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CONCEPTUALIZATION OF LEADERBOARD LEADERBOARD IN LEARNING TO MEMORIZE THE QUR'AN IN ISLAMIC BOARDING SCHOOLS

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Abstract

Learning to memorize the Qur'an in Islamic boarding schools faces a number of classic problems: a manual memorization system, slow monitoring of students' progress, minimal incremental rewards for gradual achievements, and a decline in students' fluctuating motivation. This study aims to: 1) analyze the need for a leaderboard in learning to memorize the Qur'an in Islamic boarding schools, and 2) develop its conceptual design. The approach used is descriptive-qualitative with a literature review design using content analysis techniques that follow the interactive model of Miles, Huberman, and Saldana with 1) data condensation, 2) data presentation, 3) drawing conclusions. The results of the study indicate that the need for a leaderboard includes functional needs (macro-micro layered rankings, automatic updates, achievement history, badges, and memorization targets) and non-functional needs (ease of use, transparency, fairness, compliance with Islamic ethics, and responsive display). The resulting conceptual design integrates seven core components with a composite scoring mechanism based on five indicators (memorization enhancement, fluency, *tajwīd*, attendance of deposits, and consistency of *murāja'ah*) and a six-stage closed-loop workflow. This design is based on five principles: increasing intrinsic motivation, healthy competition, collaboration, Islamic values, and sportsmanship. This research contributes as a conceptual framework for a leaderboard that is sensitive to the context of Islamic education and can serve as a basis for developing functional applications in Islamic boarding schools.

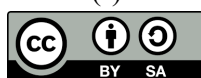
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Jurnal Manajemen Pendidikan Islam Darussalam (JMPID)

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A. Introduction

Pesantren is the oldest Islamic educational institution in Indonesia that plays a central role in producing a generation of Qur'an memorizers (Nurjanah, S., & Hermawan, A 2025; Ratnawati et al. 2024); Yusuf, B., & Al Rosid, M. H. 2025). Ministry of Religious Affairs data processed from *Education Management Information System* (EMIS) noted that Indonesia has 42,433 active Islamic boarding schools in the 2024/2025 academic year, with the number of students having reached more than four million people in the 2022/2023 academic year (Ishom 2025). Most of these pesantren hold programs *tahfīz* Al-Qur'an, both as the main program and as a complementary program to the formal education curriculum. Quantitative growth of the program *tahfīz* This does not only happen in Islamic boarding schools *Salafi* which traditionally focuses on teaching the Qur'an, but also penetrates into modern Islamic boarding schools, madrasas, and public schools (Santosa, A. B. 2022). *Systematic literature review* carried out by Akbari on the Qur'an memorization application confirms the great enthusiasm of the community in memorizing the Qur'an and the increasing awareness of the importance of maintaining the quality of learning *tahfīz* (Akbari 2024). This phenomenon shows that the *tahfīz* has become one of the most dynamic components of the Islamic education ecosystem in Indonesia (Pratama, A. S., & Al Rosid, M. H. 2025). .

However, behind this quantitative growth, the quality of program management *tahfīz* At the field level, we still face a number of empirical problems that have not been resolved. The dominant memorization deposit system in Islamic boarding schools is still manual, monitoring student development is slow and unvisualizable, and the evaluation mechanism tends to be summative and delayed. Manual recording and evaluation in Islamic boarding schools tend to be inefficient and prone to data loss (Akhorr and others 2025). On the motivational side, students often experience boredom (*Future*) due to a lack of immediate feedback, lack of incremental appreciation for gradual achievement, and lack of visualization of memorization progress (F. Wardani 2022). This gap between the quantitative growth of the program and the quality of its management in the field creates an urgent need for interventions that are able to bridge the pedagogical tradition of pesantren with contemporary educational technological innovations, without sacrificing the spiritual values that are the main foundation of the program *tahfīz*.

