Pedagogical challenges and approaches to game-based learning

Hi!

Let's learn and have fun!

some definitions
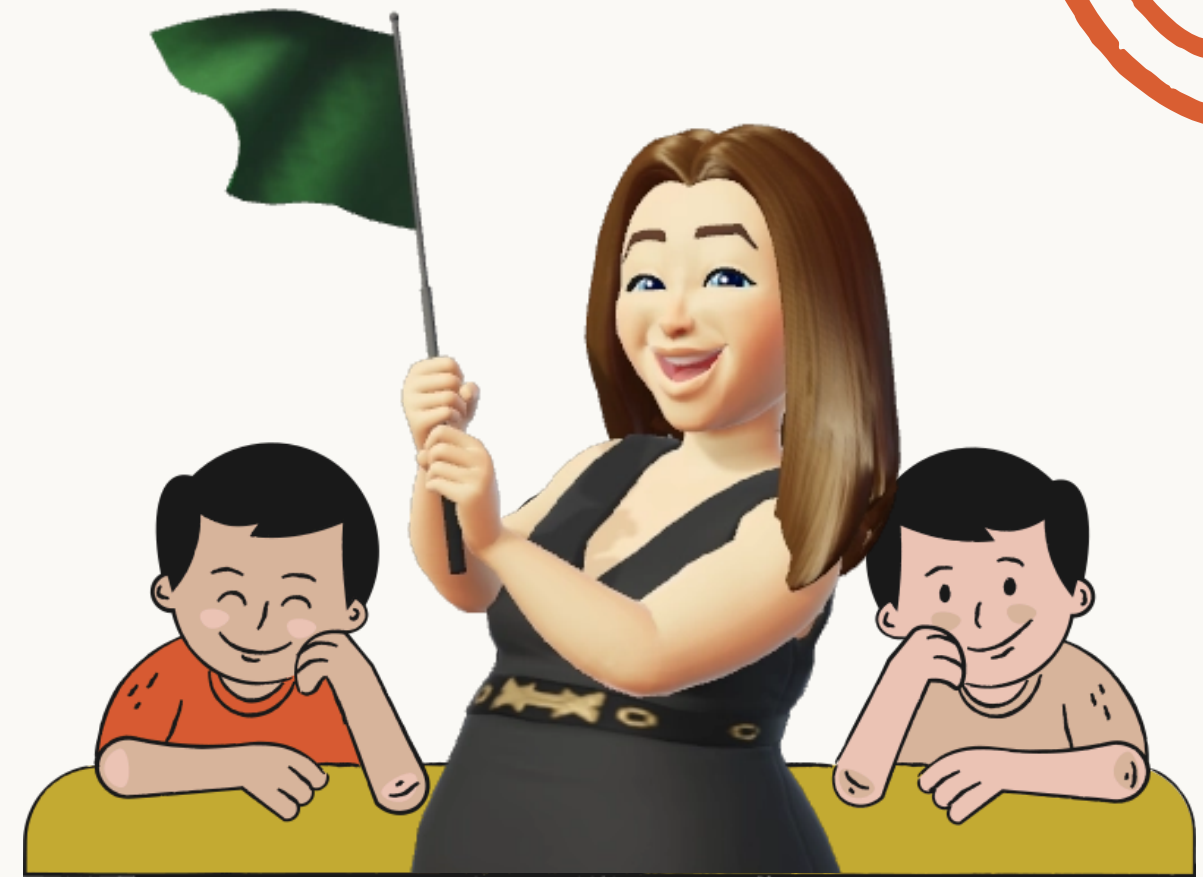
game

gamification

game-based learning

serious game

Approaches

Gamification and Meaningful gamification

Game-based learning:

Simulations

Role-playing Games

Educational Board Games and Card Games

Word Games

Puzzle Games

Video Games

Gamification

Gamification uses
game elements in non-game settings.

Adding game-like elements in lessons. Game elements include levels, points, badges, leaderboards, avatars, etc.

Motivation: likely extrinsically rewarding.

Assessment is not within the "game".

