

1 **Enhancing Literary Understanding in Secondary Education through Role**
2 **Playing Games**

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5 This paper explores the idea of incorporating role-playing games (RPG) in secondary education for enhanced learning
6 experience. As part of our research in game-based learning, the classic epic poem “Beowulf,” widely taught in higher secondary
7 schools in the United States, has been adapted into an RPG. The core objective is to refresh literary education by offering an engaging
8 and interactive platform for a deeper understanding and appreciation of this classic work. In the game, the player navigates the
9 legendary village of Heorot, as described in the original poem, engages with non-player-controlled (NPC) characters who offer insights
10 and narrative progression, and confronts challenges that mirror the poem’s key events. The gameplay is enriched with narratives,
11 cutscenes, and boss fights that bring Beowulf’s story to life. Findings demonstrated that a game-based presentation of literary
12 work can enhance student engagement in the classroom, fostering a deeper understanding of the content.
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15 CCS Concepts: • Human-centered computing → Interaction techniques; • Applied computing → Arts and humanities.
16

17 Additional Key Words and Phrases: Gamification, Role-playing game, Game Design, Boss Fight
18

19 **ACM Reference Format:**

20 . 2018. Enhancing Literary Understanding in Secondary Education through Role Playing Games. In . ACM, New York, NY, USA, 9 pages.
21 <https://doi.org/XXXXXX.XXXXXXXX>
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24 **1 INTRODUCTION**

25 Conventional classroom teaching often uses verbose PowerPoint lecture slides packed with information. Lack of
26 immersion in the classroom environment fails to engage young adults in learning. Research findings demonstrate
27 that student interest and motivation toward learning could be substantially enhanced if education is combined with
28 entertainment [4, 18]. The results of these studies further demonstrate that students are more engaged with game-based
29 learning (GBL) than in traditional settings and could have better outcomes in a GBL classroom format [10, 16]. This
30 proposal investigates GBL’s efficacy, usability, and acceptability in secondary education literary work. It aims to develop
31 a complete GBL approach from a full unit of secondary course material and, next, implement and evaluate it in the
32 classroom environment. This requires mapping a literary work to a role-playing game (RPG) with frequent scopes for
33 testing students’ knowledge in the game environment to unlock the next level of the game.
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36 This research focuses on “Beowulf” as a setting for the game because of its prevalence in secondary and postsecondary
37 education in the United States. A local English school teacher was reported to have encountered substantial difficulties
38 motivating students while teaching the old epic poem. The teacher tried to draw students’ attention by demonstrating
39 movie clips in between lectures. However, this didn’t work well due to a lack of interactivity. Hence, an RPG of Beowulf
40 was decided to be developed, which, in addition to its interactive features, would carry students to distant time and
41 space to appreciate the masterpiece to the fullest.
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51 Manuscript submitted to ACM
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53 2 BACKGROUND

54
55 Playing is integral to children's early cognitive development [15]. Video games and RPGs intrinsically motivate students
56 and can work as incentives to assimilate classroom materials with enhanced enthusiasm and satisfaction [8, 14, 20].
57 Most classroom educational materials, irrespective of subjects, i.e., science or arts, are about solving problems, facing
58 challenges, or discovering untried paths and are highly adaptable to video games. For example, a geology teacher
59 may want students to explore the solar system by visiting various planets in an immersive virtual environment to enrich
60 their learning experience. Similarly, an English literature teacher may want students to learn the story of Beowulf in a
61 game-based environment that genuinely portrays a medieval village setting. In role-playing games (RPG), students
62 become part of the game characters by landing on planets to explore the Mars surface or fighting with Grendel or
63 Grendel's mother while playing the role of Beowulf. As educational tools, games liven up teaching methods that are
64 usually dull [21, 22]. Research findings continue to argue for GBL's efficacy as a foundational motivational tool for
65 effective learning [2, 17].
66

