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La Independiente: an AI-enhanced Platform Co-Designed with Latin-American Crowd-Workers

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Abstract
Crowd-work has increased significantly in recent years, particularly among women from Latin America. However, the specific needs and characteristics of this workforce have not been studied nearly enough. For this reason, we have conducted a series of surveys, questionnaires, and design sessions directly with Latin-American users of crowd-working platforms. Our aim was to create a system to empower crowd-workers with AI enhanced tools for their day-to-day tasks. As a result, we created a customized platform, "La Independiente", and two web plugins. This project is unique in that it leverages gender perspective methodologies, AI powered-systems, and public policy analysis to design smart tools that are both professionally useful and culturally relevant.

Keywords:
Co-Design; Generative AI; Latin American workforce; Latin American women

1 Introduction
As studies have shown, Latin American workers, and specially women, make up a large portion of crowd-working platforms [7]. Despite the growth of this workforce, their necessities and experiences remain unnoticed. Potential support systems have also been overlooked. Research has been made on how to improve their productivity [6], but it is also necessary that we study who they are or how to best provide them support.

In order to address this knowledge gap, we carried out a comprehensive study, including surveys and participatory design sessions. This research has allowed us to gain in-depth insights into their preferences, needs, and the challenges they face. Two web plugins and a personalized platform, "La Independiente", were then designed. Our goal was to address the needs of these workers, and to empower them through tools that leverage generative artificial intelligence (AI). We identified, for example, that crafting personal narratives and developing a support community were essential for Latin American crowd-workers. Therefore, one of our smart tools facilitates creating a job profile that aligns with their personal narrative, while the platform itself fosters the development of a community that shares experiences and knowledge.

Specifically, La Independiente uses a conversational assistant and a recommendation system for two purposes: to provide job profiles that match the user's query, and to offer information related to crowd-working experiences that others have shared on the platform. As for the web plug-ins, the first one enables the creation of comprehensive and culturally relevant job profiles through generative AI. The second is a multilingual virtual coach that prepares workers for their client interviews, and also utilizes AI.

La Independiente and the web plug-ins are tools aimed at assisting Latin American crowd-workers in developing their technical and interpersonal skills. What makes them unique is a horizontal approach that highlights their cultural background. They emerge from direct research and communication with said workers: they are the ones who identify their needs and co-design the AI-based tools. Thus, this research brings light on the people that power crowd-working platforms and proposes a participatory approach to designing culturally relevant technological instruments.

2 Related Work
Before conceiving La Independiente, the team carried out a survey on Tolaka, a global crowd source platform, in order to gain insight into the characteristics of Latin American crowd-workers [3]. The survey was comprised of 60 questions in Spanish and was answered by 60 participants from 12 countries. The results showed that working from home with a flexible schedule was invaluable to respondents, since the majority were women who also had caregiver responsibilities. The desire for a tool to assist them in their tasks was shared by most. Fully understanding the activities

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that they had to perform was also key, and 63% of participants expressed that they relied on translating applications. Therefore, language was identified as a major challenge in their activities. Finally, it was found that establishing a network with peers was vital, since sharing experiences could help workers complete their tasks successfully. It was these findings that led to the creation of a platform to support Latin American crowd-workers.

One aspect that must not go unnoticed is that this research is inspired and guided by feminist theory. As the previous survey revealed, most Latin American crowd-workers were women with family responsibilities, who turned to crowd-working in the hopes of achieving financial independence. It can be said then, following D'Ignazio and Klein [4], that this research is feminist in content, for it addresses the experiences and issues women face. But it is also feminist in process because by establishing direct rapport with Latin American crowd-workers, it advocates for a production of knowledge that is both participatory and inclusive.

3 Formative Studies

Once the idea to create an AI-enhanced platform to support crowd-workers was developed, the team decided to carry out a participatory design study. Its aim was to find the specific preferences and requirements of Latin American crowd-workers in relation to generative AI tools, in particular, ones that could provide them support in their tasks. In order to perform this part of the research, crowd-workers were engaged through Upwork. Participants were selected taking into account the possibility of being displaced by generative AI due to the nature of their work, e.g., content writing, translation, or data entry.

The next stage consisted of collecting essential background information of participants, including previous gig work experiences, and familiarity with generative AI. In order to ensure crowd-workers were aware of the capabilities of this technology, a comprehensive explanation was provided. We used ChatGPT as an example. Participatory design sessions then followed. Our aim was to let crowd-workers express their own needs, and then conceive ways in which generative AI could assist them in their tasks. Therefore, participants were only presented with a series of prompts, and then encouraged to contribute with at least one idea. A hands-off approach to the design session contributed to a creative and collaborative environment, thus allowing participants to generate their own ideas and insights independently.

