BEYOND BOUNDARIES THROUGH APPLIED QUALITATIVE RESEARCH

Investigating the Impact of Educational Technology on Learners' Engagement in Game Design

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Phase 1 Study : Overview

- Phase I study explored a game-based methodology recognised as Flipped Gamification that aims to boost students' engagement, creativity, and critical thinking skills.

- **Research gap:** While specific data on flipped gamification was limited in Phase 1, related concepts were thoroughly examined.

- Based on the data analysis from Phase I, this presentation will conclude with insights on the implementation of the Flipped Gamification framework deriving from Phase II qualitative research.

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Introduction

The flipped Gamification Model

- Flipped Gamification merges **flipped learning** (pre-class study, in-class active learning) with **game-based learning** principles.

- **The Unique approach is a paradigm shift from giving choices to inspiring learners.** By tapping into students' interests to become game creators, conducting research, designing educational games or interactive presentations, and sharing them with their peers to foster a sense of empowerment.

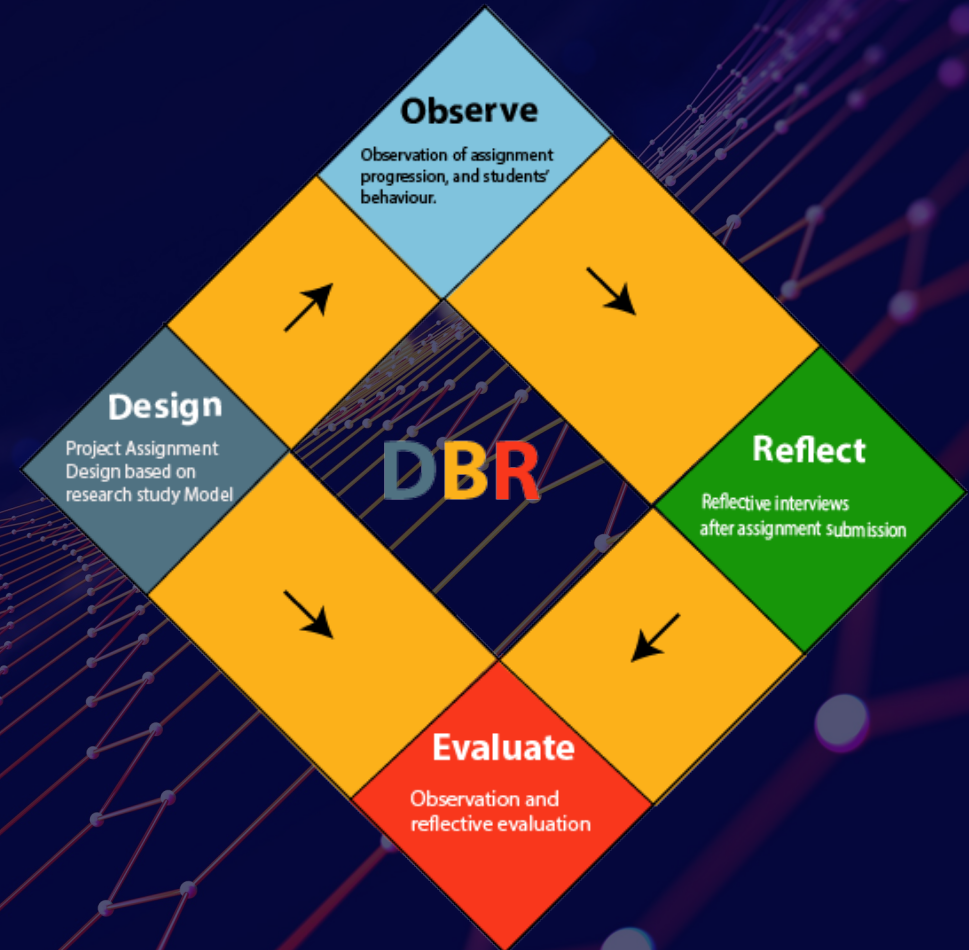Authors - Silvio Nocilla and Monaliza Nocilla 2024

Outcome: Overview of Phase II

- Students became **more self-directed**, engaged, and equipped with **21st-century skills**.

