

DEVELOPMENT OF A GAMIFICATION-BASED PROBLEM-BASED LEARNING MODEL TO ENHANCE SPEED READING SKILLS OF FIFTH-GRADE ELEMENTARY SCHOOL STUDENTS

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Abstract. Many students struggle with reading, and their skills have declined significantly due to learning loss observed in schools. Students find it difficult to comprehend text, lose focus, and show decreased motivation. Meanwhile, reading skills are crucial for students as they serve as the foundation of 21st-century competencies and support learning across all subjects. This condition demands learning innovations that not only train reading speed but also enhance motivation through interactive approaches. The objectives of study are : (1) to develop a Problem-Based Learning (PBL) model integrated with gamification for improving the speed reading skills of fifth-grade elementary students in the form of a teacher's guidebook that is feasible for used, and (2) to test the validity of the model. The research employed a Research and Development (R&D) method using the ADDIE model and was conducted at SDN 1 Gading Kembar, SDN 3 Asrikaton, and SDN 3 Saptorenggo. Research instruments included expert validation, implementation observation, students' response questionnaires, and speed reading tests. The results showed that expert validation reached 87.25% (very valid), model implementation achieved 93% (very practical), and effectiveness was indicated by an increase in reading speed from 121 words per minute (wpm) to 185 wpm with an N-Gain of 0.52 (moderated). The study concludes that the gamified PBL model is effective in improving both students' speed reading skills and their motivation. This is supported by gamification elements (points, levels, challenges, leaderboards) and the PBL syntax, which foster collaboration, problem-solving, and active learning engagement.

Keywords: Gamifikasi; Problem Based Learning

I. INTRODUCTION

The COVID-19 pandemic has exerted a profound impact on multiple sectors, including education. Online learning during this period has been shown to decrease students' reading proficiency by as much as 91.6% and to diminish their interest in literacy (Muryani et al., 2022). Yet, reading competence constitutes a fundamental twenty-first-century skill, functioning not only as a means of acquiring information but also as the foundation for critical, creative, collaborative, and communicative thinking (Daryanto & Karim, 2017). As an integral component of language skills, reading plays a pivotal role in supporting successful learning across disciplines (Ngalimun, 2014). Among the various forms of reading, speed reading occupies a distinctive position, as it enables students to access information rapidly while maintaining comprehension (Nurhadi, 2016; Tantri & Dewantara, 2017).

Field observations at SDN 1 Gading Kembar revealed that the average reading speed of fifth-grade students was only 100 words per minute (wpm), considerably lower than the normative standard of 170–180 wpm for this grade level, as suggested by Soedarso (2010). Such low performance indicates that students not only lack fluency but also experience

difficulty in identifying key ideas and solving problems presented in texts. Moreover, students demonstrate low motivation, often perceiving speed reading practice as monotonous and disconnected from engaging learning experiences. This reflects a broader challenge in literacy education, where students' affective engagement is as critical as their cognitive development (Guthrie & Wigfield, 2000). Without motivation, students struggle to sustain concentration, limiting both reading speed and comprehension outcomes.

To address these challenges, Problem-Based Learning (PBL) offers a promising instructional approach, as it emphasizes real-world problems, inquiry, and collaboration. Prior studies have shown that PBL enhances critical thinking and problem-solving skills across disciplines (Hmelo-Silver, 2004; Pakpahan, 2014; Siti, 2021). However, PBL in its traditional format is not always sufficiently engaging for younger learners, particularly in contexts where baseline motivation is low. In this regard, integrating gamification elements into PBL provides an opportunity to bridge the gap between cognitive demand and motivational support. Gamification—through the incorporation of points, levels, rewards, challenges, and leaderboards—has been shown to

foster motivation, persistence, and engagement in learning tasks (Deterding et al., 2011; Krath et al., 2021).

The motivational benefits of gamification can also be explained through Csikszentmihalyi's Flow Theory (1990), which posits that learners achieve optimal engagement when there is a balance between challenge and skill. In speed reading instruction, gamified challenges can scaffold students gradually from simple to complex texts, sustaining their focus and intrinsic motivation while avoiding boredom or anxiety. When embedded into the structured inquiry of PBL, gamification not only stimulates motivation but also situates speed reading as a purposeful problem-solving activity rather than a repetitive exercise. This synergy ensures that students remain cognitively challenged and emotionally engaged, ultimately enhancing both reading speed and comprehension.

