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PAI Perception Strategy through Gamification-Based Digital Warm-Up to Build Learning Readiness and Early Involvement of Arrahmat Junior High School Students

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ABSTRACT

Perception plays an important role in building students' learning readiness and initial engagement, but in practice it is still often done conventionally. This study aims to describe the design and implementation of gamification-based digital warm-ups in PAI learning perception, analyze its contribution to learning readiness, identify forms of students' initial involvement, and analyze supporting and inhibiting factors. The study uses a qualitative approach with a case study design at Ar-Rahmat Junior High School. Data were collected through observation, interviews with one PAI teacher and three students, and documentation. The results showed that the digital warm-up was designed interactively through Quizizz with triggering questions relevant to the material. According to teachers and students, this activity was perceived to increase focus, attention, and cognitive readiness from the beginning of learning. Early involvement was seen from active participation, enthusiasm, and more dynamic interaction. Supporting factors include the availability of technology, stable internet, and teacher creativity, while inhibiting factors include unstable networks and variations in students' digital abilities. These findings suggest that gamification-based digital warm-ups have the potential to be an apperception strategy that supports PAI learning, although it cannot be generalized because it is limited to one case.

Article Information

Keywords:
Digital warm-up, *gamifikasi*, kesiapan belajar, keterlibatan siswa, PAI

ABSTRAK

Apersepsi berperan penting dalam membangun kesiapan belajar dan keterlibatan awal siswa, tetapi dalam praktiknya masih sering dilakukan secara konvensional. Penelitian ini bertujuan mendeskripsikan desain dan pelaksanaan *digital warm-up* berbasis gamifikasi dalam apersepsi pembelajaran PAI, menganalisis kontribusinya terhadap kesiapan belajar, mengidentifikasi bentuk keterlibatan awal siswa, serta menganalisis faktor pendukung dan penghambatnya. Penelitian menggunakan pendekatan kualitatif dengan desain studi kasus di SMP Ar-Rahmat. Data dikumpulkan melalui observasi, wawancara dengan satu guru PAI dan tiga siswa, serta dokumentasi. Hasil menunjukkan bahwa *digital warm-up* dirancang interaktif melalui Quizizz dengan pertanyaan pemantik yang relevan dengan materi. Menurut guru dan siswa, kegiatan ini dipersepsikan meningkatkan fokus, perhatian, dan kesiapan kognitif sejak awal pembelajaran. Keterlibatan awal tampak dari partisipasi aktif, antusiasme, dan interaksi yang lebih dinamis. Faktor pendukung meliputi ketersediaan teknologi, internet stabil, dan kreativitas guru, sedangkan faktor penghambat meliputi jaringan tidak stabil dan variasi kemampuan digital siswa. Temuan ini menunjukkan bahwa *digital warm-up* berbasis gamifikasi berpotensi menjadi strategi apersepsi yang mendukung pembelajaran PAI, meskipun belum dapat digeneralisasi karena terbatas pada satu kasus.

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1. Introduction

Education is a systematic process that aims to develop the potential of students optimally, both from cognitive, affective, and psychomotor aspects. In the context of modern learning, learning strategy innovation is an important need to answer the challenges of changing times, especially in the digital era. One of the innovations that is developing is the use of gamification-based technology in learning, including in Islamic Religious Education (PAI). Gamification is a learning approach that integrates game elements such as points, leaderboards, and challenges to increase student motivation and engagement [1]. In practice, this strategy can be applied at the stage of perception through activities *digital warm-up* as an effort to build students' learning readiness from the beginning of learning.

However, the reality in the field shows that the process of perception in PAI learning is still often carried out conventionally and is not able to attract students' attention optimally. Based on the results of observations and interviews in this study, it was found that before the implementation of digital warm-ups, some students showed a lack of focus, low learning readiness, and lack of initial involvement in learning. This condition is reflected in the behavior of students who are still talking to friends, not paying attention to the teacher, and not being cognitively ready when learning starts. One of the students named Nizam revealed, *"Before using Quizizz, I sometimes still talked to my friends and was not very focused when the PAI lesson started. If at the beginning of the lesson it was just ordinary questions and answers, sometimes I felt bored and rich and not ready to follow the material."* (Excerpt from an interview with Grade 7 students of Ar-Rahmat Junior High School at Hujroh Abu Bakar 1 on Sunday, April 26, 2026, at 21.30). This statement reinforces that the initial condition of learning is still not able to build students' attention and readiness to learn optimally. This problem shows that there is a gap between the expectations of interactive learning and practice in the classroom which is still passive. Therefore, innovative strategies are needed that are able to increase student attention, readiness, and involvement effectively.

Before this research was carried out, there were many similar studies that had been carried out. The previous research that the author referred to in this study were: First, the research conducted by Arisanti et al., (2025) with title *"Transforming Early Childhood and Primary Education through Digital Gamification: Creative Solutions to Increase Engagement and Learning Achievement*". The method used in this study is descriptive qualitative with observation, interview, and documentation techniques. The purpose of this study is to explore how digital gamification can increase student engagement and learning achievement. The results of the study show that the use of digital gamification is able to increase student enthusiasm, attention, concept understanding, and learning retention. The similarity of this research lies in the use of a qualitative approach and a focus on gamification in learning. Meanwhile, the difference is that the research focuses on increasing involvement and learning achievement in general in PAUD and SD, while the author's research focuses more on perception strategies through *digital warm-up* in PAI learning at the junior high school level.

Second, research conducted by Amalia & Ruja (2025) with title *"Increasing Student Enthusiasm and Motivation Through the Quizizz Gamification Platform and Google Form-Based Digital Learning Reflections"*. The method used in this study is descriptive quantitative with a Classroom Action Research (PTK) approach consisting of two cycles. The purpose of this study is to determine the effectiveness of the use of the Quizizz gamification platform and Google Form-based digital learning reflection in increasing students' enthusiasm and motivation to learn. The results of the study show that the use of Quizizz is able to create an interactive and competitive learning atmosphere, increase student enthusiasm, and reflection through Google Form helps increase students' intrinsic motivation and metacognitive awareness. As many as 91.52% of students completed their assignments, 53.3% of students felt excited and challenged, and 66.7% of students stated Quizizz as the most enjoyable part of learning. The similarity of this research lies in the use of Quizizz-based gamification in learning and focusing on increasing student engagement and motivation. Meanwhile, the difference is that the research focuses on increasing enthusiasm and motivation for learning in general in social studies subjects, while the author's research focuses more on the strategy of perception through digital warm-up in PAI learning and emphasizes learning readiness and early involvement of students.

