

Oman Visionaries Game: An AI-Enhanced Gamified Platform for Engaging Students with Oman Vision 2040

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Abstract. Oman Vision 2040 sets forth the national roadmap for long-term social, economic, and technological advancement. Although numerous initiatives aim to raise awareness of the vision's priorities, many school-aged learners still struggle to grasp its strategic directions when taught through traditional, non-interactive approaches. To enhance student engagement with Oman Vision 2040 and support modern educational practices, this work introduces *Oman Visionaries Game*, an AI-enabled gamified learning platform. The system integrates an AI-driven chatbot that guides learners through key concepts, encourages exploration of national priorities, and facilitates meaningful dialogue on innovation, sustainability, and future-oriented development. Through this interactive environment, the platform aims to make learning more intuitive, appealing, and aligned with Oman's strategic aspirations.

Keywords: Oman Vision 2040, Gamification, AI Chatbot, Educational Technology, Interactive Learning.

1 Introduction

Nations around the world have adopted long-term strategic frameworks to guide technological, economic, and social development in pursuit of sustainable progress and enhanced quality of life. In Oman, this direction is embodied in Oman Vision 2040, which serves as the national reference for shaping development policies from 2021 to 2040 and acts as the foundation for sectoral strategies and consecutive five-year development programs [1]. As a transformative roadmap, Oman Vision 2040 outlines the country's aspirations to preserve its cultural identity while transitioning toward a diversified, knowledge-driven economy. The vision spans key sectors—including health, education, technology, environment, and the economy—and promotes an integrated model for inclusive and sustainable national advancement.

The Oman Vision 2040 Implementation Follow-up Unit, based in Muscat, oversees the execution of this national agenda. The unit works closely with government entities, private-sector partners, and community stakeholders to ensure alignment with national goals and effective translation of the vision into practical initiatives. Central to the vision are objectives

that support economic diversification, stimulate innovation, cultivate human capital, and encourage socially responsible and environmentally conscious lifestyles.

Oman Vision 2040 aims to reduce reliance on oil revenues by empowering the private sector, strengthening the labour force through enhanced education and skills development, and positioning Oman as a competitive regional hub. It provides frameworks for technological innovation, proposes economic reform policies, and supports programs designed to improve public services and social infrastructure. These pillars collectively contribute to achieving a sustainable and resilient national economy driven by knowledge, innovation, and societal well-being [1].

2 Literature Review

The educational approach behind the Oman Visionaries Game reflects a broader shift toward using gamification as an engaging method to reinforce learning outcomes. By blending culturally relevant content with established game-based learning principles, the platform aims to instil national awareness while simplifying the complex strategic priorities of Oman Vision 2040. This aligns with global findings demonstrating that gamification enhances learner motivation, increases knowledge retention, and transforms passive learning into an interactive experience.

Prensky's work underscores the role of digital games in improving learning by merging enjoyment, interaction, and cognitive stimulation. His research highlights how games can cultivate critical thinking and problem-solving skills by immersing learners in exploratory environments. The Oman Visionaries Game builds on these concepts by applying them within a specifically Omani context. While Prensky focuses on general educational gamification, this project adapts his principles to promote national identity and strategic understanding among young learners—an element not addressed directly in his writing. Thus, although grounded in Prensky's pedagogical foundations, the game introduces a culturally localised dimension by aligning gameplay with Oman's national priorities [2].

Similarly, the observations of Gee emphasise how video games foster adaptability, reasoning, and analytical thinking by allowing learners to explore, experiment, and make decisions within immersive environments. His findings align with the vision behind the Oman Visionaries Game, where gameplay acts as a medium for students to engage with Oman Vision 2040 strategies experientially. However, unlike Gee's broader focus on literacy and cognitive development, this project applies these principles toward a targeted educational objective—helping students internalize national goals through structured, culturally meaningful gameplay. The novelty of the Oman Visionaries Game lies in its harmonisation of local content with modern game design, translating complex national vision themes into approachable and relatable learning experiences for Omani youth [3].