4 Design Principles

The results of the previous survey, along with the participatory design session, revealed Latin American crowd-workers' desire for a digital platform to assist them in their daily tasks. They coincided that this platform should facilitate connectivity with peers, and provide intelligent assistants to enhance client interactions, as well as offer task guidance. Such a platform, they agreed, would nurture their professional development.

Based on our findings on the characteristics and needs of Latin American crowd-workers, three main features for a system were proposed. First, it should allow interaction in both Spanish and English. Crowd-workers stated that they spent much time understanding and translating instructions; thus, being able to use their first language would reduce working hours and simplify their tasks. Secondly, the platform should help them produce comprehensive work profiles that showed their strengths and experiences, but that also resonated with their culture and personal history. This feature is essential due to the major role storytelling and cultural identity have in Latin America. According to Bruner, the act of telling our lives involves the same cognitive process used when creating narratives [1]. That is to say, when we communicate what we call "our life", we are actually selecting, ordering, and interpreting a portion of the events that happened in our lives in order to craft our life stories. We believe generative AI can help crowd-workers to generate a personal narrative that is both professionally useful and culturally meaningful.

Thirdly, the platform should enable the creation of a community where crowd-workers can learn about the experiences of others, obtain support, and build a professional network. Community building is another key characteristic deeply ingrained in Latin American culture. By linking it to crowd-working, it might be able transform impersonal and segmented tasks into a shared effort involving many people in contact, and thus, modify the nature of work. In this way, the emphasis on enabling and fostering communication between workers has the potential to transform crowd-working into *community* crowd-working. Reflecting on the needs and practices of Latin American crowd-workers could then contribute to modify the way crowd-work in general is performed and understood.

5 System

As previously mentioned, our studies led us to the creation of a platform, La Independiente, and two web plugins. The first one is an AI-enhanced personal branding web plugin that creates attractive work-related bios around the values and aspirations of Latin American crowd-workers. After filling a form with their strengths and work experience, the web plugin generates a biography that workers can easily copy and paste onto their online profiles or share with clients. The team utilized the OpenAI GTP-4 API, providing it with a specific prompt: "Compose a biography about a crowd-worker reflecting the following tone: [here we insert the tone specified by the user on the interface]. As our previous research showed us, Latin American crowd-workers seek to enrich their online profiles with unique and culturally resonant biographies. For them, crafting work profiles that reflect their technical and soft skills, as well as their individuality and cultural identity is essential. Thus, the purpose of this web plugin is to empower crowd-workers by helping them fulfill a working need in a culturally relevant fashion.

The second tool we created is a client communication management web plugin that introduces a virtual coach powered by generative AI. It is designed to support workers in their client interviews. It also features multilingual capabilities to accommodate the region's various languages. In order to reduce the stress and uncertainty associated with interviews, this web plugin helps users create effective prompts for the AI. Client interviews directly affect crowd-workers' professional success. This tool aims to assist them in this key aspect of their work while fostering effective communication.

Finally, La Independiente platform collects information crowd-workers wish to share about their technical skills, soft skills, interests in collaborative work sites, along with their crowd-work related experiences. It then employs a conversational assistant to provide recommendations regarding the users' interests. This way, the platform is capable, for example, of finding and presenting suitable working profiles for a specific task. Based on the crowd-working experiences data, it can also offer recommendations on how to perform certain tasks, or how to improve communication with clients. Next, we will address some technical details about the platform's operation.

5.1 Database

Based on the type of information the platform will receive in order to make use of a conversational assistant, an initial data base schema was proposed. The main header of the database contains all the data related to the users, including personal information. Three fields correspond to technical skills, soft skills, and platforms of interest that users may indicate when registering, and the last one is used to estimate the time users would spend using the platform in general. Any comments that users make on the platform regarding different crowd-work sites will be stored in the database, along with their evaluations of other people's comments. Finally, there is a field for the overall evaluation of the platform, which will be considered as user feedback.

5.2 Recommendation System

A recommender system gathers user data and auto-analyzes it to generate suggestions tailored to the user's needs. Two types of recommendation systems are generally used: the first one is based on "Content Filtering," and the second one on "Collaborative Filtering". A content-based recommendation system relies on the similarity between elements to make suggestions. For example, if a user is looking for a new movie to watch, the system will carry out the search process for options similar to those that the user has already seen before. In a broad sense, collaborative filtering is the process of categorizing information or patterns using techniques involving collaboration among multiple conversational assistants, viewpoints, data sources, etc. Based on the structure developed for the database, the team opted for a Content Filtering recommendation system.

