



AI-Assisted Design of a Gamified HTML Vocabulary Game for College English

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Abstract. Vocabulary learning in college English often lacks motivation and proper pronunciation practice. This paper presents a teacher-designed HTML vocabulary game developed with AI-assisted coding. Implemented in two classes with 140 students over one semester, the game used a scramble function for voluntary participation. Instructor observations showed higher engagement and repeated pronunciation exposure. This case study offers a low-cost, teacher-designed gamification model that differs from commercial platform studies.

Keywords: AI-Assisted Design, Gamified learning, College English vocabulary, Teacher-designed HTML game

1 Introduction

Vocabulary acquisition is critical for college English learners^[1]. Yet in this study, the instructor observed that students often guess pronunciations instead of using dictionaries. Gamification has been widely adopted^[2] but existing research relies heavily on commercial platforms^[3,4]. Several gaps remain: teachers are treated as users not designers; public two-player competitive formats get limited attention; and teacher observations are rarely documented.

To address these gaps, this case study presents an HTML vocabulary game designed with AI-assisted coding. The game uses a two-player PK format and a click-to-pronounce audio feature. It ran for one semester with 140 students. This paper contributes a teacher-designed HTML game design, a PK mechanism with platform credits, an audio-based solution to pronunciation guessing, and qualitative classroom observations. It should be noted that this is an exploratory practice report rather than a controlled experiment. The goal is to present a replicable teacher-designed design and qualitative observations, not to prove causal effectiveness.

2 Literature Review

2.1 Gamification in College English Vocabulary Instruction

Gamification has been widely applied to English vocabulary teaching. A systematic review of empirical research confirms that its use has extended to over ten non-English-speaking countries, positively affecting students' English skills and attitudes^[5]; Recent studies have explored platforms such as Kahoot! and Quizizz, as well as mobile apps and WeChat-based mini-games^[6]; Meta-analyses confirm that gamification generally increases learner motivation, engagement, and short-term retention^[7]. However, most existing studies rely on commercial platforms with fixed templates. Although teachers can customize word lists, game mechanics, feedback design, and interaction formats cannot be fundamentally altered. This limitation prevents games from being tailored to specific pedagogical problems such as the pronunciation avoidance observed in this study. Recent studies have also explored the integration of AIGC and gamification in college English writing instruction^[8], though such AIGC-based approaches fall outside the scope of the present study.

2.2 Competition and the Teacher-Designer Gap

Competition is often incorporated through leaderboards, yet most implementations remain asynchronous. Synchronous public competition can heighten engagement via social presence and peer observation^[9]. Nevertheless, two-player PK formats on a single classroom display have been rarely examined. Attention to teacher-designed gamification has grown^[10], but empirical case studies remain rare. Most interventions are designed by researchers, not practicing teachers. Teachers' design trade-offs and in-the-moment adjustments are largely absent from the literature.

2.3 Research Gap

This study addresses the following gap: limited empirical documentation exists for teacher-designed HTML vocabulary games that (a) use a two-player PK format on a classroom computer, (b) integrate with learning platforms for credit rewards, (c) target pronunciation avoidance through click-to-audio features, and (d) report teacher observations over multiple weeks.

3 Game Design and Implementation

3.1 Pedagogical Context and Problem

The study took place in a college English course at a Chinese university using the New Target textbook. The instructor noticed students often guessed pronunciations instead of using dictionaries. A total of 140 second-year non-English majors from two classes took part. Students could scramble for a chance to play, but only two per session could

participate. The classroom had a teacher computer, a projector, and student smartphones for scrambling.

3.2 Game Mechanics

The game runs on HTML, CSS, and JavaScript. A large language model (AI) was used to generate nearly all of the code. The instructor described the desired functionality, and the AI produced the matching logic, timer, and click handlers. No external engine or commercial platform was needed.

The core mechanic is a matching game (match-3 puzzle games). Word-definition or word-picture pairs sit face down; players click to reveal and match them. A few key design choices stand out.

Two-player PK mode. Two students play head-to-head on the classroom computer. Their screens are projected for the whole class to watch. This public format adds a mild but productive social pressure.

Timer. A countdown clock tracks each player's time. The timer was added to create moderate time pressure. According to the Yerkes-Dodson law^[11], a mild level of stress can improve memory retrieval. The timer pushes students to recall vocabulary faster without excessive anxiety. The faster player wins.

Click-to-pronounce audio. Each word card triggers its correct pronunciation when clicked. This directly targets the "guess randomly" problem observed in class. Even without active effort, repeated clicks give students multiple correct auditory exposures. The pronunciation is generated by the browser's Web Speech API using the system's default voice (standard American English), requiring no pre-recorded audio files.

Small word sets per session. Each PK round covers only the vocabulary from one TEXT A section, typically 50 words. That keeps each match short and predictable.

3.3 The Two-Player PK Process

The Chaoxing platform's scramble function was used to select participants. Students who wanted to play clicked the button, and the platform randomly picked two volunteers. The two students then took turns playing the matching game on the classroom computer while the class watched the projected screen. The one who finished faster received 5 points added to their Chaoxing participation score, which counted toward the final grade. The loser received no points but also no penalty. Each PK session finished within six minutes. The game ran for one semester, covering four textbook units, with at least one session per unit.

3.4 Technical Implementation

The game runs locally on the classroom computer using HTML, CSS, and JavaScript. No internet is needed for the game itself, though Chaoxing handles scramble and point addition. Audio pronunciation is implemented via the browser's Web Speech API (JavaScript window.speechSynthesis). The API generates real-time synthetic speech using the system's default English voice (standard American English). No pre-recorded audio

files are needed, which significantly reduces teacher preparation time and makes the game easier to adapt for new word lists.

