DESIGNING AI-BASED GAMIFICATION TO ENHANCE ELEMENTARY SCHOOL STUDENTS' MOTIVATION, READING COMPREHENSION AND PROBLEM SOLVING SKILLS

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Abstract

This study aims to design and examine an AI based gamification model for elementary school English learning, particularly to support students motivation, reading comprehension, and problem solving skills. The study used a mixed methods approach with a Design and Development Research orientation supported by the ADDIE model. AI tools were used under teacher control to design short reading texts, crossword tasks, word and picture puzzles, storybooks, missions, quests, feedback, vocabulary support, and decision making activities. The model was implemented in an experimental class, while a control class received conventional instruction. Students motivation was examined descriptively through observation sheets based on Ryan and Deci Self Determination Theory and supported by interviews, whereas reading comprehension and problem solving were examined through pretests, posttests, analytic rubrics, and SPSS analysis. In this simulated reporting model involving 30 students in each class, the experimental class obtained a motivation observation score of 84.86 in the very high category, while the control class obtained 75.42 in the high category. Reading comprehension scores were 81.93 and 70.80, and problem solving scores were 78.33 and 69.37 for the experimental and control classes respectively. SPSS analysis showed significance values of .000 for reading comprehension and problem solving. The study concludes that teacher mediated AI based gamification can become pedagogically meaningful when it is age appropriate, ethically reviewed, and aligned with clear learning outcomes.

Keywords - AI based gamification, elementary EFL, motivation, reading comprehension, problem solving, ADDIE

Introduction

Technology mediated English learning has opened wider possibilities for teachers to design learning activities that are more flexible, interactive, and responsive to students needs. In elementary school contexts, this issue is not only technical but also pedagogical. Young learners need instruction that can attract their attention, support their confidence, and help them build meaning from simple English texts. When English lessons are dominated by repetition, translation, and teacher centered explanation, students may participate passively and may read texts only at a surface level. For this reason, instructional design should not merely add digital tools to existing routines. It should reorganize the learning experience so that students have a reason to read, interact, decide, and explain their understanding.

Gamification is one approach that can respond to this need. Deterding et al. (2011) define gamification as the use of game design elements in non game contexts, while Kapp (2012) emphasizes that gamification in learning should serve instructional purposes rather than entertainment alone. In English learning, gamification may include missions, quests, levels, points, badges, challenges, feedback, progress indicators, stories, and collaborative tasks. These elements can make classroom activities more structured and purposeful, especially when students are asked to complete learning missions rather than only answer routine exercises. However, gamification should not be reduced to rewards. If points and badges are added without meaningful tasks, the learning process may become externally attractive but cognitively weak. Effective gamification requires alignment among game elements, learning objectives, students characteristics, and assessment.

Artificial intelligence has also become increasingly relevant in education. Generative AI and other AI supported tools can help teachers prepare materials, create prompts, simplify texts, generate examples, provide feedback drafts, and develop alternative task scenarios. Ng et al. (2025) argue that generative AI offers opportunities for content generation, interaction, and personalization, but they also

remind educators to consider reliability, bias, teacher readiness, and school level governance. Lo (2023) also shows that AI tools such as ChatGPT have changed the discussion of educational technology, yet their value depends on pedagogical judgment. Therefore, AI should not be positioned as a replacement for the teacher. In elementary learning, teacher mediation is even more important because young learners need age appropriate language, emotional support, and direct classroom guidance.

The present study integrates these two areas by proposing AI based gamification for elementary English learning. The phrase AI based gamification in this paper does not mean that students are taught by an autonomous AI system. It means that existing AI tools are used by the teacher and researcher to support the design of gamified learning activities. AI assists in preparing short reading texts, vocabulary support, crosswords, puzzles, AI designed storybooks, mission cards, quest sequences, scenarios, decision making prompts, and feedback options. The teacher remains responsible for reviewing, adapting, and implementing the materials. This position is central because AI generated output may be linguistically inaccurate, culturally unsuitable, or too difficult for elementary learners if it is used without human evaluation.