The main problem of any recommendation system arises during its launch stage: the absence of data, also known as cold start. Despite not having an initial dataset on which algorithms could be tested, surveys were conducted with female users of the Toloka platform. The first survey involved workers indicating their soft skills, technical skills, and crowd-work platforms of interest. Each worker provided three responses for each of the topics. Questionnaires were also conducted in order to obtain data that would be very similar to the one presented on the platform. Around 100 Tolaka users from Latin America helped in this stage of the platform design. The second survey asked users to provide comments on the last four tasks they had completed on Toloka or any other crowd-work platform. Users were given total freedom to write their comments. However, the team reviewed the content of said comments to validate the provided information, and to make sure that users were capable of understanding our needs in both surveys.

With the data from the surveys, the team carried on with the algorithms' design. They were also divided into two parts, so that the conversational algorithm focused on one, and then carried out the database search process. In this way, the response can be more accurate and reduce the time required for data analysis. Considering the platform will provide the necessary information for processing the data with the algorithms, they were designed to filter content. As a result, the content relates to the potential request or search of any user with the most accurate response possible. In case that the content being searched focuses on the skills and interests of other users, the conversational assistant may provide more than just one response, relating the search to three possible responses that are relevant to the search.

The overall processing of all information consists of transforming written language into numeric language, which is the basis of Natural Language Processing (NLP). This allows for the use of comparison or similarity techniques. In the numeric representation called vectors, the simplest way to determine similarity is by obtaining the angle formed by the vectors being compared. A value very close to one means they are very similar.

In case the conversational assistant receives a request related to a skill or person working on a platform, the algorithm will only take information from the corresponding part of the database, and then give an output to the request. The data from the first completed survey is the one used as a reference for training the model. In this stage of the conversational assistant development, the results obtained from processing the data from the first survey with the model we developed have been favorable. As mentioned before, the response presents three candidates that are most similar to what is entered as a request.

If the conversational assistant receives a request that needs information on how to perform a task or whether there is a task of a certain type on any platform, the system continues to filter the content. In this case, the relevant information is retrieved from the database consisting of comments from crowd-work platforms. This data was gathered through the questionnaire regarding the opinions of tasks performed by users on these platforms. However, the vast majority of comments only refer to Toloka, which is where the survey was conducted.

Since there are two paths the conversational assistant can take, the process of receiving a request should be able to identify the model to be selected and provide a valid answer. Nevertheless, if the request made to the conversational assistant does not correspond to any of the designed models, the conversational assistant must be able to indicate that it does not have the information to provide a specific recommendation.

5.3 Conversational Assistant

For the development of the question classification model, 2000 questions were used. They were obtained through the third task carried out by users on the Toloka platform. These 2000 questions or possible requisitions were then reviewed and labeled, such that each one could be categorized into one of three categories. The first category corresponds to the search or request for information on user characteristics, the second one to the search for information related to crowd-work platforms, and the third one to questions related to other common information. For the last case, the answer provided is generated with the help of the ChatGPT model. In order to obtain the classification model of the conversational assistant, a procedure that handles two main components was performed. The first component corresponds to Natural Language Processing (NLP). The second component consists of a Support Vector Machine (SVM) classifier, which handles each of the categories for the set of 2000 questions or requisitions. To obtain the final model, the data set was divided into a training set and a test set. To test the platform, the team used an AWS service with the following characteristics:

- EC2 (Elastic Compute Cloud) instance type T for processes due to alterations in usage demand.
- A server with a Linux platform and Ubuntu distribution.
- A CPU with 4 cores and 4 virtual cores for each core.
- A RAM memory of 16 GB.

6 Cognitive Walkthrough

As an essential part of our research on crowd-workers, we also organized an event, the Crowd-work Platforms Forum: Policy Perspectives from a Feminist Design. Its objective was to bring together decision makers, policy makers, and experts from diverse

sectors to share their insights into integrating gender perspective into crowd-work. As our studies showed, most Latin American crowd-workers are women who also have caregiver responsibilities. For this reason, we strived to create a platform for knowledge exchange, collaboration, and the development of inclusive policy recommendations that promote equal opportunities, fair treatment, and empowerment for crowd-workers.