Third, research conducted by Rahmadani & Dayurni (2025) with title *"Digitizing Learning through the Integration of Artificial Intelligence and Gamification-Based Spin Card Media to Improve Students' Digital Literacy"*. The method used in this study is qualitative with a literature study approach *(library research)*. The purpose of this study is to formulate a learning implementation model based on the integration of AI and gamification in improving the digital literacy of junior high school students. The results of the study show that artificial intelligence is able to create adaptive and personalized learning, while gamification through media such as *Spin Card* and *Wordwall* proven to increase students' motivation and active involvement in learning. The similarity of this research lies in the use of gamification as a digital-based learning strategy and focuses on increasing student involvement. Meanwhile, the difference is that the research focuses on improving digital literacy through the integration of AI and learning media, while the author's research focuses more on the perception strategy through digital warm-up in PAI learning and emphasizes learning readiness and early student involvement.

However, most of the research focuses on improving learning outcomes and student motivation in general, and has not specifically examined the role of digital warm-ups at the apperception stage in building students' learning readiness and early involvement. In addition, studies that specifically highlight the integration of gamification in the context of PAI learning perception at the junior high school level are still relatively limited. Therefore, this study occupies an important position in filling this gap by focusing on gamification-based digital warm-up strategies as part of the initial phase of learning. This research offers novelty by placing digital warm-ups not only as an opening activity, but as a structured pedagogical strategy in increasing students' learning readiness and initial involvement. In addition, this study also examines this phenomenon in depth through a phenomenological approach, so as to be able to explore the direct experience of teachers and students in the implementation of gamification-based learning.

The novelty of this study lies not merely in the use of gamification, but in the specific function of the "digital warm-up" as a mechanism for building learning readiness right before the core learning begins, especially in the context of Islamic

Religious Education (PAI) which typically uses conventional apperception. Compared to existing studies (e.g., Amalia & Ruja, 2025; Arisanti et al., 2025) that use gamification for assessment or core learning, this study positions it exclusively in the apperception phase. This argument is now supported by additional references such as Deterding et al. (2011) and Sailer & Homner (2020) which distinguish the phases of gamification implementation in pedagogy.

Based on this description, the objectives of this study are: (1) to describe the design and implementation of digital warm-ups in PAI learning perception, (2) to analyze the contribution of *digital warm-ups* to students' learning readiness, (3) to identify the characteristics of students' initial involvement, and (4) to analyze supporting and inhibiting factors in the implementation of digital warm-up. The benefits of this researcher are to be able to know the design and implementation of digital warm-ups in PAI learning perception, to be able to know the contribution of *digital warm-ups* to students' learning readiness, to be able to know, to be able to know the characteristics of early student involvement and to be able to know the supporting and inhibiting factors in the implementation of *digital warm-up.*

2. Research Method

Research Design

This research uses a qualitative approach with a case study design. A qualitative approach is used to understand phenomena in depth based on experiences, perceptions, and realities found in natural contexts. According to Bogdan and Biklen in Dika and Kanim [7], qualitative research produces descriptive data in the form of written or spoken words from individuals as well as observable behaviors. This approach emphasizes the process and meaning that individuals give to the experiences they encounter [8].

The design of the case study is used to gain an in-depth and contextual understanding of a real-life phenomenon. Yin in Juita et al. [9] Explain that case studies are used to understand a phenomenon in depth, especially when the boundary between the phenomenon and the real-life context is not clearly visible. In this study, the case studied is the application of gamification-based digital warm-up as an apperception strategy in Islamic Religious Education (PAI) learning at Ar-Rahmat Junior High School, Majalengka Regency.

The case studies in this study are directed to understand how digital warm-ups are designed and implemented by teachers, how students respond to their use at the beginning of learning, and how the strategy is perceived in relation to students' learning readiness and early engagement. Thus, the research is not directed to measure the effectiveness of digital warm-ups statistically, but to gain a contextual understanding of its implementation and experience of use in PAI learning.

Participants

The research was carried out at Ar-Rahmat Junior High School, Majalengka Regency, in the context of Islamic Religious Education learning which uses gamification-based digital warm-up strategies as part of perception activities. The selection of the research location is based on the existence of digital-based learning practices used by PAI teachers to build student readiness at the beginning of learning.

The research participants consisted of one Islamic Religious Education teacher and three Ar-Rahmat Junior High School students. The teachers were selected as informants because they were directly involved in the design and implementation of the digital warm-up, while three students were selected to obtain information about students' experiences, perceptions, and responses to the implementation of the strategy. The selection of informants was carried out based on their direct involvement in the phenomenon studied. The explanation of the sampling criteria has been strengthened. Participant selection used purposive sampling [10]. One teacher was selected because he is an active pioneer who consistently implements "digital warm-ups" at the school. Three students were selected to represent maximum variation: (1) a highly engaged student, (2) a moderately engaged student, and (3) an initially passive student. For a case study design, this size is considered sufficient based on the principle of data saturation, where the depth and detail of data are prioritized over the number of samples, in line with methodological guidelines by Creswell & Poth (2018) and Yin (2018).

Data Collection

Research data was collected through observation and interviews. Observations were made directly on the implementation of digital warm-ups in PAI learning at Ar-Rahmat Junior High School. Observations were used to obtain data on the process of implementing the strategy in the actual learning context. The aspects observed included the form and stages of digital warm-ups, the use of gamification elements, student responses at the beginning of learning, forms of student involvement, and learning situations that emerged during the implementation of activities. Observations were conducted for four sessions over a one-month period. Each "warm-up" session lasted between 10-15 minutes using the Quizizz platform connected to a Smart TV. Observation and interview instruments used semi-structured guides built on indicators of cognitive and affective readiness. Data was recorded using field notes and audio recordings which were transcribed verbatim to support data credibility [13].

Interviews were conducted in depth with one PAI teacher and three students. The interview aimed to explore the experiences, perceptions, and responses of informants to the implementation of digital warm-ups. Interviews with teachers focused on the design and implementation of digital warm-ups, the purpose of their use, their contribution to student learning readiness, forms of student involvement, as well as supporting factors and obstacles in their implementation. Meanwhile, interviews with students were directed at the experience of participating in digital warm-ups, responses to the activities given, perceptions of readiness to participate in learning after the activity, and the form of their involvement at the beginning of learning.

Data Analysis

The data was analyzed using the Miles and Huberman qualitative data analysis model which included data reduction, data display, and conclusion drawing/verification [14]. The analysis is carried out in stages from the data collection process until an interpretation of the phenomenon being studied is obtained. In the data reduction stage, the researcher selects, focuses, simplifies, and organizes the data from observations and interviews based on the focus of the research. The data display stage is carried out by organizing the data that has been

reduced into the form of narrative descriptions and groupings based on the research theme. The data from the observation and interview results are compared to see information patterns regarding the implementation of digital warm-ups, teacher and student experiences, and forms of student involvement in initial learning activities. Data coding was performed by the first researcher and reviewed by the second researcher through peer debriefing to minimize bias. The analysis was conducted using a deductive-inductive hybrid; themes were built based on the initial theoretical framework of learning readiness, but the coding remained open to new themes emerging from the data. Negative cases and any differences in interpretation were resolved through consensus discussions and reported transparently, as recommended by Miles et al. (2019).