Taken together, the evidence of low reading speed (100 wpm versus the expected 170–180 wpm), compounded by students' low motivation, underscores the urgency of an instructional model that integrates both problem-solving and motivational strategies. Accordingly, the present study seeks to: (1) develop a gamification-based PBL model designed to enhance the speed reading and problem-solving skills of fifth-grade elementary students, presented in the form of a teacher's guidebook; and (2) examine the validity and effectiveness of the proposed model. To the best of the authors' knowledge, no prior research has systematically combined PBL and gamification to improve speed reading and motivation at the elementary school level, highlighting both the urgency and the novelty of this study.

II. RESEARCH METHODS

This study employed a Research and Development (R&D) approach using the ADDIE development model (Analysis, Design, Development, Implementation, Evaluation) (Branch, 2009), as it is systematic, flexible, and allows for continuous revision. The research subjects comprised learning and reading experts for product validation, fifth-grade teachers as practitioners, and 62 fifth-grade students from SDN 1 Gading Kembar, SDN 3 Asrikaton, and SDN 3 Saptorenggo, representing high, medium, and low reading proficiency categories.

The research procedure consisted of the following stages: analysis (identifying needs, student characteristics, and learning conditions), design (drafting the gamification-based PBL model along with its learning tools), development (constructing the prototype, conducting expert validation, making revisions, and preparing the teacher's guidebook), implementation (conducting small- and large-group trials to measure effectiveness), and evaluation (assessing the feasibility, validity, practicality, and effectiveness of the model).

The instruments employed included model implementation observation sheets, teacher and student interviews, documentation of scores and instructional materials, expert validation and student response questionnaires, as well as speed reading tests (pretest and posttest) based on the guidelines of Nurhadi (2016). Qualitative data were analyzed through data

reduction, presentation, and conclusion drawing using triangulation techniques, while quantitative data were analyzed using percentages to determine the categories of validity, practicality, and feasibility. Additionally, the N-Gain test was employed to measure the model's effectiveness based on improvements in students' speed reading test results.

III. RESULT AND DISCUSSION

This section presents the results and discussion of the study.

A. Results

This study produced a gamification-based Problem-Based Learning (PBL) model to improve the speed reading skills of fifth-grade elementary school students. The development process referred to a modified version of Borg & Gall's R&D model, consisting of needs analysis, design, development, implementation, and evaluation.

The needs analysis revealed that teachers did not yet have a specific model for speed reading, instructional media remained conventional, and students' reading motivation was relatively low. Student characteristics indicated difficulties in identifying keywords, limited concentration, and a lack of interest in reading beyond school assignments. The schools, however, provided adequate facilities, including projectors and reading texts, along with strong teacher support for instructional innovation. Development strategies were directed toward integrating PBL with gamification elements such as levels, points, challenges, and leaderboards.

The design stage produced a draft model structured around the syntax of problem orientation, group discussion, information search, presentation, and reflection. The initial product included a teacher's guidebook, media, lesson plans, instruments, and leveled reading texts.

Table I. Blue Print Syntax Model Pbl Based Gamification

Aspect	Explanation
Teacher's Role	The teacher acts as a facilitator by providing learning resources that enhance students' speed reading skills, instructional tools, and gamification elements. As a motivator, the teacher offers guidance and encouragement to help students apply speed reading techniques and solve the problems presented. As a moderator, the teacher directs the stages of the gamification-based PBL model to ensure smooth and timely implementation. As a facilitator, the teacher assists students in discovering solutions to the problems provided.
Definition / Concept	The gamification-based Problem-Based Learning (PBL) model for speed reading is a learning approach designed to improve speed reading skills among fifth-grade elementary school students. This model integrates the problem-solving orientation of PBL with engaging and interactive gamification elements.
Syntax / Learning Strategy	The syntax of the Problem-Based Learning model consists of: (1) Problem orientation, (2) Organizing students, (3) Guiding individual or group investigation, (4) Developing and presenting solutions, and (5) Analyzing and evaluating the outcomes. The stages of speed reading activities include: (1) Pre-reading stage (introducing goals and techniques), (2) Speed reading practice, (3) Speed reading with comprehension, and (4) Reflection stage. Gamification elements include: (1)

