**Token Economies Without Blockchain: Reward Systems as Motivational Scaffolds for Vocabulary Mastery**

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**ABSTRACT:** *This study examines gamification strategies centered on Skinner's operant conditioning theory and their impact on learning behavior and student engagement. This strategy focuses on rewards and punishments. Over the course of ten weeks, data were collected via a digital questionnaire distributed to 21 high school students. The questionnaire included open-ended questions to capture qualitative experiences, as well as 5-point Likert scale items to measure perceptions of gamification mechanics. Reflexive thematic analysis, which emphasizes iterative coding and researcher reflexivity, was used to interpret the stories and discover important themes that answer this research question. The main findings showed that while rewards significantly increased external motivation and persistence in completing tasks, technological stress and burnout were caused by technical barriers (such as slow networks and complicated interfaces) and poorly designed competitive elements (such as leaderboards). Students emphasized the importance of balanced gamification, prioritizing intuitive design, collaborative tasks, and consistency with learning objectives. To avoid over-justification, especially given the diverse needs of students, this research emphasizes the importance of combining intrinsic motivation with external rewards.*

**ABSTRAK**: Studi ini meneliti strategi gamifikasi yang berpusat pada teori pengkondisian operan dari Skinner dan dampaknya terhadap perilaku belajar dan keterlibatan siswa. Strategi ini berfokus pada penghargaan dan hukuman. Selama sepuluh minggu, data dikumpulkan melalui kuesioner digital yang didistribusikan kepada 21 siswa sekolah menengah. Kuesioner tersebut mencakup pertanyaan terbuka untuk menangkap pengalaman kualitatif, serta item skala Likert 5 poin untuk mengukur persepsi tentang mekanisme gamifikasi. Analisis tematik refleksif, yang menekankan pengodean berulang dan refleksivitas peneliti, digunakan untuk menginterpretasikan cerita dan menemukan tema-tema penting yang menjawab pertanyaan penelitian ini. Temuan utama menunjukkan bahwa meskipun hadiah secara signifikan meningkatkan motivasi eksternal dan kegigihan dalam menyelesaikan tugas, stres dan kelelahan teknologi disebabkan oleh hambatan teknis (seperti jaringan yang lambat dan antarmuka yang rumit) dan elemen kompetitif yang dirancang dengan buruk (seperti papan peringkat). Para siswa menekankan pentingnya gamifikasi yang seimbang, memprioritaskan desain yang intuitif, tugas-tugas kolaboratif, dan konsistensi dengan tujuan pembelajaran. Untuk menghindari pembenaran yang berlebihan, terutama mengingat kebutuhan siswa yang beragam, penelitian ini menekankan pentingnya menggabungkan motivasi intrinsik dengan imbalan eksternal.

**Keywords:** *Gamification, Operan Conditioning, Thematic Analysis*

1. **INTRODUCTION**

English has become the most important language in the world. It is widely used for communication among individuals from all over the world. English has always been of special interest. Language is crucial for fostering competitiveness in all parts of life. Students are required to learn English from a young age. English is an important language as a tool for finding out information. It is also important for a student to know information not only through conversation but also from written information. Reading is the most significant way to process knowledge (Ismail et al., 2017). Through good reading skills, students can absorb information from reading. Krashen stated that listening and reading are important in the input hypothesis (Krashen & Terrell, 1983).

Reading is an important skill for processing information, as it shares characteristics with general information-processing models of memory and cognition (Schwartz et al. 1984). It entails a complicated interaction of many brain functions and cognitive processes that are required for reading and interpreting written information. According to (Mackworth, 2014) Reading involves several cognitive functions, including sensory, motor, language, attention, and various types of memory. These processes are interrelated and crucial for matching, coding, and modeling written words with stored visual patterns and mental models.

