Developing Entrepreneurial Mindsets Through Gamified and Immersive Cultural Storytelling: A Case Study of the AQadventures Program

Ana Katrina P. de Jesus

Department of Humanities, College of Arts and Sciences
University of the Philippines Los Baños, Philippines

Abstract: *This case study examines the implementation of "AQadventures," an educational intervention addressing critical thinking deficiencies identified in the Programme for International Student Assessment (PISA) assessments among Filipino students. The program integrates entrepreneurial education with immersive and gamified cultural storytelling through two narrative experiences: "PAILAH," set in pre-colonial Philippines, and "IQ, AQ, EQJ," based on the life and works of a Filipino scientist. Implemented at a private school in Laguna, Philippines, the program engaged 30 students in Grades 7 to 9 through immersive, team-based challenges designed to develop Personal Entrepreneurial Competencies. Qualitative analysis of observations, student reflections, artifacts, and teacher interviews revealed significant development in opportunity recognition, strategic planning, communication, and persistence competencies. Students demonstrated increased ability to generate diverse ideas, evaluate solutions, and collaborate effectively—directly addressing skills gaps identified in PISA assessments. The cultural framing enhanced engagement and helped students connect entrepreneurial concepts to Filipino identity. Despite time and resource constraints, the program meaningfully fostered an entrepreneurial mindset, while integrating academic competencies. Findings suggest this integrated approach offers a promising model for developing 21st-century skills within culturally relevant contexts, with potential applications across diverse educational settings.*

Keywords: *gamified learning; entrepreneurial competencies; cultural storytelling; problem-based learning; immersive learning*

1. Introduction

The Philippine education system faces significant challenges in developing students' creative thinking and problem-solving skills, as evidenced by the country's low performance in the Programme for International Student Assessment (PISA) 2022. Results indicate that Filipino learners were five to six years behind in learning competencies (Servallos, 2023). These assessments reveal a gap not merely in academic performance, but in fundamental abilities necessary for success in the 21st-century economy: generating, evaluating, and improving ideas in response to complex challenges. Conventionally, educational approaches in the Philippines have been teacher-led and instructive, proving insufficient in cultivating adaptive thinking and entrepreneurial mindset required in a rapidly evolving global landscape.

Creativity within educational contexts has been largely neglected as an explicit educational outcome, and its role is acknowledged as more by accident than through intentional design. (Jackson, 2008). This limited understanding has contributed to deficiencies in how creative and entrepreneurial thinking is fostered in classrooms. Concurrently, student engagement has suffered under conventional approaches that fail to connect theoretical knowledge with practical applications.

In response, the "AQadventures" program was developed as an educational intervention addressing these gaps through gamified, immersive learning experiences. The program integrates multiple subjects into cohesive, narrative-driven learning adventures promoting active engagement, critical thinking, and problem-solving within culturally relevant contexts. The "AQ" is AQadventures means two things: one is "Adversity Quotient" and the other is "Academic Quests." By embedding Personal Entrepreneurial Competencies (PECs) within story-based challenges, AQadventures is aimed at transforming how students approach learning, from passive recipients to active problem-solvers.

This case study examines AQadventures' implementation at a private school institution in Laguna, Philippines, focusing on two narrative experiences: "PAILAH," set in pre-colonial Philippines, and "IQ, AQ, EQJ," based on Filipino national scientist Emil Q. Javier. Through analysis of program structure, implementation, participant experiences, and learning outcomes, this research provides insights into gamified cultural storytelling's potential for fostering entrepreneurial competencies, while addressing critical thinking deficiencies identified in PISA assessments.

2. Review of Literature
2.1 Entrepreneurial Education

The integration of entrepreneurship into education has been widely discussed in recent decades, owing to its positive impact, not only on the growth of individuals, but also on socio-economic development. Nonetheless, practitioners face numerous challenges in integrating entrepreneurship to education systems, such as resource constraints, fear regarding commercialism, challenges in assessment, among others (Lackéus, 2020).