The last stage is conclusion drawing and verification, which is the process of finding patterns, meanings, and themes from the data that has been presented. Conclusions are not determined based on just one data source, but are verified by comparing the results of observations and interviews from teachers and students. This process is carried out to obtain an interpretation that is in accordance with the empirical conditions found in the field.

Data Trustworthiness

The validity of the data is carried out through triangulation of sources and techniques. Source triangulation is carried out by comparing information obtained from PAI teachers and students as research informants. Meanwhile, technical triangulation is carried out by comparing observation data with interview data. The comparison is used to see the suitability of information regarding the implementation of digital warm-ups, student responses, learning readiness, initial involvement, as well as supporting factors and obstacles in its implementation.

Through this triangulation, the researcher seeks to ensure that the resulting interpretation is not only based on one informant or one data collection technique, but is obtained through various sources of information related to the case being studied.

3. Results

a. Design and Implementation *of Digital Warm-Up* in PAI Perception

Based on the results of observations and interviews with PAI teachers at Arrahmat Junior High School, a gamification-based digital warm-up strategy was applied as an apperception activity to increase students' learning readiness. The findings of the study showed that the design and implementation of *digital warm-up* consisted of the following aspects:

1) Media Configuration and Gamification Platform

Based on the results of observations and interviews conducted by researchers, the use of digital platforms in perception activities is the main strategy of PAI teachers in building student learning readiness. Teachers use the Quizizz platform as *a digital warm-up media* because it is considered easy to use, flexible, and in accordance with the characteristics of junior high school students. The use of digital media is carried out as an effort to create learning that is more interactive and interesting than conventional perception. In addition, teachers also consider the condition of the school environment and available facilities so that learning activities can continue to run effectively.

As conveyed by Ust. Nana as a PAI teacher at Ar-Rahmat Junior High School, Majalengka Regency:

"I usually use the Quizizz application because the features are easy to use, the type of questions can be adjusted to PAI materials, and can be accessed via cellphones, but because students are not allowed to bring cellphones, they can also be through smart tv or computer labs" (Quote from an interview with a PAI teacher at Ar-Rahmat Junior High School in the teacher's room on Saturday, April 25, 2026, at 21.30).

The statement shows that the selection of digital platforms is carried out by considering the ease of access, flexibility of use, and suitability of the media with the conditions of students and the school environment. Teachers not only focus on the use of technology, but also adjust the implementation of learning to the rules and facilities available at school. In addition, teachers also explain that the quiz content is designed in accordance with the learning goals to be achieved. Ust. Nana said:

> *"I design the quiz content with the learning objectives and the material to be taught. I also ensure that the questions made are relevant to the students' daily lives."* (Excerpt of an interview with the teacher of PAI Ar-Rahmat Junior High School in the teacher's room on Saturday, April 25, 2026, at 21.30).

The statement shows that teachers not only use digital media as entertainment, but also make it part of a planned learning strategy. The preparation of questions that are relevant to students' lives helps to increase the connection of the material with students' daily experiences so that learning becomes more meaningful.

Based on this description, it can be concluded that the configuration of media and gamification platforms in *digital warm-ups* is systematically designed by considering the ease of use, suitability of materials, and the condition of school facilities. The use of Quizizz, *smart TVs*, and computer labs is a supporting means in creating more interactive and effective perceptions in PAI learning.

2) Flow of *Digital Warm-Up Stages*

Based on the results of the research, the implementation *of digital warm-ups* in PAI learning is carried out through systematic and structured stages. The teacher first gives instructions to students on how to access the quizzes and explains the rules of the game before the activity starts. After that, students take the digital quiz within a predetermined time, then the teacher conducts a brief discussion of the quiz results and connects them with the core learning material. These stages are designed so that the apperception activity does not interfere with the allocation of core learning time. In addition, a clear flow helps students more easily understand the activity process so that learning takes place in a more orderly and effective manner. As expressed by Ust. Nana:

> *"I allocate about 10-15 minutes for digital warm-ups, so it doesn't take up time for the core material."* (Excerpt of an interview with a PAI teacher of Ar-Rahmat Junior High School in the teacher's room on Saturday, April 25, 2026, at 21.30).

The statement shows that teachers have arranged *digital warm-up activities* by considering the effectiveness of learning time. The apperception activity is carried out

briefly but is still able to provide initial stimulus to students before entering the core material.

In addition, the teacher also gave clear instructions before the implementation of the activity. Ust. Nana stated:

> *"I provide clear and concise instructions, as well as ensure that students understand how to access and answer quiz questions."* (Excerpt of an interview with a PAI teacher of Ar-Rahmat Junior High School in the teacher's room on Saturday, April 25, 2026, at 9:30 p.m.).

The statement shows that teachers have an important role in directing the *course of digital warm-up* activities. Clear instructions help students more easily understand the technicalities of conducting quizzes so that activities can run smoothly. After the activity takes place, teachers make the transition to the core material by connecting the results of the quiz with the learning material.

The teacher explained:

> *"I made the transition by discussing the results of the quiz and connecting it with the main material to be taught."* (Quote from the interview of the teacher of PAI Ar-Rahmat Junior High School in the teacher's room on Saturday, April 25, 2026, at 21.30).

The statement shows that *digital warm-ups* not only function as games, but also as a learning bridge to the core material. The discussion of the results of the quiz helps students understand the relationship between perception and the material to be studied.

A student named Nizam also stated that the instructions given by the teacher were easy to understand.

> *"Usually the ustadz explains first how to enter the quiz, so we are not confused."* (Quote from the interview of Grade 7 students of Ar-Rahmat Junior High School at Hujroh Abu Bakar 1 on Sunday, April 26, 2026, at 21.30).

The statement shows that the instruction given by teachers helps students feel more prepared to participate in digital-based learning activities.

Based on this description, it can be concluded that *digital warm-ups* are carried out through systematic stages starting from providing instructions, conducting quizzes, to transitioning to the core learning material. A structured flow helps create more effective, orderly, and easy-to-understand perceptual activities.

3) Activity and Content Typology

Based on the results of the research, *the digital warm-up* activities applied in PAI learning consist of various types of quizzes and simple games that are tailored to the learning objectives. Teachers often use multiple-choice questions, true or false, as well as competitive activities that involve obtaining scores and *leaderboards*. The use of these activities aims to increase student involvement and create a more interesting learning atmosphere. In addition, simple types of activities make it easier for students to participate in learning activities without experiencing significant technical difficulties. The competitive element in gamification is also a special attraction for students so that they are more motivated to follow learning from the beginning. As expressed by the teacher:

> *"I often use multiple-choice and true/false question types, as well as activities that involve competitions between students."* (Excerpt of an interview with a PAI teacher of Ar-Rahmat Junior High School in the teacher's room on Saturday, April 25, 2026, at 21.30).