	Points, (2) Levels, (3) Achievements, (4) Rewards, and (5) Leaderboards.
Operational Steps	Learning Introduction 1. Teacher greets the students 2. Teacher checks attendance 3. Teacher leads a prayer 4. Teacher conducts apperception 5. Teacher explains the learning objectives, speed reading goals, and gamification process Core Learning/ Syntax 1. Problem orientation and introduction of speed reading techniques 2. Organizing students for speed reading practice 3. Guiding individual or group investigation and reading comprehension 4. Developing and presenting solutions to the problem 5. Analyzing and evaluating problem-solving outcomes, followed by reflection.
Assessment	• In the implementation of gamification-based PBL for speed reading, assessment is conducted through tests. • The assessment focuses on cognitive aspects. • Tests may be written or oral. • Tests are used to measure students' reading speed and their comprehension in solving problems within texts.
Strengths of the Strategy	• Helps students improve and enhance speed reading skills. • Students feel challenged by the gamification components. • Students practice solving problems in reading texts. • Student-centered learning with the teacher serving as facilitator.
Weaknesses of the Strategy	Requires additional preparation time for gamification components and reading materials suitable for the PBL framework.

The gamification-based Problem-Based Learning (PBL) model positions the teacher as a facilitator, motivator, and moderator. In this role, the teacher provides learning resources and gamification elements, encourages students in applying speed reading strategies, and ensures that each learning stage runs effectively. This balance allows students to actively discover solutions while remaining engaged through game-like features.

Conceptually, the model integrates PBL's problem-solving orientation with gamification's motivational mechanics. The syntax consists of five stages—problem orientation, student organization, investigation, solution development, and evaluation—combined with speed reading activities such as pre-reading, practice, comprehension, and reflection. Gamification elements (points, levels, achievements, rewards, leaderboards) create a sense of challenge and progression that aligns with flow theory, addressing students' low motivation in conventional speed reading instruction.

Assessment emphasizes cognitive outcomes, using written or oral tests to evaluate both reading speed and comprehension in problem contexts. The model's strengths include enhancing reading proficiency, fostering problem-solving, and motivating learners through gamification, while its main limitation lies in the time required for preparing gamified materials and texts.

Tabel II. Syntax Model Pbl Based Gamification

PBL Syntax	Level 1: Basic (Reading Techniques)	Level 2: Intermediate (Reading Speed & Content Comprehension)	Level 3: Advanced (Maximum Speed & Rapid Analysis)
1. Problem Orientation	The teacher presents a 150–200-word text and poses the problem: "Why does slow reading hinder comprehension?"	The teacher presents a 250–350-word text and raises the problem: "How can one quickly identify the main idea?"	The teacher presents a 400–500-word text and raises the problem: "How can long texts be comprehended

			<i>both quickly and accurately?"</i>
2. Organizing Students	Students engage in group discussions about reading habits (e.g., subvocalization, lack of focus).	Students are assigned specific roles: main idea finder, detail recorder, and timekeeper.	Students are assigned different focus areas: inference, conclusion, key details, and summary.
3. Guiding Investigation	Activities include visual tracking exercises, silent reading, and reading short texts with a timer.	Activities include scanning and skimming practices, timed reading, and group discussions on main ideas and key details.	Students read a 500-word text within 3 minutes, respond to HOTS (higher-order thinking skills) questions, and produce a quick summary or mind map.
4. Developing & Presenting Results	Groups present effective techniques that enhance reading speed.	Groups present concise summaries and main ideas derived from the text.	Groups present text analyses in the form of summaries or mind maps.
5. Analyzing & Evaluating	Reflection focuses on identifying the most effective techniques to reduce subvocalization and improve concentration.	Reflection emphasizes whether the targeted speed and comprehension ($\geq 80\%$) have been achieved.	Reflection addresses which strategies are most effective in achieving a speed of 170–180 wpm with $\geq 85\%$ comprehension.

The implementation of the Problem-Based Learning (PBL) model in speed reading instruction is structured into three progressive levels, each designed to develop students' technical, cognitive, and analytical reading competencies. At the basic level, the learning process begins with the orientation of a problem in which the teacher presents a short text of approximately 150–200 words and encourages students to reflect on the issue of slow reading and its impact on comprehension. In the organizational stage, students discuss their reading habits, such as subvocalization and difficulties in maintaining focus. Guided investigation is then conducted through visual tracking exercises, silent reading, and timed practice with short passages. The development and presentation phase allows students to share effective techniques that enhance their reading pace, followed by reflection on which strategies most successfully reduce subvocalization and increase concentration.