- Tools like Beca et al.'s (2022) **"Gamer4Nature Toolkit for Game Design"** provide structured guidance for students and educators.

- Enhanced autonomy, engagement, and knowledge retention.

- Increased students' intrinsic motivation to continue learning beyond the lesson.

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Theoretical Framework

- **Design-Based Research (DBR)** was used as methodology to iteratively test the flipped gamification model.

- Adapts Beca et al.'s (2022) **Gamer4Nature Toolkit** for practical classroom use.

- Adapts Rajković et al. (2020) Project-Based Learning (PBL) Design Assignment.

- Focus on problem-solving, creativity, and critical thinking.

Observe
Observation of assignment progression, and students' behaviour.

Design
Project Assignment Design based on research study Model

DBR

Reflect
Reflective interviews after assignment submission

Evaluate
Observation and reflective evaluation

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Research Question

▶| ◀ To what extent does Flipped Gamification impact on:

Engagement
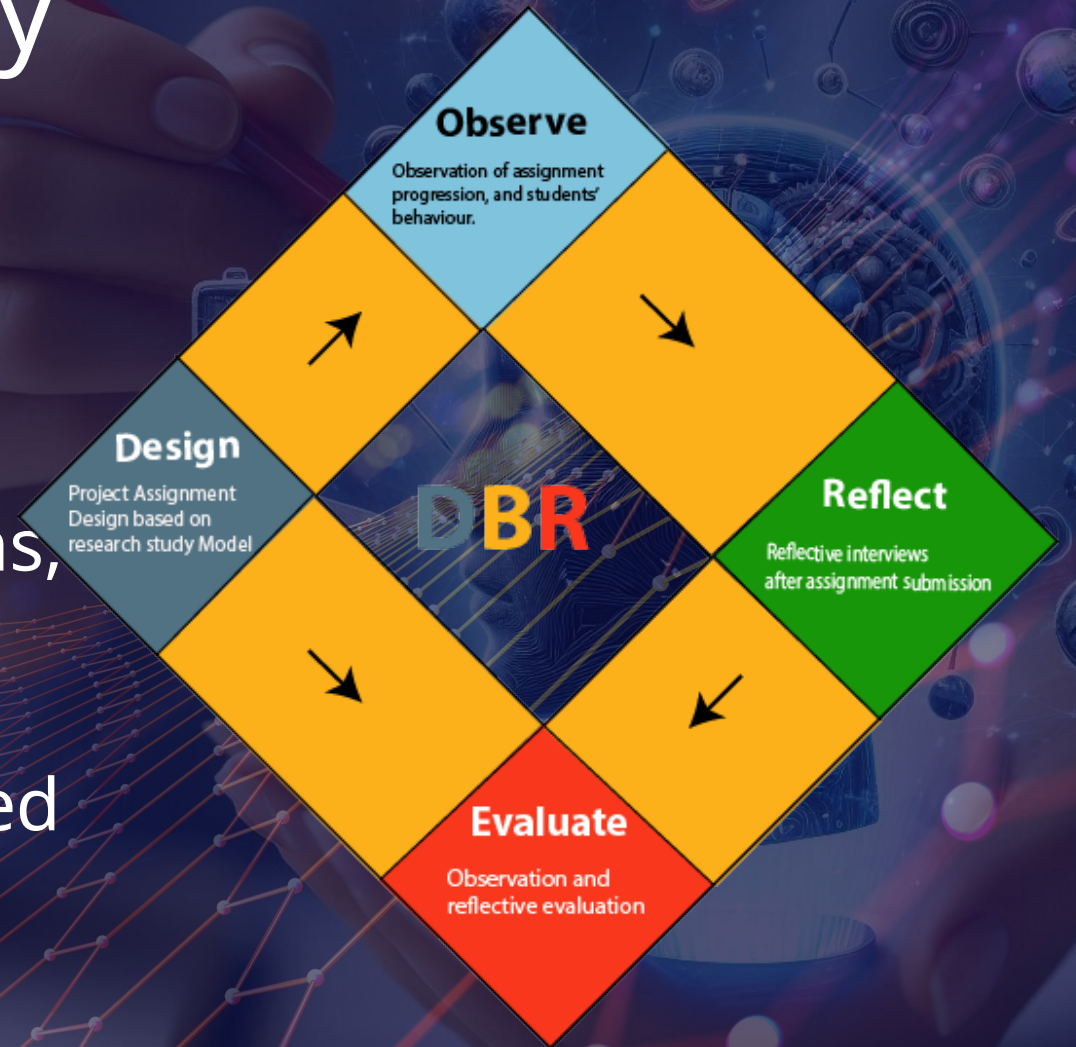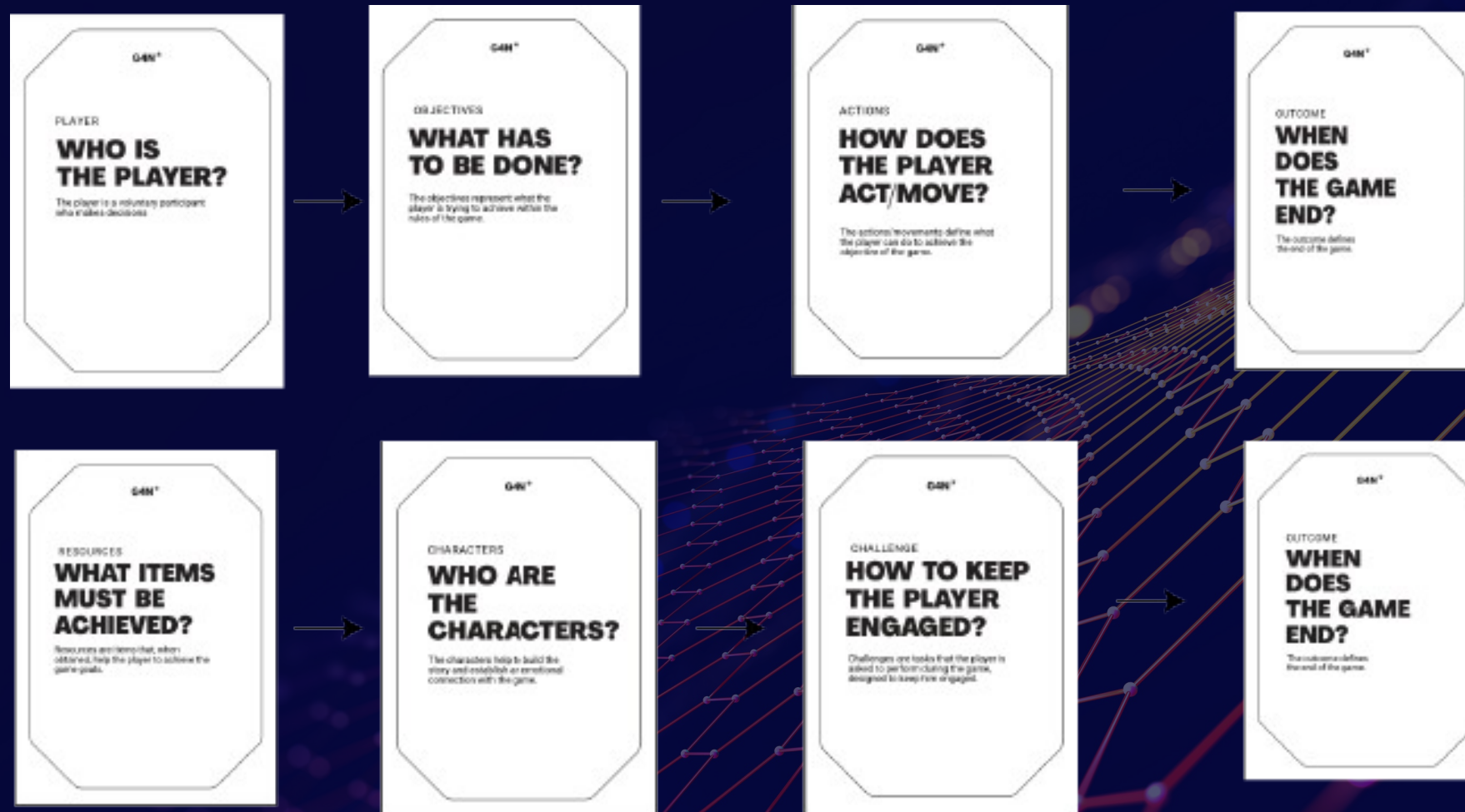
Problem-solving skills

Creative thinking abilities

As Student-Led learning approach to engage by empowering participants?