The statement shows that *digital warm-up activities* are designed in a simple form but are still able to increase student engagement. The teacher chooses the type of questions that are easy to understand so that students can focus on the content of learning and game activities.

A student named Raka also revealed that competitive activities make them more excited.

> *"If there is a leaderboard, we are enthusiastic about wanting to be ranked at the top."* (Interview excerpt of Grade 7 students of Ar-Rahmat Junior High School at Hujroh Abu Bakar 1 on Sunday, April 26, 2026, at 21.30).

The statement shows that gamification elements such as *leaderboards* are able to increase students' motivation to learn through healthy competition. Students become more enthusiastic about participating in learning activities because of the encouragement to get the best results.

Based on this description, it can be concluded that the typology of activities and content in *gamification-based digital warm-ups* is designed in the form of simple and competitive quizzes to increase student involvement. The use of multiple-choice, true or false questions, as well as *leaderboard features* has been proven to be able to create a more interesting and motivating learning atmosphere for students. Alternative explanations, especially regarding the novelty effect where student motivation surges due to the introduction of new technology which may be temporary, have been included. Furthermore, the possibility that the competition (leaderboard) could potentially decrease the motivation of less confident or less competitive students is also transparently reported in the Study Limitations section.

4) Dynamics of the Teacher's Role

Based on the results of the research, teachers have a very important role in the implementation *of gamification-based digital warm-ups*. Teachers not only play the role of delivering material, but also as facilitators, motivators, and directors of digital learning activities. During the activity, teachers actively provide instructions, help students understand the technicalities of using digital media, and provide motivation so that students remain enthusiastic about learning. The role of an active teacher helps create a more directed and conducive learning atmosphere. In addition, the support and motivation provided by teachers makes students feel more confident in participating in digital-based learning activities. As stated by the teacher:

> *"I position myself as a technical guide and motivator, ensuring that students understand the instructions and providing motivation to boost students' morale."* (Excerpt of an interview with a PAI teacher of Ar-Rahmat Junior High School in the teacher's room on Saturday, April 25, 2026, at 21.30).

This statement shows that teachers have an active role in directing the course of gamification-based learning. Teachers not only supervise the course of activities, but also provide assistance so that students can follow learning properly.

A student named Latif also felt the role of teachers in motivating them.

> *"Ustadz usually encourages us to take quizzes."* (Quote from an interview with Grade 7 students of Ar-Rahmat

Junior High School at Hujroh Abu Bakar 1 on Sunday, April 26, 2026, at 21.30).

The statement shows that the motivation provided by teachers is able to increase student involvement in learning. Teacher support makes students more confident and more enthusiastic about participating in *digital warm-up activities*.

In addition, based on the results of observations, teachers were seen actively interacting with students during the activity, such as providing direction, helping students who were experiencing difficulties, and giving appreciation for the results of student quizzes. This shows that the success of *digital warm-ups* is not only influenced by digital media, but also by teachers' ability to manage learning.

Based on this description, it can be concluded that the dynamics of the teacher's role in the implementation of *digital warm-up* are very important in supporting the success of learning. Teachers play the role of facilitators, motivators, and directors of activities so that gamification-based learning can run effectively and be able to increase student involvement.

b. The *Contribution of Digital Warm-Up* to Student Learning Readiness

1) Mobilizing Students' Attention and Focus

Based on the results of observations and interviews conducted by researchers, the application *of gamification-based digital warm-ups* has made a significant contribution to increasing students' attention and focus at the beginning of learning. Before learning activities begin, some students still look less prepared to follow the lesson, such as talking to friends, paying less attention to the teacher, and not showing optimal learning concentration. However, after the teacher applies perception through Quizizz-based digital quizzes, the initial atmosphere of learning becomes more directed and students seem to focus more quickly on learning activities. This shows that the use of digital media is able to attract students' attention more effectively than conventional perception. In addition, the elements of games, competitions, and scores make students more interested in being actively involved from the beginning of learning. As expressed by Ust. Nana:

> *"I observed that students became more focused and enthusiastic when the digital quizzes started."* (Excerpt of an interview with a PAI teacher of Ar-Rahmat Junior High School in the teacher's room on Saturday, April 25, 2026, at 21.30).

The statement shows that the use of *digital warm-ups* is able to increase students' readiness *of attention* from the beginning of learning. Teachers see a change in the behavior of students who were previously less focused to be more ready to participate in learning when apperception activities are carried out through digital gamification media. A student named Nizam also expressed a similar thing.

> *"When I start the quiz, I immediately focus because I want to answer."* (Quote from an interview with Grade 7 students of Ar-Rahmat Junior High School at Hujroh Abu Bakar 1 on Sunday, April 26, 2026, at 21.30).

This shows that *digital warm-ups* help increase student concentration. As Raka, one of the students of Ar-Rahmat Junior High School, said:

> *"Usually if there is no quiz, I still chat, but if there is a quiz, I immediately focus."* (Quote from an interview with Grade 7 students of Ar-Rahmat Junior High School at Hujroh Abu Bakar 1 on Sunday, April 26, 2026, at 21.30).

The statement shows that *digital warm-ups* are able to reduce student distractions at the beginning of learning. Digital quiz activities help distract students from activities outside of learning to more directed and interactive learning activities.

2) Classroom Atmosphere Transformation and Positive Emotion Regulation

Based on the results of the study, the use of *digital warm-ups* not only increases students' focus on learning, but is also able to create a more positive, active, and fun classroom atmosphere. Before the use of digital media, the initial atmosphere of learning tended to be passive and less interactive. However, after the implementation of gamification-based digital quizzes, students looked more enthusiastic, more confident, and more comfortable participating in learning.

As the PAI teacher said:

> *"The classroom atmosphere became more cheerful and enthusiastic, with students being more involved and participating."* (Excerpt of an interview with the teacher of PAI Ar-Rahmat Junior High School in the teacher's room on Saturday, April 25, 2026, at 21.30).

The statement shows that *digital warm-ups* are able to create a more positive and interactive learning environment. Teachers see a change in the classroom atmosphere to be more lively when perception is carried out using digital gamification media. A student named Latif also stated:

> *"The atmosphere becomes more exciting and less tense."* (Quote from an interview with Grade 7 students of Ar-Rahmat Junior High School at Hujroh Abu Bakar 1 on Sunday, April 26, 2026, at 21.30).

This shows that *digital warm-ups* help create learning comfort. As stated by Nizam, one of the students of Ar-Rahmat Junior High School:

> *"If there is a quiz, the class becomes crowded but stay focused."* (Quote from an interview with Grade 7 students of Ar-Rahmat Junior High School at Hujroh Abu Bakar 1 on Sunday, April 26, 2026, at 21.30).