4 Classroom Observations and Reflection

No formal tests or questionnaires were administered. The instructor made systematic observations reported below.

4.1 Engagement and Social Dynamics

Each time the teacher announced a PK session, many students scrambled for the chance. The scramble function created urgency and fairness. During the match, the rest of the class watched the screen closely, reacting with gasps or cheers. This peer attention turned the activity into a class-wide event. The scramble mechanism ensured only volunteers were selected, avoiding forced participation. Students who lost did not seem upset; they gained no points but also lost nothing. With no point deduction, the atmosphere stayed positive. Each session finished within six minutes, and no technical issues occurred.

4.2 Pronunciation Effect

The click-to-pronounce feature was used frequently. Students clicked cards quickly to win, and each click played the correct sound. One student might hear the same word three to five times in a single match, providing repeated listening exposure without opening a dictionary. In regular class, students often guess pronunciations because checking takes effort; the game removed that barrier.

4.3 Perceived Learning Effectiveness

No test scores were collected, but the instructor felt that participants knew the target words better in later classes. The matching process with visual recognition, time pressure, and repeated audio aligns with retrieval practice and spaced exposure^[12]. While two students played, the rest of the class often played the game in their heads and felt nervous for the competitors. This also livened up the classroom atmosphere and increased interaction. As the instructor concluded: “I am sure it was effective because playing the matching game is itself a form of review. It deepens memory.”

5 Discussion

5.1 Contributions and Implications

This study addresses several literature gaps. The game mechanics themselves are intentionally simple, mirroring familiar matching-game structures. The novelty does not lie

in technical complexity but in the teacher-as-designer approach: a front-line instructor with basic web skills, assisted by AI, created a fully customizable game tailored to a specific textbook and a specific local problem (pronunciation avoidance). This differs fundamentally from commercial platforms where teachers are merely users of fixed templates. It provides a concrete example of teacher-designed gamification, shows how a public two-player PK format works in a real classroom, offers qualitative evidence to complement controlled experiments, and demonstrates that low-tech AI-assisted HTML games can solve local problems like pronunciation avoidance. Unlike studies using commercial platforms and short-term tests, this study uses a teacher-designed HTML game, a PK format on a shared computer, and qualitative observations over one semester. The teacher becomes a designer, not just a user. For instructors: start with a specific problem, use free web tools (HTML/CSS/JavaScript), link rewards to the existing learning platform, keep sessions short, use voluntary scramble, and avoid point deductions.

5.2 Limitations

Several limitations should be acknowledged. This study did not include pre-tests or post-tests, nor did it employ a control group. Therefore, the observed effects cannot be causally attributed to the game. No quantitative learning outcome data were collected. Observations come from a single instructor without external verification. Participation rates were not systematically tracked. This omission limits the interpretation of the results. Without knowing how many distinct students participated over the semester or how many were repeat participants, it is impossible to determine whether the observed engagement was driven by a small subset of highly motivated students or broadly distributed across the class. Consequently, claims about “increased student engagement” must be treated as preliminary. Future implementations should record each student’s participation frequency to enable more precise analysis of engagement patterns. Generalizability is limited to one instructor, two classes, one textbook, and one university context. Long-term retention was not assessed. Additionally, long-term vocabulary retention was not assessed; whether the short-term engagement during six-minute sessions translates into lasting memory remains unknown.

5.3 Future Research Directions

To compensate for the methodological limitations of this exploratory study, a rigorous quasi-experimental framework is proposed for future validation. This framework adopts a pre-test/post-test controlled design to quantitatively verify the instructional effectiveness of the teacher-designed HTML vocabulary game.

In terms of research design, intact college English classes will be randomly divided into an experimental group and a control group. The experimental group will receive semester-long vocabulary teaching assisted by the AI-designed HTML gamified tool, while the control group will adopt conventional vocabulary instruction without gamified intervention.

Standardized evaluation indicators will be implemented for quantitative measurement. Uniform vocabulary pre-tests, immediate post-class quizzes, and delayed retention tests will be conducted to compare students' short-term in-class mastery and long-term vocabulary memory retention. In-class random vocabulary checks are adopted as continuous classroom evidence to dynamically compare learning effects between groups. Meanwhile, standardized scales will be used to quantify students' English learning motivation, classroom engagement, and pronunciation avoidance levels.

For data analysis, paired-sample and independent-sample t-tests will be adopted to compare intra-group and inter-group differences. Different from the qualitative observation adopted in this study, the revised framework can generate empirical data to scientifically validate the game's pedagogical effects on vocabulary learning and phonetic habit improvement. Such a design may also be adaptable to other skills^[13].

6 Conclusion

This paper presents a teacher-designed HTML vocabulary game with a two player PK mechanism and click-to-pronounce audio. The game ran for one semester in a college English course. Winners received points on the Chaoxing platform. The competitive format and immediate reward system helped sustain student interest across multiple units. By turning vocabulary review into a timed challenge, the activity made class time more efficient: students were motivated to recall words faster and listen to correct pronunciations repeatedly. The voluntary scramble function and no penalty for losing kept the atmosphere positive. This case study offers a low cost teacher driven model that differs from commercial platform research. It shows that HTML games built by instructors can increase learning interest and improve classroom vocabulary review efficiency, especially when addressing local problems like pronunciation avoidance. Nevertheless, these conclusions are based on qualitative observations; future studies should incorporate longitudinal tracking to examine long-term retention.

Acknowledgments

This study was supported by the Innovation Training Project "Application of AI Speech Technology in English Learning" of Panzhihua University (Grant No. S202411360077).

Disclosure of Interests

The author declares no conflict of interest.

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