Let's Brainstorm: Personalized Chatbot Prototype as Creativity Partner in Idea Crowdsourcing Platforms

Sana Hassan Imam[1,2] and Rolf Drechsler[1,3]

[1]Institute of Computer Science, University of Bremen, Germany
[2]Faculty of Business Studies and Economics, University of Bremen, Germany
[3]Cyber-Physical Systems, DFKI GmbH, Germany

Abstract

Crowdsourcing platforms have become a powerful tool for generating innovative ideas by harnessing the collective intelligence of a diverse set of individuals. However, these platforms often lack the motivation to stimulate creative thinking and guide users through the idea generation process. To address the limitations of current crowdsourcing platforms, this paper introduces the "Creativity Partner" chatbot. This intelligent tool leverages a deep understanding of user contributions and the specific challenges of crowdsourcing campaigns. The Creativity Partner empowers users to generate novel and impactful ideas by acting as a collaborative guide. It achieves this not by offering direct solutions, but by posing targeted prompts and stimulating questions. The chatbot provides relevant feedback to enhance the creative process. Furthermore, the Creativity Partner determines the "idea creativity score" based on factors like novelty, feasibility, and diversity. This score serves as a springboard for further innovation. Instead of limiting creativity with direct suggestions, the chatbot offers targeted brainstorming prompts designed to elevate users' scores. Our research demonstrates that through iterative use of these prompts, users achieve demonstrably more creative ideas. This approach benefits both users, who experience a boost in creativity, and platform managers, who gain access to potentially high-impact ideas that might otherwise be overlooked. Ultimately, the Creativity Partner fosters a more engaging and successful crowdsourcing environment.

Keywords:*User Creativity, Chatbot "Creativity Partner" , Generative AI, Idea Crowdsourcing platform*

1 Introduction

Idea crowdsourcing platforms enable virtual interaction, knowledge sharing, problem-solving, and value co-creation (De Vreede et al., 2013). The innovation process comprises idea generation, evaluation and selection. The idea generation phase includes problem identification, research, brainstorming, and aligning the solutions with design thinking principles. The idea generation is the core of the innovation process and requires significant human creativity (Joosten et al., 2024).

Theoratical Background: Idea crowdsourcing platforms hold immense potential for unlocking users' creativity. Research by (Wairimu, 2020) highlights the role of "cognitive development" within these platforms. By facilitating interaction and exchange of ideas, users build on each other's knowledge, fostering novel and valuable solutions. This collaborative aspect can be further enhanced through platform design that encourages user engagement and feedback (Z. Zhao, 2019). Ultimately, by harnessing the collective intelligence and creativity of a diverse crowd, idea crowdsourcing platforms can become powerful tools for driving innovation.

Creativity is a complex, multi-faceted concept and hard to define and measure (Oppenlaender et al., 2020). Research typically differentiates between H-creativity (Big-C), which involves historically significant contributions, and P-creativity, which focuses on everyday individual insights (Kilgour, 2007). Kaufman and Beghetto's four C model (Kaufman & Beghetto, 2009) expands this to include Pro-C (professional creativity), little-c (everyday creativity), and mini-c (individual learning). Most definitions emphasize originality and effectiveness, often linked to divergent thinking, which involves generating novel and useful ideas. Determining the creativity of a user involves assessing the uniqueness, diversity, and feasibility of his ideas (Puryear & Lamb, 2020). The uniqueness of an idea refers to the idea's originality (Acar et al., 2017), diversity explores how many different perspectives or multiple solutions a user can provide (Torrance, 1966), and feasibility of the idea refers to the practical value of an idea in solving a problem or achieving a specific goal (Amabile, 2018).

Psychometric creativity tests measure a subjects creative potential and can be classified into tests of divergent thinking (e.g., the Alternate Uses test (Guildford et al., 1978)) and convergent thinking (e.g., the Remote Associates test (Mednick & Mednick, 1971)). To assess creativity, we adopted the the Alternate Uses Task (AUT) model with a slight variation (Ashkinaze et al., 2024). The AUT challenges users to find diverse uses for everyday objects, evaluating their *divergent thinking through fluency, flexibility, originality, and elaboration.* Based on the findings of Alternate Uses Task (AUT) (Ashkinaze et al., 2024), we adopted parameters with a slight variation such as fluency and flexibility in divergent thinking named as diversity, originality as novelty, and elaboration as feasibility aligning with the core tenets of the AUT model.

Research Gap: Traditional idea-generation methods may limit human creativity as people tend to gravitate towards familiar solutions (Joosten et al., 2024). Exploring novel and practical ideas requires significant human creativity. Enhancing the users' creativity is an imperative need for idea crowdsourcing platforms. However, creativity is a complex phenomenon to measure in such platforms. Current methodologies for assessing creativity often rely on subjective evaluations, which can introduce bias and inconsistency (Simonton, 2007). Moreover, there is a gap in research on objective metrics that can reliably quantify creative outputs in a crowdsourcing context (Y. Zhao & Zhu, 2014). While some studies have attempted to incorporate algorithmic approaches to gauge creativity, these efforts are still in earlier stages and lack robust validation (Rafner, 2021). Additionally, the interplay between user interface design and creativity enhancement in crowdsourcing platforms remains under-explored, suggesting a critical gap in understanding how digital environments can be optimized to foster innovative thinking (à Campo et al., 2019). Addressing these gaps is essential to develop more effective tools and frameworks that not only capture but also stimulate creative potential in diverse user groups. This research gap helps us to formulate the following research question.

