Introduction

Equestrian sport is the discipline of developing a deep partnership between horse and human through training. Rather than just giving commands, the rider builds a connection rooted in trust, understanding, and subtle communication. Over years of training together, the pair enters competitions to showcase their speed, strength, mental harmony, and agility. It is far more than a physical competition—it is a demonstration of true unity between human and animal.

While the general public often views equestrian events as conventional athletic contests focused solely on maximum speed, like Olympic track or field events; this misconception overlooks the unique essence of the sport. In fact, equestrianism highlights the rigorous, long-term training that transforms a horse and rider into a synchronized team. Ultimately, what appears to be a test of raw speed is actually the culmination of patience, mutual trust, and a deep psychological bond built over time.

Equestrianism is unique among sports because success depends on the partnership between human and horse rather than the rider's skill alone. Horse and rider must function as a single unit built on trust, communication, and mutual understanding. This relationship is developed through daily care, patient training, and consistent interaction outside the competition arena, while the horse's physical and mental welfare must always take priority over competitive success. However, traditional text-based learning often struggles to convey these concepts effectively. Learning through dense blocks of text encourages passive knowledge acquisition, requires considerable cognitive effort, and can easily reduce learners' engagement and motivation. Without opportunities for interaction or experiential learning, abstract concepts such as trust, communication, and horse welfare become difficult to fully understand and remember. Therefore, this project adopts a gamified, story-driven approach, allowing learners to explore equestrian culture through interactive gameplay, observation, and decision-making. By experiencing realistic scenarios instead of simply reading about them, players are expected to develop a deeper understanding of equestrian history, horse welfare, and the importance of the horse–rider partnership.

Research Question:To what extent does gamification enhance learners' understanding of equestrian culture and horse welfare in the short term compared with traditional learning methods?

This project aims to develop an interactive story-driven simulation game that redefines how the public understand equestrianism. Rather than framing horse sports as simple tests of physical speed, the game immerses players in the life of a rider to shed light on the deep partnership, patience, and non-verbal trust required between human and animal. By placing ethical decision-making at the core of gameplay, the project emphasizes the necessity of putting horse welfare first, ultimately raising public awareness about the true spirit of equestrian collaboration.

The game delivers hands-on, experiential learning by allowing players to make daily care and training choices that directly impact their horse's physical and mental well-being. Players

learn horse care fundamentals and experience realistic training dilemmas, such as choosing gentler, longer-term training methods over aggressive approaches that risk a mental breakdown. Through these interactive scenarios, players gain a practical understanding of natural horse behavior, welfare priorities, and the foundation of a genuine bond with a horse.

The game progresses through three core phases:

- **The Narrative Intro:** An animated backstory that introduces the rich history, characteristics, and fundamentals of equestrian disciplines.
- **The Care & Training Module:** An interactive simulation where players handle daily grooming, nutrition, and psychological training to build trust and chemistry.
- **The Competition Stage:** An engaging finale featuring dressage, cross-country, and eventing, where players apply their hard-earned horse-rider harmony in competitive events.

Literature Review

The research on gamification, defined as the use of game elements in non-game contexts such as education, highlights its ability to promote active participation, collaboration and teamwork(Triantafyllou et al, 2024). Studies show that gamification enhances learners' motivation to pursue knowledge, while also improving self-efficacy and problem-solving skills through structured challenges and rewards. By incorporating instant gratification and extrinsic motivators, such as points or badges, gamification creates a more engaging learning environment, particularly for children and teenagers. Although its impact on soft skills development is more subtle, gamification should be recognized as a remarkable new form of education that benefits students and contributes to academic progress.

The study of the digital game 'Farm Animal Welfare' aims to explore how informative games can transform ordinary information into vivid storytelling and create meaningful impacts on children(Hawkins et al.2019). Since many children have limited knowledge about caring for rural animals, this educational game helps them learn practical aspects of farm animal welfare more effectively than textbooks alone. Findings show that children better understand welfare needs and farming systems, and their beliefs about animals having emotions and intelligence are strengthened after playing. As both their study and ours use educational interventions to enhance public awareness of animal welfare, it serves as an excellent reference for building the foundation of our equestrian bonding training game.

Horse welfare emphasizes the importance of the 3Fs: friends, forage, and freedom, alongside clean housing and choice in the environment(FEI,2026). Learners should recognize not only physical health issues but also signs of mental stress in horses. Using the Five

Domains—nutrition, environment, health, behavior, and mental state—it is essential to ensure both physical and psychological well-being. In light of this, horse care and welfare should be central in the equestrian bonding training game. Through daily care tasks, users can appreciate the importance of partnership and responsibility, highlighting that horse-rider harmony outweighs mere success in competition.

