

The Impact of Pre-Task Games on Group Communication and Group Members' Engagement in Virtual Teams

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Abstract. This research investigates whether processing a brief, attractive game before a team-based activity can improve communication and group bonding in a virtual team. Virtual teams often suffer from different communication issues, which can lead to less effective teamwork and inefficient collaboration. The study randomly assigned sixteen teenagers (ages 15–18) into four virtual teams: two control virtual teams that did not play a pre-task game, and two experimental virtual teams that played "Draw Something" before solving a collaborative "Situation Puzzle". The researchers measured communication frequency and task performance by counting utterances and using a T-test to measure the difference between control groups and experimental groups. The results showed that teams that played the pre-task game had impressively improved on total utterances, collaborative utterances, and even off-topic utterances compared to the control teams ($p < 0.05$). These findings suggest that brief interactive games can help to reduce the feeling of isolation, encourage participation, and enable more active cooperation, although they may also lead to an increase in casual conversation. While the study was limited by a small sample size and poor experimental conditions, it demonstrates the potential for gamification as a simple, low-cost method for improving communication in cooperative work environments.

Keywords: Gamification, Virtual Team, team Communication, team Bonding, Collaborative Work, Pre-task Games

1. Introduction

Team projects are a major part of modern society in both educational and business settings. In many cases, team members are located in different places around the world and can't work face-to-face, so they form a virtual team. According to Seliverstova, a virtual team is "a group of people... working together from different locations and possibly different time zones, who are collaborating on a common project and use information and communication technologies (ICTs) intensively to co-create" (Seliverstova) [1]. However, virtual teams also faced many challenges. To be specific, virtual teams face a feeling of isolation and detachment. This is because they "miss out on those opportunities to get together and bond as a group, and that is tough sometimes. And you do feel like step-children sometimes" (Kirkman et al. 74) [2]. The feeling of isolation obviously will greatly reduce the engagement in teamwork working for team members.

This research explores whether combining small, interactive games into a collaboration task can improve team unity and overall communication efficiency. The central research question is: Can a task that incorporates game-like elements help to strengthen relationships between team members or motivate more engagement in communication among collaborators? We hypothesize that a small, interactive game within a collaborative task can genuinely contribute to team cohesion without interrupting the project's overall process.

2. Prior work

After researching online, we found some academic works that relate to our study. First, Tasha Squires' 2016 article, "Engaging Students through Gamification," [3] demonstrates how gamification can dramatically increase student participation in a voluntary library reading program. By transforming a program into a team-based game called "Conquest of the Realm" (CotR), Squires increased student involvement from 17% to 80%. This case study shows that using game mechanics can effectively motivate students to engage in team collaboration.

Second, in a 2010 article, "Challenges in Managing Virtual Teams," [4] Rudy and Liesl Nydegger explore the difficulties organizations face when using virtual teams. They identify that the core challenges stem from the lack of physical co-location and the heavy reliance on technology for communication. The authors note that the geographical and temporal separation of team members complicates coordination, collaboration, and the management of a dispersed workforce.

Our study integrates these perspectives by testing a minimal, low-cost icebreaker placed immediately before a collaborative task. Unlike longer training or full-fledged serious-game interventions, our design targets the first few minutes of team formation and evaluates concrete communication outputs (talk quantity and composition). This narrow focus allows us to isolate the start-of-task moment, where small changes may have outsized effects on participation.

3. Methodology

We conducted a controlled experiment with 16 volunteers (8 males, 8 females) between the ages of 15 and 18. These participants were randomly selected and had diverse backgrounds, personalities, and prior experiences. The main objective was to explore how a simple interactive game could enhance communication and engagement in team collaboration.

The volunteers were randomly divided into four groups of four members each.

- Control Teams (Team 1 and 3): These teams were asked to complete a complex collaborative task called the "Situation Puzzle" online through a meeting platform. In this task, participants worked together to find the hidden cause of a scenario described by a host, who could only answer "yes" or "no" to the team's questions. This task was chosen to reflect the team's communication and problem-solving abilities.

- Experimental Teams (Teams 2 and 4): These teams completed the same "Situation Puzzle" online through a meeting platform, but with an added pre-task activity. Before beginning the puzzle, they played a short interactive game called "Draw Something," where participants took turns drawing a word or phrase for others to guess. The purpose of this game was to encourage initial interaction and build a sense of connection.

After the puzzle task, the researchers recorded the number of puzzles solved and the frequency of verbal communication within each group. Teams 3 and 4 repeated the procedures of Teams 1 and 2, respectively, to increase the reliability of the findings and reduce potential experimental errors. The data on puzzle completion rates and communication frequency were then analyzed to determine if

the interactive game had a positive influence on communication and engagement during the collaborative tasks.

4. Results

We collected data and calculated the mean total utterances, mean collaborative utterances, and mean irrelevant/off-topic utterances per participant for both the "Pre-Task Game Team" and the "Non-Pre-Task Game Team". Our analysis used both descriptive and inferential statistical methods to understand the communication patterns and observed phenomena.