Game-like aspects are adjusted
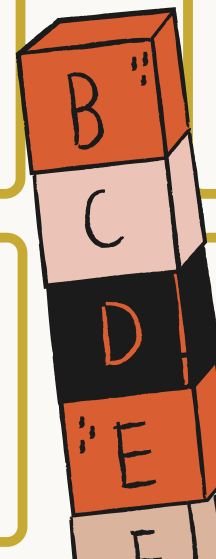to fit the lesson contents.

Game-based Learning

Games-based learning uses actual games to teach.

Using games to teach specific learning objectives. Games such as Minecraft, Tetris and so on.

Motivation: games are intrinsically rewarding.

Assessment is in-game.

Lesson content is adjusted to fit the game.

1) games foster motivation

2) play is a natural mode of learning

3) games induce cognitive flow, which is productive for learning

4) games support learning-by-doing

5) games allow for performance monitoring

6) games offer freedom of movement

7) games support social learning

8) games allow for safe experimentatio

9) games accommodate new generations of learners

10) there are many successful games for learning

The effectiveness

The effectiveness

the evidence of effectiveness needs
to be more extensively studied

the evidences on the use of games
in educational contexts in relation to
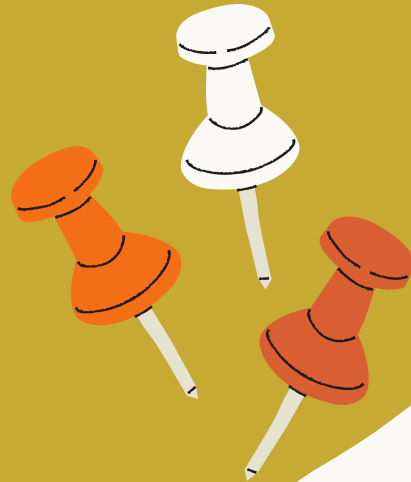
Learning outcomes

Affective outcomes

Yu et al., (2021); Zainuddin et al., (2020);
Mayer (2019); Faiella & Ricciardi (2015)
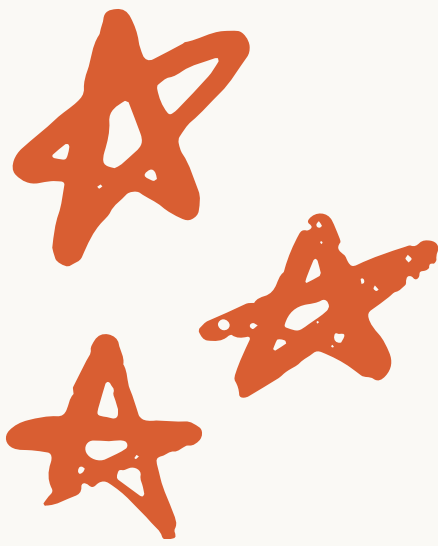
The effectiveness

Which game features promote learning?

- students learned better in a computer game when words were spoken rather than printed on the screen

- students learned better in a computer game when words were presented in conversational style than formal style

- providing students with pregame information such as the names and descriptions of the key concepts in the lesson resulted in better learning posttest scores

- providing advice or explanative feedback during the game resulted in better learning posttest scores

- providing prompts for players to write or select explanations during the game resulted in better learning posttest scores
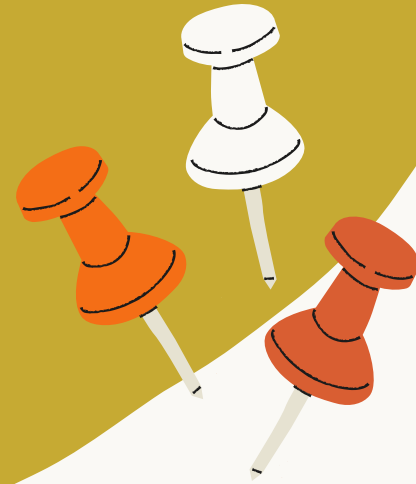
The effectiveness

When does game playing have positive consequences?