The study is built around three learning concerns in elementary English learning. The first concern is motivation. Many students lose interest when English lessons are repetitive, abstract, and disconnected from active participation. Ryan and Deci (2020) explain that motivation is related to autonomy, competence, and relatedness. In a gamified classroom, these needs can be supported through choice, achievable challenge, feedback, collaboration, and a sense of progress. The second concern is reading comprehension. Elementary EFL learners often struggle to identify main ideas, locate details, understand vocabulary in context, make simple inferences, and draw conclusions. The third concern is problem solving. Students are rarely asked to use information from texts to make decisions, choose strategies, or justify answers. These three concerns are connected. When students are less motivated, they tend to avoid reading tasks and have fewer opportunities to practice reasoning. When reading comprehension is weak, problem solving based on text information also becomes difficult.

Previous studies provide a strong basis for addressing these concerns. Maimaiti and Hew (2025) reported that gamified self regulated learning improved EFL reading comprehension, motivation, self regulation skills, and learning process patterns. Nguyen-Viet et al. (2023) identified challenge, enjoyment, intrinsic motivation, satisfaction, engagement, and learning effectiveness as important dimensions of gamification. Grabner-Hagen and Kingsley (2023) showed that need supportive gamification in elementary classrooms can be educationally meaningful when it supports autonomy, competence, and relatedness. In AI supported language learning, Oeda (2025) proposed an AI enhanced system for initiating and sustaining vocabulary learning, while Jin and Luo (2026) connected AI assisted vocabulary learning with lexical retention and EFL reading comprehension. These studies suggest that AI and gamification can strengthen language learning when the design is controlled by pedagogical goals.

Despite this growing literature, a research gap remains. Many studies discuss AI in higher education, adult learning, general technology adoption, vocabulary learning, or teacher perspectives. Other studies examine gamification mainly in relation to motivation and engagement. Fewer studies specifically design a teacher mediated AI based gamification model for elementary English learning that addresses motivation, reading comprehension, and problem solving skills at the same time. This gap is important because elementary learners have different developmental characteristics from older students. They need concrete tasks, simple language, supportive feedback, social interaction, and carefully scaffolded challenges. Therefore, a design that works for university students cannot simply be transferred to elementary classrooms.

Based on this background, this paper aims to present a full paper version of a thesis on AI based gamification for elementary

English learning. The paper focuses on four questions. First, how can AI based gamification be designed for elementary school English learning. Second, how do students respond to the implementation of the model in terms of motivation. Third, is there a difference in reading comprehension between students taught through AI based gamification and those taught through conventional instruction. Fourth, is there a difference in problem solving skills between students taught through AI based gamification and those taught through conventional instruction. The paper is expected to contribute a clearer design framework for responsible AI integration and meaningful gamification in elementary English classrooms.

Methodology

This study used a mixed methods approach with a Design and Development Research orientation. The mixed methods approach was selected because the study investigated both the design process and the learning outcomes of the proposed model. The qualitative component was used to explore students motivation and classroom responses during the implementation of AI based gamification. The quantitative component was used to examine reading comprehension and problem solving skills through pretest and posttest performance. The combination of these data sources allowed the researcher to examine not only whether learning outcomes changed, but also how students experienced the gamified learning process.

The development procedure was organized through the ADDIE model, which consists of analysis, design, development, implementation, and evaluation (Branch, 2009). In the analysis stage, the researcher identified classroom problems, students needs, reading difficulties, motivational issues, curriculum demands, and school feasibility. Data were collected through preliminary observation, teacher interview, curriculum analysis, and informal review of students learning characteristics. This stage was important because gamification cannot be designed effectively without understanding actual classroom conditions. The output of the analysis stage was a set of design needs, such as the level of reading text, the type of vocabulary support, the form of missions, the duration of activities, and the level of teacher guidance needed.

In the design stage, the researcher prepared the structure of the AI based gamification model. Existing AI tools were used to support the preparation of reading materials, vocabulary prompts, crossword clues, word puzzles, picture puzzles, storybook drafts, mission cards, quest sequences, scenario based tasks, decision making prompts, and feedback alternatives. However, the AI output was not used directly. The researcher and collaborating teacher reviewed the output to ensure that the language level was appropriate, the content was relevant to the curriculum, the examples were safe for children, and the tasks were feasible in the classroom. This review procedure served as an ethical and pedagogical filter because AI output can contain errors or unsuitable content.