Research question: How can user interface design and objective metrics be combined within idea crowdsourcing platforms to effectively assess and stimulate creative contributions from users?

To answer this question, we proposed a holistic generative AI approach that in the first step calculates the uniqueness, diversity, and feasibility of user's ideas to evaluate individual users' creativity. Using the calculated scores, the second step creates prompt designs aimed at stimulating and enhancing users' creativity to iteratively refine and improve their idea quality. We suggest a prompt design approach instead of direct suggestions to encourage human creativity and prevent dependency on AI.

Key insights and Contributions: Overcoming the challenge of fostering users creativity and guiding them through the idea generation process in idea crowdsourcing platforms requires tools that not only encourage idea generation but also empower users to refine and develop their concepts. This paper introduces the Creativity Partner, a novel conversational AI tool designed to assist users within idea crowdsourcing platforms. The Creativity Partner leverages natural language processing (NLP) techniques and the capabilities of OpenAI's gpt-3.5-turbo model to provide users with personalized feedback and suggestions throughout the idea generation process.

The Creativity Partner operates on the premise that effective idea development requires a multi-faceted approach. It goes beyond simply evaluating the originality of an idea. Instead, it analyzes user-submitted concepts based on three key aspects: novelty, feasibility, and diversity. Novelty refers to the idea's uniqueness compared to existing solutions. Feasibility assesses the idea's potential for implementation with current resources and technology. Finally, diversity measures how the idea differentiates itself from other submissions related to the same innovation call, promoting a broader range of potential solutions.

By providing users with scores and tailored suggestions for improvement on these three dimensions, the Creativity Partner aims to fosters a more comprehensive and iterative approach to idea generation. Furthermore, the Creativity Partner's user-friendly conversational interface can facilitates a dynamic and collaborative brainstorming experience. Users can engage in a back-and-forth dialogue, seeking clarification on feedback, providing additional details about their idea, or reformulating their concept based on the suggestions received. This continuous interaction can empower users to refine their ideas and unlock their full creative potential within the idea crowdsourcing platform.

Prototype Testing: This research is a prototype testing and will investigate the effectiveness of the Creativity Partner in boosting user creativity within idea crowdsourcing platforms. We will analyze how the Creativity Partners functionalities, particularly its multi-faceted idea evaluation and interactive conversational interface, contribute to the development of stronger and more impactful ideas. In the next phases, we plan to conduct comprehensive user testing sessions involving diverse participant groups to ensure a wide range of feedback and perspectives. These sessions will include both qualitative and quantitative assessments to measure the Creativity Partner's

impact on various creativity metrics, such as fluency, flexibility, originality, and practicality. Additionally, we will explore the long-term effects of repeated interactions with the Creativity Partner on users' creative capabilities. Future research will also investigate the adaptability of the Creativity Partner to different domains and contexts within crowdsourcing platforms, examining its potential to support specialized creative tasks. By refining the prototype based on user feedback and performance data, we aim to enhance its usability and effectiveness, ultimately contributing valuable insights into the design of digital tools for creativity enhancement. By examining user interaction with the Creativity Partner and the quality of submitted ideas through a series of experiments, this study aims to contribute to the growing body of knowledge on how AI-powered tools can enhance creative idea generation within collaborative online environments.

2 Literature Review

Idea crowdsourcing platforms have emerged as a powerful tool for harnessing collective intelligence and fostering innovation (Brabham et al., 2014). These platforms allow individuals and organizations to tap into a global pool of creative minds, leading to the generation of novel solutions to complex challenges (Acar & Runco, 2012). However, a significant challenge for users remains: consistently generating high-quality ideas (Olson et al., 1995).

Existing research highlights the importance of various factors in fostering user creativity within idea crowdsourcing platforms. Studies emphasize the need for clear and well-defined innovation calls to guide participants towards impactful solutions (Cheng et al., 2020). Additionally, diversity in user backgrounds and expertise has been shown to contribute to a wider range of ideas and ultimately, more innovative outcomes (Mannix & Neale, 2005). Furthermore, providing users with feedback and opportunities to refine their ideas iteratively has been identified as a crucial factor in enhancing the quality of submitted concepts (Chan et al., 2021).

However, current feedback mechanisms within idea crowdsourcing platforms often lack sophistication. Traditional methods, such as peer review or expert evaluation, can be time-consuming and resource-intensive (Cheng et al., 2020). This gap paves the way for the exploration of AI-powered tools like the Creativity Partner, which can offer users real-time, personalized feedback throughout the idea generation process.