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Research Methodology

- **Sample**: 12 participants from the Advanced Diploma in Information Computer Technology

- **Qualitative Design** using observations, interviews/reflective practices.

- Project-Based Learning (PBL) integrated with game creation.

Observe
Observation of assignment progression, and students' behaviour.

Design
Project Assignment Design based on research study Model

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Beça et al.'s (2022) **Game4 Nature Model**

PLAYER
WHO IS THE PLAYER?
The player is a voluntary participant who makes decisions.

OBJECTIVES
WHAT HAS TO BE DONE?
The objectives represent what the player is trying to achieve within the rules of the game.

ACTIONS
HOW DOES THE PLAYER ACT/MOVE?
The actions/movements define what the player can do to achieve the objective of the game.

OUTCOME
WHEN DOES THE GAME END?
The outcome defines the end of the game.

RESOURCES
WHAT ITEMS MUST BE ACHIEVED?
Resources are items that, when obtained, help the player to achieve the game goals.

CHARACTERS
WHO ARE THE CHARACTERS?
The characters help to build the story and establish an emotional connection with the game.

CHALLENGE
HOW TO KEEP THE PLAYER ENGAGED?
Challenges are tasks that the player is asked to perform during the game, designed to keep him engaged.

OUTCOME
WHEN DOES THE GAME END?
The outcome defines the end of the game.

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Assignment Structure

- **Stage 1**: Proposal submission.
- **Stage 2**: Design using Beca's storyboard model.
- **Stage 3**: Full project development (VR/3D game or presentation).

Project Deliverable Sample

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Key Findings – Creativity & Problem-Solving

- **Creativity Enhancement:** High scores 12 – promotes creative thinking.

- **Overall Experience:** Score of 9 – generally positive feedback.

- **Problem-Solving:** Moderate score 8– some improvement in skills.

- **Project Development:** Lower scores 6– room for improvement.

Participants' Reflections
- Storyboard Utility: 8
- Prj Development: 8
- Problem-Solving: 10
- Creative Enhancement: 12
- Additional Insights: 12
- Overall Experience: 10

Made with Whimsical

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Flipped Gamification vs Traditional Gamification

Flipped Gamification Concern (Mogavi et al., 2022):

Gamification may overshadow learning, with students focusing more on game mechanics and resorting to unethical behaviour (e.g., cheating) for rewards.

Flipped Gamification Solution: Empowering students to create their own games keeps the focus on learning and reduces these risks.