In the development stage, the researcher produced the learning package. The package included lesson plans, gamified worksheets, AI assisted story based reading missions, crossword activities, puzzle tasks, classroom rules, challenge cards, scoring rubrics, motivation observation sheets, interview guidelines, and assessment tasks. Expert judgment was used to validate the product and instruments. The validators included experts in English education, educational technology, and assessment. The validation focused on content appropriateness, language suitability, curriculum alignment, clarity of instructions, feasibility, gamification quality, ethical AI use, and assessment relevance. Revision was conducted based on validator comments before classroom implementation.

In the implementation stage, two intact classes were involved. One class functioned as the experimental group and received instruction through AI based gamification. The other class functioned as the control group and received conventional instruction. Both groups were taught reading related English materials, but the experimental class experienced the materials through missions, quests, challenges, crosswords, puzzles, storybook activities, feedback, progress indicators, and decision

making tasks. Before the treatment, both groups completed pretests on reading comprehension and problem solving. After the treatment, both groups completed posttests using equivalent tasks and analytic rubrics. During the implementation, classroom observation was conducted to document participation, persistence, interaction, and responses to the gamified tasks.

The research variables were defined as follows. The independent variable was AI based gamification design, which refers to teacher mediated use of AI supported materials organized through gamified classroom activities. The dependent variables were students motivation, reading comprehension, and problem solving skills. Motivation refers to students observed autonomy, competence, and relatedness during the learning process. Reading comprehension refers to the ability to understand literal information and infer implied meaning from short English texts. Problem solving refers to the ability to define a problem, identify possible strategies, propose a solution, implement the solution, and evaluate the outcome within a simple learning scenario.

The research instruments consisted of design validation sheets, motivation observation sheets, interview guidelines, reading comprehension tests, and problem solving tasks with analytic rubrics. The motivation observation sheet was conceptually informed by Ryan and Deci Self Determination Theory, especially the dimensions of autonomy, competence, and relatedness. Motivation was not tested with SPSS because the data were obtained from classroom observation and interviews. Each observed indicator was rated on a four point scale, then the obtained score was divided by the maximum score and converted into a percentage. The final motivation result was interpreted descriptively using categories, while interview data were used to confirm the observed patterns of autonomy, competence, and relatedness. Reading comprehension was assessed by adapting the Reading Comprehension Scoring Rubric from Pearson Evaluation Systems, which emphasizes literal comprehension and inference. Problem solving was assessed by adapting the Problem Solving VALUE Rubric from the Association of American Colleges and Universities, which covers defining the problem, identifying strategies, proposing solutions, implementing solutions, and evaluating outcomes. Only reading comprehension and problem solving were analyzed using SPSS through descriptive statistics, Shapiro Wilk normality tests, Levene homogeneity tests, paired samples t tests for within class pretest and posttest comparison, and independent samples t tests for experimental and control class comparison.

The testing procedure followed the same logic used in SPSS based experimental research for the two performance variables. The students names were coded, each reading and problem solving response was scored using the appropriate rubric, final scores were tabulated for the experimental and control classes, and the assumption tests were checked before hypothesis testing. Because the experimental and control classes consisted of different students, the final comparison between groups used an independent samples t test. Paired samples t tests were used only to examine pretest and posttest change within the same class. Motivation was reported separately as descriptive observation data supported by interview interpretation.

Findings and Discussion

The first finding concerns the quality and feasibility of the AI based gamification design. The developed model was considered feasible because it translated abstract technology use into concrete classroom materials. AI did not appear as an independent tutor in front of students. Instead, AI functioned as a design assistant that helped the teacher and researcher prepare varied learning resources. The most practical outputs were short reading texts, vocabulary prompts, crossword activities, word and picture puzzles, storybook drafts, missions, quest cards, and feedback sentences. These outputs were then reviewed, simplified, and adapted before being used in class. This finding confirms that the pedagogical value of AI depends less on the tool itself and more on the instructional decisions surrounding the tool.