The application of AI in creative tasks is a burgeoning field with growing research interest. Studies have explored the use of AI for tasks such as generating creative text formats (Ko et al., 2023) and image idea generation (Paananen et al., 2023). These studies demonstrate the potential of AI to augment human creativity by providing novel suggestions and fostering divergent thinking. The research (Summers-Stay et al., 2023) dives into the question of whether AI can compete with humans in brainstorming. The study compared ideas generated by human professionals to those produced by an AI system. Interestingly, the AI-generated ideas were rated higher in both novelty and potential customer benefit, while being just as feasible as the human ideas. Overall, the top-performing ideas came from the AI, suggesting that AI could be a valuable tool to boost the idea generation process.

Chatbots are emerging as valuable tools within crowdsourcing platforms. Advancements in Natural Language Processing (NLP) allow chatbots to understand and respond to user queries effectively, as highlighted by (Caldarini et al., 2022). The research by (Liang et al., 2017) allows chatbot to tap into the collective intelligence of the crowd, granting it access to a wider range of knowledge and perspectives than traditional chatbots. While the paper doesn't delve into potential drawbacks like quality control or ongoing crowdsourcing costs, Chatbot presents a promising concept for chatbot development by harnessing the power of crowdsourced knowledge. The research by (Tavanapour & Bittner, 2018) explores using a chatbot to facilitate idea generation on online platforms. While a human facilitator can delve deeper and adapt to user questions, a chatbot can provide a structured format for initial idea submissions. This encourages detailed descriptions and a common ground for further crowd discussion and voting. The paper highlights the potential of chatbots for initial idea submissions, especially when human facilitation is unavailable. As chatbot technology continues to develop, its role in facilitating communication and enhancing user experience within crowdsourcing platforms is likely to expand.

Our proposed Creativity Partner builds upon this foundation by integrating AI-powered idea evaluation and feedback mechanisms directly within the idea crowdsourcing platform, offering a unique approach to enhancing user creativity in this collaborative online environment.

3 Methodology

The paper proposes a model to help idea crowdsourcing users enhance and stimulate their creativity through generative AI. Figure 1 illustrates the proposed methodology where we perform this task in three steps. In first step, we performed the idea evaluation by calculating the creativity score for user submitted "initial idea" through three main aspects of creativity: 1) Uniqueness, 2) Diversity, and 3) Feasibility. We created the function "Calculate Scores with OpenAI" for the scores calulation. In second step based on these calculated scores, we propose brainstorming prompt designs to stimulate users' creative thinking to improve the idea quality. In third step, we ask users if they reformulate their initial ideas based on the brainstorming feedback provided by Creativity Partner. We then re-evaluate the reformulated ideas scores in a conversational interface. The conversational chatbot interface also provides interactive chat facility for users questions as shown in Figure 1.

The Creativity Partner is a conversational AI tool designed to be your personal brainstorming buddy within the idea crowdsourcing platform. It leverages OpenAI's powerful gpt-3.5-turbo model and natural language processing (NLP) techniques to provide real-time feedback and suggestions throughout your idea generation journey. The

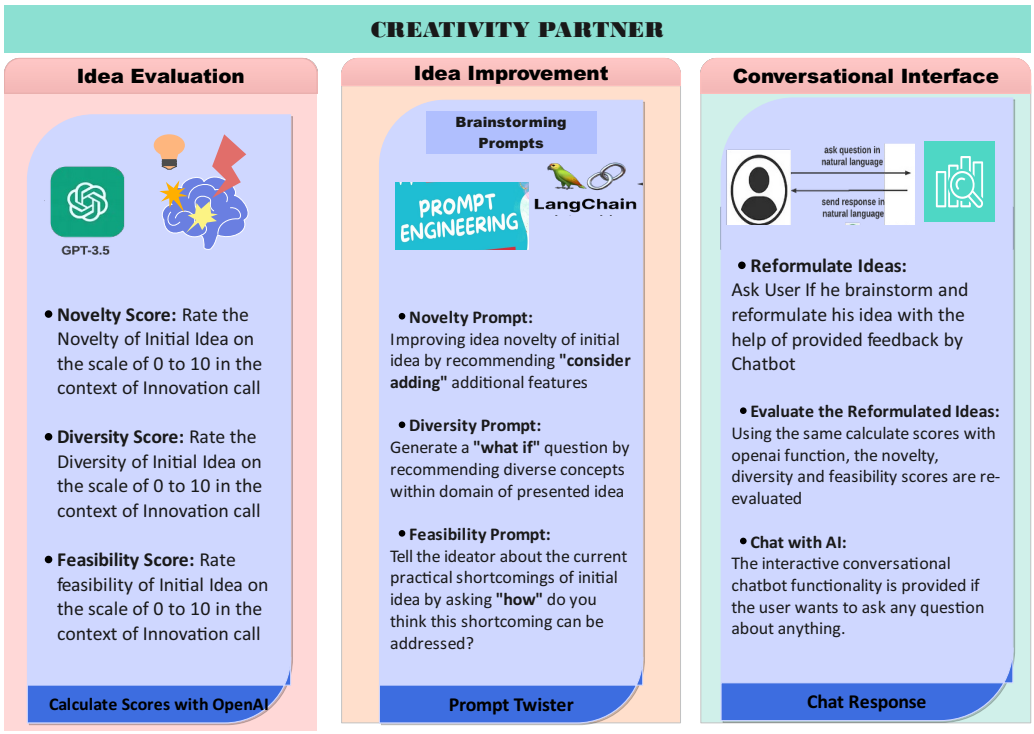

Figure 1: Personalized Chatbot: Creativity Partner's Brainstorming Methodology for Boosting User Creativity in Idea Crowdsourcing Platform

proposed chatbot "Creativity Partner" has the following core functionalities.