Building on research in gamification, which enhances motivation and teamwork, and studies showing that animal welfare education through games can transform children's understanding of sentience and care, alongside guidance from horse welfare frameworks such as the 3Fs and Five Domains, our equestrian bonding training game integrates these insights. This suggests that using game elements to educate users is a viable approach. It is hoped that, through engaging in the equestrian bonding training game, users will recognize that equestrian sport is not merely about speed or competition, but about the harmonious bond between horse and rider. Such harmony can only be achieved by emphasizing the importance of horse care and the rider's responsibility, highlighting welfare as the foundation of true partnership.

Project Design

The prototype was designed as a browser-based educational adventure game that introduces equestrian culture and horse welfare through storytelling and interactive gameplay. Instead of presenting information as text or quizzes, the game encourages players to learn by exploring environments, interacting with horses, completing tasks, and progressing through a narrative.

The game is organised into four chronological chapters, following the historical development of the relationship between humans and horses. Chapter 1 introduces the origins of human–horse partnership, while Chapter 2 focuses on the development of riding, horse care, and early equestrian traditions. Chapter 3 explores modern equestrian sports through interactive activities, including a show-jumping mini-game. Finally, Chapter 4 introduces responsible competition and horse welfare, encouraging players to prioritise the horse's wellbeing over winning.

To reinforce learning, educational concepts are embedded within gameplay and story telling rather than delivered through direct instruction. For example, players observe horse body language before approaching a horse, prepare appropriate food during horse care activities, and experience how correctly fitted equipment and welfare-conscious decisions influence the horse's behaviour. Each chapter concludes with an updated journal entry, allowing players to reflect on what they have learned while maintaining the narrative progression.

This design aims to balance historical storytelling, interactive gameplay, and educational objectives, creating an engaging learning experience that aligns with the project's research question on the effectiveness of gamification.

Method

The prototype was developed using HTML, CSS, and JavaScript to create a lightweight browser-based educational game that is accessible without additional software. HTML was used to structure the website, CSS to create responsive layouts and animations, and JavaScript to implement dialogue systems, chapter progression, mini-games, and user interactions. These technologies were selected because they are beginner-friendly, platform-independent, and suitable for rapid prototyping.

Development followed an iterative workflow. We first established the overall website structure, including the chapter navigation and user interface. Interactive gameplay mechanics, such as clickable objects, dialogue sequences, and a show-jumping mini-game, were then added incrementally. Rather than building all features at once, individual components were implemented and tested before being integrated into the complete prototype.

Artificial intelligence was used throughout development to accelerate content creation and iteration. Gemini generated visual assets and short animated scenes, while ChatGPT supported narrative design, educational content integration, dialogue writing, gameplay planning, and JavaScript debugging. AI-generated outputs were manually reviewed and refined to ensure historical accuracy, educational relevance, and consistency with the overall game design.

Self-testing was conducted throughout development. Based on these tests, navigation was simplified, chapter pacing was adjusted, and additional gameplay interactions were introduced to replace text-heavy explanations, resulting in a more engaging and coherent educational experience.

Experiment design

To evaluate the effectiveness of the prototype, a between-group experimental design will be adopted. Participants will be randomly assigned to one of two learning conditions: a gamified learning group using *The Equestrian Journal* prototype, or a traditional learning group receiving the same educational content in a conventional text-based format.

Both groups will learn identical topics covering equestrian history, modern equestrian sports, horse care, and horse welfare. After completing the learning activity, participants will complete the same post-learning questionnaire consisting of twelve multiple-choice questions designed to assess their understanding of the educational content.

The primary dependent variable is the questionnaire score, which measures short-term knowledge acquisition. Additional observations, such as task completion and participant feedback, may also be collected to evaluate engagement and overall learning experience.

By comparing the performance of the two groups, the study aims to investigate whether integrating storytelling and interactive gameplay can improve learners' understanding of equestrian culture and horse welfare compared with traditional learning methods, directly addressing the project's research question.

Result:

The project resulted in a functional, mobile-responsive educational game titled *The Equestrian Journal*. The final prototype uses a four-chapter narrative to introduce the relationship between humans and horses, equestrian culture, the three Olympic equestrian disciplines, and horse welfare. Educational content was integrated through dialogue, videos, exploration tasks, a show-jumping mini-game, welfare-sign identification, the Five Domains framework, and scenario-based decisions.