At the intermediate level, the teacher introduces a text of 250–350 words, framing the central problem as the challenge of identifying main ideas efficiently. Students are assigned roles within their groups, such as main idea finder, detail recorder, and timekeeper, thereby fostering collaborative engagement. The investigation phase emphasizes scanning and skimming strategies, timed reading activities, and group discussions to extract main ideas and essential details. In presenting their results, groups deliver concise summaries and highlight the central ideas of the text. Reflection is then directed toward evaluating whether the targeted speed and comprehension level ($\geq 80\%$) have been attained, thereby linking strategy use to measurable outcomes.

At the advanced level, students engage with more complex tasks that integrate higher-order thinking. The teacher provides a 400–500-word text and raises the central problem of how to comprehend lengthy passages both quickly and accurately.

Student groups are organized according to different cognitive focuses, including inference, drawing conclusions, identifying key details, and constructing summaries. During the investigation stage, students are required to read a 500-word text within three minutes, respond to higher-order thinking skills (HOTS) questions, and generate rapid summaries or mind maps. In the presentation phase, groups share their analyses in structured formats such as summaries or mind maps, which promote both efficiency and clarity. The final reflection centers on evaluating the most effective strategies for achieving the target speed of 170–180 words per minute with a comprehension rate of at least 85%, thus emphasizing both fluency and depth of understanding.

The development stage involved validation by subject-matter and instructional experts. Validation results showed an average score of 4.2 (Valid–Highly Valid). Revisions were made to improve the design of the guidebook, diversify reading texts, and refine the categorization of learning levels (Basic, Intermediate, Advanced). The revised product also integrated the use of a website as a medium for texts and a leaderboard displaying students' reading speed and comprehension.

1. Model Validity

Further validation demonstrated percentages ranging from 80% to 90.1% (High–Very High). The overall average validity was 87.25% (Very Valid), confirming that the model was consistent with learning theory, instructional objectives, and students' needs.

2. Model Implementation

The implementation stage involved deploying the web-based product in classroom settings with students grouped according to the PBL approach. At Level 1, students accessed modules to practice fundamental reading techniques and discussed their reading habits through interactive forums. At Level 2, students engaged with collaborative online activities where they identified main ideas and details using shared digital workspaces. At Level 3, students performed intensive timed reading tasks and collaboratively generated mind maps or summaries on the platform. Teachers functioned as facilitators, guiding discussions and monitoring progress through the web-based dashboard.

Field trials were conducted with a small group (18 students at SDN 1 Gading Kembar) and larger groups (24 students at SDN 3 Saptorenggo and 20 students at SDN 3 Asrikaton). The small-group trial showed an increase in average reading speed from 120 words per minute (wpm) to 180 wpm, with an N-Gain of 0.50 (Moderate). Model implementation by teachers reached 93% (Excellent), while student responses were rated at 92% (Very Positive). The large-group trials demonstrated improvements from an average of 125 wpm to 190 wpm at SDN 3 Saptorenggo and from 118 wpm to 185 wpm at SDN 3 Asrikaton, both with N-Gain scores of 0.52–0.53 (Moderate). Teacher implementation averaged 94% (Excellent), and student responses reached 93% (Very Positive).

3 Model Evaluation

The final evaluation confirmed that the gamification-based PBL model developed in this study met three key criteria: validity, practicality, and effectiveness.

a. Validity (87.25% – Very Valid).

The high validity score indicates that the model is aligned with learning theories, speed reading objectives, and students' learning needs. Validity encompassed content accuracy, clarity of the PBL syntax, integration of gamification elements, variation in reading texts, and the use of instruments for assessing speed reading skills. With a rating of Very Valid, the model can be implemented without major revisions, requiring only minor adjustments such as expanded text variation and enhanced media design. The high level of validity also underscores its conceptual, methodological, and practical robustness, ensuring its scientific reliability.

b. Practicality (93.0% – Highly Practical).

Practicality reflects the ease with which teachers can apply the model in daily instruction. Trial results confirmed that teachers could successfully implement each stage of PBL with the support of the teacher's guidebook, web-based media, and straightforward yet effective assessment instruments. Teacher responses reached 93% (Highly Practical), suggesting that the model does not increase workload but rather simplifies classroom management. For students, practicality was evident in their high levels of participation, enthusiasm in completing challenges, and clarity in following instructions. These findings demonstrate that the model is not only theoretically sound but also feasible in real school settings.

c. Effectiveness (N-Gain = 0.52 – Moderate).