3.1 Idea Evaluation

The Creativity Partner goes beyond a simple scoring system. Here's a closer look at its evaluation process:

Predefined Prompts: The system utilizes carefully crafted prompts for OpenAI's gpt-3.5-turbo model. These prompts guide the model in analyzing the user's idea for specific criteria.

The Creativity Partner's idea evaluation is based on three key aspects:

Novelty Score: This score reflects how original and unique the idea is compared to existing solutions. The scores are calculated based on the research Imam et al., 2024, where The idea uniqueness score measures how different an individual's ideas are from other users, and the idea diversity score measures how different a person's ideas are from each other. Cosine similarity is used to measure the uniqueness and diversity scores using transformer embeddings.

The more dissimilar an idea is from others, the higher its uniqueness and diversity scores. Feasibility is assessed through LLMs summarizing feedback by peers and managers of the platform. The novelty score for the submitted idea is calculated by the semantic similarity of the idea with the previously submitted ideas pool.

$$Similarity\ (i, P) = \ cos(st[i],\ st[x])\ \forall\ x \in P \tag{1}$$

$$Uniqueness\ Score(i)\ =\ 1\ -\ Similarity\ (i, P) \tag{2}$$

Where 'i' represents the new idea we want to assess for uniqueness. 'P' represents the pool of existing ideas. 'st[x]' represents the sentence transformer function that embeds the sentence 'x' into a vector representation and cos(a, b) represents the cosine similarity between vectors 'a' and 'b'. Similarity(i, P) determines the semantic similarity of the i th idea in Pool P. While Uniqueness measures how different an idea is from others. It is the inverse of similarity, so we get it by subtracting similarity from 1. We normalized the ranges by dividing the score by the total number of ideas in the idea pool.
Prompt: A prompt for novelty is: "Rate the following idea on a scale of 0 to 10, where 0 is extremely common and 10 is extremely unique: [idea] in the context of [innovation call]."

Feasibility Score: This score assesses how realistic and achievable the idea is considering current resources and technology. To define the feasibility score, we summarised the feedback of peers and managers on every idea and calculated the idea feasibility score using prompt engineering through LLMs. If an idea has no feedback, its feasibility score is calculated by the similar ideas in the idea pool calculated by semantic similarity.
Prompt: A prompt for feasibility is: " Rate the following idea in terms of feasibility on a scale of 0 to 10, where 0 is impossible and 10 is easily achievable with current resources and technology: question,idea "

Diversity Score: This score evaluates how different the idea is from other submissions related to the same innovation call, promoting diverse thinking. The scores are calculated based on the following approach (Imam et al., 2024).
The diversity score measures how semantically different a new idea is from the same user's previous ideas. It reflects the degree to which an individual is exploring new conceptual territory within their own body of ideas.

$$Similarity(i, P_u) = \ cos(st[i],\ st[x])\ \forall\ x \in P_u \tag{3}$$

$$Diversity\ \ Score(i) = 1 -\ \ Similarity\ (i, P_u) \tag{4}$$

Where P_u represents the pool of the same user's previous ideas.
Prompt: A prompt for diversity is: "Rate this idea on its diversity compared to this set of existing ideas on a scale of 0 to 10, where 0 is extremely similar to existing ideas and 10 is radically different where the question is question and idea is idea. Provide a list of 2-3 existing ideas in a similar domain")"

To achieve this, the Creativity Partner utilizes pre-defined prompts specifically crafted for OpenAI's model. These prompts guide the analysis, ensuring a focused evaluation of each aspect.

3.2 Idea Improvement

Based on the generated scores for novelty, feasibility, and diversity, the Creativity Partner offers personalized brainstorming prompts of suggestions for improvement. Here's how it works:

Low Novelty? The system generates prompts that encourage you to consider adding unique features or exploring alternative approaches to make your idea stand out.
Brainstorming Prompt: Generate a suggestion for improving idea novelty in the presented idea by recommending consider adding additional similar features in one line: idea")

Feasibility Concerns? Prompts are formulated to identify potential challenges and suggest solutions to ensure your idea can be realistically implemented.
Brainstorming Prompt: "Tell the ideator about the current practical shortcomings of presented idea in a form of question by asking how do you think this shortcoming can be addressed?: idea") "

Limited Diversity? The Creativity Partner prompts you with "what if" questions that encourage divergent thinking, helping you explore alternative concepts within the same domain.
Brainstorming Prompt: "For improving divergent thinking, Generate a what if question by recommending diverse concepts within domain of presented idea: idea")"