67 Most RPGs are highly dynamic and adaptable and can set the level of challenge by determining an individual's skill
68 level [7, 19]. In GBL, this can be easily achieved by having the teacher choose the desired difficulty level or adapt the
69 game based on how often students fail a task or activity. Students can better understand literary themes, character
70 development, and narrative structures by interacting with the content in a dynamic and immersive way [1, 3, 12].
71 GBL facilitates active participation, critical thinking, and collaborative discussions, collectively contributing to a
72 richer comprehension of literature. The gamification of education, not simply educational games but digitized video
73 gaming implementations, seemed well beyond the speculative or experimental stages and stood as viable and beneficial
74 complements to more traditional pedagogy [5, 6, 9, 11, 13]. The Oregon Trail, Green Blobs, and others demonstrated
75 the important role video games could play in the learning process. Surely, literary studies could also benefit from the
76 innovations of video games.
77

78 The RPG version of Beowulf divided the whole epic poem into several modules, each designed with narratives,
79 cutscenes, and interactive gameplay with quiz questions at the end of each module. AI-generated sounds and cutscenes
80 were used. Defeating opponents during the gameplay and passing the quiz by correctly answering questions allowed the
81 player to proceed to the next module. The game included conversations between the player and non-playing characters
82 (NPC) in a medieval village setting and visual cues to provide underlying information for the quiz. Students could act
83 Beowulf and fight with monsters, which could be strenuous; however, students would not be able to reach the next step
84 of the game without completing the quest. Students were found to be highly enthusiastic about the gamified version as
85 it was demonstrated side-by-side with the conventional PowerPoint slides in a local high school.
86

87 3 THE GAME-BASED BEOWULF LEARNING TOOL

88 The game-based Beowulf learning tool integrates gameplay with educational content to reinforce comprehension and
89 provide an engaging learning experience. The following subsections outline the key gameplay features and provide a
90 brief overview of different modules.

91 3.1 Key Gameplay Features

92 The game employs the RPG style, allowing students to embark on a journey through the world of Beowulf by playing
93 Beowulf. Key gameplay features include:
94

- 105 • **Interactions with non-playing characters (NPC)** The player interacts with NPCs to gather information.
106 NPC dialogues are designed to provide hints and information relevant to quizzes.
- 107 • **Narratives and cutscenes** Narratives and cutscenes between the player's interactions with NPCs provide
108 additional insights about Beowulf.
- 109 • **Quizzes** Players participate in quizzes in the form of multiple-choice questions (MCQ) based on game infor-
110 mation and the Beowulf story. They have to choose the correct answer for each question to answer the next
111 questions and proceed to the next step of the game. The quiz system allows them to repeat unlimited times
112 despite incorrect answers to promote a positive learning experience.
- 113 • **Boss Fights** Monsters and other antagonists appear as boss characters, who are generally far stronger than
114 other opponents the players have faced so far. Three boss fights keep students engaged by interactively telling
115 the story of Beowulf's battles. The first one is with the monster Grendel, the second fight is with Grendel's
116 mother, and the last one is with the dragon.
- 117
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120 The project was carried out in collaboration with an English teacher at a local high school, who helped with dialogues
121 and quiz questions.

124 3.2 Gameplay Loop

126 The game is divided into three modules: Act I, Act II, and Act III. A flow chart of the game incorporating different
127 features as mentioned in the last subsection has been demonstrated in Figure 1. Arrows, diamonds, and hexagons are
128 used in the flow chart to illustrate different features and actions of the game.

130 In the flow chart of Figure 1, the start and end of the game are marked by yellow hexagons. Blue-colored box arrows
131 show the in-between cutscenes and narratives. Players' interactions with NPCs, other acts, or movements, i.e., going
132 from one place to another, are differentiated from other features in cyan-colored diamonds. Ash-colored diamonds
133 demonstrate quizzes. Players repeat the quiz questions to make each of them correct before proceeding to the next quiz
134 question or the next step of the game. This is shown in a loop when the answer to the quiz question is wrong. White
135 rectangular boxes mark boss fights. Each module has one boss fight. Each boss fight can take two paths depending on
136 the player's performance: the player defeats or wins. Red diamonds mark defeats, and victories over the enemies are
137 shown in green. Again, the player must win to proceed to the next module. So, in case of defeat, they have to repeat
138 boss fights. Modules are briefly detailed below.