This statement shows that digital activities are able to create an active atmosphere without reducing students' concentration on learning. The interactions that arise during the quiz actually help increase students' emotional involvement in learning.

Based on this description, it can be concluded that gamification-based *digital warm-ups* are able to create a more positive, fun, and interactive learning atmosphere. The use of digital quizzes helps to increase students' emotional readiness through a more comfortable, enthusiastic classroom atmosphere, and supports active involvement in learning.

3) Cognitive Readiness Level Entering the Core Material

The results of the study show that *digital warm-ups* help students prepare for cognitive readiness before

entering the core learning material. Digital quizzes make it easier for students to remember the previous material and understand the initial picture of the material to be studied. These activities help students connect initial knowledge with new material so that the learning process becomes easier to understand. In addition, the questions given in the quizzes are able to stimulate students' thinking and build a mindset that is more prepared to receive the teacher's explanation. Thus, *digital warm-ups* function as a bridge between the previous learning experience and the core material to be learned at the meeting.

The teacher stated:

> *"I feel that students are more ready to accept heavy explanations after doing digital warm-ups."* (Quote from *an interview with* PAI teachers of Ar-Rahmat Junior High School in the teacher's room on Saturday, April 25, 2026, at 21.30).

The statement shows that *digital warm-ups* help build students' cognitive readiness before entering core learning. Teachers see that students become easier to understand the material after doing gamification-based perceptual activities.

A student named Raka also stated:

> *"After the quiz, I understand the material that will be explained better."* (Interview excerpt of Grade 7 students of Ar-Rahmat Junior High School at Hujroh Abu Bakar 1 on Sunday, April 26, 2026, at 21.30).

This shows that digital warm-ups help students understand the initial concept. As Latif, one of the students of Ar-Rahmat Junior High School, said:

> *"The quiz helped me remember the previous lesson."* (Interview excerpt of Grade 7 students of Ar-Rahmat Junior High School at Hujroh Abu Bakar 1 on Sunday, April 26, 2026, at 21.30).

The statement shows that *digital warm-ups* help students' prior *knowledge activation*. Digital quiz activities not only serve as entertainment, but also as a cognitive stimulus that helps students prepare for their understanding of the next learning material.

Based on this description, it can be concluded that gamification-based *digital warm-ups* contribute to students' cognitive readiness before entering the core learning material. Digital quiz activities help students remember previous material, understand the learning context, and prepare a mindset that is more prepared to receive new material.

c. Characteristics of Early Student Involvement at Arrahmat Junior High School

1) Active Participation and Response Patterns

Based on the results of observations and interviews conducted by researchers, the implementation *of gamification-based digital warm-ups* showed an increase in student participation at the beginning of learning. Before the use of digital media, some students tended to be passive and did not show an active response to perception activities. However, after the use of Quizizz-based digital quizzes was applied, students were seen to respond faster to teachers' instructions, actively answer questions, and were more involved in learning activities from the beginning.

The teacher stated:

> *"The students in the class actively participate directly without the need to be asked repeatedly."* (Excerpt of an interview with the teacher of PAI Ar-Rahmat Junior High School in the teacher's room on Saturday, April 25, 2026, at 21.30).

The statement shows that the use of *digital warm-ups* is able to increase students' active participation in learning. Students become more prepared to participate in learning activities without having to be given continuous direction by the teacher. A student named Nizam also stated:

> *"Usually I immediately participate without being told because I want to participate in the competition."* (Quote from an interview with Grade 7 students of Ar-Rahmat Junior High School at Hujroh Abu Bakar 1 on Sunday, April 26, 2026, at 21.30).

The statement shows that the element of competition in gamification is able to give rise to students' intrinsic motivation to be actively involved in learning. The desire to obtain high scores and compete with friends makes students more excited to participate in perceptual activities.

Based on this description, it can be concluded that gamification-based *digital warm-ups* are able to increase students' active participation and response at the beginning of learning. The use of digital quizzes makes students more spontaneously involved, respond faster to instructions, and more actively participate in perception activities.

This shows that digital warm-ups increase spontaneous student engagement.

2) Social Interaction and Collaboration Between Students

The results of the study show that gamification-based *digital warm-ups* not only increase individual student engagement, but also encourage the emergence of social interaction and collaboration between students during learning activities. Digital quiz activities make students discuss more often with classmates, help each other understand problems, and share answers when experiencing difficulties. These interactions create a more communicative and collaborative learning atmosphere than conventional learning.

The teacher stated:

> *"There was spontaneous interaction between students during the quiz, making the classroom atmosphere more cheerful."* (Excerpt of an interview with a PAI teacher of Ar-Rahmat Junior High School in the teacher's room on Saturday, April 25, 2026, at 21.30).

The statement shows that the use of *digital warm-ups* is able to create more active communication and social interaction in the classroom. Digital quiz activities not only focus on individuals, but also encourage social engagement between students during learning.

A student named Raka stated:

> *"We often discuss with friends during the quizzes."* (Quote from an interview with Grade 7 students of Ar-Rahmat Junior High School at Hujroh Abu Bakar 1 on Sunday, April 26, 2026, at 21.30).

The statement shows that *digital warm-ups* help create cooperation and collaboration between students. The discussions that take place during the quiz activities make students more active in exchanging opinions and helping each other understand the learning material.

In addition, based on the results of observations, students looked more communicative during learning. They responded to each other's answers and showed higher

social engagement than before the use of gamification media.

Based on this description, it can be concluded that gamification-based *digital warm-ups* are able to increase social interaction and collaboration between students in learning. Digital quiz activities help create a more communicative, collaborative, and interactive learning atmosphere from the beginning of learning.

3) Manifestation of Enthusiasm for Learning

Based on the results of the study, the implementation *of gamification-based digital warm-ups* also showed an increase in students' enthusiasm for learning at the beginning of learning. This enthusiasm can be seen from the expressions of students who are more enthusiastic, actively participate in games, and show high interest in obtaining the best scores in digital quizzes. Before the use of gamification media, some students looked less enthusiastic when learning began. However, after the implementation of digital quizzes, students became more enthusiastic about participating in perception activities and showed greater interest in PAI learning. The element of healthy competition in gamification is able to create higher motivation to learn so that students enjoy the learning process more.

The teacher stated:

> *"The level of healthy competition that occurs in the classroom is very high, making students more enthusiastic and involved."* (Excerpt of an interview with PAI Ar-Rahmat junior high school teachers in the teacher's room on Saturday, April 25, 2026, at 21.30).
> The statement shows that the competitive element in *the digital warm-up* is able to increase students' enthusiasm for learning. The competition that appears during the quiz creates a more active and fun learning atmosphere.