“Reading is a complex skill involving knowledge about the writing system, a lexicon of words, and access to syntactic rules used to build acceptable sentences” (Ferstl, E., & d'Arcais, G., 1999). By reading, students will directly understand how words are used in sentences and how to arrange the words correctly to produce an understandable meaning. Reading can be used as a means to make the sentences composed by students better. The learner can imitate the word order in a sentence and then apply it to their writing work. Through imitating, the learner slowly begins to understand what they are reading. Proficiency in reading affects students' ability to master vocabulary unintentionally (Pulido, 2003). When the learners read, they have to understand the message in the passage, so they tend to seek the meaning of each word. This will make them familiar with the vocabulary. Vocabulary knowledge can be acquired through extensive reading, not through teaching second language learners who have achieved reading proficiency (Coady, 1996).

Reed in Mackworth (1972) defined reading as a psycholinguistic guessing game where readers select language signals from perceptual data based on their expectations, resulting in a thought-language interaction. He explains that efficient reading involves selecting the fewest and most productive cues to make accurate guesses the first time. Neurophysiologists have discovered that brain waves (evoked potentials and background activity) reflect psychological factors like expectancy, attention, and learning, and physiological changes in the orienting response, leading to heightened sensitivity. That means reading requires active reasoning from the reader, which is accompanied by good mastery of vocabulary and linguistics to obtain the intended information from the reading.

These days, we still find that schools choose the assessment of reading comprehension. The students are expected to master reading skills to gain more information about a text. Therefore, reading comprehension can not be achieved unless the students have a rich vocabulary and understand linguistic competence. In reality, the students have difficulty or are unwilling to gain more information because of the low engagement materials. Student engagement refers to involvement that encompasses active participation in academic and extracurricular activities, as well as dedication to learning goals (Ginting, 2021).

One of the techniques the teacher applies in class is gamification. Gamification involves applying game features and mechanics to non-game environments, such as education, to improve engagement, motivation, and learning results (Wulantari et al. 2023). This requires integrating every aspect in-game with learning materials to make the class more enjoyable. These days, gamification has already changed into a different shape due to the improvement of technology. The use of technology in gamification makes it easier to use games. Nowadays, we know gamification platforms such as Kahoot and Quizizz. Gamification of learning allows students to compete with other students to get the highest score. Using games in learning allows students to be more interested in participating in learning.

Gamification is widely used by teachers to engage students in fun activities during teaching and learning. This study discusses the role of token economies in a gamification platform called Blooket to motivate students in vocabulary learning. This study also discuss the students’ constraint in game-based learning.

1. **LITERATURE REVIEW**

Gamification

Gamification is a technology that incorporates gameplay elements in nongame situations, engaging customers, students, and users with rewards and other motivators (Sanchez et al,2019). Gamification these days is often incorporated into the teaching-learning system. The point of implementing gamification into the teaching-learning process is to make teaching and learning more engaging. This is related to the student's motivation when the materials are engaging to learn new things in a fun way. Gamification is rooted in psychological theories such as Self-Determination Theory (SDT) and Flow Theory, which emphasize intrinsic motivation, autonomy, competence, and engagement (da Silva et al., 2019; Krath et al., 2021). For instance, SDT aligns gamification elements like challenges and feedback with the psychological needs for competence and relatedness (Muangsrinoon & Boonbrahm, 2019). Flow Theory explains how immersive experiences in gamified systems enhance focus and satisfaction 8. However, only 9 out of 39 studies in higher education explicitly linked gamification to motivational theories, highlighting a gap in theoretical rigor (Khaldi et al., 2023).

Gamification elements positively impact student engagement and indirectly affect academic achievement in a classroom (Çakıroğlu et al., 2017; García-López et al., 2023; Mitchell & Co, 2024). Student engagement is important in the teaching and learning process. When a student finds a learning process engaging, it will be easier for them to comprehend the material. The game often uses points or rewards for students after they answer the question correctly. This will make students more passionate about earning bigger points. Until this point, the game sounds like a great way to implement it in the class.

