The Influence of Narrative Framing and Gamification on Learning Performance: An Experimental Study

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Introduction

The intersection of gamification and narrative framing has gained significant attention in educational research due to its potential to enhance engagement and learning outcomes (Plass, Homer, Mayer, & Kinzer, 2020). Gamification integrates game-like elements into non-game contexts to increase motivation (Deterding, Dixon, Khaled, & Nacke, 2011), while narrative framing provides a meaningful context that can improve learning retention (Endres et al., 2024). This study explores how these two elements interact to influence the learning of abstract symbols and how personality traits affect performance in different learning conditions.

Background

Gamification in Learning

Gamification has been shown to enhance intrinsic motivation and engagement by leveraging game mechanics such as feedback, points, and progress tracking (Toda et al., 2019). Bedwell et al. (2012) found that the alignment between used game attributes and learning outcome is difficult. Recent studies (e.g., Huber et al., 2023; Ninaus et al., 2023) show that game elements can cause distractions and can also decrease the performance. Reaseons therefore could be a higher cognitive load (Sweller, 1988) and also the seductive details effect (Rey, 2012). Gamification can reduce dropout rates and improve the task attractivity. (Huber et al., 2023)

Narrative Framing and Learning

Narrative structures provide a meaningful and immersive context, facilitating deeper cognitive processing and emotional participation, especially when stories are vivid and personally relevant (Van Laer et al., 2014). Research suggests that embedding learning content within a narrative that trigger positive emotions enhances engagement and learning efficiency. In contrast negative emotions lead in task-irrelvant thinking and outcomes are likely being negative (Loderer, et al. 2020).

Personality and Learning Performance

Personality traits play a crucial role in how learners interact with gamified environments. For instance, openness to experience is associated with curiosity and adaptability, making individuals with high scores more receptive to game-based learning (Duckworth et al., 2007). The Big Five Inventory-K (BFI-K) (Kovaleva et al., 2013) is a short, version of the Big Five model, assessing: openness to experience (curiosity, imagination, receptiveness to new

experiences), conscientiousness (organization, discipline, and task-oriented behavior), extraversion, agreeableness, and neuroticism (additional domains that can also influence learning style and motivation).

Research Design

The research builds directly on Endres et al. (2024), who showed that:

- Narrative + emotional design
  significantly improved long-term retention and motivation in instructional videos.
- Neutral, non-gamified designs
  performed worst across engagement and transfer measures.
- Narrative + gamified conditions
  yielded the best outcomes in both learning performance and user experience.
- Notably, narrative framing alone (without gamification) showed better results than gamification alone, underscoring the additive value of narrative immersion.

Research Questions

This study aims to answer the following research questions:

1. Does narrative framing in a gamified environment positively impact learning performance compared to a gamified environment with neutral instruction?
2. Does a gamified environment with narrative framing lead to better learning performance than a non-gamified environment with narrative instruction?
3. How does personality influence learning performance?
   a. Is the impact of narrative framing stronger for individuals with low conscientiousness scores?
   b. Do individuals with high openness to experience scores perform better in a gamified environment?
   c. Do individuals with high openness to experience scores perform better overall?

Methodology

The study follows a 2x2 between-subjects experimental design, manipulating two independent variables:

1. instruction type: narrative vs. neutral
2. learning environment: gamified vs. non-gamified

2x2 test conditions	neutral instruction	narrative instruction
gamified environment	neutral + gamified	narrative + gamified
non-gamified environment	neutral + non-gamified	narrative + non-gamified

Table 1: Experimental conditions

Participants (N = 100-160 adults) will be randomly assigned to one of these conditions.

Procedure

Pre-Test: Measures general parameters for categorization (gender, age, occupation, etc.) and includes the Big Five Inventory-K (BFI-K) to assess personality traits (Kovaleva et al., 2013).

Learning Phase: Participants learn 20 abstract symbols through five rounds, receiving immediate feedback on correctness.

Post-Test: Subjective measures of engagement, perceived effort, and enjoyment (Klepsch, Schmitz, & Seufert, 2017).

Expected Outcomes

Based on prior research, we hypothesize that: Narrative framing will enhance performance in gamified environments due to increased engagement (Endres et al., 2024). Gamification will improve performance compared to non-gamified settings, particularly for participants with high openness to experience scores (Mayer, 2020). Individuals with low conscientiousness may benefit more from narrative framing, as it provides additional structure and motivation (Duckworth et al., 2007).

Implications

This study will contribute to the understanding of how gamification and narrative framing interact to influence learning. It will also provide insights into the role of personality in digital education, potentially informing the design of personalized learning experiences (Huber et al., 2024).

Project milestones

1. Finalization of study preparation   03.04.2025
   including narratives, pre- and posttests, recruitment letter
2. Finish data collection   22.05.2025
3. Finish of data analysis   12.06.2025
4. Submission of research poster   17.06.2025

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