The prototype underwent multiple iterations during development. Earlier versions relied heavily on explanatory text and quiz-style questions, which made the experience feel more like an educational website than a game. Later versions adopted a more coherent, plot-driven structure, reduced the amount of text, and introduced audiovisual material, progress tracking, interactive choices, and gameplay activities. Functional testing confirmed that the main chapters, videos, scoring system, decision activities, Journal entries, and mobile layout could operate within the intended browser-based experience.

However, the planned comparative user study could not be completed within the available project period. Therefore, no valid quantitative conclusions can be drawn regarding whether the gamified experience improved short-term understanding more effectively than the traditional learning condition. The results presented here should consequently be interpreted as development and prototype outcomes rather than evidence of learning effectiveness.

Conclusion:

This project explored how gamification could be applied to the teaching of equestrian culture and horse welfare through the design of a narrative-based educational game. The final prototype demonstrates that historical information, sporting knowledge, and welfare principles can be combined within a single interactive experience. The iterative process also suggested that gamification involves more than adding quizzes or points: meaningful player actions, narrative continuity, visible progress, feedback, and decisions connected to the learning content are necessary for an experience to function as an educational game.

Nevertheless, the original research question—*To what extent does gamification enhance learners' short-term understanding of equestrian culture and horse welfare compared with traditional learning methods?*—cannot yet be answered conclusively because the planned user evaluation was not completed. The project therefore establishes a prototype and an evaluation framework rather than confirming the effectiveness of gamification.

Future research should test the game with a larger participant group using a pre-test/post-test or controlled experimental design. Participants could be assigned to either the gamified experience or equivalent non-gamified learning materials, with learning gain, knowledge retention, engagement, completion time, and usability compared between groups. Qualitative interviews or open-ended feedback could also identify confusing content and areas where the gameplay requires further improvement.

Limitations:

The principal limitation was the absence of completed user testing. Due to the restricted development schedule and the smaller-than-expected student team, available time was primarily devoted to developing and iterating the prototype. Consequently, the study did not obtain sufficient participant data for statistical or thematic analysis.

A further limitation concerns the alignment between the prototype and the questionnaire. The current prototype did not fully cover every concept or feature assessed by the questionnaire, as some planned educational content and interactions could not be implemented within the development period. Consequently, participants may not have had sufficient exposure to evaluate certain questionnaire items meaningfully. This mismatch may reduce the content validity of the evaluation and make some responses difficult to interpret. Future studies should revise the questionnaire based on the final prototype, or further develop the prototype to ensure that every measured item corresponds directly to content or interactions experienced by participants.

Reference:

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Appendix I:
User questionnaire:

Ch.1 history

1. What does the word "equestrian" mean?
    - Anything related to horses or horseback riding
    - A type of shelter built to keep farm animals safe
    - A horse trick performance
    - A person who designs and makes saddles

2. Why did people first start riding horses long ago?
    - To win sports races and entertain crowds
    - To help herd and move animals across big grassy fields
    - To fight in giant medieval battles
    - To trade goods across foreign countries

3. When did equestrian sport first appear in modern Olympics Games?
    - 1890
    - 1900
    - 1910
    - 1920

4. Until 1952, who were the only types of people allowed to compete in Olympic equestrian events?
    - Young boy
    - Military officers
    - Civilian men
    - Women

Ch.2 Horse welfare

1. What is not the main domain of horse welfare?
    - Nutrition
    - Environment
    - Physical strength
    - Mental state

2. Which food is not suitable for horses to eat?

- Potato
- Carrot
- Corn
- Grains

3. In natural horsemanship, what is a horse's primary form of communication?
    - Loud vocal neighing
    - Subtle body language
    - Stamping their feet constantly
    - Tail swishing only

4. What is the ultimate definition of true “Horse-Rider Harmony”?
    - Winning competitive equestrian events through highly intensive training methods
    - Training a horse to automatically obey every command given by the rider
    - Achieving mutual trust while prioritizing the horse's physical and mental welfare
    - Maximizing performance efficiency to achieve the highest possible scores in competition

5. Which of the following choices is not a kind of daily horse care?
    - Feeding
    - Hydration
    - Social
    - Sensitive area cleaning

6. What is not body language when a horse rejects you?
    - kicking at you
    - turning around
    - swishing tail
    - blinking

Ch.3 Equestrian sport (competition)

1. Which of the following choices is not one of the parts of eventing in equestrian?
    - Dressage
    - Training
    - Cross-Country
    - Show jumping

