined below:

(i) **Critiques**: This theme details the issues, bugs, or difficulties users encountered while using the tool, pointing out areas where it doesn't meet expectations or fails to perform optimally. **C3.** pointed out that "*errors in the form are not notified to the user*". **A3.** felt that error messages were not detailed enough, noting that "*it told me that an error occurred, but it didn't tell me what the error was*";
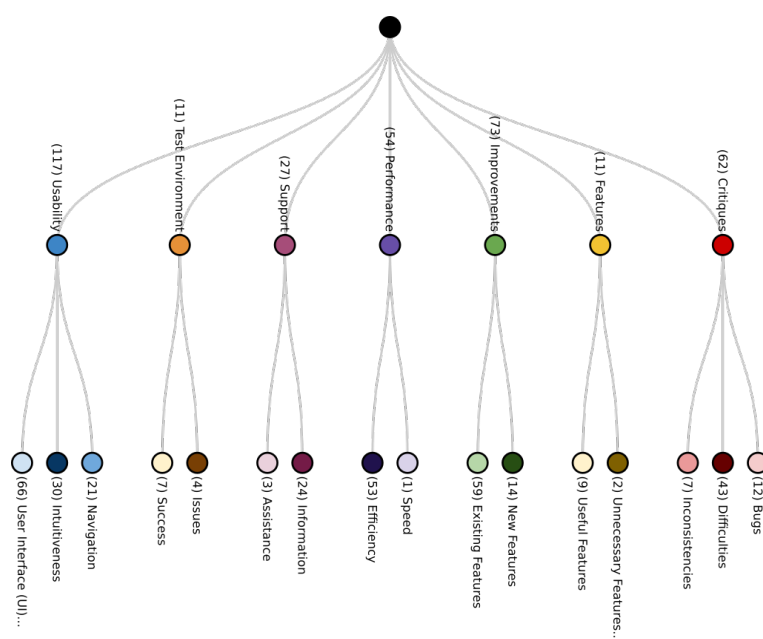
Figure 4. Code and themes tree generated.

(ii) **Features**: This theme encompasses feedback on specific features of the tool, such as opinions on their functionality, usefulness, or redundancy. **A1.** appreciated the button's hover effect, stating, "*Yes, the hover on the button made it easier to know it was clickable and not just a decorative element*". **C2.** found value in the instant status updates, commenting, "*Yes. Immediate status update. This is very important.*";

(iii) **Improvements**: This theme refers to feedback where users provide suggestions for improving the tool. This could be enhancements to existing features or ideas for new functionalities. **C1.** recommended changes in the UI for data entry, suggesting, "*Change the location of the entry for this information. I suggest placing a button on the main screen. I don't think it's very intuitive inside the user icon. Perhaps the entry could be inside the activity box itself*". **A4.** mentioned improving feedback for mandatory fields, expressing, "*The feedback for mandatory fields could always be next to the fields*";

(iv) **Performance**: This theme encompasses comments concerning the speed, efficiency, and overall performance of the tool. **C3.** found the registration process simple and appreciated the follow-up options presented in a popup, noting, "*It was easy to register, and the popup with the three options for the sequence of the activity made things easier*".

(v) **Support**: This theme covers comments on the quality of user support, customer service, instructional documentation, and feedback associated with the tool. **C3.** proposed an enhancement to the support feature, suggesting, "*A chatbot could add a lot to more intuitive people as well.*" **A1.** felt that the system provided adequate feedback, stating, "*Yes, the system provided sufficient feedback.*"

(vi) **Test Environment**: This theme refers to the environment or conditions under which the tool was tested and evaluated. **A2.** appreciated the welcoming nature of the organizers, noting, "*I quite liked it, the organizers were very receptive.*" **C1.** found the experience interesting but lengthy, suggesting possible improvements

for efficiency, expressing, "*It was interesting, but long-winded. To work in sync, it is necessary to wait for the slowest. Perhaps the number of scenarios could be reduced to speed up*";

(vii) **Usability**: This theme refers to how user-friendly the product is. It includes feedback about the product's ease of use, intuitiveness, and whether the features and functionalities are easy to learn and understand. **A4.** suggested some UI changes for a more intuitive experience, noting, "*The access button to the activities seems just like text, it could be changed to a button with an icon or make it like the access button to my info. The color of the texts in Activities/Details could be clearer.*" **C2.** found the functionality easy to navigate and saw multiple ways to complete tasks, stating, "*It was easy. I had two ways to reach the functionality. Exploratively, it is possible to conclude the scenario.*"