In the context of educational technology, the gamification approach (*Gamification*) that is, the use of game design elements in a non-game context has been empirically proven to be able to improve students' motivation and academic performance. A comprehensive meta-analysis by Zeng et al. (2024) of 22 experimental studies found a moderate positive effect of gamification on academic performance (Hedges's $g = 0.782$, $p < 0.05$) (Zeng and others 2024). One of the most studied elements of gamification is the leaderboard (*leaderboard*), which serves as a visual representation of student achievement and a driver of managed competition. *Systematic review* Li specifically studied the use of *leaderboard* in education and found that this element can increase

motivation as well as encourage active participation, although the effect is highly dependent on the design used (Li 2024). The findings indicate that *leaderboard* has the potential as a motivational instrument in the context of learning *tahfīz*, noting that the design must take into account the specific characteristics and needs of the pesantren context.

Although the study of gamification in general education has come a long way, its application in the specific context of learning *tahfīz* The Qur'an is still very limited. Che Hassan has proposed the conceptual framework of GLAM-Q (*Gamification Learning for Al-Quran Memorisation*), but the framework has not yet specifically elaborated on the design *leaderboard* that is in accordance with the context of the pesantren (Hassan, Shamsuddin, and Yusof 2023). Gamification-based teaching materials for memorization revision *tahfīz* using the MDA framework, but the focus is on *Board games* physical, not on a digital *leaderboard* system (Ahmad and others 2024). Meanwhile, Qiao pointed out that the impact of *leaderboard* is strongly influenced by the ranking position and individual characteristics of the learners, which confirms the importance of design *leaderboard* that is contextual and adaptive (Qiao and others 2024). This research gap shows that there has not been a study that comprehensively conceptualizes the design of the *leaderboard* for learning *tahfīz* in Islamic boarding schools, a design that integrates gamification principles with Islamic ethical values.

Based on this background, this study aims to: (1) analyze the needs of the *leaderboard* in learning to memorize the Qur'an in Islamic boarding schools, covering functional and non-functional needs from the perspective of ustaz, students, and pesantren managers; and (2) develop a conceptual design of a *leaderboard* that integrates gamification principles with pedagogical values and Islamic ethics. This research is expected to provide a theoretical contribution in the form of a conceptual framework of a *leaderboard* that is sensitive to the context of Islamic education, as well as a practical contribution in the form of a design foundation that can be developed into a functional application in Islamic boarding schools.

B. Method

This study uses a descriptive-qualitative approach based on literature review (*Library Research*). This approach was chosen because the research aims to describe the existing conditions of learning *tahfīz* Al-Qur'an in Islamic boarding schools, analyzing the need for a *leaderboard* system, and compiling a conceptual design based on literature synthesis without conducting experimental interventions (Creswell 2014). Data were obtained from literature sources in the form of scientific journal articles, proceedings, reference books, and policy documents relevant to three main domains: learning *tahfīz* The Qur'an in Islamic boarding schools, gamification in education, and design principles *leaderboard*. Literature searches are conducted through the Scopus database, Google Scholar, and accredited national journal portals with a publication range of the last five years (2021–

2026). Data analysis using content analysis techniques (*Content Analysis*) which follows the interactive model of Miles, Huberman, and Saldaña, includes three simultaneous flows: data condensation through thematic selection and coding of the literature, presentation of data in the form of matrix and descriptive narratives, and conclusion drawing and verification (Matthew B. Miles, A. Michael Huberman 2014). The findings from the literature review were then synthesized to produce a needs analysis framework and a contextual conceptual design of the scoreboard for learning *tahfīz* at Islamic boarding schools (Park and Kim 2021).

C. Results and Discussion

Analysis of Leaderboard Needs in Learning to Memorize the Qur'an in Islamic Boarding Schools