Token System

Tokens in game-based learning (GBL) are rooted in operant conditioning and reward prediction error mechanisms. Skinner’s theory posits that reinforcement (e.g., tokens) strengthens desired behaviors, such as completing educational tasks (Eckert et al., 2023; Slota & Young, 2014). For example, token economies in classrooms use variable-ratio reinforcement schedules, where rewards are unpredictable, to sustain engagement and persistence, mimicking mechanisms in games like slot machines (Eckert et al., 2023; Slota & Young, 2014). This unpredictability triggers dopamine release, enhancing motivation and memory consolidation, as shown in a pilot study where elementary students solved 23% more math problems when tokens were awarded unexpectedly (Eckert et al., 2023).

Student Engagement

The term "student engagement" refers to a broad concept that includes behavioral, cognitive, and emotional elements of students' academic experiences (Kahu, 2013; Salmela-Aro et al., 2021; Wong & Liem, 2022). Enhancing learning outcomes, personal growth, and overall academic achievement are all dependent on it. The objective of this synthesis is to offer a coherent comprehension of student participation through an analysis of findings from various research publications. Interactions with classmates, teachers, and the community are all part of the behavioral, cognitive, and emotional components of student involvement in the classroom (Finn & Zimmer, 2012) . It's a wide idea that can be viewed as a collection of classroom behaviors or as a whole social-cultural ecosystem that connects classroom activities, individual experiences, and community involvement (Zepke, 2015).

Desired educational outcomes, including graduation rates, enrollment in postsecondary education, and academic achievement, are positively correlated with engagement (Kassab et al., 2023). It is necessary for learning and can be improved for at-risk pupils through adjustments to school policies and procedures(Kassab et al., 2023)

Academic achievement and personal growth are strongly impacted by the intricate and multidimensional concept of student engagement. It has behavioral, cognitive, and affective components and is impacted by several variables, such as social interactions, institutional regulations, and educational procedures. To properly comprehend and improve student engagement in higher education, a more critical and holistic approach is required, despite the dominant perspective on engagement emphasizing participation and classification.

Effective Teaching

The concept of effective teaching is complex and includes a range of teaching approaches, philosophies, and results. Its meaning might change based on the setting and parties involved, but it is essential for improving student learning and accomplishment. Students’ success depends on effective teaching (Killion and Hirs, 2011). That means effective teaching is important to students. The students must have maximum opportunity in learning (Silcock, 1993). Through students' ability to learn more, children will gain more knowledge. (Silcock, 1993) argues that students can learn so many things from the teacher due to the differences in teaching behavior. Students' intellectual, physical, social-emotional, and behavioral well-being are all impacted by effective instruction (Killion and Hirs, 2011). Students are not only taught the existing material, but they are also given opportunities that make their presence meaningful. In effective learning, student outcomes and teacher input are the focus of learning, accompanied by effective assessment (Taylor & Thion, 2023). Apart from that, development in children can help children gain acceptance from teachers and other education professionals (Tuckman, 2013).

1. **METHOD**

This study employs a qualitative methodology, which focuses on exploring subjective experiences, perceptions, and meanings to generate rich, context-specific insights rather than numerical generalizations (Braun et al., 2019; Bryan & Graham, 2024). Qualitative research prioritizes depth over breadth, allowing researchers to uncover the "why" and "how" behind participants' behaviors and attitudes, as emphasized by scholars like Braun and Clarke (2006), who define it as a method for identifying patterns and themes in non-numerical data (Braun et al., 2019).

Data were collected via a questionnaire, defined by Lietz (2010) as a structured instrument for gathering self-reported information through standardized questions, enabling systematic comparison of responses. The questionnaire combined 5-point Likert-scale surveys and open-ended questions to explore senior high school students' perspectives holistically. Likert scales, developed by Rensis Likert (1932) quantify attitudes on a continuum (e.g., "strongly agree" to "strongly disagree"), balancing detail and usability. The 5-point scale was chosen to minimize respondent fatigue while capturing nuanced opinions, aligning with recommendations by Taherdoost (2022) for reliability in attitudinal research. Open-ended questions complemented this by inviting qualitative narratives (e.g., "Describe a moment when rewards motivated you"), addressing critiques that Likert scales alone lack contextual depth (Bryan & Graham, 2024).