Finally, we showcase a word cloud depicting the most frequently cited words by students in their responses, accompanied by the assigned codes. The word cloud, displayed in Figure 5, embodies a Folksonomy [Xu et al. 2008], wherein notable terms such as "botão", "atividade(s)", "fácil", "poderia", among others, are emphasized.
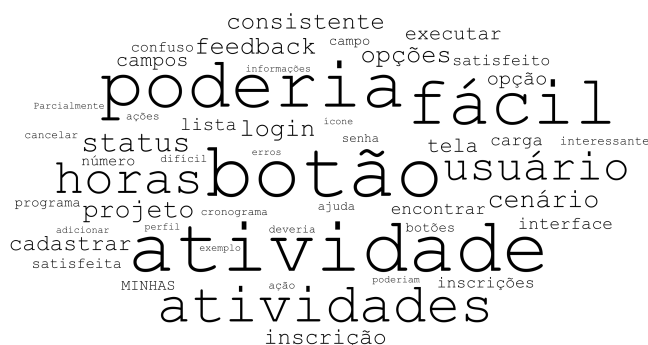

Figure 5. Folksonomy [Xu et al. 2008]: Quotes Word Cloud.

3.3.2. Discussion

During the evaluation phase, user feedback highlighted key areas for potential enhancement and optimization of our tool. Feedback ranged from minor adjustments in interface aesthetics to significant modifications in the tool's structure and functionalities. Users emphasized the importance of intuitive design elements, improved visibility, and easier access to critical features. It became clear that certain pages required a complete redesign to enhance user interactions and increase productivity. Suggestions were also made to relocate data entry points for better accessibility and improve color contrasts for a more intuitive visual experience. Moving forward, these insights will shape the tool's development roadmap, with an immediate focus on addressing interface and usability improvements for a more intuitive and user-friendly experience. Additionally, efforts will be directed toward enhancing feedback mechanisms and support features to ensure effective tool navigation and utilization. Continuous monitoring and optimization based on ongoing user feedback will further enhance the tool's performance, aiming to exceed user expectations and provide a productive and satisfying user experience.

4. Related Work

In our research, we have identified two relevant works in the literature.

The study by Farias *et al.* (2014) aim to enhance the evaluation of classroom subjects by investigating student performance and participation in projects. Emphasizing the significance of extension programs, this research bridges the gap between theoretical knowledge and practical implementation in programming and prototype development.

Similarly, Balbino and Anacleto (2012) combine theoretical insights with technological advancements to explore the use of online social networks in educational practices. It introduces Contagious, a tool that provides guidelines for constructing online social networks aimed at innovating educational approaches.

These studies are relevant to our work by highlighting the importance of extending educational practices beyond traditional classrooms and exploring innovative methodologies. They contribute practical implementations that align with evolving educational needs. However, unlike our proposal, which aims to support and automate the management of outreach activities, assisting coordinators in meeting program demands and focusing more on community engagement, these studies do not specifically address the comprehensive management needs of outreach programs and projects.

5. Final Remarks

The Group-based Expert Walkthrough Evaluation proved invaluable in evaluating our tool, providing fresh expert perspectives on its usability and revealing both strengths and weaknesses. The questionnaire served as a robust feedback mechanism, highlighting areas for improvement. This dual perspective from experts and users provided comprehensive insights into the user experience.

The experience also taught us the value of diverse insights in refining the tool. Expert input was crucial for optimal performance, while student insights offered a unique perspective from potential participants. We also learned the importance of managing group meetings effectively to minimize distractions and ensure focused discussions during evaluations. These findings have shaped the evolution of our tool, emphasizing the significance of impartial assessments and the need for a structured approach when coordinating larger groups.

The feedback and insights obtained during this process will play a crucial role in shaping our future development plans. We will prioritize enhancing usability and user experience based on the valuable suggestions received. Additionally, maintaining ongoing engagement with both expert and user groups will guide us in making iterative improvements to the tool. By leveraging this learning, we aim to transform the tool into a valuable asset for all users, refining its strengths and addressing identified weaknesses. Moreover, the knowledge gained from this experience will inform our approach to user engagement and product development in future endeavors.

For future work, our intention is to adopt an iterative and incremental software development process aimed at continuously delivering new features. Once we achieve a stable version incorporating a core set of features (MVP), our plan is to conduct qualitative and exploratory research through multiple case studies to validate our tool's effectiveness in managing diverse outreach projects and activities.

Data Availability

We are committed to promoting transparency and reproducibility in research. Following this commitment, we provide all the data supporting the findings of our study, which are openly available on Zenodo at `https://doi.org/10.5281/zenodo.8128672`.

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