Current Tahfiz Learning Conditions

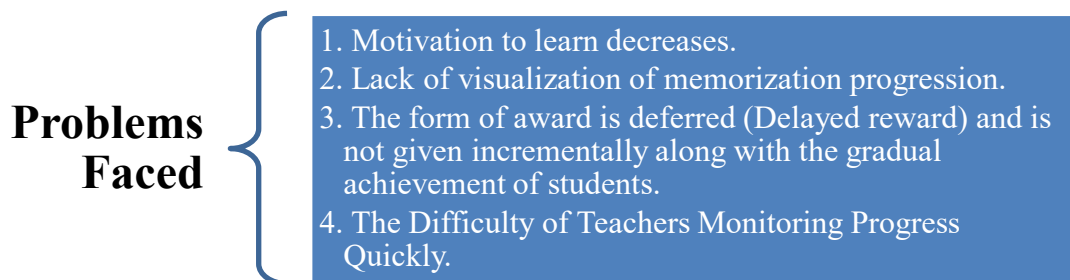
Quran memorization (*tahfiz*) in Islamic boarding schools generally relies on a memorization system (*tasmi'*) divided into three daily sessions *sabaq*, *sabaq far*, and *manzil* and is supported by mentoring methods such as One Day One Verse (ODOA) to strengthen memory retention (Lukianto, Rosjid, and Al Gifari 2024; Aziz and Kholis 2025). The religious teacher directly guides students in improving their *tajwid* (recitation) and memorizing the Quran, although most recording is still done using manual control cards (Akhror et al. 2025). Memorization evaluation is carried out in stages, including half-juz (*juz*) exams, comprehensive exams, verse linking (*imtahān waṣl al-āyāt*), and monthly and semester evaluations tailored to the individual student's abilities (Siregar et al. 2023; Lukianto et al. 2024).

The main obstacle to this system lies in monitoring student progress, which is still dominated by manual recording and periodic reports at the end of the semester, slowing down the process for administrators and parents to obtain real-time data (Akhror et al. 2025). However, the implementation of web-based monitoring systems and mobile applications has been proven to provide faster and more efficient evaluation functions, with an effectiveness rate of 96% (Ridwan 2022). Unfortunately, the adoption of digital technology remains very limited and uneven in Islamic boarding schools, which lack technological resources.

Problems Faced

The process of memorizing the Quran (*tahfiz*) in Islamic boarding schools often faces challenges in the form of decreased student motivation due to boredom and busy schedules. The use of manual recording systems makes it difficult for students to visually and comprehensively monitor their memorization progress. Forms of appreciation for student achievements are also still delayed and not provided in stages. The burden on teachers is increasingly heavy in evaluating memorization quickly due to the high ratio

of students to teachers. Therefore, the integration of digital technology and gamification elements is an urgent solution to increase student motivation while facilitating efficient teacher monitoring. As shown in the following figure:



Picture 1. Problems Faced

Motivation to learn decreases

Motivational dynamics are a crucial challenge faced by students who memorize the Qur'an. Research in various Islamic boarding schools tahfiz shows that students often experience boredom (Future) and boredom, especially when facing juz that subjectively felt to be more difficult or when entering the middle phase of the memorization program. Inhibiting factors of motivation include a lack of Striving personal, the density of pesantren activities, a less conducive environment, and the inability to manage time effectively (F. Wardani 2022). Phenomenological research on students in pesantren tahfiz in Kendari City revealed that motivational support factors include social support, religious factors, and inspiration from senior students, while inhibiting factors include lack of mastery Makhārij al-ḥurūf and tajwīd, dense activities, and an unconducive environment (Wardani 2022). This decrease in motivation is volatile and influenced by internal and external factors; Without adequate support mechanisms, students tend to lose momentum and consistency in memorization.

Lack of visualization of memorization progression

The dominant manual recording system in pesantren does not provide a comprehensive visual picture of the progress of student memorization. A simple table deposit book records only the dates and pages deposited without providing a graphical representation of progress trends, comparison of achievements, or projected completion of targets. The absence of this visualization makes it difficult for students to understand their position in the overall memorization program and do not have a travel map (Roadmap) that is clearly towards the end target. Park and Kim emphasized that leaderboard As a game mechanic, it functions to help students set goals and release learning motivation through visual representation of achievements (Park and Kim 2021). Further, systematic review Li specifically examines the use of leaderboard in higher education and found that leaderboard can increase motivation as well as encourage active

participation, although the effect depends on the design leaderboard Used (Li and others 2024). Lack of Appreciation for Student Achievements. The tradition of appreciation in Islamic boarding schools is generally limited to graduation ceremonies tahfīz At the end of the program or announcement, students excel at certain moments.