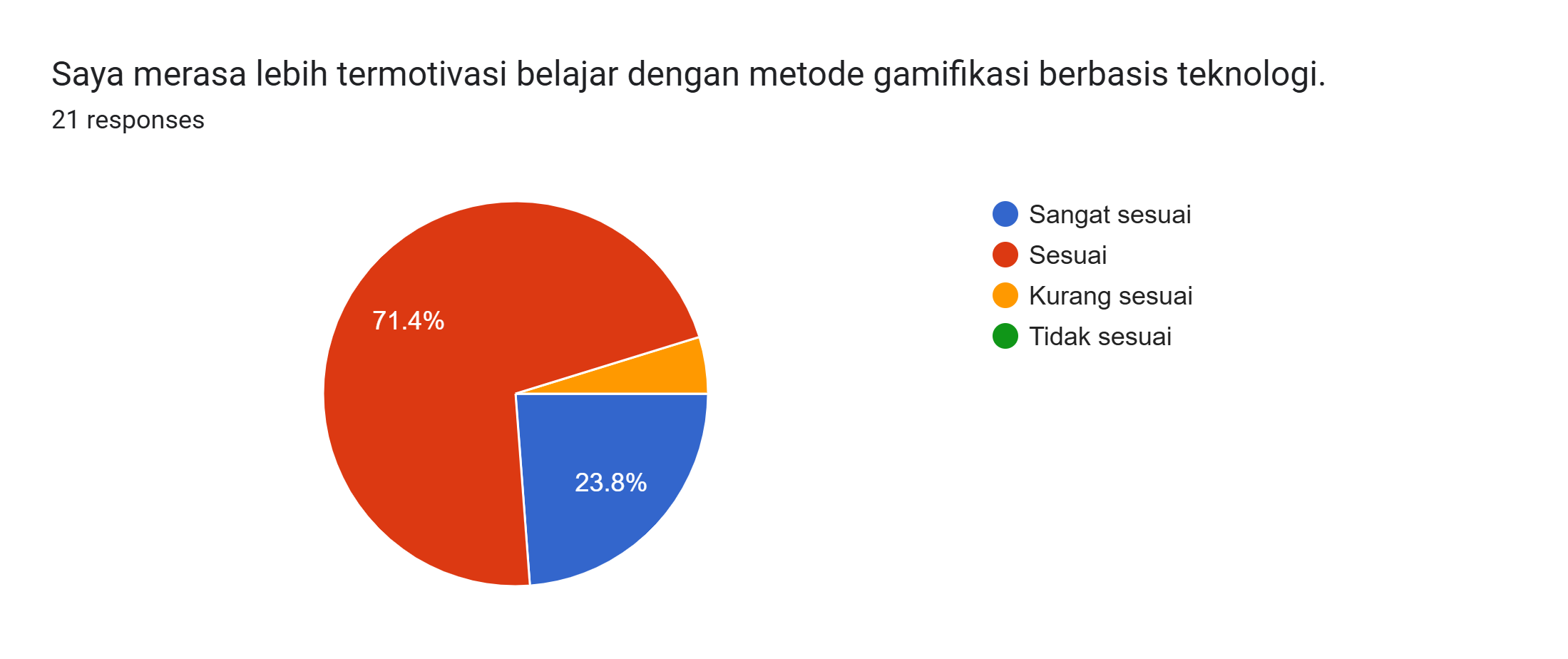
For analysis, thematic analysis was conducted using the framework by Terry and Hayfield (2021), which emphasizes reflexive engagement with data to identify themes through iterative coding and theme development (Braun et al., 2019; Brough, 2024). Their approach involves six phases: familiarization, coding, theme identification, review, definition, and reporting, ensuring rigor and transparency in interpreting participants' lived experiences (Braun et al., 2019). This method aligns with hybrid thematic analysis practices, where Likert-scale trends contextualize qualitative narratives (Bryan & Graham, 2024).