3 Methodology

Agile – Scrum Framework

The Agile–Scrum methodology was selected as the most appropriate approach for this project due to its adaptability, emphasis on continuous feedback, and ability to support rapid, incremental development. These characteristics are essential when building software that requires frequent refinement based on user input, evolving requirements, and iterative feature enhancement. Scrum promotes close collaboration among stakeholders and team members, ensuring that priorities remain aligned with user expectations throughout the development cycle. The framework's iterative nature allows teams to identify risks early, adjust plans efficiently, and maintain consistent progress toward a high-quality final product. Its focus on flexibility, transparency, and continuous improvement makes Scrum particularly effective for dynamic and innovation-driven projects such as the Oman Visionaries Game [4].

3.1 Stages of Scrum Framework

Pre-project

This initial phase covers early preparations required before development begins. It may include assembling the project team, defining the vision, securing resources, and confirming the need for the proposed solution.

Feasibility

At this stage, the project undergoes a preliminary assessment to determine its technical, financial, and operational viability. The team evaluates whether the project's goals can realistically be achieved. If significant constraints are identified, the project may be reconsidered or discontinued before further resources are committed.

Foundations

This stage establishes the overall direction and framework for the project. It involves defining the project scope, clarifying high-level requirements, and identifying the responsibilities of each team member. Rather than a detailed analysis, this phase focuses on structuring the project so development can proceed with a shared understanding of objectives.

Evolutionary

During evolutionary development, the solution is progressively shaped through iterations. The team relies on timeboxing, prototyping, workshops, and continuous stakeholder feedback to refine concepts and functionality. Each cycle results in an increasingly mature and technically sound solution that responds to identified needs. Multiple rounds of planning, development, testing, and revision may occur during this stage.

Development

This stage focuses on building the core product. The team writes code, constructs system components, and performs functional and integration testing. The goal is to transform conceptual designs into a working solution that aligns with both technical and educational requirements.

Deployment

In the deployment phase, the product is released either partially or in full, depending on the readiness of individual components. Deployment activities include assembling deliverables, conducting final reviews, resolving technical issues, and making the solution available to users. Once the product enters operational use, the project formally concludes.

Post-Project

After deployment, the project is assessed to determine whether expected benefits are being realised. Many long-term advantages emerge only after the solution has been in use for some time. This phase collects feedback, measures performance, and identifies opportunities for future enhancements [5].

3.2 Stages of Scrum Framework for Project

Pre-project

In the context of the Oman Visionaries Game, the pre-project stage involved outlining the game's vision, identifying key stakeholders, and preparing the initial product backlog. A cross-functional Scrum team including developers and the Product Owner was formed with clearly defined responsibilities. Early planning also addressed timelines, resources, and potential challenges, ensuring alignment between the game's goals and the educational priorities of Oman Vision 2040.

Feasibility

This phase evaluated whether the game was achievable within technical constraints, educational requirements, and available resources. The feasibility study ensured the concept could meet its intended purpose, deliver value, and operate within project limitations. Stakeholder feedback was incorporated to confirm the relevance and practicality of the proposed solution.

Foundation

During the foundation stage, the project's structure was established by setting explicit objectives, gathering detailed requirements, and identifying the target user group. For the Oman Visionaries Game, this involved determining the appropriate topics from Oman Vision 2040, clarifying learning outcomes, and creating a design plan that aligned the gameplay with national educational objectives.

Evolutionary

Evolutionary development focused on iterative creation and enhancement of game features. Short development cycles enabled the team to produce early versions, gather feedback from players and stakeholders, and refine the game mechanics accordingly. Each iteration aimed to enhance engagement, improve learning effectiveness, and maintain alignment with the pedagogical goals of Oman Vision 2040.

Development

During development, the primary game components were constructed. This included coding interactive elements, designing visual assets, implementing gameplay logic, and integrating educational content. Throughout consecutive sprints, the team collaborated to ensure each

feature supported the game’s intended learning purpose. Stakeholder input guided adjustments, ensuring a polished and effective product.