2. What does the acronym "LIMA" stand for in animal and horse training?
   - Least Intrusive, Minimally Aversive
   - Low Impact, Maximum Acceleration
   - Linear Intermediate Mounting Approach
   - Long Intense Movement Activity

3. What is the name of the equestrian discipline that looks like horse ballet, where horses perform graceful, rhythmic movements?
   - Vaulting
   - Dressage
   - Show jumping
   - Eventing

4. Which of the following training methods involve the most use of punishment or negative reinforcement?
   - Traditional training method
   - natural training method
   - LIMA training method
   - Desensitization & Habituation Training

5. Which of the following equipment is not used for training horses?
   - saddle
   - clicker
   - perches
   - whip

Opinion collection

1. What is your preferred study or learning method for new topics?
   - Playing a game
   - Reading textbooks
   - Watching animations
   - Listening to audiobook

2. Does this game help you understand more about equestrian sport?
   - Absolutely no
   - Not really

- Maybe
- Absolutely yes

3. Does this game help you understand more about horse welfare and proper care?
- Absolutely no
- Not really
- Maybe
- Absolutely yes

4. Which topic did you learn the most about from the game?
    - Equestrian History
    - Different Horse Training method
    - Horse Welfare/Daily Care
    - Horse Training Equipment (Bridles, Saddles)
    -

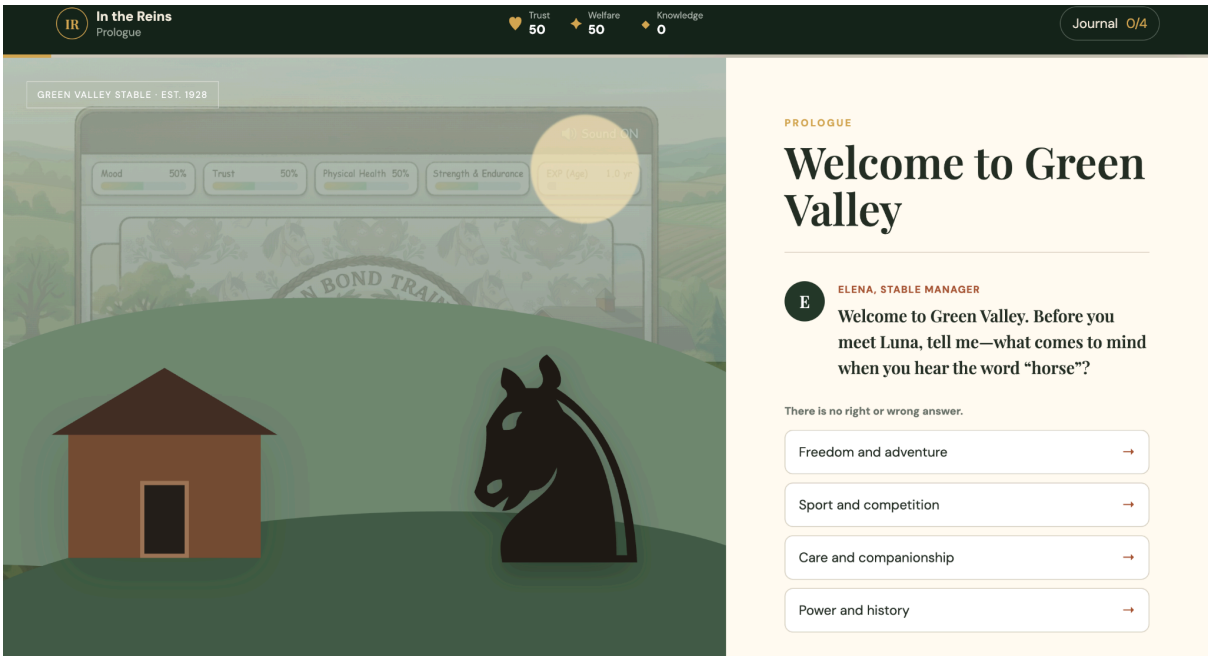
5. In general, how effective do you find games as a tool for education?
    - Not at all effective
    - Slightly effective
    - Moderately effective
    - Highly effective

6. How well did the game explain the historical development of equestrian sports?
    - I still don't understand it
    - I have a basic idea
    - I understand it moderately well
    - I understand it clearly