- people who were assigned to play first-person shooter games an extended period of time performed better on perceptual attention tasks than people assigned to play a control game or no game

- people who were assigned to play a spatial puzzle game for an extended period scored higher on mental rotation tests of two-dimensional shapes than people who were assigned to not play that game

The effectiveness

Do people learn better from computer games?
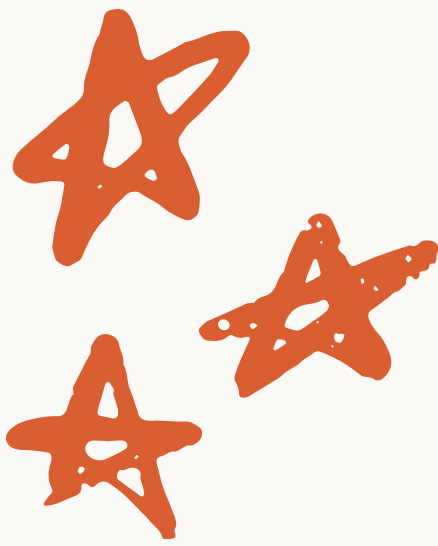
- the most-studied educational discipline is science, in which learning by playing games produced higher test scores than learning from conventional lessons

- in reviewing mathematics studies, games resulted in better learning than conventional media

- in experiments involving learning a second language, students learned better from games than from traditional media
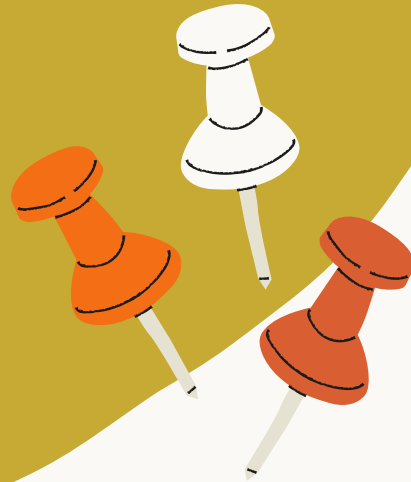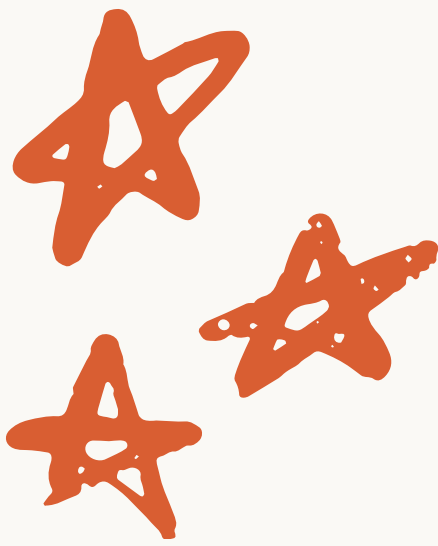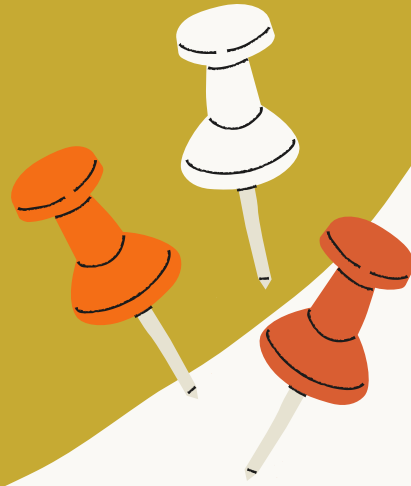
The effectiveness

- the realism added for its own purpose is not a promising game feature when the goal is to improve learning outcomes

- adding collaboration or narrative themes, when the goal is to greatly improve learning, is not appear to harm learning and may be helpful for certain kinds of learners
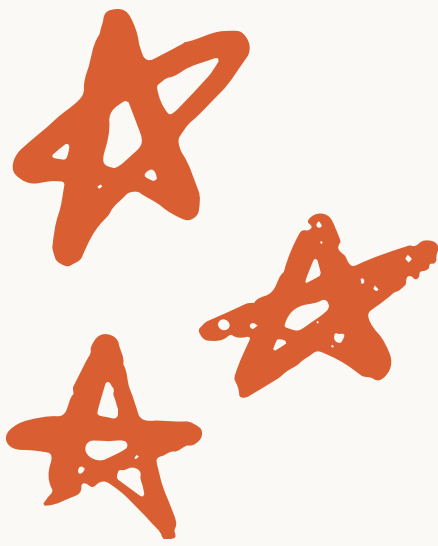
The effectiveness

- educational games could generally improve student motivations but the effect of them on motivation is contradictory

- situational games could improve student motivation and performance

- competitive games could lead to frustration of students

- some students do not like to compete with their classmates

The effectiveness

The review of literature has revealed that potential of games to improve learning and affective outcomes has not been established experimentally.

