

## How Different Perceived Affordances of Game Elements Shape Motivation and Performance in Gamified Learning: A Cognitive Evaluation Theory Perspective

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**Abstract :** Previous gamification research has produced mixed results regarding the effectiveness of gamified learning. One possible explanation for this is that individuals perceive the game elements differently. Cognitive Evaluation Theory posits that external rewards can boost or undermine intrinsic motivation, depending on whether the rewards are perceived as informational or controlling. This research tested the hypothesis that game elements can be perceived as either informational feedback or external reward, and the motivational impact differ accordingly. An experiment was conducted using an educational math puzzle to compare the motivation and performance as a result of different perceived affordances game elements. Participants were primed to perceive the game elements as either informational feedback or external reward, and the duration of an attempt to solve the unsolvable puzzle - amotivation indicator - and the puzzle score - a performance indicator-were measured with the game elements incorporated and then without the game elements. Badges and points were deployed as the main game elements. Results showed that, regardless of priming, a significant decrease in performance occurred when the game elements were removed, whereas the control group who solved non-gamified math puzzles maintained their performance. The undermined performance with gamification removal indicates that learners may perceive some game elements as controlling factors irrespective of the way they are presented. The results of the current study also imply that some game elements are better not being implemented to preserve long-term performance. Further research delving into the extrinsic reward-like nature of game elements and its impact on learning motivation is called for.

**Keywords :** cognitive Evaluation Theory, game elements, gamification, motivation, motivational affordance, performance

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