- 143 • **Act I** After the intro narratives with cutscenes, the game begins in the village of Heorot, where players gather
144 information, meet with King Hrothgar at Heorot Hall, sit for a quiz as instructed by the king as a condition to
145 face the monster Grendel in a boss fight, who would appear at the Herot Hall to attack villagers as the next step
146 of the game. The player has to defeat Grendel to proceed to the next module, i.e., Act II. Successful completion
147 marks the end of Act One.
- 148 • **Act II** Continues with the post-fight narrative as players meet King Hrothgar at the Heorot Hall and, next,
149 encounter Grendel's mother within her lair. Players are first quizzed on information about the battle with
150 Grendel and conversations with King Hrothgar and his associate Unferth. Players get additional information
151 through a narrative cutscene, leading to a boss fight with Grendel's mother in her underwater lair. Again, the
152 player has to defeat Grendel's mother to proceed to the next module, i.e., Act III.
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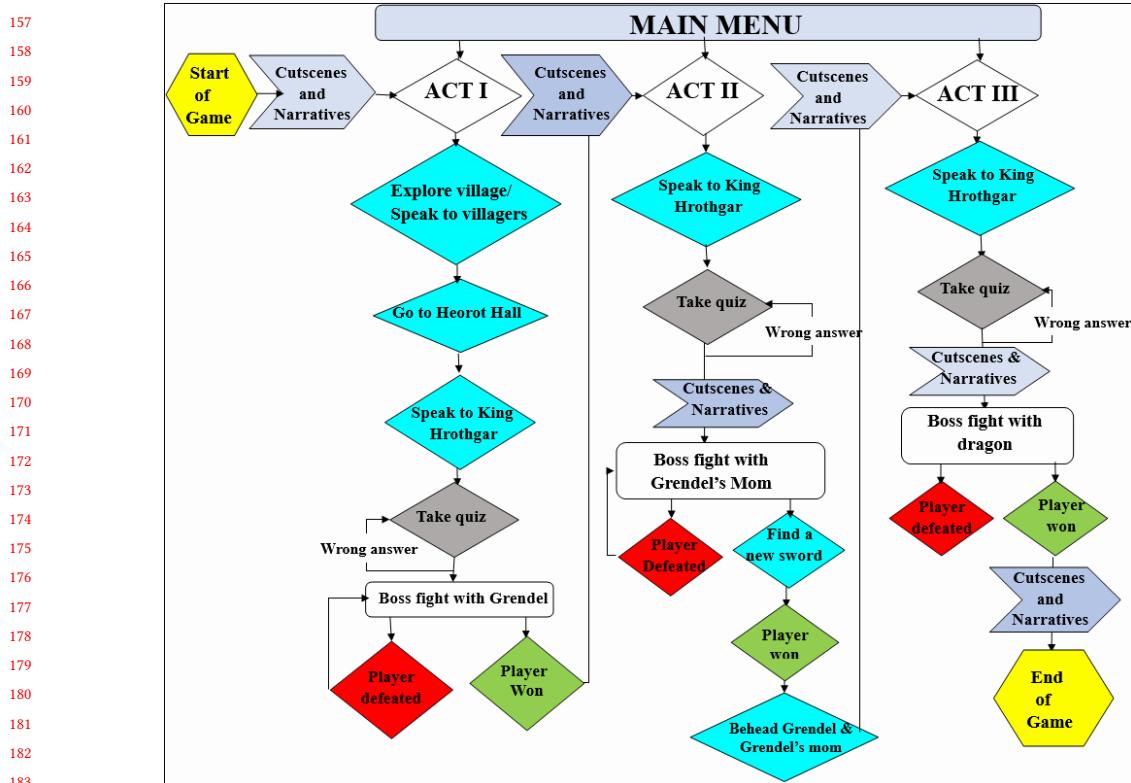


Fig. 1. The flowchart demonstrating different steps and features of Act I, Act II, and Act III of the game-based implementation of Beowulf.