The second finding shows that the designed materials supported a clearer gamified learning sequence. In the experimental class,

learning did not begin with isolated explanation or vocabulary lists. It began with a simple story situation, mission, or challenge. Students were invited to understand a problem faced by a character, read a short English text, complete a vocabulary or puzzle task, answer comprehension questions, and make a decision based on textual information. This sequence made the reading activity more purposeful. Students were not asked to read only because the teacher required them to answer questions. They read because the text contained clues needed to complete the mission.

The model can be summarized through several connected components. AI supported the preparation of materials, gamification organized the classroom experience, the teacher mediated the learning process, and the assessment measured the three targeted variables. The combination is important because an AI generated storybook, crossword, or puzzle does not automatically improve learning. It becomes educational only when the teacher connects it to learning objectives, reading comprehension indicators, motivational support, and problem solving tasks. Table 1 summarizes the main components of the proposed model and their pedagogical functions.

Table 1. Components of the proposed AI based gamification model

Component	Pedagogical function
AI supported preparation	AI helps draft reading texts, crossword clues, puzzles, storybook scenes, missions, and feedback. The teacher reviews all outputs before classroom use.
Gamified classroom structure	Learning is organized through stories, quests, challenges, points, progress indicators, peer work, and reflection so that reading becomes purposeful.
Reading comprehension support	Students identify main ideas, details, vocabulary meaning, inferences, and conclusions by using information from short English texts.
Problem solving support	Students read a situation, identify relevant information, choose a strategy, make a decision, and justify the answer.
Motivational support	Students experience choice, achievable challenge, feedback, collaboration, confidence, persistence, and visible progress.

The final reporting model is summarized in Table 2. The values are simulated data for drafting purposes only and should be replaced with real classroom data before formal submission. Motivation is reported descriptively based on Self Determination Theory observation and interviews, while reading comprehension and problem solving are reported using SPSS based statistical testing.

Table 2. Summary of final results for the three research variables

Variable	Instrument and scoring	Experimental n 30	Control n 30	Final result
Motivation	SDT observation sheet and interview; descriptive percentage	84.86 very high	75.42 high	Descriptive SDT result; no SPSS test
Reading comprehension	Pearson reading rubric; final score	81.93 SD 5.23	70.80 SD 6.28	SPSS t value 7.46; Sig. .000
Problem solving	AAC&U VALUE rubric; final score	78.33 SD 5.44	69.37 SD 7.99	SPSS t value 5.08; Sig. .000

Note. Motivation values are percentages converted from SDT observation scores. Reading and problem solving values are mean scores with SD values. The SPSS test used independent samples t test with df 58 for the two performance variables. Shapiro Wilk and Levene tests supported the use of parametric testing. Data are simulated and must be replaced by actual research data.

As shown in Table 2, the experimental class obtained higher final results than the control class in all three variables. The motivation observation result indicates that the gamified activities supported students autonomy, competence, and relatedness, but this variable was interpreted

descriptively rather than tested through SPSS. The reading comprehension result shows that students in the experimental class performed better in understanding literal information and making inferences from short texts. The problem solving result indicates that the experimental class was better able to use textual information to define problems, choose strategies, propose solutions, and explain outcomes. The significance values for reading comprehension and problem solving indicate statistically significant differences at the .05 level.

The third finding relates to students motivation. Classroom observation and interview responses indicated that the AI based gamification model encouraged stronger interest, participation, confidence, and persistence. Motivation was calculated descriptively based on Ryan and Deci Self Determination Theory. The observation sheet covered autonomy, competence, and relatedness. Autonomy was reflected in students willingness to make choices and try strategies during missions. Competence was reflected in students confidence, persistence, and ability to complete achievable challenges. Relatedness was reflected in peer interaction, cooperation, and willingness to discuss answers. In the simulated reporting model, the experimental class reached an overall motivation score of 84.86 in the very high category, while the control class reached 75.42 in the high category. This pattern suggests that students were more willing to engage with English tasks when the activities were presented as missions, games, stories, and challenges rather than as ordinary exercises.