Current literature emphasizes that effective entrepreneurial education goes beyond teaching business creation to fostering an entrepreneurial mindset characterized by opportunity recognition, resilience, strategic thinking, and creative problem-solving (Bacigalupo et al., 2016). Research indicates entrepreneurial education interventions are most effective when incorporating experiential components allowing students to practice and apply competencies in varied contexts (Cooper, Bottomley & Gordon, 2004).

2.2 Gamification in Educational Contexts

Gamification has emerged as a promising approach for enhancing student motivation and engagement. In a study on gamified and immersive learning, it was asserted that gamification makes learners feel ownership of their learning, hence, improving overall engagement (Moscoso et al., 2020). Well-designed gamification can increase time on task, persistence through difficulties, and intrinsic motivation (Dichev, Dicheva & Irwin, 2020).

Educational gamification's theoretical underpinnings draw from self-determination theory, suggesting effectiveness is tied to satisfying students' needs for autonomy, competence, and relatedness (Ryan & Deci, 2000). Gamification shows promise as an effective instructional approach across cognitive, motivational, and behavioral learning outcomes, with particularly strong results when incorporating game stories (such as persistent game worlds with characters) and creating environments that balance competition and collaboration, as supported by methodologically rigorous studies. (Sailer & Homner, 2020).

2.3 Cultural Storytelling as Pedagogical Practice

There are diverse manifestations of how stories drive learning since storytelling has been a long-standing tradition. Whether to entertain, or to share knowledge, promote cultural heritage, storytelling is at the core of human culture. Storytelling now transcends mere entertainment, finding applications in education, media, simulations, and training (Lugmayr et al., 2022).

Combining insights from multicultural education theory with real-life classroom stories, this book demonstrates that "all" students will perform better on multiple measures of achievement when teaching is filtered through students' own cultural experiences

When teaching is culturally responsive, students are said to perform better on various levels of achievement (Gay, 2018). When storytelling is added to culturally responsive teaching, then learners are expected to find the lessons personally relevant for them. Research shows that storytelling creates collaborative worlds where students can engage through conversations, questioning, reflections in an environment not limited by curriculum constraints. Hence, storytelling becomes powerful venues for thinking, learning, creative expression, and social interaction (Al-Jafar & Buzzelli, 2004).

2.4 Filipino Educational Context and PISA Performance

In 2020, the World Bank Group country report analyzed factors behind the poor PISA performance of Filipino learners. Their analysis revealed several contributing factors, such as inadequate educational attainment, socioeconomic gaps in proficiency and learning attitudes, school disciplinary climate, and other aspects, including instructional quality and learning time (Haw & King, 2023).

The dismal PISA performance of the Philippines reveals serious challenges in developing higher-order thinking skills, as well as in creative thinking and problem-solving. In a discussion paper by Orbeta and Paqueo (2022), it was forwarded that classrooms should not be limited to being spaces where learners are imparted knowledge, but as spaces for knowledge generation. This way, students optimize their learning experience though learner-centered education, while simultaneously empowering educators to contribute to policy-making through research.

Educational reform efforts increasingly emphasize 21st-century skill development, including critical and creative thinking, communication, collaboration, and digital literacy. A scoping review of what makes Filipino graduates employable, specifically among education professionals, revealed that the needed competencies were: "communication; information and communication technology; problem-solving and critical thinking; collaboration, cooperation, and teamwork; research; and leadership" (Caingcoy, 2024). This underscores the importance of what were once called "soft skills" or the essential skills.

Overall, this literature review reveals significant gaps regarding integration of gamification, cultural storytelling, and entrepreneurial education within Philippine K-12 context. This case study aims to contribute to the body of knowledge by examining these approaches' combined implementation in addressing PISA-identified challenges.

3. Methodology
3.1 Research Design

To examine AQadventures' implementation and outcomes, this study employed qualitative case study methodology. Case study research is appropriate for investigating complex educational interventions within real-world contexts (Yin, 2018). The bounded system was the six-month implementation of "PAILAH" and "IQ, AQ, EQJ" narratives.

The design incorporated descriptive and evaluative approaches. The descriptive component documented the program's structure, implementation process, and participant experiences, while the evaluative component assessed effectiveness in developing entrepreneurial competencies and addressing creative thinking deficiencies.