4.1. Descriptive analysis

The descriptive analysis revealed that the Pre-Task Game Team had a higher frequency of all types of utterances compared to the Non-Pre-Task Game Team. (Shown in Figure 1, Figure 2)

- Total Utterances: The mean total utterances per participant was 28 in the Pre-Task Game Team, compared to 17 in the Non-Pre-Task Game Team, an absolute difference of 11 utterances.
- Collaborative Utterances: The Pre-Task Game Team had a mean of 16 collaborative utterances per participant, while the Non-Pre-Task Game Team had only 9.
- Irrelevant/Off-Topic Utterances: Off-topic communication also increased in the Pre-Task Game Team, with a mean of 7 utterances, compared to 5 in the Non-Pre-Task Game Team.

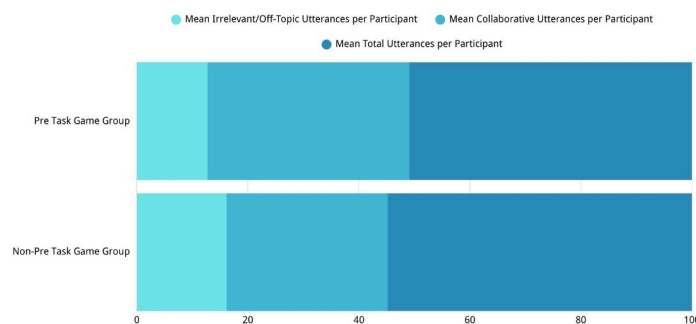


Figure 1. Comparison of mean utterances per participant between the pre-task game group and non-pre-task game group. The chart presents a breakdown of irrelevant/off-topic utterances in light blue, collaborative utterances in dark blue, and the combined utterances for each group. It can be seen that the pre-game task group has a higher percentage of irrelevant/off-topic utterances compared to the non-pre-task game group

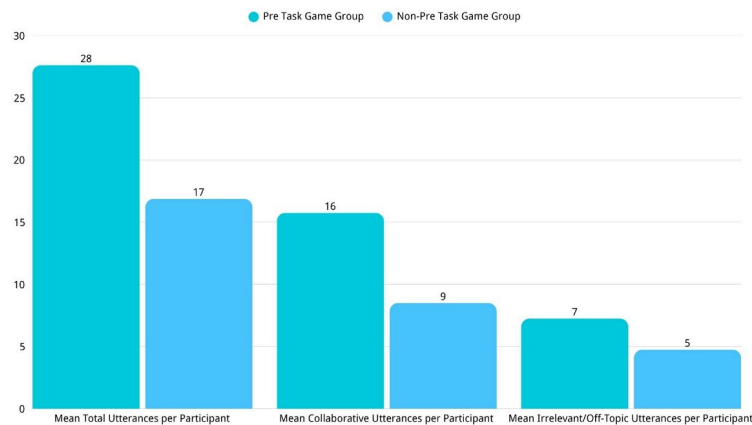


Figure 2. Comparison of the mean utterances per participant in the pre-task game group and non-pre-task game group. The bar chart is presented in three bar graphs for each category: mean total utterances, mean collaborative utterances, and mean irrelevant/off-topic utterances of the two groups. The total number of utterances is significantly higher for the pre-task game group than for the non-pre-task game group; there is a slightly greater focus on collaborative utterances, while less irrelevant/off-topic statements were made

4.2. Inferential analysis

T-tests were run on each category of utterances to compare the means between the two teams. Tests were done to check if the differences in the frequency of utterances were statistically significant and not accidental. The level of significance α was 0.05.

The results of the t-tests were all statistically significant for each type of communication measured, with all p-values less than 0.05.

- Total Utterances: $t(8.7)=4.19$, $p=0.00251$.(Figure 3)
- Collaborative Utterances: $t(8.6)=4.14$, $p=0.00278$.(Figure 4)
- Off-Topic/Irrelevant Utterances: $t(12.0)=5.56$, $p=0.00013$.(Figure 5)

These findings are detailed in the figures and tables below.

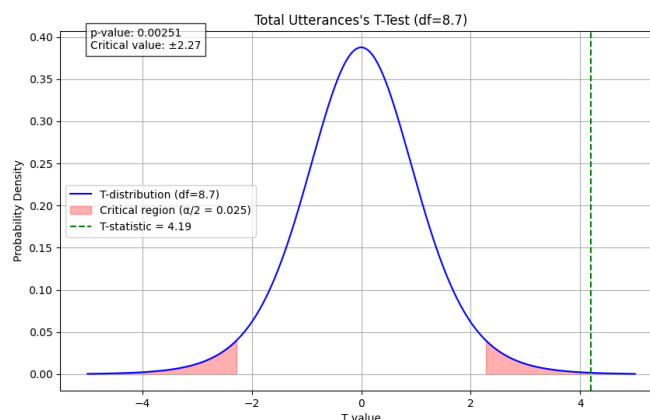


Figure 3. T-test analysis for total utterances. A graph of the T-distribution with $df = 8.7$ is shown in blue, and the critical region for $\alpha = 0.025$ is shaded in red. The calculated T-statistic of 4.19 is indicated by the green dashed line, lying outside the critical region, suggesting that the result is statistically significant. The p-value of 0.00251 further supports the significance of the test