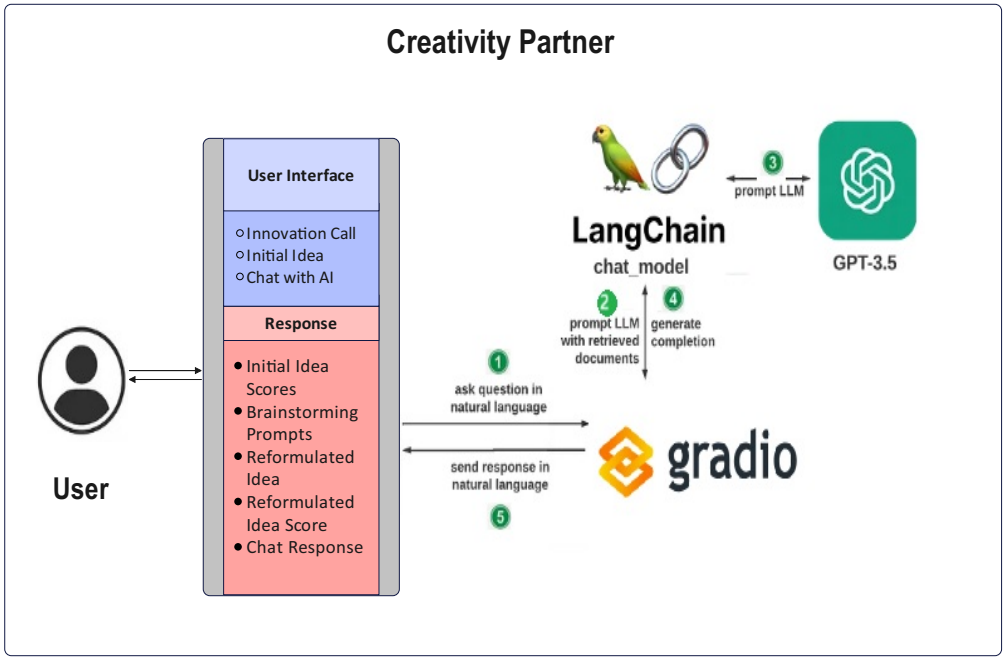

Figure 2: Personalized Chatbot: Creativity Partner Interaction Flow

3.3 Conversational Interface:

Brainstorming shouldn't feel like a one-way street! The Creativity Partner provides a user-friendly chat interface built with Gradio and using *langchain framework* (Topsakal & Akinci, 2023) to interact with *GPT 3.5 Turbo* (Ye et al., 2023) as shown in the Figure 2, allowing for a dynamic and engaging experience.

Interactive Textboxes The interface provides clear textboxes for you to submit the innovation call (the problem you're trying to solve), your initial idea, and even reformulated ideas after receiving feedback.

Personalized Feedback: Based on the idea evaluation, the Creativity Partner offers tailored suggestions for improvement specific to your idea's strengths and weaknesses.

Open-ended Chat: Users can engage in a back-and-forth dialogue with the Creativity Partner. Ask clarifying questions, provide additional details about the idea, or delve deeper into specific aspects of the feedback it's all part of the collaborative brainstorming process. Overall, the Creativity Partner leverages OpenAI's capabilities and NLP techniques within a user-friendly Gradio interface to create a dynamic and personalized brainstorming experience. It empowers you to develop stronger, more well-rounded ideas by offering continuous feedback and support throughout your idea generation journey.

4 Results

In order to check if our "Creativity Partner" chatbot works as planned, we run it through made-up conversations (synthetic scenarios). We give the chatbot few instructions (synthetic input) to see how it responds. Here are three examples of these scenarios:

4.1 Test Cases

The figure 3 depicts a collaboration between a user and the Creativity Partner chatbo. The user initiates the conversation by proposing an idea for a rain proof jacket in response to the innovation call for "Features of smart jacket" (initial idea and innovation call).

The chatbot analyzes the user's input and evaluates the initial idea scores for novelty (2.0), feasibility (9.0), and

diversity (2.0) . The Idea has very low novelty and diversity score, so the chatbot offers constructive feedback by suggesting a reformulated phrasing: “Consider adding additional features such as waterproof zippers and sealed seams to enhance rainproof capabilities of the product. What if rainproof materials were made from sustainable and bidegradable sources such as plant-based fabrics or recycled plastic bottles” (feedback on the original idea). The chatbot used the Novelty and Diversity brainstorming prompts of “Consider adding” and “What if” as mentioned in previous section.