With the assistance of a Consultant in Gender Perspective Methodologies, it was decided to conduct a two-day hour event through virtual channels with six activities:

- Workshop 1: "Bridging the Gender Gap in the Gig Economy: Integrating a Gender Perspective in Crowd-work Platform Policies".
- Workshop 2: "Breaking the Silicon Ceiling: Feminist Perspectives on Research and Policy in Tech".
- Panel: "Designing tools with and for crowd-workers".
- Panel: "Towards a Fairer Future of Work: Integrating Gender Perspectives in Crowd-Work Platforms".
- Session: "Experiences towards Gendering Tech Research and Policy".

The forum was held on July 26 and 27, 2023, from 10 am to 1:30 pm Mexico City time. The first day had an attendance of 40 people, and the second of 26. The event was also broadcast live on YouTube.

Three main issues were identified: pay inequity, discrimination on crowd-work platforms, and underrepresentation. In regards to the first one, women are often paid less than their male counterparts for similar tasks. Indeed, studies have shown that on platforms such as Amazon Mechanical Turk, women earn on average less than men for equivalent tasks [5]. Secondly, women face additional challenges on crowd-work platforms, for example, harassment and sexist comments [2]. Finally, women are unrepresented in science, technology, engineering and mathematics (STEM) fields. According to UNESCOS's 2017 report [8], less than 30% of word's science and technology researchers are women.

Based on these findings, public policy recommendations for platforms were given. In order to achieve gender equity in task remuneration, it is necessary to conduct periodic salary reviews. Clear information on how each task is paid must also be included in order to reach transparency in remuneration. In regards to harassment, robust systems for workers to report harassment situations should be established. It is essential as well to provide clear guidelines on what is considered harassment. Generating mini-courses for clients as a requirement to join platforms with awareness-raising content on equity and respect for all women workers can also be implemented. In relation to promotion and representation, it is recommended to establish mentoring programs that connect workers with successful female mentors in the sector, generating support and mentoring networks. Benefits for employers who hire and promote equitably could also be offered, including fee discounts. In this way, platforms could reduce the fees they charge employers for posting jobs or completing transactions as long as they maintain a track record of inclusive hiring. Similarly, employers that practice fair hiring could receive badges or certifications that are displayed on their profiles.

These policies seek to address the issues women crowd-workers face in their day to day activities. However, transparency, accountability and inclusion can bring positive change not only to women, but to everybody involved in crowd-working platforms.

7 Discussion and Further Work

After the successful implementation of the proposed work plan for the prototype phase, the team has decided to continue the project into the pilot stage. La Independiente will move to production under the oversight of Universidad Nacional Autónoma de México (UNAM) and Northeastern Civic AI Lab.

Some key aspects for further scalability of the platform have already been identified, the first one being accessibility. Accessibility guidelines mainly encompass four areas: perceivability, comprehensibility, operability, and robustness. In the prototype phase of the platform, accessibility design techniques cover the most basic requirements for content management, and thus generally comply with accessibility guidelines. For the production stage, it will be important to include such guidelines for all components of the platform.

Another main point is related to synthetic data. A cold-start for the database and model development implies that the conversational assistant requires constant use and feedback from crowd-workers to provide meaningful and accurate answers. At the prototype stage, platform development was informed by crowd-workers. However, registration to the platform will be available for the production phase.

Content moderation could also be implemented. There is now complete freedom for users to post any content on the community section. It will be important to include a process to review said content, and only then, approve it for publication. Similarly, verification of user information could be tackled. Data users provide in the registration process is not verified. Furthermore, the prototype lacks a system to indicate whether information given is valid or not.

Finally, it is still possible to improve the algorithms. Around 2000 sample questions were used to train the question classification model. Thus, the platform could be used to record all questions that will be provided by users, and then employ them to improve this model. Secondly, the information search model in the "communities" section assesses the entire table corresponding to user comments in the database. If the information contained here greatly increases, it will be necessary to divide the type of search in order to achieve shorter search times. Having identified these challenges will allow the team to achieve scalability of the platform in a more efficient manner.

8 Conclusion

After identifying a significant knowledge gap concerning Latin American crowd-workers, the team conducted studies to understand their characteristics and needs. Our aim was to find ways in which generative AI could assist them in their day to day tasks. As a result of our research, a platform and two web plugins were co-designed with crowd-workers, and a prototype was built. These tools facilitate their work by means of generative AI, but they achieve this objective by also being culturally meaningful. Indeed, La Independiente and the two web plugins are work-supporting tools that address the preferences and needs of Latin American crowd-workers, such as crafting personal narratives or building a community. In this way, a much more significant integration of AI was reached, for the tools resonate with crowd-workers at a deeply meaningful level.

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