- **Act III** Continues with the post-fight narrative from ACT II, where the player defeated Grendel’s mother. The player acting Beowulf delivers Grendel’s head to King Hrothgar and is quizzed for the final time. After the quiz, students are met with a narrative cutscene explaining the events after Beowulf leaves Heorot village and returns to his homeland to be crowned King. Act III is the final act, where the player playing King Beowulf faces the fire-breathing dragon. The final boss fight with the dragon, followed by another narrative scene, wraps up the epic tale.

4 IMPLEMENTATION

This includes software components, such as the game engine, assets, and other resources used to gamify Beowulf. These are briefly detailed below.

4.1 Game Engine

The Unity game engine has been used as the implementation platform of the game-based Beowulf learning tool.

4.2 Assets and Resources

A variety of assets and resources have been integrated to enhance the game:

- 209 • **Models and Character Controllers** Sourced from the Unity Asset Store (<https://assetstore.unity.com/>).
- 210 • **Custom Animations** Obtained from Mixamo (www.mixamo.com).
- 211 • **AI-driven Speech Synthesis** Implemented using ElevenLabs (<https://elevenlabs.io/>).
- 212 • **Sound Effects** Royalty-free sound effects acquired from Pixabay (<https://pixabay.com/>).
- 213 • **Debugging and Research** Utilization of ChatGPT-4 for debugging and research purposes.
- 214 • **Image Generation** Utilization of ChatGPT-4 for debugging and research purposes.
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218 5 RESULTS

219 At the time of writing this paper, all modules were complete; minor revisions were being made. Act I was already
220 demonstrated interactively to students in a local high school as Beowulf was taught in the classroom. Act II and Act III
221 were in the pipeline for demonstration. In Figure 2, Beowulf interacts with a villager shown as an NPC to learn about
222 the destruction caused by the monster Grendel. NPCs and narratives helped players accumulate valuable information
223 about the situation. Figure 3 shows Beowulf's fight with the monster Grendel from Act I. The progress for both in the
224 boss fight is shown by red bars. In the figure, monster Grendel is ahead of Beowulf in the boss fight as his red bar shows
225 better progress than Beowulf's.
226



249 Fig. 2. A scene from Act I: Beowulf interacting with a villager shown as a non-playing character (NPC) in the game to learn about
250 Grendel's destruction soon after his ship landed in the Heorot village.

251
252
253 Figure 4 shows a screenshot from Act II depicting Beowulf running away from Grendel's mother during a boss fight
254 to look for a new sword. Grendel's mother was following him. Subtitles are displayed in white.

255 The player also participated in quizzes. A screenshot of a quiz question from Act I being answered by a player is
256 shown in Figure 5. The correct answer turned green from white on click, as shown in the picture, while the incorrect
257 answer turned red.
258



Fig. 3. A scene from Act I: The player as Beowulf in a boss fight with the monster Grendel. The progress for both in the boss fight is shown by red bars.



Fig. 4. A scene from Act II: Beowulf runs away during a boss fight with Grendel's mother and is asked to press the space bar to grab the new sword as Grendel's mother follows him.

6 EVALUATION

An interactive RPG of Act I was demonstrated to forty-two high school students during the regular class hour. The teacher's lecture was intertwined with the demo. Next, students answered the quiz questions as the teacher asked them to choose the correct answer to each question interactively. Students were found to collaborate among



Fig. 5. The player answering a quiz question following his meeting with King Hrothgar in Act I. The correct answer (D) turns green from white on click, as shown in the picture, while the incorrect answer turns red.

themselves while choosing correct answers. After the demonstration, students also provided written feedback on the gamified version of Beowulf.

Student feedback was compiled. After an in-depth review, the following metrics were used for the usability study: 1) effective content delivery, 2) curriculum enrichment, 3) immersive learning experience, 4) interactive learning, 5) incentives for learning, 6) interactive content review, and 7) inclusive learning environment. These are further detailed in Table 1. Students commented positively on each component. Some suggestions were provided for further enrichment of the game. A few representative student comments are shown in Table 1 under the column “Example quotes.”