Following the chatbot’s guidance, the user refines the initial idea based on the feedback as shown in Figure 3. The Creativity Partner then re-evaluates the reformulated idea, potentially resulting in improved Idea scores for novelty (7.0), feasibility (9.0), and diversity (7.0) . The figure 4 depicts a collaboration between a user and the Creativity

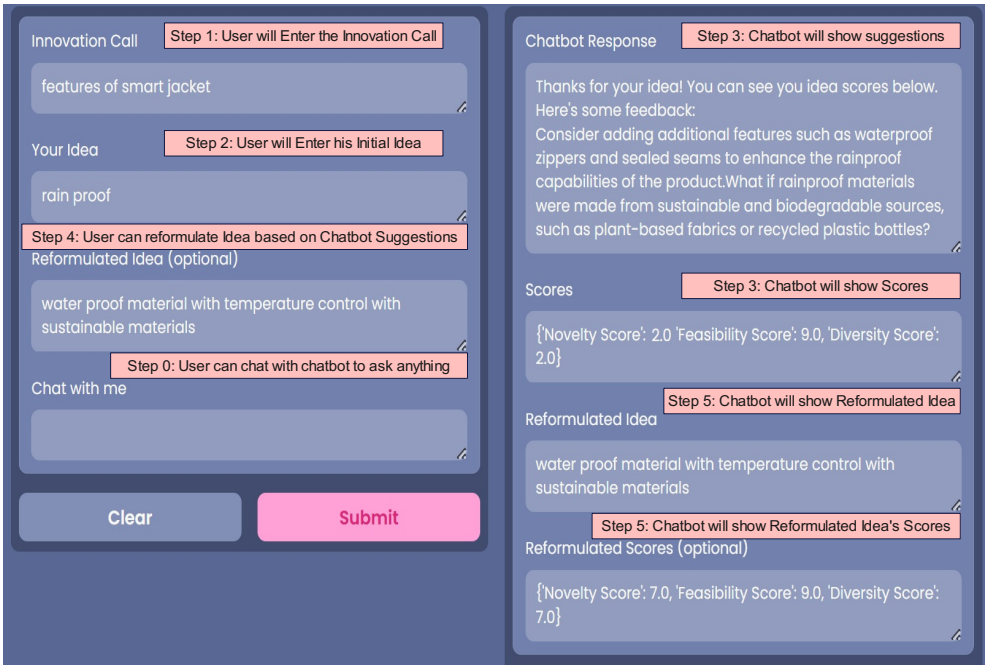

Figure 3: Personalized Chatbot: Creativity Partner’s Brainstorming and Idea Reformation with Improved Novelty Scores

Partner chatbot on an idea crowdsourcing platform. The user initiates the conversation by proposing an idea for a smart fridge in response to the innovation call for “Smart Home Appliances” (initial idea and innovation call).

The chatbot analyzes the user’s input and evaluates the initial idea scores for novelty (6.0), feasibility (9.0), and diversity (2.0) . The Idea has very low diversity score, so the chatbot offers constructive feedback by suggesting a reformulated phrasing: “What if smart fridges were able to detect when food was about to expire and automatically suggest recipes to use up those ingredients before they go bad?” (feedback on the original idea).

Following the chatbot’s guidance, the user refines the initial idea based on the feedback (user reformulate the idea) as shown in Figure 4. The Creativity Partner then re-evaluates the reformulated idea, potentially resulting in improved Idea scores for novelty (8.0), feasibility (7.0), and diversity (8.0).

The figure 5 depicts a collaboration between a user and the Creativity Partner chatbot. The user initiates the conversation by proposing an idea for a smart umbrella with an LED in response to the innovation call for “Smart Daily Gadgets” (initial idea and innovation call).

The chatbot analyzes the user’s input and evaluates the initial idea scores for novelty (6.0), feasibility (4.0), and diversity (7.0) . The Idea has very low feasibility score, so the chatbot offers constructive feedback by suggesting a reformulated phrasing: “How do you think the issue of limited battery life on the smart umbrella can be addressed” (feedback on the original idea).

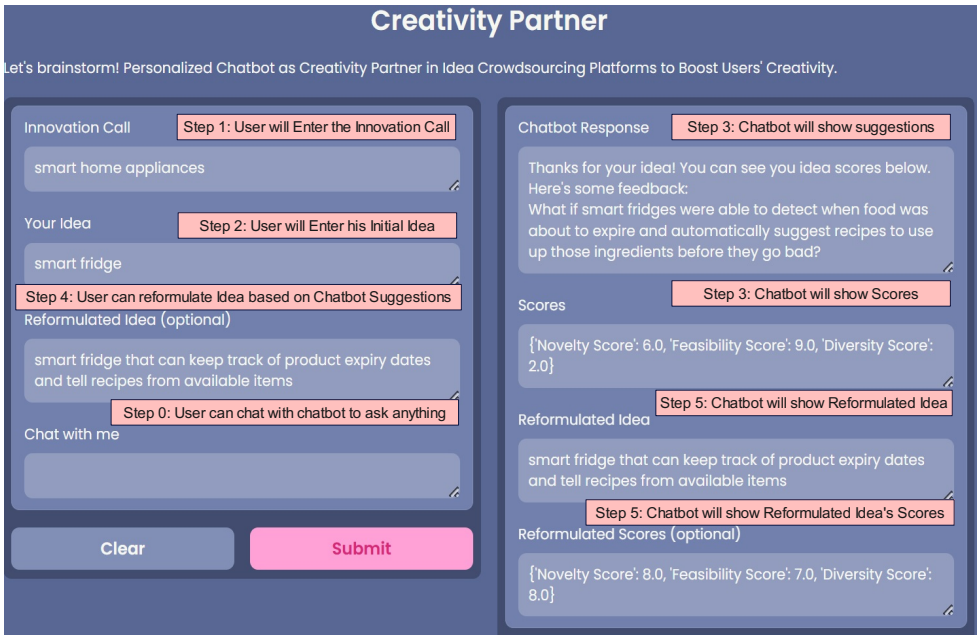

Figure 4: Personalized Chatbot: Creativity Partner's Brainstorming and Idea Reformation with Improved Diversity Scores

Following the chatbot's guidance, the user refines the initial idea based on the feedback (smart umbrella with solar lights that can be charged itself) as shown in Figure 5. The Creativity Partner then re-evaluates the reformulated idea, potentially resulting in improved Idea scores for novelty (7.0), feasibility (8.0), and diversity (7.0).

