STRATEGIX

Play Smart. Solve Strategically.

EME 6614: Instructional Game Design for Training and Education (Spring 2026)

(A03) Pitch Document: STRATEGIX

Prepared by: Houman Rassa

Instructor: Dr. Atsusi Hirumi

Table of Contents

TEAM MEMBER

Houman Rassa

INSTRUCTIONAL CONTEXT

Target Learners

The target population consists of middle school learners in grades 8–10 with varying levels of prior mathematical knowledge, strategic reasoning ability, and academic confidence. Learners within this age group often demonstrate strong motivation when engaged in competitive environments that provide immediate feedback and visible indicators of progress. As digital natives, they are accustomed to interactive platforms that allow for repeated attempts, iterative improvement, and performance tracking. However, variability in persistence, strategy selection, and tolerance for productive struggle must be considered in the design.

Learning Context

Strategix is designed for implementation within formal educational settings as a supplemental digital learning experience aligned with middle school mathematics standards. The platform may be integrated into classroom instruction, small-group intervention, enrichment activities, or independent practice. The game supports instructional goals related to mathematical problem-solving, strategic reasoning, and reflective analysis while maintaining compatibility with existing curriculum pacing.

Instructional Goal

The instructional goal of *Strategix* is for learners to analyze mathematical problem situations, intentionally select and apply appropriate problem-solving strategies, and justify their decisions based on efficiency, accuracy, and strategic effectiveness. Learners demonstrate achievement of this goal through measurable performance indicators, including strategy selection patterns, efficiency metrics, and improvement across iterative whole-task challenges. This emphasis aligns with higher-order cognitive processes associated with analyzing and evaluating problem-solving strategies (Anderson & Krathwohl, 2001).

HIGH CONCEPT AND THEME

High Concept

Strategix is a competitive, turn-based strategy game in which learners earn points by solving math-based challenges efficiently and strategically. Rather than rewarding speed or correctness alone, the game emphasizes decision-making, trade-offs, and strategic planning by allowing multiple solution paths and scoring players based on the effectiveness of their chosen strategies.

Theme / Tone

The tone of the game is competitive, analytical, and fast-paced, with an emphasis on “smart play” over guesswork. The theme reinforces the idea that success comes from thoughtful planning, strategic choices, and reflection on outcomes rather than trial-and-error alone.

GENRE

Strategix falls within the competitive strategy and educational puzzle genres, combining turn-based gameplay with problem-solving challenges that require planning, evaluation, and adaptation.

KEY FEATURES

- **Competitive Ranked Progression System**: Players advance through performance-based tiers and leagues, increasing long-term engagement and replayability.
- **Strategy-First Scoring Model**: Unlike traditional math games that reward speed or correctness alone, *Strategix* evaluates efficiency, strategic effectiveness, and adaptability, differentiating it within the educational game market.
- **Multiple Valid Solution Pathways**: Each challenge supports diverse strategies, increasing cognitive authenticity and reducing reliance on memorization or guessing.
- **Built-In Learning Analytics Dashboard**: The digital platform captures decision logs, efficiency metrics, and strategy trends over time, providing actionable performance data for educators and institutions.
- **Adaptive Complexity Engine**: Challenge difficulty scales dynamically based on learner performance patterns, supporting both remediation and enrichment within the same platform.
- **Standards-Aligned Challenge Library**: Content is aligned to middle school mathematics standards, increasing adoption potential in formal educational settings.
- **High Replay Value Through Iterative Strategy Refinement**: Repeated play encourages measurable improvement, making the platform suitable for sustained classroom integration rather than one-time use.

PEDAGOGICAL FOUNDATIONS

The design of Strategix is grounded in whole task learning principles (Hall & Laurence, 2023), emphasizing complete problem-solving performances rather than isolated procedural skills. Each challenge requires learners to analyze a mathematical situation, select an appropriate strategy, execute a solution, and evaluate the effectiveness of their decision within a competitive context. This structure reinforces the integration of conceptual understanding and strategic reasoning, aligning with higher-order cognitive processes identified in the revised Bloom's Taxonomy (Anderson & Krathwohl, 2001).

The game also draws upon principles of self-regulated learning (Zimmerman, 2002), as learners must plan strategies, monitor performance using efficiency feedback, and reflect on decision patterns across repeated matches. In-game performance analytics function as analytic, criterion-referenced assessment of higher order cognitive strategy, consistent with research indicating that complex problem solving requires performance-based evaluation rather than conventional recall testing. Scaffolding is embedded through progressively complex challenges and structured feedback that compares strategy efficiency rather than rewarding correctness alone. The ranked progression system reinforces persistence, iterative refinement, and sustained whole-task performance over time.

Because learners vary in prior knowledge, confidence, and persistence, the design supports multiple viable solution paths and adjustable challenge complexity. Assessment focuses not only on final answers but also on decision quality, improvement across attempts, and justification of strategy selection. Performance evidence is generated through in-game decision logs, efficiency metrics, and strategy comparisons, aligning evaluation with the instructional goal of strategic mathematical problem-solving.

STORY

In *Strategix*, players enter a competitive digital arena where advancement depends not on speed, but on strategic mastery. Participants assume the role of emerging “Strategic Analysts” tasked with solving increasingly complex mathematical challenges within a global performance ladder.