There is wide agreement about the need for

- customization
- aspects of enjoyment or novelty
- ensuring the voluntary nature of participation
- providing early, frequent, meaningful and rapid feedback
- creating a playful environment with clear goals, challenging tasks, and authentic stories in which team spirit is fostered
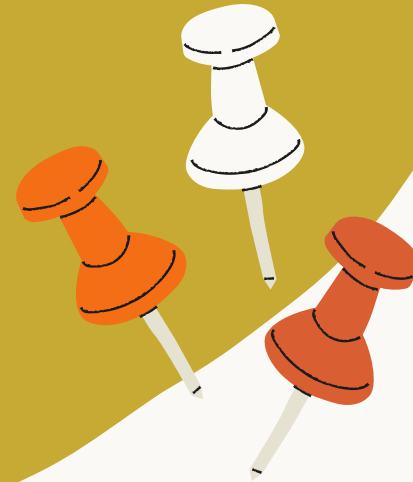
Bibliografic references

- Beard C., & Wilson J. P. (2002). The Power of Experiential Learning: A Handbook for Trainers and Educators. London: Kogan Press.
- Boud D. (1989). Some competing traditions in experiential learning. In S. Warner & I. McGill (eds.). Making sense of experiential learning: diversity in theory and practice. Buckingham: Open University Press.
- Csikszentmihalyi M. (1997). Finding flow. New York: Basic.
- Deci E., Ryan R. (1985). Intrinsic motivation and self-determination in human behaviour. New York, Plenum Press.
- Deterding S., Dixon D., Khaled R., Nacke L. (2011). From game design elements to gamefulness: defining "gamification" , in: Proceedings of the 15th International Academic MindTrek Conference: Envisioning future media environments, 9-15.
- De Zan G., De Toni A. F., Fornasier A., & Battistella C., (2015). A methodology for the assessment of experiential learning lean: The Lean Experience Factory case study. European Journal of Training and Development, 39(4), 332-354.
- Faiella F., Ricciardi M. (2015). Gamification and learning: a review of issues and research. Je-LKS, 11(3), 13-21.
- Finch D., Peacock M., Lazdowski D., Hwang M. (2015). Managing emotions: A case study exploring the relationship between experiential learning, emotions, and student performance. The International Journal of Management Education, 13(1), 23-36.
- Kolb D.A. et al. (2000). Experiential Learning Theory: Previous Research and New Directions. In Sternberg R. J. , Zhang L. F. (Eds.), Perspectives on cognitive, learning, and thinking styles. NJ: Lawrence Erlbaum.
- Krath J., Schürmann L., von Korflesch H. F.O. (2021). Revealing the theoretical basis of gamification: A systematic review and analysis of theory in research on gamification, serious games and game-based learning. Computers in Human Behavior, 12(5).
- Yu Z. et al. (2021). The Effect of Educational Games on Learning Outcomes, Student Motivation, Engagement and Satisfaction. Journal of Educational Computing Research, 59(3), 522-546.
- Mayer R.E. (2019). Computer Games in Education. Annu. Rev. Psychol., 70, 531–49.
- Nicholson, S. (2015). A RECIPE for Meaningful Gamification. In Wood, L. & Reiners, T. (eds.). Gamification in Education and Business (1-20), New York: Springer.
- Usher R. (2009). Experience, pedagogy, and social practices. In K. Illeris (ed.), Contemporary Theories of Learning (pp. 159-168). London: Routledge.
- Wurdinger S. D., & Carlson J. A. (2009). Teaching for experiential learning: five approaches that work. Lanham, MD: Rowman and Littlefield Publishers.
- Zainuddin Z. et al. (2020). The impact of gamification on learning and instruction: A systematic review of empirical evidence. Educational Research Review, 30.