3.2 Research Setting and Participants

The study was conducted at a private education institution in Laguna, Philippines. Participants included 30 students from grades 7-9 (ages 12-15) across four classes who participated in AQadventures as part of their regular curriculum. Students worked in teams of five members, creating a collaborative learning environment.

3.3 Data Collection Methods

In gathering data for this case study, a multi-method approach was employed. Specifically, structured participant observations of program sessions were conducted using protocols focused on engagement, collaboration, problem-solving, and applications of entrepreneurial competencies. To investigate participants' experiences, the written reflections of students following each major program episode were analyzed, along with student-created outputs from program activities. Additionally, semi-structured interviews were conducted with six facilitating teachers, supplemented by program documentation, including session plans, narrative scripts, assessment rubrics, and implementation notes.

3.4 Data Analysis

These multiple data sources were analyzed through systematic coding, categorization, and thematic analysis (Saldaña, 2009). Initially, interviews were transcribed, and thematized. Student reflections were organized, and the student outputs were digitized, analyzed, and compared. Analysis proceeded through open coding to identify significant statements and patterns. Following this, axial coding was done to group related codes into categories, and thematic analysis to synthesize categories into overarching themes. Findings from different data sources were compared and integrated to strengthen validity, look out for incongruencies, if any, and finally develop a comprehensive understanding of the case, from implementation to evaluation.

4. Results and Discussion
4.1 Implementation of the AQadventures Program
4.1.1 Program Structure and Delivery

PAILAH consisted of 10 core episodes, with a culminating challenge, each dedicated to a specific entrepreneurial competency. Sessions typically followed a consistent structure: (1) narrative immersion through storytelling and role assignment, (2) team-based challenge related to the episode's focal competency, (3) debriefing and reflection, and (4) connection of experience to entrepreneurial concepts. This aligned with Kolb's experiential learning cycle.

Immersive learning happens when students are invited to embody roles in the unfolding storyworld. In the process, they relate to their respective roles, to their co-learners who are also playing roles, to the teacher who facilitates the learning and gamified activities while also embodying a role, and to the lesson content, which is contextualized in the story.

IQ, AQ, EQJ employed a similar episodic structure, but contextualized entrepreneurial competencies within Filipino national scientist Emil Q. Javier's biographical story, creating connections between entrepreneurship and STEM education:

> "What makes this approach unique is how it demonstrates that entrepreneurial thinking isn't just for business—it's equally applicable to scientific endeavors.

Students began to see how opportunity recognition and strategic planning are essential skills for scientists too." (Teacher E.D., Grade 7 Facilitator)

4.1.2 Physical and Social Learning Environment

Classrooms were reconfigured to represent narrative settings, creating immersive environments supporting role-play and scenario-based learning. This physical transformation was complemented by social restructuring through specific roles within student teams, creating interdependent learning communities with shared challenges.

Team identities were particularly evident in student reflections, with approximately 80% containing specific references to team collaboration and role fulfillment:

"Working together as a team made the challenges feel possible even when they seemed hard at first. Having different roles meant everyone had something important to do, and we had to communicate to solve the flood problem." (Student G., Grade 7)

4.1.3 Implementation Challenges

Time constraints were frequently cited, with five of six teachers reporting difficulties completing all planned activities within allocated periods. This sometimes led to compression of reflection activities. Resource limitations also posed challenges, though observational data indicated these limitations often became incorporated into the learning experience itself, with students developing creative solutions using available resources.

4.2 Development of Entrepreneurial Competencies
4.2.1 Opportunity Recognition and Risk Management

Student artifacts demonstrated progressive development in identifying opportunities within problem scenarios and evaluating associated risks. Early artifacts showed straightforward problem-solution pairings, while later work exhibited more sophisticated analysis of multiple possibilities and consideration of potential obstacles. This progression was evident in flood response blueprints, where teams initially focused on immediate protective measures but later identified community development opportunities arising from environmental challenges.

Students transferred these competencies beyond the program context:

"Before AQadventures, I usually saw problems as just problems. Now I find myself thinking 'what could be done with this?' even outside of class. Like when our barangay flooded last month, I started thinking about community solutions instead of just complaining." (Student B.N.)