This motivational pattern can be explained through Self Determination Theory. Autonomy was supported when students had opportunities to choose roles, strategies, answers, or ways of completing missions. Competence was supported through clear instructions, vocabulary scaffolding, guided questions, puzzles with visible solutions, and immediate feedback. Relatedness was supported through group work, peer explanation, collaborative problem solving, and shared classroom progress. This pattern is consistent with Sailer et al. (2017), who found that specific game design elements can influence psychological need satisfaction, and with Grabner-Hagen and Kingsley (2023), who showed that need supportive gamification can motivate elementary learners when it is designed with scaffolding and classroom interaction.

The fourth finding concerns reading comprehension. The experimental learning activities encouraged students to process English texts more actively. In conventional reading instruction, students often treat a text as a source of answers for literal questions only. In the AI based gamification model, the text became part of a mission. For example, after reading a short story about a child who lost an object, students needed to identify the main idea, locate key details, understand clue words, infer the possible location, and decide what the character should do next. This structure required students to use comprehension skills for a meaningful purpose. The crossword and puzzle activities also supported vocabulary recognition before students moved to deeper comprehension questions.

The reading comprehension results showed a better pattern in the experimental class because students had more repeated and meaningful contact with text information. In the simulated reporting model, the experimental class obtained a mean score of 81.93, while the control class obtained 70.80. The storybook activities gave context to vocabulary. The mission cards gave purpose to reading. The puzzles strengthened word meaning and visual association. The guided questions helped students move from literal understanding to inference and conclusion. These components supported the rubric indicators used in this study, namely literal comprehension and inference. Maimaiti and Hew (2025) provide support for this direction by showing that gamified self regulated learning can improve EFL reading comprehension and motivation. Jin and Luo (2026) also support the role of AI assisted vocabulary learning in relation to EFL reading comprehension.

The fifth finding concerns problem solving skills. In this study, problem solving

was not treated as a complex mathematical skill. It was defined as the ability to understand a task situation, identify relevant information, choose a strategy, make a decision, and justify the answer. This definition is suitable for elementary English learning because students can practice reasoning through simple story based and scenario based tasks. For instance, after reading a storybook page about a hungry character, students might choose the best food based on information in the text. After completing a puzzle about places in school, students might decide where a character should go to solve a problem. These tasks required students to connect reading comprehension with decision making.

The implementation showed that problem solving developed when students were asked to explain why their answer made sense. In the simulated reporting model, the experimental class obtained a mean score of 78.33, while the control class obtained 69.37. The explanation stage was important because it moved the task beyond guessing. Students had to refer back to the text, identify evidence, and use simple reasoning. Some students initially gave short answers without justification, but teacher prompting and peer discussion helped them produce clearer explanations. In this way, the gamified tasks created a bridge between reading and reasoning. Students were not only asked what the text said; they were also asked what action should be taken based on the text.

The relationship among motivation, reading comprehension, and problem solving was one of the most important results of the study. Motivation supported participation because students were more willing to enter the task. Participation created more opportunities to read, discuss, ask questions, and try again. Reading comprehension provided the information needed for problem solving. Problem solving, in turn, gave students a reason to reread, check clues, and explain their thinking. This reciprocal relationship indicates that the three variables should not be treated as separate classroom outcomes. A student who is motivated to complete a mission is more likely to engage with the reading text. A student who understands the text is more prepared to solve the scenario. A student who can solve the scenario is more likely to feel competent and motivated.

Figure 1 illustrates the conceptual relationship among theoretical foundations, teacher mediated AI design, gamified classroom process, and the expected learning outcomes. The framework starts from Self Determination Theory, Constructivist Learning Theory, and Sociocultural Theory. These theories inform the design of AI supported materials and gamified tasks. The classroom process then involves reading, playing, collaborating, solving missions, explaining decisions, and reflecting on progress. The outcomes are motivation, reading comprehension, and problem solving skills. The figure emphasizes that teacher mediation and scaffolding connect the technological and pedagogical components of the model.