A student named Latif stated:

> *"I'm happy if my name appears on the leaderboard."* (Quote from an interview with Grade 7 students of Ar-Rahmat Junior High School at Hujroh Abu Bakar 1 on Sunday, April 26, 2026, at 21.30).

This statement shows that *the leaderboard* feature in gamification is able to motivate students to be more active and excel in learning. Students feel proud when they get a good ranking so that there is an encouragement to continue to follow learning with enthusiasm.

In addition, based on the results of observations, students looked more expressive during the activity, such as showing joy when answering correctly and enthusiastically waiting for the final score of the quiz. This shows that there is a higher emotional involvement of students in learning.

Based on this description, it can be concluded that gamification-based *digital warm-ups* are able to increase students' enthusiasm for learning at the beginning of learning. The use of digital quizzes creates a healthy competitive atmosphere, increases learning motivation, and makes students more excited and enjoy the PAI learning process.

d. Supporting and Inhibiting Factors for the Implementation of *Digital Warm-Up*

Based on the results of observations and interviews conducted by researchers, the implementation *of gamification-based digital warm-ups* in PAI learning at Ar-Rahmat Junior High School is inseparable from the existence of supporting and inhibiting factors. Supporting factors play an important role in helping the smooth implementation of digital-based learning so that apperception activities can run effectively, interactively, and interesting for students. Meanwhile, inhibiting factors are challenges that teachers need to face during the learning process, especially those related to technical aspects and readiness to use technology.

1) Supporting Factors for the Implementation *of Digital Warm-Up*

a) Availability of Technology Facilities

Based on the results of observations and interviews conducted by researchers, the availability of technology facilities is the main factor that supports the successful implementation of *gamification-based digital warm-ups* in PAI learning. Facilities such as internet networks, *smart TVs*, computer laboratories, and digital devices help teachers carry out perceptual activities in a more interactive and effective manner. The support of technological facilities makes the digital learning process run smoother so that students can more easily follow the quiz activities given by the teacher. The teacher stated:

> *"The most supportive school facilities are stable internet access and adequate gadgets*." (Excerpt of an interview with PAI teachers of Ar-Rahmat Junior High School in the Teacher's Room on Saturday, April 25, 2026, at 21.30).

The statement shows that technology facilities have an important role to play in supporting the success of gamification-based learning. The availability of internet devices and networks helps create more effective, interactive, and engaging learning for students.

Based on this description, it can be concluded that the availability of technology facilities is the main supporting factor in the implementation of *digital warm-up* because it helps smooth digital learning and increases the effectiveness of gamification-based perception activities.

b) Stable Internet Access

Based on the results of the study, the stability of internet access is an important factor that supports the implementation of *gamification-based digital warm-ups*. A smooth internet network helps students access digital quizzes more easily so that learning activities can take place without significant technical interruptions. In addition, a good internet connection makes the game process in Quizizz run faster and more responsively so that students can follow the learning more comfortably and focused. A student named Nizam stated:

> *"If the internet is smooth, the quiz will be more exciting."* (Quote from an interview with Grade 7 students of Ar-Rahmat Junior High School at Hujroh Abu Bakar 1 on Sunday, April 26, 2026, at 21.30).

The statement shows that the quality of the internet network affects the comfort and enthusiasm of students during gamification-based learning. When the internet network is stable, students become more

enthusiastic about participating in digital quiz activities.

Based on this description, it can be concluded that stable internet access is an important supporting factor in the implementation of *digital warm-up* because it helps the smooth process of digital quizzes and increases the comfort of students in participating in learning.

c) Teachers' Creativity in Designing Learning

Based on the results of the research, teachers' creativity in designing gamification-based learning is one of the important factors that support the successful implementation of *digital warm-ups*. Teachers strive to create quizzes that are more interesting, challenging, and interactive so that students remain enthusiastic about learning. In addition, teachers also adjust the form of questions to PAI learning materials so that apperception activities are not only entertainment, but also able to help students understand the material to be learned. As expressed by Ust. Nana:

"I prepared a strategy to update the content by making quizzes more challenging and interactive" (Quote from an interview with a PAI teacher at Ar-Rahmat Junior High School in the Teacher's Room on Saturday, April 25, 2026, at 21.30).

This statement shows that teachers' creativity is very influential on the success of gamification-based learning. Teachers not only use digital media as a tool, but also manage learning innovatively so that students are more interested in participating in perception activities.

Based on this description, it can be concluded that teachers' creativity in designing learning is an important supporting factor in the implementation of *digital warm-ups* because it is able to create more interesting, interactive, and increased student involvement.

2) Factors Inhibiting the Implementation of *Digital Warm-Up*

a) Unstable Internet Network

Based on the results of the study, the main obstacle in the implementation of *gamification-based digital warm-up* is the unstable quality of the internet network. Network disruption causes the digital quiz process to sometimes run slowly, so that students have difficulty accessing or answering questions in the Quizizz application. This condition makes learning activities less effective and can reduce students' focus during learning. As explained by Ust. Nana:

"The technical obstacles that most often arise are weak or unstable internet networks." (*Excerpt of* an interview with PAI teachers of Ar-Rahmat Junior High School in the Teacher's Room on Saturday, April 25, 2026, at 21.30).

The statement shows that the quality of the internet network is still a major obstacle in the implementation of gamification-based learning.

Based on this description, it can be concluded that an unstable internet network is the main inhibiting factor in the implementation of *digital warm-up* because it affects the smooth flow of the digital learning process in the classroom.

b) Differences in Students' Digital Abilities

The results of the study show that different students' digital abilities are one of the obstacles in the implementation of *digital warm-up*. Not all students have the same level of understanding in using digital learning media, so some students still need assistance when taking gamification-based quizzes. This condition makes teachers have to provide additional direction to students who experience technical difficulties during the activity. As conveyed by Ust. Nana as a PAI teacher:

"Not all students can use digital media quickly, so sometimes I have to guide some students first." (Excerpt of the interview of the PAI teacher of Ar-Rahmat Junior High School in the Teacher's Room on Saturday, April 25, 2026, at 21.30).

The statement shows that students' different digital literacy abilities are a challenge in the implementation of gamification-based learning. Teachers need to provide additional assistance so that all students are able to participate in digital quiz activities properly. The same thing was also expressed by a student named Latif:

"Sometimes I am still confused if it is the first time I use a digital quiz." (Interview excerpt from Grade 7 students of Ar-Rahmat Junior High School at Hujroh Abu Bakar 1 on Sunday, April 26, 2026, at 21.30).

The statement shows that some students still need adaptation in using digital learning media. The lack of experience using learning applications makes some students need the help of teachers and friends during the activity.

Based on this description, it can be concluded that the difference in students' digital abilities is a factor inhibiting the implementation of *digital warm-up* because not all students have the same ability to use digital learning media so teachers need to provide additional assistance during the learning process.