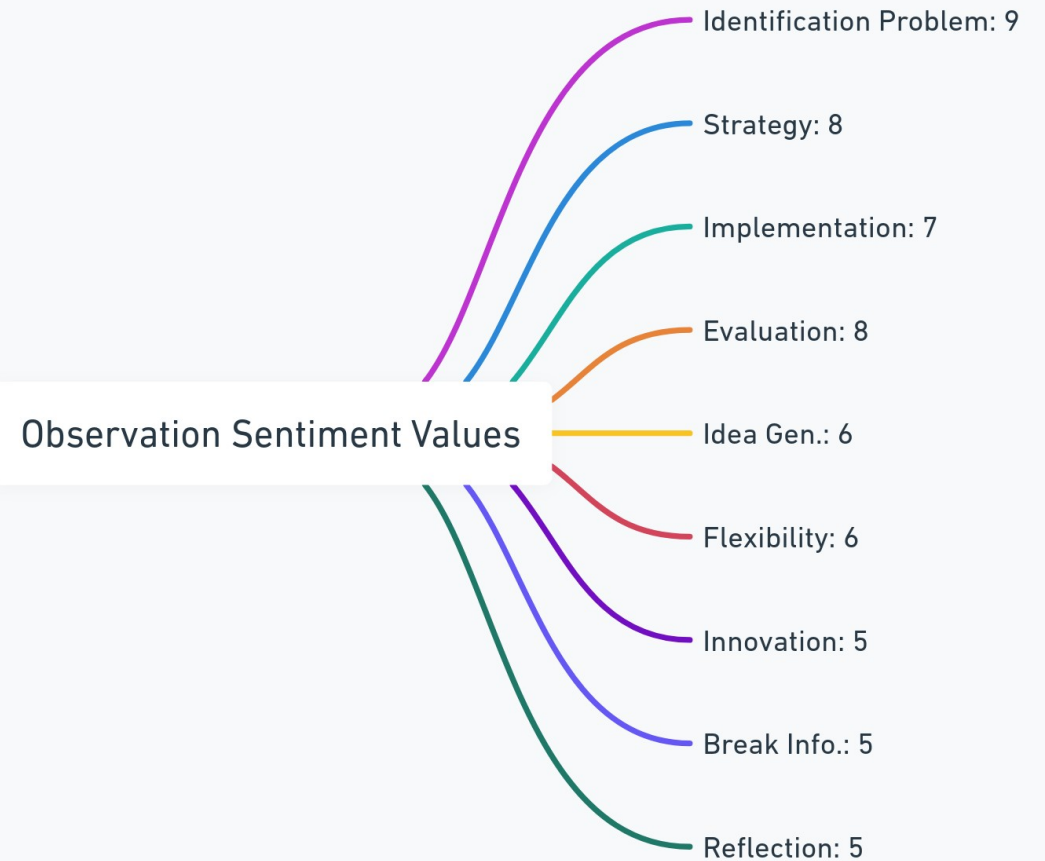**Design Challenge (Meder & Brijnesh, 2014):**

Matching game design elements with student needs is critical for engagement.
Key Factor: Selecting the right game components optimizes learning outcomes.

In flipped gamification, students create their own games, unlike traditional gamification where students play predefined games.

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Observation Analysis

Problem-Solving: Enhanced problem identification, strategy development, and solution implementation.

Creative Thinking: Improved idea generation and flexibility, but struggled with innovation.

Observation Sentiment Values

Identification Problem: 9

Strategy: 8

Implementation: 7

Evaluation: 8

Idea Gen.: 6

Flexibility: 6

Innovation: 5

Break Info.: 5

Reflection: 5

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Challenges Experienced by Participants

Time Management: Balancing project deadlines with other courseworks.

Critical Thinking: Difficulty breaking down complex information and reflecting on thought processes.

What students convey:

Participant 7 state that

"The assignment was open-ended, allowing for a high degree of creativity. There was ample room for students to be innovative, with the outcome largely depending on how far student was willing to go in developing a strong project."

Participant 5 noted that

"This was an enjoyable assignment, but conflicting deadlines with other assignments prevented me from putting more effort into it."

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Recommendations and conclusion (Model)

- Clear articulation of project purpose and deliverables.

- Detailed project plans with timelines.

- Continuous feedback and regular reviews.

- Evaluation and reflection on outcomes.

- Address time management and support critical thinking skill development.

- Flipped gamification fosters student engagement and critical 21st-century skills.

- Practical frameworks and toolkits can enhance the implementation of game-based learning in educational settings.

Stage 1: Initiation

Objectives: Define project purpose
Output: Project proposal Documentation

Stage 2: Planning

Objectives: Develop detail project plans
Output: Project plans proposal

Stage 3: Execution and Evaluation

Objective: Implementation and evaluation project success.
Output: deliverables, progress and evaluation reports

Stage 4: Evaluation

Output: deliverables, progress report and evaluation report.

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References

Anderson, T., & Shattuck, J. (2012). Design-Based Research: A Decade of Progress in Education Research.Beca, P., et al. (2022). **Students as Game Creators: Easing the Game Construction Process Using a Toolkit for Game Design**.Nocilla, S., & Nocilla, M. (2024). **Empowering Learning Through Game Creation**: MCAST Journal of Applied Research & Practice.Scott, E. E., Wenderoth, M. P., & Doherty, J. H. (2020). **Design-Based Research: A Methodology to Extend and Enrich Biology Education Research**.Yu, H. (2024). Enhancing creative cognition through project-based learning.