

# EDCI 339 – INQUIRY PROJECT

GAMIFICATION & ENGAGEMENT: CAN GAME-BASED LEARNING IMPROVE KNOWLEDGE RETENTION IN ONLINE COURSES?

## DEFINITION/WHAT IS GAMEFICATION

**Gamification is the use of game elements such as points, badges, leaderboards, challenges, and rewards in non-game settings to increase motivation and engagement.**

Source: (Centre for Teaching Excellence, n.d.).

**In education, this entails weaving game characteristics into learning activities themselves** (University of waterloo, 2026).

**LO #5:** Gamification is an instructional design approach that combines pedagogy and digital learning design to increase student engagement and motivation.

## WHAT IS KNOWLDEGE RETENTION?

**Learning retention is the ability to take newly learned information and store into long term memory** (What is Learning Retention, 2021)

Learning retention relates to key theories of how people learn and store information over time (LO #4). It also supports evaluating whether instructional strategies effectively improve long-term understanding and knowledge retention (LO #5).

## COMMON GAMIFICATION ELEMENTS



**Badges and Achievements**



**Points and Rewards**



**Leaderboards**



**Feedback systems**



**Progress Tracking**

**Interactive Learning Activities**



## LEARNING THEORIES RELATED TO ONLINE LEARNING AND GAMEFICATION

### Reinforcement Learning:

Based on operant conditioning, which was discovered by B.F. Skinner, “rewards” gained from game-based learning triggers dopamine. Especially when rewards are unpredictable or challenging to attain, it keeps us motivated and can even become addictive. Incentives guide retention and engagement with the learning platform, creating more attentive learning habits. (Pedersen, 2025) (LO #4)

### Constructivism:

As described by McLeod, constructivism is “...both a learning theory and a philosophy that suggests learners actively build their knowledge through experiences and interactions.” (2025). Using online gamified education programs, learners may be more inclined to engage with material that is interesting to them. This empowers students to take ownership of their education and become active participants in their classroom. (LO #4)

### Self Determination Theory:

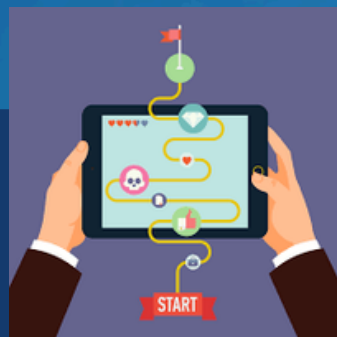
Forming the basis of human motivation, this theory remains the intersection of three psychological needs. They consist of autonomy (being in control of one’s own decisions), relatedness (feeling a sense of connection and inclusion among others), and competence (need to feel like you are capable of achievement and mastery of skills). Internal drive, or intrinsic motivation from learners may be present when interacting with educational systems that make use of gamification. (Kenyon, 2023) (LO #4 + #5)

### Flow Theory:

When learners are making use of gamified education programs, the right level of difficulty must be achieved to reach desired outcomes. Using flow theory, this can be described as the channel between boredom and anxiety, meeting students exactly where their skill level lies, to keep them interested in the resource. (Metin, 2021) (LO #4,5,6)

## EVIDENCE THROUGH EXAMPLES

- Kahoot!** – Live quizzes with points, leaderboards, and fast-paced competition  
→ Increases engagement and participation during review activities
- Duolingo** – Language learning app using XP points, streaks, levels, and badges  
→ Boosts motivation and daily practice consistency
- Gamified review games** (e.g., Jeopardy-style quizzes)  
→ Improves recall and engagement before tests



Gamification shows us how different tools and modes are used to support learning (LO #3). These tools also highlight the importance of using different designs and modes of teaching for accessibility needs (LO #6). These real life examples of gamification that we've included can be used to critically think about how tools like apps, points, and leaderboards can improve learning (LO #5).

## FACTORS THAT INFLUENCE SUCCESS

- Clear goals** – Game elements should support outcomes and not distract
- Teacher facilitation** – Instructors should focus on how well the game is introduced and guided
- Student motivation** – Success might depend on student interests and engagement
- Accessibility & inclusivity** – All students and learners should be able contribute and participate
- Meaningful feedback** – Feedback should relate to learning outcomes and provide opportunity for improvement.
- Integration with content** – gamification should enhance learning material, not replace it

Resource: (Christopoulos & Mystakidis, 2023)

## POSSIBLE DOWNSIDES

While Gamification can increase engagement and motivation, it may also have some downsides when not designed effectively, some drawbacks include:

### Focus on reward over learning

some students may become more interested in earning points, badges or rewards rather than actually understanding the material. This can reduce deep learning and long-term retention (LO #4 & 5)

### Competition can discourage learners

leaderboards and competitive activities may motivate some students, but they can also create stress or discourage learners who struggle or fall behind (LO # 5 & 6)

### Can become distracting

if game elements are overused or poorly designed, students may focus more on the entertainment aspect than the educational goals, making learning less effective (LO #5)

### Not effective for everyone

Not all students are motivated by games or competition students may prefer more traditional teaching methods or independent learning styles (LO #6)

### Accessibility and technology issues

Digital game based learning often requires devices, internet access, and digital literacy skills which may not be available to all students (LO # 2, 3 & 6)