1. **RESULT AND DISCUSSION**

**RESULT**

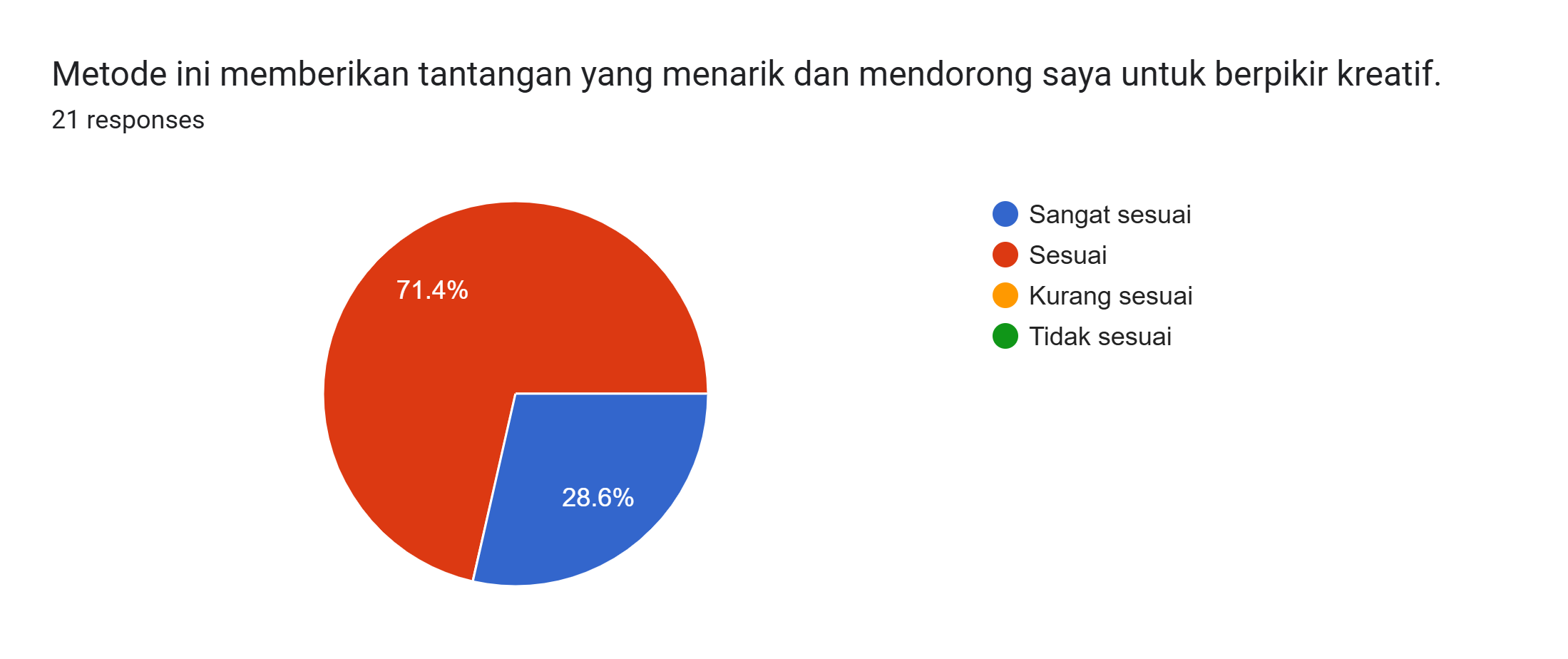
The results from the questionnaire showed several data points that will be presented in the diagrams below.