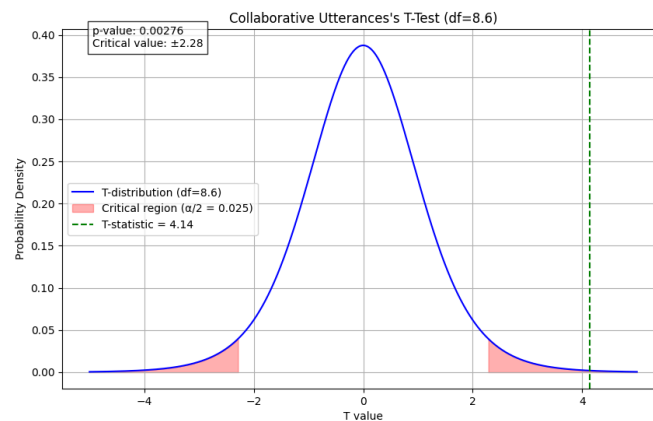


Figure 4. T-test analysis for total utterances. A graph of the T-distribution with $df = 8.6$ is shown in blue, and the critical region for $\alpha = 0.025$ is shaded in red. The calculated T-statistic of 4.14 is indicated by the green dashed line, lying outside the critical region, suggesting that the result is statistically significant. The p-value of 0.00276 further supports the significance of the test

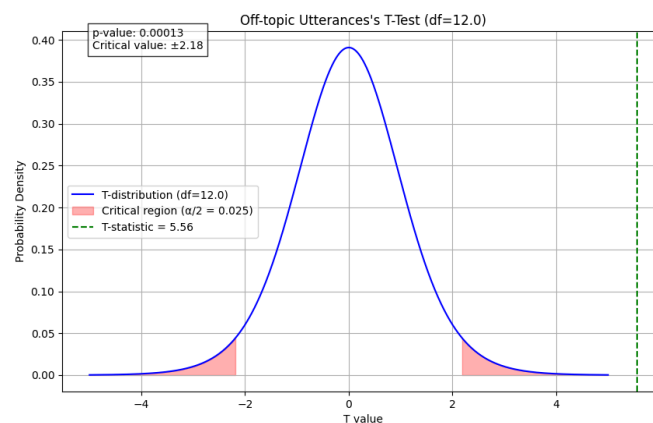


Figure 5. T-test analysis for total utterances. A graph of the T-distribution with $df = 12$ is shown in blue, and the critical region for $\alpha = 0.025$ is shaded in red. The calculated T-statistic of 5.56 is indicated by the green dashed line, lying outside the critical region, suggesting that the result is statistically significant. The p-value of 0.00013 further supports the significance of the test

5. Discussion

The results of the experiment clearly indicate that collaborative task can be improved through increasing communication and better cooperation among team members with a short pre-task game. The experimental team seemed more willing to share ideas and build relationships with each other, helping them solve the puzzle more quickly. The pre-task game is likely to be useful in breaking the initial awkwardness that often exists between strangers.

5.1. Impact of pre-task games

The increased communication in the experimental groups can be attributed to the "Draw Something" game, which served as a stress reliever for the pressure due to awkwardness. By engaging in a fun,

non-task-related activity, the participants were able to break down initial social barriers and feel more comfortable interacting with one another. This created a more open and collaborative environment, stimulating more active behaviors for team members.

5.2. Role of off-topic communication

Although the pre-task game team showed the engagement in more off-topic conversations, this did not lead to the opposite effect. This suggests that a certain amount of casual chat may not be detrimental to the efficiency of finishing a task and could even strengthen group connection. It helps build rapport and trust among team members, which can be beneficial for long-term collaboration.

5.3. Limitations of the study

Several limitations of this study include a very small sample size of 16 participants, all of whom were teenagers. Therefore, the findings may not generalize to larger teams or to an adult population. Future research could usefully investigate whether different game types have benefits or whether the game's positive effects are sustained in longer-term projects. This study provides evidence that a quick game can be an easy way to improve teamwork, especially when team members do not know each other.

6. Future work

Although this study presents encouraging findings on the impact of interactive games on team communication, there are some avenues that need to be pursued further. First, the sample size and population under investigation (teenagers) limit the external validity of the findings. Subsequent studies may incorporate larger and more varied samples, e.g., adults or professionals in different fields, to determine if the observed effects hold across settings. In addition, additional studies with a wider range of interactive games with varying levels of complexity or competitiveness may further identify more specifically which precise aspects of a game enhance collaboration and communication. Additional studies could also examine the long-term effects of pre-task games on group unity and task performance because transient effects are only quantified in this study. Finally, investigating how such games interact with other communications equipment (e.g., video conferencing programs) can provide better insights into optimizing hybrid or remote group projects. With a broader perspective and field of inquiry, future research could make more advanced recommendations for the integration of gamification into group collaboration practices.

References

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