

# Extending StackOverflow® Gamification Using Social Media

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## ABSTRACT

StackOverflow is a popular Q&A community, with thousands of users solving and answering questions. The current gamification of badges and reputation does not seem to be effective and sufficient enough that could increase user's motivation. This project will address the issues and recommendation from various users to provide a better design of StackOverflow gamification by integrating Social media on it. There is a definite need of improving gamification in StackOverflow.

## Author Keywords

StackOverflow (SO).

## INTRODUCTION

Stack Overflow is a popular Q&A website for an ever-increasing range of computer programming topics. SO is likely to be the most popular website in the computer programming world with over 4,000,000 registered users [1] and with more than 11,000,000 questions [2]. The website serves as a platform for users to both ask questions related to programming and to answer the questions of other users. These contributions by the users are the heart of the content and are met with reputation points and “badges” for the user. What we hope to uncover is whether this use of gamification is the primary motivating factor for the user's collaboration and if so, is it possible to improve the current system in order to foster an increase in collaboration by users that wouldn't normally contribute?

This research aims to examine the ways that collaboration is achieved in SO and what changes can be made to encourage collaboration of more users and to promote an increase in contributions from users of all skill levels. We aim to answer the following research questions:

- Is the publication of reputation and badges on social media a factor to promote more answers?
- Is the current gamification used by Stack Overflow meeting the member's necessities?

- How would the users like to include their reputation and badges on social media?

Throughout the course of this research, we will present an overview of relevant, related work, examine what the primary motivating factors are for user collaboration, discuss the merits and shortcomings of the current system, and provide our recommendations of how Stack Overflow may be improved to encourage more active participation from a wider range of its users.

## RELATED WORK

StackOverflow has been heavily studied in recent years. The following papers are the most representative

**StackOverflow and GitHub:** Associations between Software Development and Crowdsourced Knowledge which successfully linked users from the two platforms and determined that “for active committers, asking questions on StackOverflow catalyzes committing on GitHub and similarly, for active committers, answering questions on StackOverflow catalyzes committing on GitHub.”

**One-day flies on StackOverflow:** Why the vast majority of StackOverflow users only posts once which found that “less active users” are more likely to not have questions answered, get negative feedback (or answers that can be interpreted that way), self-answer their own question and less likely to have questions not already answered.

## Can Gamification Motivate Voluntary Contributions? The case of StackOverflow Q&A Community:

This research was focused on answering activity considering a dataset with 46,571 StackOverflow users. The analysis was focused on comparing the answering activity 7 days before getting the badge and 7 days after the awarding date. The results suggested a positive impact on increasing the number of answers due to badges. For example, those users increasing reputation when answering questions are more likely to answer more questions as a result of the

gamification. The analysis was more focused on the behavior of members after receiving a badge. However, a different approach is needed to analyze the different behaviors according to each badge (gold, silver, bronze).

**Does Gamification Work?:** This Literature review indicates that gamification provides positive effects, however, the effects are greatly dependent on the context in which the gamification is being implemented, as well as on the users using it. Most of the reviewed papers reviewed positive results for the same of the motivational affordances of the gamifications implementations studied.

**Building Reputation in StackOverflow:** They analyzed the StackOverflow (SO) data from four perspectives to understand the dynamics of reputation building on SO. They found that a large number of questions are related to .NET technologies, OOP languages and web development. Therefore contributors with expertise in those topics will have greater chance building reputation quickly. A contributor should participate regularly and answer as many questions as possible. These actions will improve the contributor's influence and chances of getting up-votes.

**Stack Overflow Badges and User Behavior:** An Econometric Approach: The authors included the different actions to increase reputation, such as editing posts, asking questions and answering questions. They discovered that the behavior changes according to the action to obtain the badge. For example, users earning a badge for editing tend to make more edits in the prior days to receiving a badge compared to days after. In addition, the users who receive a badge for asking questions are not motivated to obtain more badges. The authors proposed anonymous questions feature to increase the rate of posted questions. However, a system of anonymous questions can decrease the level of quality and increase the number of questions.

## RESEARCH METHODOLOGY

To study the collaboration in Stack Overflow as a community of practice, qualitative research will allow us to address human aspects such as motivation to increase the contributions on the community. On Stack Overflow, the contributions are composed of questions and answers. However, this research is focused on maximizing the contributions on questions through proposing a more detailed classification in the elements of gamifications and social media as an external factor to strengthen the current gamification. The next sections are dedicated to the research questions and study design to be followed.

### Research Questions

*Is the publication of reputation and badges on social media a factor to promote more answers?*

This study will confirm the general necessity of sharing reputation and badges on social media such as *Facebook*,

*Twitter* or *Linked-in* as an important factor to obtain external recognition and stimulate the contributions in the community.

*Is the current gamification used by Stack Overflow meeting the member's necessities?*

This study will provide us the possible dissatisfaction in the user experience related to gamification and find the possible improvements on the look and feel as well as on the aesthetics used to show the reputation and badges.

*How the users would like to include their reputation and badges on social media?*

This section will anticipate the user's vision about the information that they need to share on social media. Base on the second question, users can provide recommendation on how they would like to export their achievements and which information they would consider important to be included and now it is discarded.

### Study Design

This research will include selected Stack-Overflow members with different levels of reputation, number of answers posted and age from the database dump provided by Stack Overflow. A second group will be formed by undergraduate students at UVic who are current members on Stack Overflow. In the first phase, we will carry out unstructured interviews through Skype to a small group of subjects selected from the database dump. In addition, we will apply structured interviews to a small group of UVic students. After, we will abstract the most important values using coding and carry out cross-case analysis on both groups. In the second phase, we will apply survey questionnaires including additional questions aimed at gaining more insights about the about the impact of social media and gamification on the community.

### RISKS

Part of the results of this project depends on the availability of the SO members chosen from the data dump offered by SO. Not having the insights of these users might reduce the domain range of the users to only students. In addition, the recommendations to improve Gamification might lead to having the SO community being biased and sarcastic. Finally, given the limited time, we might carry out interviews and surveys for small domain of users.

### EXPECTED RESULTS

After collecting all the data from our research we expect to have a better understanding of how gamification and social media affects Stack Overflow and its users. To be more precise, we will look at how these game design elements such

as badges and reputation points. We will also look to see if the current gamification is working to prompt users to be more active and engaging. Based on our findings we will hope to add contributions to this system of rewarding users by adding in our own gamification methods. These new techniques will attempt to add more efficiency to the users while interacting with Stack Overflow. We will also be looking at how social media is impacting the user experience. Our hypothetical contributions will be heavily based on the data we collect and the answers to our research questions. We are looking to end this extensive study with concrete improvements to StackOverflow's: gamification implementation, social media synergy and user interaction.

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