

# Social Gamification Techniques and Group Dynamics in Shared Transportation

Central European Conference on Information and Intelligent Systems

---

Bogdan Okreša Đurić<sup>1</sup> Markus Schatten<sup>1</sup> Tomislav Peharda<sup>1</sup>  
Pasqual Martí<sup>2</sup> Jaume Jordán<sup>2</sup> Vicente Julian<sup>2</sup>

18 September 2024

<sup>1</sup>University of Zagreb Faculty of Organization and Informatics Artificial Intelligence Laboratory

<sup>2</sup>Valencian Research Institute for Artificial Intelligence, Universitat Politècnica de València

1. Social Gamification: Cooperation and Competition
2. Use Case & the Proposed Approach
3. Conclusion

- The paper focuses on gamification techniques applicable to improving **group decision-making** in shared transportation.
- Gamification often targets individual users; however, group dynamics are crucial in optimising resource use.
- Key elements: cooperation, competition, and social gamification.

- **Gamification** is about using game elements in non-game contexts to enhance engagement.
- Common elements: avatars, badges, leaderboards, challenges.
- In **shared transportation**, the challenge is aligning group decisions for resource optimisation.

## Social Gamification: Cooperation and Competition

---

- **Social** Gamification: Enhancing individual tasks through group interaction and cooperation.
- **Competition and cooperation** trigger different psychological processes.

# Gamification Categories

- Four types of gamification based on **social dependence**:
  - Individual-based: Focus on individual performance.
  - Competitive: Users compete for rewards (e.g., leaderboards).
  - Cooperative: Teams work toward shared goals.
  - Competitive-cooperative: Hybrid of cooperation within teams and competition between teams.
- Cooperative settings result in higher participation and foster feelings of belonging.
- **Coopetition** enhances engagement, group cohesion, and overall system performance.

# Implications of Social Gamification

- Psychological Impact: Cooperative environments enhance user well-being and **engagement**.
- Social Identity: Belonging to a group increases motivation and commitment.
- Effective gamification design leverages both competitive and cooperative dynamics to motivate users.



## Use Case & the Proposed Approach

---

- We consider the user of the **transport system**  $i$ , represented by his travel request:

$$p_i(O_i, D_i, T_i)$$

- If the transport operator detects that this request is too expensive for the system to fulfil or simply impossible, the gamification system is activated to motivate **the user to modify it**.
- The system will calculate the possible modifications and present them to the user together with a **reward that motivates** them to accept a suggested modification.

# Group Gamification Approach

- The proposed system merges cooperation and competition.
- Groups are divided into:
  - Guilds: Long-term groups that cooperate and compete against other guilds.
  - Parties: Short-term groups formed to solve immediate challenges.

# Key Elements of the Proposed Approach

- Individual vs. Group Dynamics:
  - Individual users compete for rewards but must cooperate within their party.
  - Guilds compete at an intergroup level while parties cooperate to maximise rewards.
- Motivation Mechanisms:
  - Leaderboards, badges, and custom rewards drive individual engagement.
  - Visual feedback emphasises both individual and group progress.

# Benefits of the Approach

- Enhanced Engagement:
  - Combining competition and cooperation fosters deeper involvement.
  - Temporary groupings (parties) encourage negotiation and decision-making.
- Social Dynamics:
  - Cooperative intergroup interactions increase team cohesion.
  - Guilds enhance long-term participation and group loyalty.

## Conclusion

---

- Social gamification, through cooperation and competition, can enhance shared transportation systems.
- The proposed system uses both short-term and long-term groupings to balance individual and group dynamics.
- Future research will explore and validate additional gamification techniques through simulations and real-world testing.

## Acknowledgement

---



# Acknowledgement

This work is partially supported by grant PID2021-123673 and PDC2022-133161-C32 funded by MCIN/AEI/10.13039/501100011033 and by “ERDF A way of making Europe”. Pasqual Martí is supported by grant ACIF/2021/259 funded by the “Conselleria de Innovación, Universidades, Ciencia y Sociedad Digital de la Generalitat Valenciana”. Jaume Jordán is supported by grant IJC2020-045683-I funded by MCIN/AEI/10.13039/501100011033 and by “European Union NextGenerationEU/PRTR”.

Bogdan Okreša Đurić is supported by the project MOBODL-2023-08-5618 funded by the European Union and the Croatian Science Foundation. Markus Schatten and Bogdan Okreša Đurić are supported by the Croatian Science Foundation under the project number IP-2019-04-5824.

# Acknowledgement



**Funded by  
the European Union**  
NextGenerationEU

**MOBODL-2023-08-5618**

This project was funded by the  
European Union and the Croatian  
Science Foundation.



Bogdan Okreša Đurić<sup>1</sup>

Markus Schatten<sup>1</sup>

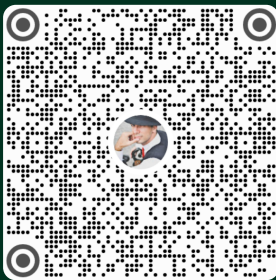
Tomislav Peharda<sup>1</sup>

Pasqual Martí<sup>2</sup>

Jaume Jordán<sup>2</sup>

Vicente Julian<sup>2</sup>

dokresa@foi.unizg.hr



<sup>1</sup>University of Zagreb Faculty of Organization and Informatics Artificial Intelligence Laboratory

<sup>2</sup>Valencian Research Institute for Artificial Intelligence, Universitat Politècnica de València

ai.foi.hr