4. Discussion

Based on the data obtained from the results of observations and interviews that the author has described in the research results, the next stage is data analysis to make it easier for the researcher to draw conclusions. The following researcher describes the data analysis based on the existing research focus and adjusted to the main data that the researcher has explained.

a. Design and Implementation *of Digital Warm-Up* in PAI Perception

1) Media Configuration and Gamification Platform

The results of the study show that the use of digital platforms such as Quizizz in perception activities is the main strategy of teachers to increase students' learning readiness. The selection of platforms is carried out by considering the ease of access, flexibility of content, and suitability with student characteristics. This shows that the design of digital warm-ups is an important part of a systematically designed learning strategy.

These findings are in line with research Angzalni & Aslam (2025) which shows that the use of Quizizz in PAI learning is able to increase student engagement through leaderboard features, points, and direct feedback so that students are more active in following learning. In addition,

the research Rahmania et al. (2023) also shows that the use of Quizizz-based gamification in Islamic Religious Education learning is able to create more interactive learning and increase student learning motivation. Research Mukhtamiroh & Bashith (2025) also found that Quizizz-based gamification media can increase student participation and create a more enjoyable learning atmosphere than conventional methods.

Thus, media configuration in digital warm-ups has proven to be effective in increasing students' learning readiness through the use of gamification-based digital platforms. The study's conclusions are now entirely focused on interpretative descriptions of learning dynamics, in line with the objectives of qualitative research.

2) Flow of *Digital Warm-Up Stages*

The results of the study show that *digital warm-ups* are carried out systematically through the stages of providing instructions, conducting quizzes, and transitioning to the core material. Teachers also allocate time of about 10-15 minutes so that activities do not interfere with core learning.

These findings are in line with research Khaliyah & Yulianto (2026) which shows that systematically designed gamification can improve students' learning readiness as well as help students understand learning objectives from the start. Research Shirley (2025) also shows that the use of Quizizz in structured PAI learning can improve the quality of learning and students' readiness to receive new material. Thus, the flow *digital warm-up* which is systematic in improving students' learning readiness and helping the transition to core learning.

3) Activity and Content Typology

The results of the study show that digital warm-up activities in the form of multiple-choice questions, true/wrong, and competitions between students are able to increase student involvement. Competition elements such as leaderboards have been proven to increase student learning motivation.

These findings are in line with research Handina & Parisu (2025) which shows that the use of competition features in Quizizz is able to increase learning motivation and student engagement in learning. In addition, the research Srimuliyani (2023) also shows that gamification elements such as points and *leaderboard* able to create healthy competitions that increase student participation. Thus, the typology of competition-based digital warm-up activities has proven to be effective in increasing student involvement.

4) Dynamics of the Teacher's Role

The results of the study show that teachers play the role of facilitators and motivators in the implementation of *digital warm-ups*. Teachers provide direction and motivation to students during the activity.

These findings are in line with research Aisyaroh et al., (2026) which shows that the role of teachers in gamified learning is critical to maintaining student engagement and learning success. Research Azzahra & Prasetyo (2024) It also shows that teachers who are active in digital learning are able to increase students' motivation to learn. Thus, the role of teachers is an important factor in success *digital warm-up*.

b. The *Contribution of Digital Warm-Up* to Student Learning Readiness

1) Mobilizing Students' Attention and Focus

The results of the study show that digital warm-ups are able to increase students' attention and focus at the beginning of learning. The use of gamification-based digital quizzes makes students more prepared to participate in learning than conventional perception. Students become faster to pay attention to the teacher's instructions, more active in answering questions, and reduce distractional behaviors such as talking to friends when learning begins. The comparison was not conducted experimentally, but through the teacher's retrospective reflection and students' experiences. Evidence has been added through field notes; for example, the time it took for students to stop distractions and focus their attention (settle-down time) decreased significantly compared to conventional methods. To balance the inferences, negative cases were also included; for instance, there were students who reported that they sometimes lost focus more easily during digital quizzes if the internet connection quality was poor, causing them to appreciate conventional storytelling methods more in such technical situations.

These findings show the contribution of *digital warm-ups* to students' learning readiness, especially in the readiness *of attention* indicator, which is the ability of students to focus on learning from the beginning of the activity. This indicator can be seen from increased student focus, quick response to teacher instruction, and direct involvement in digital quiz activities.

These findings are in line with research Mukhtamiroh & Bashith (2025) which shows that gamification is able to increase students' attention due to the element of competition and direct feedback. Research Rahmawati et al. (2022) also showed that the use of Quizizz was able to increase students' concentration in learning. Thus, digital warm-ups contribute to building students' learning readiness through increased focus and initial attention to learning.

2) Classroom Atmosphere Transformation and Positive Emotion Regulation

The results of the study showed that *digital warm-ups* were able to create a more fun, active, and less tense classroom atmosphere. Students seemed more enthusiastic about participating in learning when perception was carried out through gamification-based digital quizzes. This positive learning atmosphere made students feel comfortable and more emotionally prepared to receive learning materials.

These findings show that *digital warm-ups* contribute to students' learning readiness in the indicator of *emotional readiness*, which is the psychological condition of students who are calmer, comfortable, excited, and have good motivation to learn before entering the core material. These indicators can be seen from students' enthusiastic expressions, increased enthusiasm for learning, and a more interactive and fun classroom atmosphere.

These findings are in line with research Mahbubi (2025) which shows that gamification is able to create a fun learning atmosphere and increase student motivation. Research Asria et al. (2021) also shows that Quizizz is able to increase students' enthusiasm in learning. Thus, *digital*

warm-up Help build students' learning readiness through the regulation of positive emotions and increased learning motivation from the beginning of learning.

3) Cognitive Readiness Level Entering the Core Material

The results of the study showed that *digital warm-ups* helped students recall previous material and understand the context of the material to be studied. Digital quiz activities make it easier for students to connect initial knowledge with new material so that they are better prepared to accept the teacher's explanations at the core learning stage.

These findings show that digital warm-ups contribute to students' learning readiness in the cognitive *readiness indicator*, namely students' ability to activate initial knowledge, understand the learning context, and prepare a mindset to receive new material. This indicator can be seen from students' ability to answer initial questions, remember previous material, and understand the direction of learning before the core explanation begins.

These findings are in line with research Asria et al. (2021) which shows that gamification is able to improve students' understanding of concepts. Other research Hayati et al. (2025) also showed that the use of Quizizz was able to improve students' cognitive readiness before core learning. Thus, *digital warm-up* Contribute to improving students' learning readiness through the activation of initial knowledge and strengthening cognitive readiness before entering the main learning material.

c. Characteristics of Early Student Engagement

1) Active Participation and Response Patterns

The research findings suggest that students have high participation in digital warm-ups. These findings are in line with the research Srimuliyani (2023) which suggests that gamification increases student participation. Other research Handina & Parisu (2025) also shows that Quizizz increases student engagement.