### Time and cost

Creating high quality educational games can require significant time, effort, and financial support from educators and institutions (LO #3 & 5)

Resource: (Darad, 2024)

## POSSIBLE BENEFITS

While there are some downsides, gamification also has benefits that include:

### Increased Engagement and Motivation

- Rewards, competition, and achievements can make learning more exciting and encourage students to engage and participate more actively (LO 4 & 5)

### Improved Retention and Memory

- Immediate feedback, and reward systems can reinforce learning and help students remember information more effectively (LO #4 & 5)

### Encourage Collaboration

- Team challenges and shared goals promote communication, team work and social learning (LO #5)

### Clear Goals and Progress Tracking

- Features such as points, badges, and performance graphs help learners track their progress and stay motivated (LO #3)

### Personalized Learning Experiences

- Adaptive and self-paced learning (LO #6)

Resource: (Ladouceur, 2024)

# ETHICAL AND EDUCATIONAL CONSIDERATION

## Data privacy in educational games

educational games often collect information such as students, quiz scores, time spent on activities, and login data. Schools and developers have a responsibility to protect this information by using secure systems and being transparent about what data is collected and how it is used. Students should also be informed about their privacy rights and, when appropriate, give consent to their data being collected. Protecting personal information helps build trust and ensures ethical use of educational technology (LO #2)

## Fairness and inclusivity

Gamified learning should be designed so that all students have a equal opportunity to succeed. Some learners may have disabilities, limited access to technology, or different learning styles that make certain game features more challenging. Educational games should include accessible design features, offer multiple ways to participate, and avoid creating disadvantages for students based on their abilities, background, or access to devices. Inclusive gamification creates a more supportive learning environment for everyone. (LO #6)

## Balancing entertainment with learning objectives

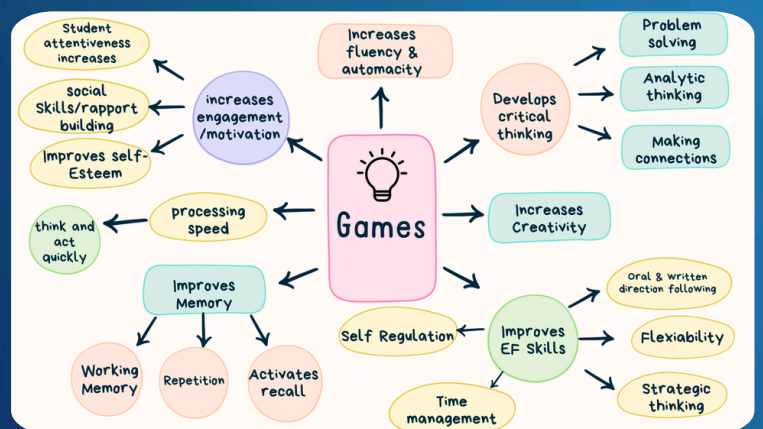
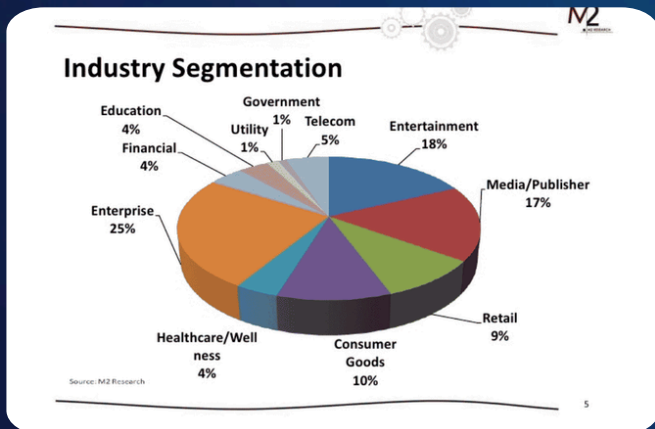
While game elements such as points, badges, and leaderboards can increase motivation and engagement, they should support learning rather than distract from it. If students focus mainly on earning rewards instead of understanding the material, learning may become more superficial. Research has shown that although gamification can significantly increase student participation and engagement, it does not always lead to improved learning outcomes or higher grades. Therefore, game elements should be connected to educational goals so that students remain focused on developing knowledge and skills. (LO# 4 & 5)

Resource: (Leach et al., n.d.)

# OUR FINDINGS/CONCLUSION

After analyzing our research findings, we believe that game-based learning does improve knowledge retention in online courses.

- Gamification can support motivation, engagement, and participation – especially when using digital tools (LO #3)
- Gamification is most effective if related to learning outcomes and design choices (LO #5)
- Gamification impact on learner retention depends on if games are designed with accessibility and different learner needs in mind (LO #6)
- Gamification works best as a tool to support learning and not as the main method for teaching (LO #5)
- Gamification apps and tools might use student and instructor information, so it is important to be aware of privacy and data use (LO #2)



# RESOURCES

Centre for Teaching Excellence. (n.d.). Gamification and game-based learning. University of Waterloo. <https://uwaterloo.ca/centre-for-teaching-excellence/catalogs/tip-sheets/gamification-and-game-based-learning>

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Pedersen, M. (2025). Gamification that works: Reinforcement learning, rewards and habit design. <https://imotions.com/blog/insights/research-insights/gamification-that-works/>