The gamified Beowulf has been designed to offer students an engaging and interactive method to explore the epic tale. Student feedback was commensurate with the goal of the Beowulf gamification project. The visual representation helped students understand what was happening in the text and gain clarity of the narrative. The gamified Beowulf awakened the latent visual learner inside each student as they suggested incorporating more Anglo-Saxoneque traits into the game for a better immersive experience. Suggestions for intensive boss fights and penalties for wrong answers demonstrated student preference to face challenges in learning. The teacher reported immediate benefits to introduce students to this process and looked forward to further development and potential applications for gamifying the classroom. The AI-generated fully voiced and scripted in-game dialogues with NPC's enhanced immersion in the storyline. Student feedback on the game stemmed from the technical aspects of gameplay and their growing understanding of the poem. Based on the feedback, necessary revisions are being carried out. In addition to the teacher's demonstration in the class, the RPG version of Beowulf will be made available to students to reinforce their learning of the epic poem.

7 CONCLUSION AND FUTURE WORK

The gamified Beowulf was envisioned primarily to reinforce the narrative and underlying themes to allow for a basic engagement with the story. Initial findings convincingly support the efficacy of the project. The game-based Beowulf

Table 1. A summary of student feedback on gamified Beowulf

Metrics	Description	Feedback type	Example quotes
Effective content delivery	The game effectively communicates the content	Positive	"It is interesting how game-making combines AI and programming. I like how accurate it is to the text and the characters quote the poem with their dialogue." "Good intro to the story. It has a lot of good text from the poem and follows the story plot well. Questions from the text are good."
Curriculum enrichment	The game enriches student learning experience	Positive	"So cool! I feel like this really helped me understand the plot. .. I like the old English when talking with other villagers." "Great, consistent, deep, detail. The summary introduces Beowulf and his character/background while also introducing other characters and their roles in the story."
Immersive learning experience	The students feel immersed into the game environment	Positive	"I love the feel once actually in the game. For AI-generated voices, they sound more natural than the usual sound we hear. Very solid feel overall." "Anglo-Saxonesque traits have been nicely incorporated into the plot.. Adding Anglo-Saxonesque music in the background would make the game more immersive."
Interactive learning	Activities such as being able to move around the village, talk to NPCs, and meet King Hrothgar provide an interactive learning experience	Positive	"I like the expedition ... I like that you are free to explore the village. .. Maybe a more interactive entry to Heorot? Like the boat is docked, and Beowulf talks to the guard down on the shore instead of in the village." "Nice interactive NPCs!"
Incentives for learning	Boss fights in the game motivate players to continue the game	Positive	"I like it when we have choices on attack. .. Multiple attacks, fighting back so the fight is not uneven." "It looks incredible! Fights might be more fun if there are more fighting moves and defense like punchout with swords."
Interactive content review	Each module has multiple choice questions, which the player must answer correctly to proceed in the game	Positive	"Honestly though, this is really cool! The review aspect is engaging." "Penalty for wrong answers, for example, make a large question bank that restarts if you get one wrong"
Inclusive learning	Sounds and subtitles made course content accessible to all students, including those who are Deaf or hard of hearing	Positive	"Texts line up with the dialog. Texts bigger and easier to read, perhaps with a black background and white text." "... voice-acting is awesome! ... Great job!"

learning tool combines gaming with education to provide students an engaging and immersive platform for studying Beowulf. By merging educational elements, motivating gameplay, inclusivity features, and compelling incentives, students' learning outcomes can be enhanced, and studying literary works like Beowulf could be an enjoyable and memorable experience. Students could be motivated to dig deep into topics with role-playing games. Just as edutainment is practiced among kindergarteners, GBL provides a similar option for secondary and post-secondary students to keep learning fresh and rejuvenated. While multiplayer features are not incorporated, students may discuss the game as a fun, novel learning tool, encouraging collaboration and knowledge sharing beyond the confines of the game.

Future work aims to longitudinally evaluate the efficacy of game-based learning, both quantitatively and qualitatively in higher secondary education. Future work will also focus on a more developed game that would include the poetic elements of the text to guide students toward a deeper understanding and more layered way to analyze the original poem.

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