Effectiveness was measured through improvements in students' reading speed. The N-Gain score of 0.52 (Moderate) indicates a significant improvement, though not yet at a high level. Average reading speed increased from 121 wpm to 185 wpm over four instructional sessions. Beyond speed, effectiveness was also reflected in students' heightened motivation, fostered by the gamification features. Although categorized as Moderate, this level of effectiveness suggests room for enhancement—for example, by extending the duration of implementation, diversifying reading materials, and integrating additional strategies to strengthen comprehension.

The findings of this study demonstrate that the implementation of the gamification-based Problem-Based Learning (PBL) model effectively enhances students' speed reading skills, fosters learning motivation, and facilitates ease of implementation for teachers.

a. Improvement in Speed Reading Skills

Students' average reading speed increased from 121 words per minute (wpm) to 185 wpm, with an N-Gain of 0.52 (moderate). This significant improvement can be attributed to structured reading practice with timed targets, reinforced by competitive motivation through points and leaderboards. These results are consistent with Nation (2009), who asserts that reading speed can be improved through systematic and repeated practice.

b. Enhancement of Learning Motivation

Gamification elements were shown to significantly boost students' motivation. Features such as reading levels, challenges, and points rendered the learning process more interactive and enjoyable. Students were motivated to maintain their leaderboard positions, which increased their focus during reading activities. This finding aligns with Self-Determination

Theory (Deci & Ryan, 2000), which posits that intrinsic motivation is strengthened through challenges, recognition, and achievement.

c. Ease of Implementation for Teachers

Teachers reported that the model was easy to apply due to its clear PBL syntax, comprehensive learning tools, and structured teacher's guide that supported lesson planning. This corroborates the findings of Hung (2011), which highlight that systematically guided PBL facilitates teachers in managing skills-based instruction.

d. Alignment with Vygotsky's Constructivist Theory

The model is consistent with Vygotsky's constructivist theory, which emphasizes learning through social interaction and scaffolding. Group discussions provided opportunities for peer interaction, while the progression of reading levels served as scaffolding that guided students from simpler texts toward more complex ones.

e. Support from Previous Studies

This study's findings are supported by Saputra (2020), who reported that gamification increased participation and reading speed, and by Yunus (2018), who found that PBL promotes critical thinking skills in intensive reading instruction.

Taken together, these results confirm that the gamification-based PBL model is effective in improving both speed and comprehension in reading, while simultaneously enhancing student motivation and simplifying instructional practice for teachers. Accordingly, the model is recommended for broader implementation in elementary schools, with opportunities for further refinement to elevate its effectiveness to a higher category.

IV. CONCLUSIONS

This study concludes that the gamification-based Problem-Based Learning (PBL) model is valid, practical, and effective in improving elementary students' speed reading skills. The model achieved a validity score of 87.25% (very valid), indicating alignment with theoretical foundations, learning objectives, and student needs. Its practicality reached 93.0%, demonstrating that teachers can implement the model with ease, supported by clear guidelines and adaptable media. In terms of effectiveness, students' average reading speed increased from 121 to 185 words per minute, with an N-Gain score of 0.52 (moderate), reflecting significant improvement while leaving room for further enhancement. The integration of PBL with gamification elements provides an engaging, interactive, and motivating learning experience. Features such as points, levels, and leaderboards foster healthy competition, strengthen intrinsic motivation, and make reading a more enjoyable activity. Teachers also benefit from the model's systematic structure and comprehensive learning tools, which facilitate classroom implementation. Consequently, the model addresses the gap between the ideal expectation of speed reading as a 21st-century literacy competency and the reality of students' low reading fluency. The study offers prospects for broader application. The model can be tested across schools with varied contexts to ensure consistency of effectiveness. Digital integration—such as mobile applications for independent practice—could further enhance learning opportunities.

Additionally, diversifying reading materials to include informational, scientific, and social texts would strengthen reading flexibility, while evaluation should extend beyond speed to deeper comprehension to ensure holistic literacy development. Practically, the model has potential for adoption in school literacy programs, both curricular and extracurricular, and as teacher training material for applying PBL and gamification in other language skills. Moreover, the findings may serve as a reference for educational policy, particularly in advancing the School Literacy Movement (GLS). Thus, speed reading instruction can be reframed not as a mere technical drill, but as a meaningful learning process that promotes motivation, social interaction, and enjoyable literacy experiences.

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