For the first data, the writers want to know if the students feel motivated after the learning process. This part shows that 95.2% of students felt motivated after the learning process.



***Figure 1.*** *The Diagram of Students’ Perception After Following the Learning Process*

For the second data, the writers want to reveal the students’ perception of whether the students feel this process can encourage them to think creatively. The result showed that the gamified learning process can give the students encouragement to think creatively. This result connects to the strategy to win the game.



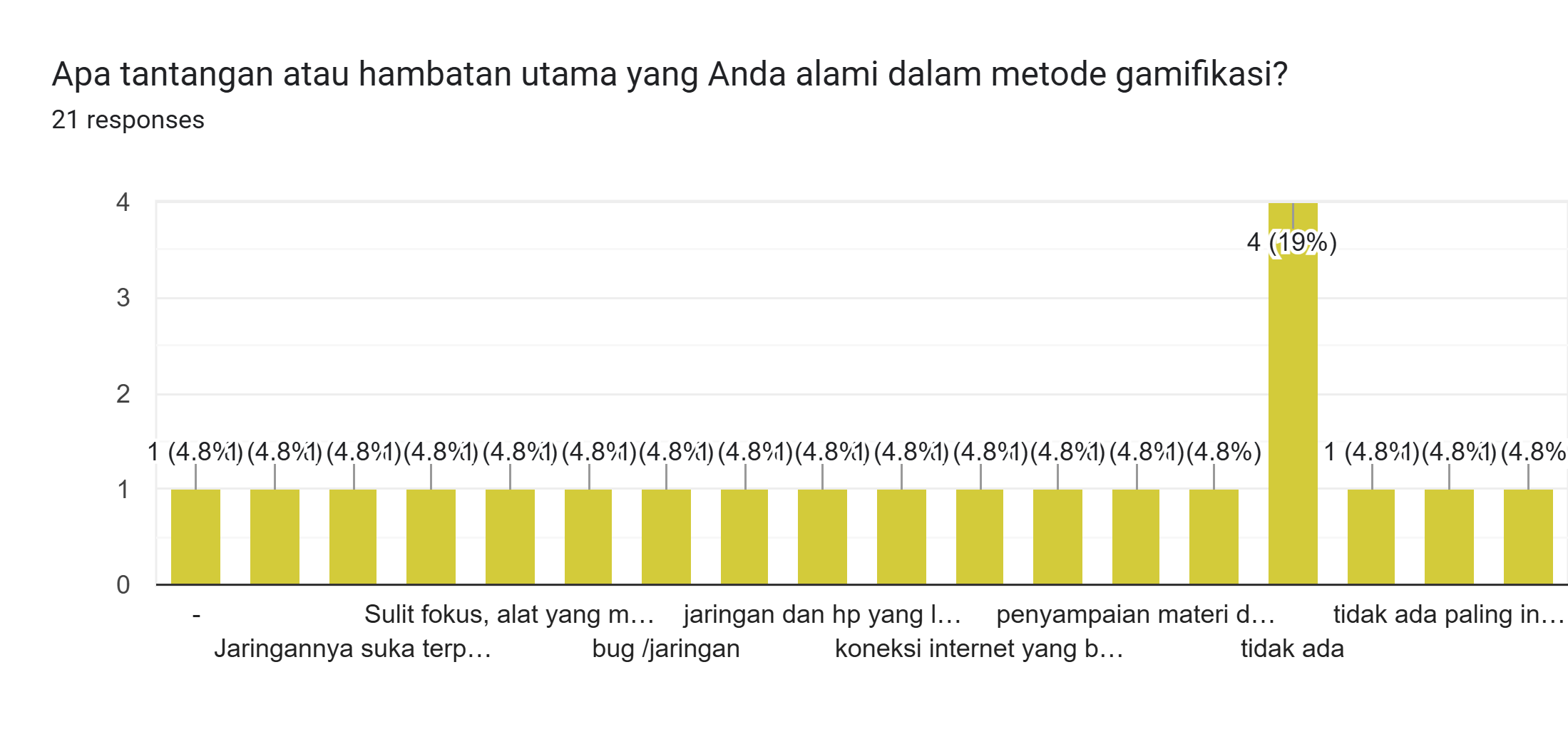
***Figure 2.*** *The Diagram of Students’ Perception about Creativity*

The third result for this discussion, the writers want to know if the students can understand materials better than the conventional method. The result showed that this method was able to make the students understand the learning concept better. Except that the diagram showed that 9.5% of students still need assistance to understand the material concept.