4.2 Prototype Testing

This user study is currently in its preliminary stages. To facilitate wider user participation and gather a broader range of input, we are actively developing a permanent, sharable link for the chatbot. To date, the testing has been conducted with a limited group of six users. This initial user group comprised three males and three females, with diverse educational and professional backgrounds, and ages ranging from 20 to 40 years. The results of this user study are presented in figures below.

Figures 6, 7, and 8 illustrate the initial and reformulated idea scores for six users who interacted with our proposed "Creativity Partner" chatbot. The "Creativity Partner" provided users with brainstorming prompts based on their initial idea scores and suggested reformulations. Following user reformulation, the "Creativity Partner" re-evaluated the scores for each idea. Both the initial and reformulated idea scores are presented in the aforementioned figures.

5 Implications and Limitations

Our Creativity Partner prototype aims to empower users to develop stronger ideas. By offering feedback on novelty, feasibility, and diversity, it can encourage users to consider aspects beyond the initial spark of inspiration. This could potentially lead to a more comprehensive and strategic approach to idea generation, ultimately resulting in higher-quality submissions. As we are in the initial phases of this prototype testing, we aim to explore how Creativity Partner might elevate the entire crowdsourcing platform. It could potentially encourage exploration of diverse solutions, streamline idea development through efficient iteration cycles, and can potentionally foster a more engaged community through its interactive interface. By testing this prototype, we hope to gain valuable insights into the potential of Creativity Partner to transform user experience and drive innovative outcomes within

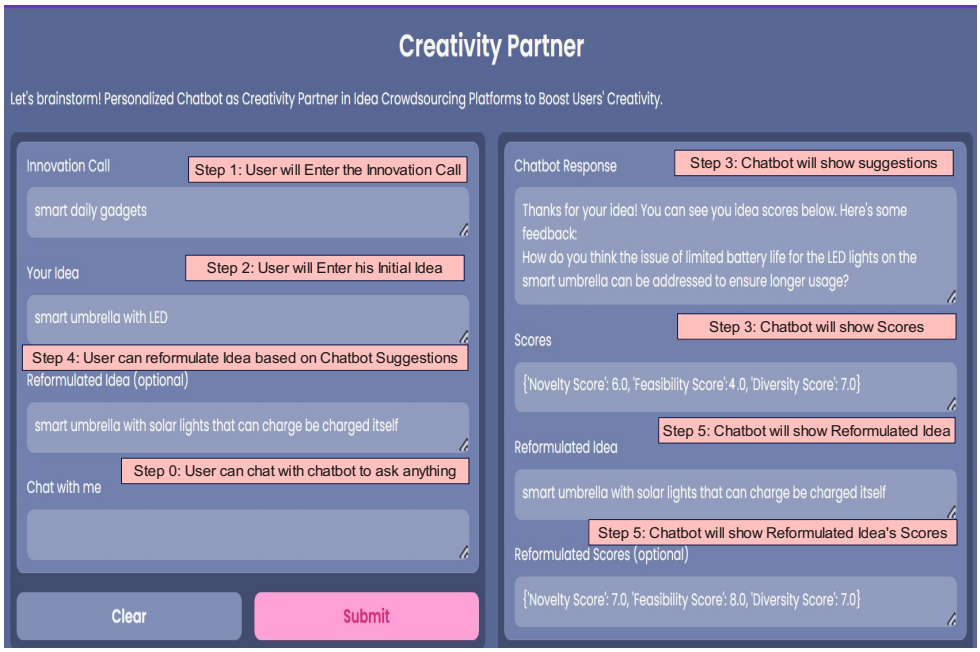

Figure 5: Personalized Chatbot: Creativity Partner's Brainstorming and Idea Reformation with Improved Feasibility Scores

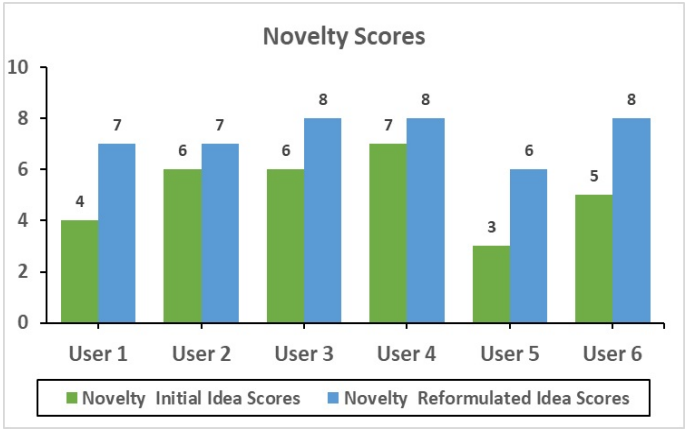

Figure 6: Users Initial Idea's Novelty Scores vs. Reformulated Idea's Novelty Scores

the platform.