Deployment

Deployment involved releasing the game to users through suitable platforms and ensuring compatibility across devices. The team addressed any emerging technical issues, monitored user behaviour, and prepared updates to enhance performance and usability. This stage ensured that the game reached its intended audience effectively.

Post-project

In the post-project stage, the team evaluated whether the game met its educational objectives and contributed effectively to students’ understanding of Oman Vision 2040. User feedback, performance metrics, and engagement data were analysed to identify strengths and areas for improvement. Insights from this phase will guide future updates and broader enhancements.

indicators and feedback.

4 Describing the metadata

4.1 Users Table

- Purpose: This table stores essential account information for each player registered in the system.
- Use Case:
 - Managing registration and login authentication
 - Retrieving and displaying user profiles during gameplay.

Table 1. Users Table.

Column Name	Data Type	Description
UserID	INT (PK)	Each user has a special identifier
Username	VARCHAR	Display name of the player
Email	VARCHAR	Registered email of the Player
Password	VARCHAR	Password encryption for a safe login

4.2 GameSubjects Table

- Purpose: Manage educational Topics (Oman Vision 2040 topics).
- Benefits:
 - Organised learning content: Each topic is clearly categorised (e.g., People and Society).
 - Level differentiation: The “Level” attribute controls difficulty tiers.
 - Scalability: New subjects can be added in the future without modifying the system structure.
- Use Case:
 - Allowing players to select a topic to explore.

Table 2. GameSubjects Table.

Column Name	Data Type	Description
SubjectsID	INT	Each Subjects has a special identifier
Subjectsname	INT	Display name of the Subjects
level	VARCHAR	Easy-Medium-Hard

4.3 Scores Table

- Purpose: Tracks the progress and achievements of players.
- Benefits:
 - Progress Monitoring: Tracks score values and achieved levels for each subject.
 - Data Insights: Enables analysis of subject popularity and player difficulty trends.
 - Relational Structure: Links player performance to both the user and the selected subject.
- Use Case:
 - Show high scores following games.
 - Store the most popular topics.

Table 3. Scores Table.

Column Name	Data Type	Description
score_id	INT	Each score has a special identifier
UserID	INT	User id from user table
SubjectsID	INT	Subject id from Subject table
score_value	INT	Points collected (e.g. 100)
level	VARCHAR	Level achieved (Easy-Medium-Hard)

5 Results

The Oman Visionaries Game was developed to address several challenges commonly observed in traditional educational settings, including limited student engagement, insufficient interactive learning tools, and difficulty grasping key concepts of Oman Vision 2040. Previous studies highlight how gamification and AI-driven learning environments can significantly enhance students' retention, motivation, and comprehension. Existing digital learning platforms often lack personalisation and adaptability, making them less effective for diverse learner needs.

By integrating game-based learning with an AI-supported chatbot, the Oman Visionaries Game delivers a more immersive and customised learning experience. The AI assistant adapts content to each player's learning pace, guiding them through relevant topics aligned with Oman Vision 2040. This creates a more engaging and intuitive environment in which complex strategic themes become easier to understand.

Beyond academic benefits, the game also reinforces cultural identity and national belonging. It encourages young learners to explore Oman's developmental priorities and future-focused sectors, such as sustainability, innovation, technology, and entrepreneurship. Aligning the gameplay with Oman's long-term vision ensures that students not only acquire knowledge but also develop an informed perspective on the country's future opportunities and directions.

6 Conclusion

The Oman Visionaries Game extends its impact beyond classroom learning by helping young students build a deeper and more meaningful understanding of Oman Vision 2040 and its national priorities. Through its gamified structure and AI-enhanced interactions, the platform transforms complex strategic themes into engaging and accessible learning experiences. The game fosters national awareness, strengthens cultural identity, and encourages students to think critically about Oman's future pathways.

Looking ahead, further enhancements will focus on improving accessibility and inclusivity, particularly through multilingual support and expanded gameplay features. By leveraging innovative educational technologies, the Oman Visionaries Game serves as a bridge between national development objectives and student learning, contributing to a more informed and future-ready generation.

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