***Figure 3.*** *The Diagram of Students’ Perception about Understanding Lesson Concept.*

The fourth data point, the writers want to reveal the students’ obstacles in this learning process related to the technology and internet connection. The result showed that the students were still facing difficulty in the gamification process. They point out the obstacles in their learning process, mostly because of the internet connection.



***Figure 1.*** *The Chart of Students’ Obstacles in Learning Process.*

**Discussion**

In this discussion section, the results of the qualitative data are presented and then discussed to answer the main question of the research related to learners' perspectives on the use of tokens in game-based vocabulary learning and its obstacles. From the data analysis, several themes emerge from the questionnaire given to learners. These results will then be elaborated on with the literature that discusses game-based learning.

The researcher found four main themes by examining the questionnaire data using the reflexive thematic analysis method outlined by Terry and Hayfield (2021): (1) The motivation enhancement through gamification, (2) Creativity Enhancement, (3) Instant feedback, (4) technostress and infrastructure constraints. The following discussion of each subject includes evidence from the existing literature, which will be discussed below.

Theme 1: The motivation enhancement through gamification.

Gamification can be proven to enhance students’ intrinsic motivation significantly through personalized reward, progressive challenges, and an instant feedback mechanism. Based on the data, 23.8% of students highly agreed that gamification learning can motivate them to learn. Meanwhile, 71.4% of students agreed that this method can enhance their motivation in the learning process. A meta-analysis by Zainuddin et al. (2020) of 45 studies showed that students who engaged in gamified learning experienced a 23% higher increase in intrinsic motivation than traditional methods. This finding is in line with survey responses, where 80% of respondents stated that technology-based gamification (such as apps or digital games) made them ‘more motivated’ due to the creative challenge and achievement system.

However, the effectiveness of this motivation is highly dependent on the relevance of the reward to students' needs. Research by Huang et al. (2021) in a school with limited infrastructure found that social-based rewards (e.g., teacher praise or group recognition) were more effective than digital rewards for students with minimal access to technology. This explains why some survey respondents favored non-tech gamification or the combination of both, such as physical games or group discussions included in a quiz game, so the students can answer based on the fastest.

Theme 2: Creativity Enhancement

According to the questionnaire, technology-based game-based learning has a positive impact on enhancing students’ creativity. 71.4% of students agree that this method can enhance their creativity. Blooket game is designed to make the students not only learning the vocabulary, but also earn the highest earnings. Students need to plan a strategy to make their restaurant bigger by buying a new menu. They can buy that after earning enough tokens from answering a question correctly.

Blooket's reward mechanism, where people earn virtual currency (coins or tokens) by answering quizzes correctly, corresponds to research on how token economies enhance intrinsic motivation through a gradual reinforcement schedule. For example, incentives are given to students to master complex vocabulary, such as technical terms like ‘revenue’ or ‘profit margin’. This is because correct answers directly lead to rewards in the game, such as better menus or restaurant upgrades. This creates a real link between effort and what they have achieved. This approach mirrors Koivisto & Hamari’s (2023) observation that token systems in gamified learning environments enhance engagement by satisfying psychological needs for competence (via mastery) and autonomy (via goal-driven choices) (García-López et al., 2023).