While the Creativity Partner prototype holds promise for enhancing idea generation within crowdsourcing platforms, there are some limitations to consider in this initial stage. Firstly, this initial version is likely being tested with a limited user pool. This means the observed feedback and idea generation patterns might not translate perfectly to the broader crowdsourcing population.

Secondly, the effectiveness of the Creativity Partner hinges on the chosen evaluation metrics. How "novel", "diverse" or "feasible" is an idea? These concepts are subjective, and defining clear metrics to measure them is crucial. Inaccurate evaluation could lead to misleading feedback for users, hindering their creative exploration.

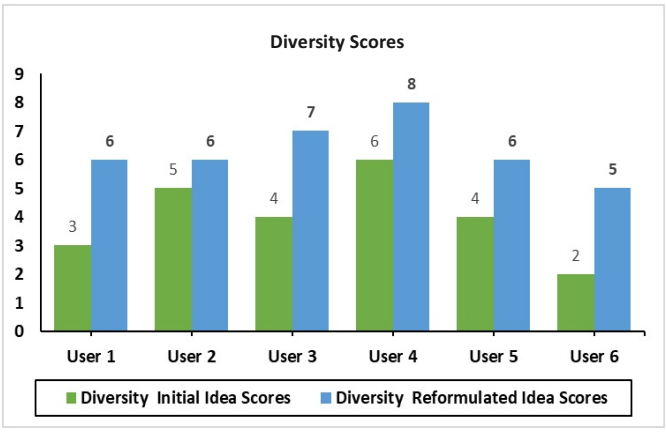

Figure 7: Users Initial Idea's Diversity Scores vs. Reformulated Idea's Diversity Scores

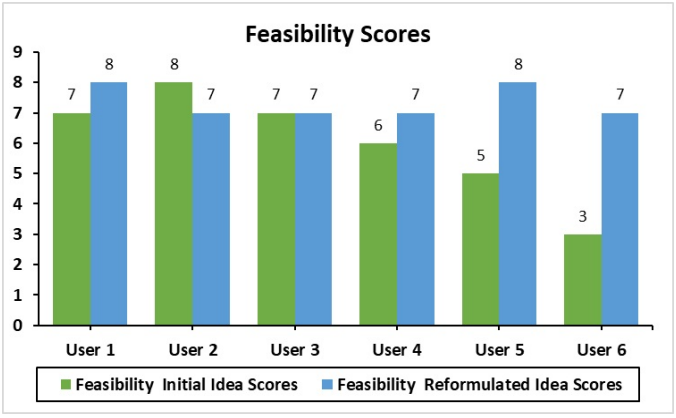

Figure 8: Users Initial Idea's Feasibility Scores vs. Reformulated Idea's Feasibility Scores

Finally, testing this prototype within a real crowdsourcing platform presents a unique challenge. Integrating the AI seamlessly and ethically requires careful consideration. A controlled testing environment might be necessary to isolate the impact of the Creativity Partner before full-scale deployment. By acknowledging and addressing these limitations, we can pave the way for a more robust and impactful Creativity Partner tool that empowers users and fosters innovation within crowdsourcing platforms.

6 Conclusion

This paper introduced the Creativity Partner, a conversational AI tool designed to assist users within idea crowdsourcing platforms. The tool leverages NLP techniques and OpenAI's capabilities to provide personalized feedback and suggestions throughout the idea generation process. Our research explored the Creativity Partner's potential to enhance user creativity within these platforms. We examine how its functionalities, including multi-faceted idea evaluation and an interactive conversational interface, can empower users to develop stronger and more impactful ideas. While the concept offers exciting possibilities, it's crucial to acknowledge the limitations inherent in prototype testing.

The findings from the initial prototype testing suggest that the Creativity Partner holds significant promise for

idea crowdsourcing platforms. By fostering a more comprehensive and strategic approach to idea generation, the tool can lead to the generation of higher-quality submissions. Furthermore, by promoting diversity and novelty in the innovation process, the Creativity Partner can contribute to a richer pool of ideas that cater to a wider range of needs. Additionally, the Creativity Partner's interactive interface can foster a more engaging and collaborative user experience, potentially leading to increased user satisfaction and long-term platform engagement.

Future research directions include conducting more user studies to gain deeper insights into how users interact with the Creativity Partner and how it impacts their creative process. Additionally, exploring how the tool can be integrated seamlessly within existing idea crowdsourcing platforms and its impact on overall platform dynamics would be valuable. Ultimately, the Creativity Partner represents a promising new approach to enhancing creative idea generation within online collaborative environments. As AI technology continues to evolve, tools like the Creativity Partner have the potential to revolutionize the way innovation happens in the digital age.

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