Each league represents a new tier of analytical proficiency, where competitors must demonstrate not only correctness, but the ability to choose and justify efficient strategies under evolving conditions. As players advance, they unlock higher-level divisions that introduce more intricate problem structures, tighter efficiency benchmarks, and stronger opponents.

The narrative tension centers on progression: maintaining rank, climbing tiers, and proving strategic superiority. Success is not based on a single round, but on sustained performance across multiple challenges. This progression-based structure creates a sense of achievement, identity, and competitive persistence that sustains engagement over time.

Rather than relying on fantasy elements, the story emphasizes intellectual competition, growth, and mastery; positioning learners as strategic thinkers refining their analytical capabilities within a dynamic and evolving digital league.

GAMEPLAY

Strategix is a competitive, turn-based digital strategy game in which players engage in structured mathematical challenges designed to reward thoughtful decision-making. During each round, players select from a dynamically generated set of problems that vary in complexity and potential point value.

Before solving, players choose a strategy pathway (e.g., estimation, algebraic modeling, graphical reasoning, systematic elimination), reinforcing intentional decision-making rather than trial-and-error approaches. After submitting their solution, the platform evaluates performance across three criteria:

1. **Accuracy**: correctness of the final solution
2. **Efficiency**: number of steps, hints used, or time relative to optimal benchmarks
3. **Strategic Effectiveness**: alignment of the selected approach with the most efficient or conceptually sound method

Immediate, explanatory feedback compares the learner’s strategy to alternative solution paths, illustrating trade-offs and reinforcing metacognitive reflection. Players can view visual breakdowns of how different strategies impact score outcomes.

The platform tracks performance data through decision logs, efficiency metrics, and strategy selection patterns over time. This data supports adaptive challenge progression, allowing the system to increase complexity or offer targeted scaffolding based on demonstrated performance trends.

Gameplay progresses through competitive tiers, with learners earning advancement based on cumulative strategic performance rather than correctness alone. Repeated play encourages learners to refine their approaches, improve efficiency, and develop stronger mathematical reasoning through iterative whole-task practice.

REFERENCES

Hall, R., & Laurence, M. (2023). *Cause and effect game design*.

Anderson, L. W., & Krathwohl, D. R. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. Longman.

Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory Into Practice, 41*(2), 64–70.

USE OF ARTIFICIAL INTELLIGENCE (GenAI)

Generative AI was integrated as a structured design support tool across four phases of development: **(1) ideation, (2) theoretical alignment and refinement, (3) structural stress-testing against instructional design principles, and (4) final editorial polishing for clarity and precision.** AI was used iteratively: prompting, evaluating, revising, and cross-checking outputs against course frameworks to ensure alignment with research, assessment standards, and instructional design theory.

AI functioned as a collaborative design assistant rather than a substitute for instructional decision-making. Its primary uses included:

1. brainstorming alternative gameplay mechanics
2. refining terminology to align with instructional and game design frameworks
3. generating scoring and feedback models that reward strategic reasoning over speed
4. assisting in visual logo conceptualization using Google Gemini (Nano Banana)

Distinguishing Human and AI Roles

Core instructional decisions [defining the learner population, establishing the performance goal, structuring whole-task progression, and determining assessment evidence] were made independently based on professional expertise and course frameworks. AI was not used to generate learning objectives, determine theoretical grounding, or establish pedagogical alignment.

AI-supported exploration focused on variations of mechanics and language. Competitive scoring systems that overemphasized speed or undermined strategic reasoning were revised or rejected. Narrative themes introducing excessive fantasy elements were also discarded to preserve cognitive focus and contextual alignment with middle school mathematics.

Iterative Prompting and Refinement

AI interaction was iterative rather than one-directional. Initial prompts such as:

- "Generate competitive scoring systems that reward strategy efficiency over speed in math problem-solving."
- "List risks of competition-based learning environments for middle school students."
- "Suggest feedback mechanisms that compare strategy trade-offs without revealing answers immediately."

produced outputs that required refinement. Subsequent prompts were progressively narrowed to increase cognitive authenticity and eliminate suggestions that prioritized superficial gamification over instructional coherence.

Each AI-generated output was evaluated using explicit criteria:

1. Alignment with the stated instructional goal
2. Requirement of genuine mathematical analysis rather than guessing

3. Support for whole-task performance progression
4. Equity and accessibility across varied learner confidence levels
5. Feasibility within a scalable digital platform

Outputs failing to meet these criteria were revised or discarded.

Critical Evaluation of Limitations

AI-generated content was treated as provisional rather than authoritative. In particular, AI outputs sometimes generalized middle school learners as uniformly competitive or digitally fluent. These were revised to reflect variability in persistence, strategy use, and tolerance for productive struggle.

Suggestions emphasizing extrinsic rewards (points, badges, acceleration) were modified to prioritize intrinsic engagement through mastery, strategic refinement, and visible performance growth.

This evaluative process ensured that final design decisions reflect intentional instructional reasoning rather than automated synthesis.

Ethical and Responsible Use

All AI use adhered to principles of academic integrity and transparency. No AI-generated text was included without review, revision, and alignment to course expectations. AI supported exploration of alternatives; it did not complete the assignment independently.

No personally identifiable information was included in prompts. All learner descriptions and visual assets were generated using generalized descriptors. Outputs were reviewed for bias, overgeneralization, and unsupported claims to ensure the final document reflects human judgment, pedagogical intent, and alignment with course standards.