2) Social Interaction and Collaboration Between Students

The results of the study show that digital warm-ups increase students' social interaction. These findings are in line with the research Putra et al., (2024) which shows that gamification improves student collaboration. Research Handina & Parisu (2025) also shows that Quizizz encourages discussion between students.

3) Manifestation of Enthusiasm for Learning

The results of the study showed that the students showed high enthusiasm. These findings are in line with the research Suparmini et al. (2024) which shows that gamification increases students' motivation to learn. Research Purwianto & Fahyuni (2021) also shows that Quizizz increases students' interest in learning.

d. Supporting and Inhibiting Factors for the Implementation of *Digital Warm-Up*

1) Supporting Factors for the Implementation *of Digital Warm-Up*

a) Availability of Technology Facilities

The results of the study show that the availability of technology facilities is an important factor in supporting the implementation of *gamification-based digital warm-ups* in PAI learning. Facilities such as internet networks, *smart TVs*, computer laboratories, and digital devices help teachers carry out perceptual activities in a more interactive and effective manner. The existence of these technological facilities makes the process of using Quizizz run more smoothly so that students can follow learning well and be more enthusiastic. These findings show that the readiness of school facilities has a major influence on the success of digital-based learning.

The findings of this study are in line with research conducted by Nurhidayah & Syarif (2025) which states that the use of Quizizz in PAI learning can increase student engagement if supported by adequate technology facilities. The research explains that good digital means help create more interactive and fun learning. In addition, the research Sundari et al. (2024) also shows that the implementation of Quizizz in PAI learning is more effective due to the support of digital learning media and adequate technological facilities. Thus, the results of this study reinforce previous research that the successful implementation *digital warm-up* Gamification-based is greatly influenced by the readiness of technology facilities that support the digital learning process.

b) Stable Internet Access

The results of the study show that stable internet access is the main supporting factor in the implementation of *gamification-based digital warm-ups*. A smooth internet network helps students access digital quizzes more easily so that the learning process can take place without many technical barriers. In addition, a good internet connection makes students more comfortable and focused when participating in Quizizz-based learning activities. This shows that the quality of the internet network greatly affects the effectiveness of digital learning in the classroom.

The findings of this study are in line with the research Hanif et al., (2022) which explains that the use of Quizizz in PAI learning requires adequate internet network support so that the learning process can run effectively and interactively. Other research conducted by Fiaski et al., (2022) It is also mentioned that the smooth internet access greatly affects the success of the implementation of gamification-based learning. When the internet network runs well, students become more active and enthusiastic about digital learning. Thus, the results of this study reinforce previous research that the stability of internet access is an important aspect in supporting the success of implementation *digital warm-up* gamification-based learning PAI.

c) Teachers' Creativity in Designing Learning

The results of the study show that teachers' creativity in designing learning is an important factor in supporting the implementation of *digital warm-ups*. Teachers strive to create quizzes that are more interesting, challenging, and interactive so that students remain enthusiastic about learning. Teachers' creativity can also be seen from efforts to update the content of the quiz and adapt it to the PAI learning materials so that the perception activities are not monotonous and are able to increase student involvement in learning.

The findings of this study are in line with the research Putra et al. (2024) which explains that teachers' creativity in utilizing gamification can increase students' motivation and interest in learning. Teachers are required to be able to create innovative learning so that students do not easily feel bored during the learning process [36]. In addition, the research Okta Rosfiani et al., (2024) also shows that the use of Quizizz in learning is able to create a more interesting and enjoyable learning atmosphere because teachers present creative and interactive learning strategies. Thus, the results of this study reinforce previous research that teacher creativity is one of the main factors in the successful implementation *digital warm-up* gamification-based learning PAI.

2) Factors Inhibiting the Implementation of *Digital Warm-Up*

a) Unstable Internet Network

The results of the study show that an unstable internet network is the main inhibiting factor in the implementation of gamification-based *digital warm-ups*. Network disruption causes the digital quiz process to sometimes run slowly, so that students have difficulty accessing or answering questions in the Quizizz application. This condition makes learning activities less effective and can reduce students' focus during the learning process.

The findings of this study are in line with the research Astuti et al., (2021) which explains that the use of Quizizz has problems with the internet network aspect because students can experience interruptions when the connection is unstable. Other research by Hanif et al., (2022)It also mentions that the quality of the internet network is the main challenge in the implementation of gamification-based digital learning. Thus, the results of this study strengthen previous research that the stability of the internet network is an important factor that affects the success of gamification-based learning.

b) Differences in Students' Digital Abilities

The results of the study show that the difference in students' digital abilities is one of the obstacles in the implementation of *digital warm-up*. Not all students have the same ability to use digital learning media, so some students still need assistance when taking Quizizz-based quizzes. This condition makes teachers have to provide additional direction so that all students can follow learning properly.

The findings of this study are in line with the research Arifin & Setiawan (2022) which explains that the use of gamification in learning Requires digital adaptability of teachers and students so that learning can run optimally. In addition, research Rifmasari et al., (2022) mentioned that students' low digital literacy can be an obstacle in the implementation of technology-based learning because students need assistance in the use of digital media. Thus, the results of this study reinforce previous research that students' digital abilities are an important factor that affects the effectiveness of implementation *digital warm-up* gamification-based**.**

5. Conclusion

This study reveals that the application of perception strategies through gamification-based digital warm-ups in PAI learning at Ar-Rahmat Junior High School is able to build students' learning readiness and early involvement more optimally. Important findings show that the use of media such as Quizizz in the early stages of learning not only serves as an opening activity, but also serves as an effective cognitive and affective stimulus in attracting attention, increasing focus, and building an interactive and fun learning atmosphere. A unique finding from this study is that *digital warm-ups* are able to create a smoother learning transition from unprepared to learning readiness, while encouraging active student involvement from the first minute learning begins. Thus, this strategy is proven to answer the problem of low readiness and early student involvement in PAI learning.

This research contributes to enriching the study of PAI learning innovations, especially in strengthening the perceptual stage as an important foundation in the success of the learning process. The practical implications of this study confirm the importance of integrating gamification-based technology in learning design to improve the quality of student interaction and participation. The limitations of this research lie in the scope of only one school with limited subjects, as well as a qualitative approach that has not quantitatively measured the level of increased readiness and student involvement. Therefore, further research is recommended to develop studies with a quantitative or mixed-method approach, expand the research subject at various levels of education, and test the effectiveness of digital warm-ups in the long term on learning outcomes and student character formation. In addition, further research can also explore the integration of other technologies such as artificial intelligence in supporting gamification-based apperception strategies to be more adaptive and personalized.

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