References to opportunity identification increased by more than half from early to late program episodes.

4.2.2 Strategic Planning and Resource Allocation

Development of strategic planning competencies was evident in artifacts from the "Systematic Planning and Monitoring" episode of PAILAH and "Lutu-Lutuan na 'sang Lingguhan" (Cooking and Budgeting for a Week) chapter of EQJ. Students demonstrated increasing sophistication in resource allocation, timeline development, and contingency planning.

Teacher interviews highlighted observable development:

> "I've seen a marked difference in how students approach projects now. Before, they would dive in without much planning. Now they take time to map out resources, assign responsibilities, and create timelines." (Teacher JA, Grade 7 Facilitator)

Artifact analysis showed 82% of final planning documents included specific contingency measures, compared to 31% in early program artifacts.

4.2.3 Communication and Persuasion

Comparative analysis of communication artifacts revealed notable improvements in audience awareness, message structure, and evidence use. To quote,

> "Learning how to communicate my ideas clearly and persuasively has been the most useful skill. In the tribal alliance activity, I had to convince other teams to trade resources with us, and I learned how important it is to understand what the other person needs, not just what you want." (Student PK, Grade 9)

4.2.4 Persistence and Resilience

Observational data showed early sessions featured student frustration and occasional disengagement when facing difficulties, while later sessions demonstrated increased persistence through challenges:

> "The rebuilding challenge taught me that failure isn't the end. When our first house design collapsed in the simulated flood, I wanted to quit. But our team regrouped, analyzed what went wrong, and created a stronger design. I learned that persistence means learning from mistakes, not just trying the same thing over and over." (Student G, Grade 8)

4.3 Engagement and Motivational Outcomes
4.3.1 Student Engagement

Observational data indicated consistently high levels of behavioral engagement during AQadventures sessions (87% on-task behavior compared to 68% in traditional classroom settings). Engagement remained high even during conceptually challenging activities.

Student reflections frequently mentioned emotional engagement:

"I was really into the role of being a tribal leader. It felt like we were actually solving real problems, not just doing schoolwork. I was thinking about our village design even after class ended." (Student LA, Grade 7)

Analysis revealed 93% of students made explicit positive references to emotional engagement.

4.3.2 Motivational Outcomes

The badge and recognition system supported motivation through visible acknowledgment of competency development:

"Earning badges felt different from getting grades. It wasn't just about memorizing facts for a test—you had to actually demonstrate the skill in action. I felt proud earning the Risk-Taker Medal because I had to overcome my fear of sharing ideas." (Student PK, Grade 9)

Teacher interviews indicated motivational impact extended beyond the program:

"I've observed students referring back to their AQadventures competencies when facing challenges in other subjects. They'll say things like 'This is where I need to use my information-seeking skills' or 'Time to apply persistence.' The language of these competencies has become part of how they approach learning in general." (Teacher RL, Grade 8 Facilitator)

4.4 Cultural Relevance and Contextual Learning
4.4.1 Connection to Cultural Identity

Cultural framing enhanced engagement and helped students connect entrepreneurial concepts to cultural identity. References to cultural elements appeared in 68% of student reflections:

"Learning about how our ancestors solved problems with limited resources made me realize that Filipinos have always been entrepreneurial. The bayanihan spirit in rebuilding the flood-damaged village is the same kind of collaboration we need for today's problems." (Student PK, Grade 9)

Cultural framing helped students reconceptualize entrepreneurship as culturally aligned to the Filipino identity, rather than a foreign concept.

4.4.2 Contextualizing Abstract Concepts

The narrative approach contextualized abstract entrepreneurial concepts within concrete situations recognizable to students:

"Opportunity seeking isn't just a business term—it's like when we had to find new farming locations after the flood. We had to look at what seemed like a disaster and find the hidden chances for something good, like how the flooded areas created new fishing possibilities." (Student LA, Grade 7)

This finding aligns with situated learning theory, positing that knowledge is inseparable from contexts in which it is learned and applied (Lave & Wenger, 1991).