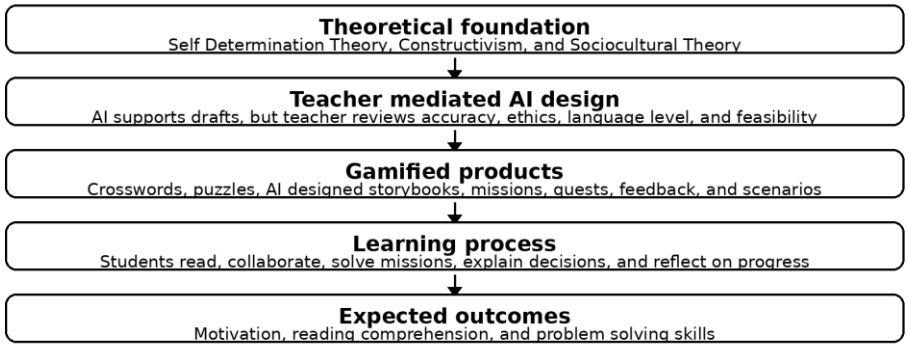

Figure 1. Conceptual framework of AI based gamification design

From a constructivist perspective, the findings show that students learned more meaningfully when they were actively involved in constructing meaning. The storybook, crossword, and puzzle activities did not function only as decorations. They required students to connect vocabulary, images, story events, and textual clues. Students built understanding by manipulating information, discussing answers, checking clues, and revising their decisions. This is consistent with constructivist learning theory, which views learning as an active process of meaning making rather than passive reception of

information (Fosnot, 2013). In the context of reading, this means students need opportunities to interact with texts in a way that requires interpretation and use.

From a sociocultural perspective, the findings also highlight the role of teacher mediation and peer interaction. The teacher guided students before, during, and after the gamified tasks. Before reading, the teacher introduced the mission and activated vocabulary. During reading, the teacher asked guiding questions and helped students notice clues. After reading, the teacher facilitated explanation and reflection. Peer interaction also helped students complete crosswords, puzzles, and scenario tasks. This support was important because elementary learners may not be ready to solve all tasks independently. The role of AI was therefore indirect. AI helped create the learning resources, but social interaction and teacher scaffolding made those resources meaningful.

Another important discussion point is that the design was feasible for classroom use. The study did not require a new AI application or an advanced digital platform. AI was used mainly during teacher preparation. The classroom implementation could use printed storybooks, mission sheets, crosswords, puzzles, cards, whiteboard progress tracking, group discussion, and teacher feedback. This makes the model more realistic for elementary schools that may have limited devices or internet access. The main requirement is not sophisticated hardware but careful instructional planning. Teachers need to know how to prompt AI, review outputs, simplify language, align tasks with objectives, and manage classroom interaction.

The use of crosswords, puzzles, and storybooks also strengthened the age appropriateness of the model. Elementary learners usually respond better to concrete, visual, and narrative based activities than to abstract explanation. Crosswords helped them recall vocabulary through clues. Puzzles helped them connect words with meanings, pictures, or story events. Storybooks helped them understand language within a meaningful sequence. When these materials were connected with missions and decision making tasks, students had a clearer reason to read and think. The design therefore combined playful learning with academic purpose.

Nevertheless, the findings also show that AI based gamification must be carefully controlled. AI generated texts can be too difficult, too long, culturally unfamiliar, or unsuitable for children. Some prompts can produce activities that look attractive but do not support the learning indicators. Therefore, teacher review is not optional. Every AI generated story, puzzle, crossword clue, and feedback sentence must be checked for accuracy, level, cultural suitability, ethics, and alignment with the curriculum. This supports Ng et al. (2025), who emphasize that generative AI integration requires attention to school strategies, reliability, ethics, and teacher readiness.

The findings further suggest that gamification should not rely too strongly on competition. Leaderboards and public ranking may motivate some students, but they may also discourage students with lower English ability. For young learners, cooperative missions, personal progress, feedback, and group achievement are often safer. In this study, collaboration and supportive feedback were more important than ranking. Students were encouraged to complete missions, help peers, explain answers, and improve from previous attempts. This approach supports inclusion because students can experience progress without being publicly compared in a harmful way.

In relation to assessment, the study shows the importance of using different instruments for different outcomes. Motivation cannot be fully captured by test scores or SPSS output when the instrument is an observation sheet and interview guide. It requires descriptive scoring, classroom observation, and interpretation of students behavior based on autonomy, competence, and relatedness. Reading comprehension and problem solving, on the other hand, require performance evidence and analytic rubrics. The reading rubric made it possible to see which aspects of comprehension were stronger or weaker. The problem solving rubric made it possible to examine whether students could identify the problem, use

information, choose a strategy, make a decision, and explain the answer. This alignment prevents the study from making superficial claims based only on enjoyment or classroom excitement.