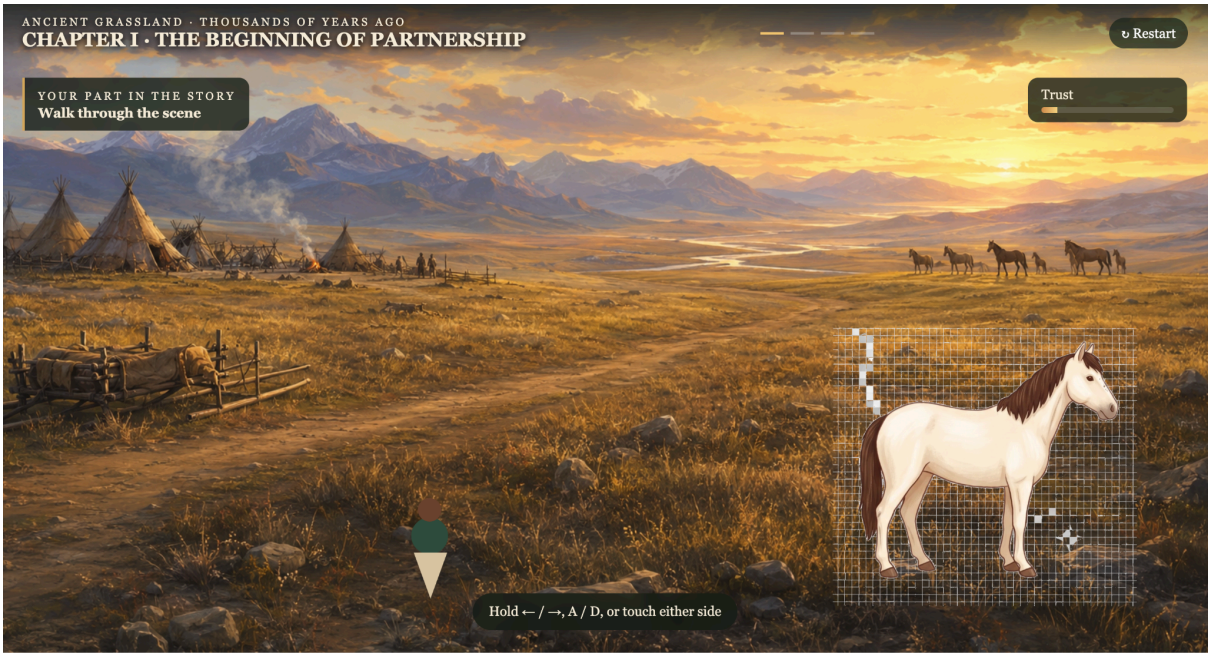
7. What was your favorite aspect of the game? (Select up to two)
    - The Story/Narration
    - The Training Scenarios
    - Learning Facts through Gameplay
    - The Art Style/Graphics

8. Are you likely to play this game again in the future?
    - No
    - Maybe
    - Probably
    - Definitely

Appendix II:
Website Iterations



Version 1: The initial prototype focused on presenting educational content through multiple choice questions . While the core information was included, user testing revealed that the experience felt too text-heavy and resembled an educational website rather than an interactive game. The visual design was also relatively plain, providing limited immersion and engagement.



Version 5: Following the initial prototype, the project shifted from a text-based educational website to a plot-driven game. The goal was to create a stronger narrative experience by allowing players to move through the environment and gradually uncover the story.

However, this iteration revealed several design challenges. Although the player could move around the scene, the gameplay lacked meaningful interactions and clear objectives. The horse sprite also appeared disconnected from the environment due to unfinished asset integration, reducing visual immersion. User testing suggested that players were unsure what actions to take next, indicating that additional guidance, interactive mechanics, and environmental storytelling were needed.

These observations motivated the following iterations, which introduced dialogue, interactive events, mini-games, and improved scene integration to create a more engaging learning experience.

Version 7:

To improve engagement, this version introduced interactive elements such as player movement, clickable objects, and simple environmental interactions. The project gradually shifted from passive storytelling towards a more game-oriented experience.

However, the visual composition also lacked consistency, with characters, icons, and scene assets appearing loosely integrated. As a result, although the prototype became more interactive, it still did not provide a sufficiently immersive or meaningful learning experience.

Version 8:

To create a smoother and more immersive learning experience, AI-generated videos and animations were introduced into the prototype. Earlier versions relied primarily on static images and abrupt scene transitions, making the gameplay feel fragmented and reducing players' sense of immersion. By incorporating short animated sequences, the project was able to present historical events, horse behaviours, and riding activities in a more natural and continuous way.

The addition of AI-generated videos also improved the narrative flow between gameplay sections. Instead of reading lengthy descriptions, players could observe actions and contexts visually before interacting with the next activity. This helped strengthen the connection between storytelling and gameplay while making educational content easier to understand and more engaging.