4.4.3 Connecting Historical and Contemporary Applications

The dual narrative structure enabled students to recognize entrepreneurial competencies' consistent application across different historical and cultural contexts:

"Students began to see that the same underlying skills apply whether you're an indigenous leader figuring out how to survive a flood or a modern scientist developing agricultural innovations. This helped them understand that these aren't just abstract concepts but practical tools for problem-solving in any context." (Teacher RL, Grade 9 Facilitator)

4.5 Alignment with PISA Creative Thinking Standards
4.5.1 Generating Diverse Ideas

AQadventures challenges required divergent thinking. Artifact analysis showed student teams produced an average of 4.7 distinct solution approaches per challenge by program conclusion, compared to 2.3 solutions in early artifacts.

4.5.2 Evaluating and Improving Ideas

The program incorporated structured reflection and revision processes. Observational data showed 73% of sessions included specific activities requiring teams to evaluate initial solutions against criteria and implement improvements.

Student reflections demonstrated growing metacognitive awareness:

"Our first shelter design seemed good until we tested it against the flood simulation. When it failed, we had to analyze why and make improvements. The second design was much better because we had learned from testing. I realize now that good ideas usually come from improving okay ideas, not just suddenly having a perfect idea." (Student G, Grade 8)

4.5.3 Communication and Collaboration

The collaborative nature of activities directly addressed collaborative problem-solving components of PISA assessments:

"At first, our team wasn't working well because everyone wanted their idea to win. But we learned that combining different people's ideas often created better solutions than any one person could come up with." (Student PK, Grade 9)

5. Conclusion
5.1 Summary of Key Findings

The integration of entrepreneurial education within culturally relevant narratives created a highly engaging learning environment supporting sustained student motivation. The dual narrative approach helped students recognize entrepreneurial competencies' universal relevance across diverse contexts.

Students demonstrated measurable development across multiple entrepreneurial competency domains, including opportunity recognition, strategic planning, resource allocation, communication, and persistence. The program effectively addressed creative thinking deficiencies identified in PISA assessments by providing structured opportunities for generating diverse ideas, evaluating and improving solutions, and collaborative problem-solving.

Gamification elements supported both extrinsic and intrinsic motivation, with evidence suggesting transfer of motivational benefits to other learning contexts. Implementation challenges centered primarily on time constraints and resource limitations.

5.2 Theoretical and Practical Implications

This case study supports integration of multiple learning theories—experiential learning, situated cognition, and gamification—within a coherent educational intervention. The outcomes suggest these theoretical frameworks can be complementary when integrated through a narrative structure providing meaningful context.

The case demonstrates feasibility of implementing complex, narrative-driven educational experiences within existing school structures despite constraints. The episode-based structure allowed flexible implementation within standard class periods, with initial struggles and adjustments with time management. Nonetheless, narrative continuity was maintained through sustained cultural storytelling.

For educational policy, alignment between AQadventures outcomes and PISA creative thinking standards suggests similar approaches could address national educational priorities related to 21st-century skill development. The program's accomplishment in developing entrepreneurial competencies without sacrificing academic content demonstrates these goals can be complementary.

5.3 Limitations and Recommendations

As a single-site case study conducted over a relatively short time frame, findings cannot definitively establish long-term impacts across diverse educational contexts. The absence of a comparison group limits causal claims about program effectiveness.

Future research directions may include longitudinal studies tracking persistence of developed competencies and their transfer to new contexts over time, and comparative studies examining the relative effectiveness of the AQadventures approach compared to other entrepreneurial education methodologies.

Overall, the AQadventures program represents a promising approach to addressing critical gaps in creative thinking and problem-solving skills among Filipino students. By integrating entrepreneurial education within culturally relevant, gamified narratives, the

program was able to create learning experiences that are simultaneously engaging and rigorous, culturally grounded and responsive to articulated gaps in education.

As educational systems worldwide prepare students for increasingly complex futures, approaches like AQadventures offer valuable insights into reimagining traditional educational objectives through innovative pedagogical frameworks. The demonstrated effectiveness in developing entrepreneurial competencies suggests that similar integrated, narrative-based methodologies may have broader applications across educational contexts.

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