The contribution of this study lies in the integration of AI, gamification, and three learning outcomes in a single elementary EFL design. Previous research often discusses AI assisted language learning, gamification, motivation, reading comprehension, or problem solving separately. This study connects them through a classroom based model. AI provides design support. Gamification provides learning structure. Reading provides content. Problem solving provides a purpose for using information. Motivation sustains participation. The teacher connects all of these components through planning, scaffolding, feedback, and assessment.

The model also offers practical implications for English teachers. Teachers can use AI to generate first drafts of reading texts, vocabulary lists, crossword clues, puzzle ideas, and storybook scenes. However, they should treat AI output as raw material, not final teaching material. They should revise vocabulary difficulty, remove unsuitable content, add local or familiar contexts, and connect every activity to specific learning objectives. Teachers should also design feedback that helps students understand mistakes rather than merely telling them whether answers are correct or wrong. In this sense, AI can reduce preparation time, but it cannot replace professional judgment.

For future classroom development, the model can be expanded by adding more differentiated tasks. Students with stronger reading ability can receive longer story missions and more complex inference questions. Students who need support can receive shorter texts, picture clues, vocabulary banks, and peer assistance. AI can help teachers create these variations more efficiently, but the final decision should remain with the teacher. This differentiated use of AI based gamification may help elementary English classrooms become more responsive to students needs while maintaining ethical and pedagogical control.

Overall, the findings support the central argument of this paper. AI based gamification can be pedagogically meaningful when it is teacher mediated, age appropriate, and aligned with learning outcomes. The model successfully addressed the three research variables by encouraging motivation, supporting reading comprehension, and developing problem solving through meaningful classroom activities. The strength of the model does not lie in technology alone. It lies in the integration of AI supported preparation, gamified task progression, reading purpose, decision making, teacher scaffolding, and rubric based assessment.

Conclusions

This paper has presented a full paper version of a thesis on designing AI based gamification for elementary English learning. The central argument is that AI and gamification can support elementary English learning when both are used through a clear pedagogical framework. AI should be used as a teacher mediated design support tool, while gamification should be used as a structure for organizing meaningful reading missions, challenges, crosswords, puzzles, storybooks, feedback, and decision making tasks. The model is not intended to replace the teacher or to make learning depend entirely on technology. Instead, it strengthens the teachers ability to prepare varied materials and to create more engaging classroom experiences.

The study examined three learning variables, namely students motivation, reading comprehension, and problem solving skills. In the simulated reporting model, the experimental class showed higher final results than the control class in all three variables. Motivation was reported descriptively through Self Determination Theory based observation and interviews. Reading comprehension and problem solving were analyzed using SPSS, and the independent samples t test showed significance values of .000 for both variables. These results support the argument that AI based gamification can strengthen classroom participation, purposeful reading, and scenario based reasoning when the teacher remains responsible for reviewing AI generated

materials, scaffolding activities, and assessing students work through appropriate instruments.

The theoretical contribution of this paper lies in the integration of Self Determination Theory, Constructivist Learning Theory, and Sociocultural Theory into one classroom design. Self Determination Theory explains how gamification supports motivation through autonomy, competence, and relatedness. Constructivist Learning Theory explains how students construct meaning through active reading and task engagement. Sociocultural Theory explains why teacher mediation, peer collaboration, scaffolding, and learning tools are essential for young learners. Together, these theories clarify why AI based gamification should be designed as a supported learning environment rather than a simple collection of digital or game elements.

For classroom practice, the model suggests that teachers can use AI responsibly without developing a new application. AI can help prepare draft texts, crossword clues, puzzles, storybook ideas, scenarios, and feedback language. However, teachers must review all outputs before using them with children. Gamification should also be designed carefully. Points, badges, and rewards are not enough unless they are connected to reading comprehension, decision making, collaboration, feedback, and reflection. The study concludes that AI based gamification is pedagogically promising when it remains teacher controlled, age appropriate, ethically reviewed, and aligned with clear learning outcomes.

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