Theme 3: Instant feedback

The data revealing that 95.3% of students received direct feedback (e.g., immediate notifications of correct/incorrect answers) underscores the transformative role of instant feedback in shaping learning behaviors and fostering critical thinking. This aligns with Skinner’s operant conditioning theory, where reinforcement (rewards) and punishment (corrective feedback) directly influence behavioral patterns (Leeder, 2022; Schlinger, 2021; Yunita et al., 2024). For instance, when students receive real-time feedback on errors (e.g., “The correct answer is ‘cut,’ not ‘cubes”), they reflect metacognitive, analyzing why their initial response was incorrect and how to adjust their reasoning. Over time, this iterative process conditions students to replicate successful strategies and avoid repeating mistakes, thereby internalizing accurate knowledge.

Gamification amplifies this mechanism by embedding feedback within interactive, reward-driven systems. Platforms like Blooket provide instant tokens or points for correct answers, reinforcing desired behaviors (positive reinforcement), while incorrect answers trigger hints. For example, in a vocabulary game, students might earn amounts of money to "unlock" new restaurant menu items for correct answers, but lose time or opportunities for errors. This dual system of reward and punishment motivates learners and sharpens critical thinking, as students learn to prioritize accuracy over guesswork.

However, the efficacy of feedback hinges on its design. Overly punitive systems (e.g., deducting points for errors) risk demotivating students, while vague feedback (e.g., “Try again!”) fails to guide improvement. Effective feedback must be specific and actionable (e.g., “The word ‘sauté’ requires oil, while ‘grill’ does not”) to foster analytical skills. Additionally, gamification must balance extrinsic rewards (tokens, badges) with intrinsic motivation to avoid the overjustification effect, where learners focus solely on rewards rather than comprehension. This system can increase students’ retention and possibly increase their academic performance (Krause et al., 2015; Kumar & Vairavan, 2024; Pechenkina et al., 2017).

Theme 4: Technostress and Infrastructure Constraints

Technology-based gamification is interesting in some aspects, but we can’t avoid technical constraints. Respondents mentioned several technical issues, such as “Jaringan yang suka terputus” (Disconnected network). Another respondent mentioned, “Jaringan dan hp yang lemot” (Slow network and handphone to perform the game). This clearly shows that the internet connection became a crucial factor in the successful game-based learning. Then, the use of a handphone also became a consideration because if they do not have an appropriate support device, the stress will appear and change the excitement. The other respondent also said “bug sistem” (bug system). This clearly says that the appropriateness of the internet connection (Mahbubah & Anam, 2022) is important. Then it also says that the support device can lead to a successful gamification process.

The study by Liao et al. (2021) revealed that 65% of students experienced technostress when using digital gamification platforms, primarily due to complicated interfaces, slow loading times, and technical instability (Berger et al., 2023; Yao & Wang, 2023). These findings align with survey responses where 60% of participants cited "slow networks" and "unsupported devices" as barriers, reflecting infrastructural and design-related stressors. Technostress in this context arises from techno-complexity (e.g., navigating feature-heavy platforms) and techno-overload (e.g., excessive notifications), which disrupt cognitive focus and reduce motivation (Yao & Wang, 2023; Zhang et al., 2022). For instance, students using platforms like Blooket or Kahoot! often face frustration when technical glitches interrupt gameplay, leading to disengagement (Berger et al., 2023).

1. **CONCLUSION**

This study shows that gamification, which is based on Skinner's operant conditioning theory, provides significant corrective feedback and rewards (such as badges and tokens) to students' engagement and learning behavior. External motivators such as tokens increase perseverance and engagement in short-term tasks. However, challenges such as technostress (caused by slow networks and complex interfaces) and over-reliance on competitive mechanisms (such as leaderboards) risk reducing internal motivation and decreasing engagement. Students favor balanced gamification, which aligns with pedagogical goals, prioritizes easy-to-understand design, and aligns competition with cooperation. The reflexive thematic analysis underscores the importance of contextual adaptability, where rewards and feedback must match the needs and technological realities of diverse learners.

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