The form of award is deferred (Delayed reward) and is not given incrementally along with the gradual achievement of students

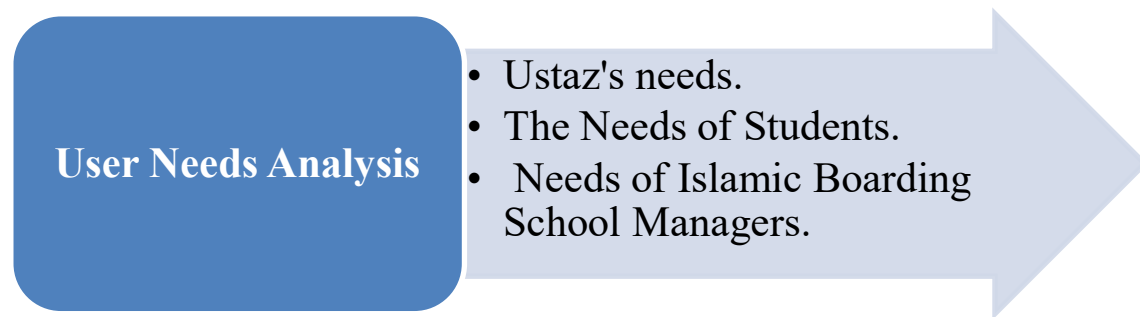
In fact, research on gamification in education shows that reward elements such as Badge, points, and regular public recognition have a positive influence on intrinsic motivation and learning performance. Zeng's meta-analysis of 22 experimental studies comparing gamified and non-gamified classes found a moderately positive effect on academic performance (Hedges's $g = 0.782$, $p < 0.05$), which indicates that the gradual reward mechanism can meaningfully improve learning achievement (Zeng and others 2024). In a similar context, Ahmad developed gamification-based teaching materials for memorization revision tahfīz using the MDA framework (Mechanics, Dynamics, Aesthetics) and obtain a score Usability high from expert teachers (4.85) and students (4.45), showing positive acceptance of the digital reward mechanism in the context of Qur'an education (Ahmad and others 2024).

The Difficulty of Teachers Monitoring Progress Quickly

Ratio of ustaz to santri in many pesantren tahfīz which is unbalanced makes individual monitoring a heavy workload. An ustaz tahfīz It can handle tens to hundreds of students at once, and manual recording makes the recapitulation process slow and vulnerable to data loss. Akhror explicitly identifies that manual recording and evaluation in pesantren tends to be inefficient and prone to data loss, and points out that the implementation of digital monitoring applications is based on Stuttgart with the 4D R&D method, it succeeded in obtaining a 100% functionality test success rate and a media expert validation score of 0.825 ("Very High" category) (Akhror and others 2025). This condition strengthens the argument that technological intervention in monitoring tahfīz It is no longer a choice, but a necessity."

User Needs Analysis

User *needs analysis* is an essential step in designing a relevant and useful leaderboard. There are three main groups of users that need to be accommodated.



Picture 2. User Needs Analysis

Ustaz's needs.

Ustaz as a memorization supervisor has practical needs related to work efficiency and quality of supervision. First, the ustaz needs a dashboard (*Dashboard*) which presents a summary of the development of all its fostered students in one view, including the number of juz that have been memorized, the frequency of deposits, and the quality of memorization. Second, ustaz needs an automatic warning system (*Alert*) that identifies students who show signs of declining performance, such as consecutive absenteeism or decreased evaluation scores. Third, ustaz needs ease in entering deposit data and evaluation that is directly integrated with the leaderboard, not as a separate system. These needs are in line with Che Hassan's findings which emphasize the need for the integration of learning analytics (*Learning Analytics*) in the framework of gamification to monitor and adapt memorization activities adaptively (Che Hassan, Wan Shamsuddin, and Yusof 2023). The conceptual framework they propose *Gamification Learning for Al-Quran Memorisation* (GLAM-Q) integrates game mechanics, dynamics, and aesthetics with learning analytics to provide personalized memorization activities.

The Needs of Students.

Students as the main subject of learning have needs that are oriented towards motivation and *Self-Monitoring*. First, students need visual feedback that shows their position on the set memorization targets, not just comparisons with other students. Second, students need a gradual recognition system (*Milestone Recognition*) which gives appreciation to every significant achievement for example every completion of one juz, five juz, or ten juz as a marker of meaningful progress. Third, students need a history of personal achievements that they can trace to see their own development over time, because of the ability to see their own growth (*Self-progress tracking*) is one of the drivers of strong intrinsic motivation. Luarn specifically examines gamification from the perspective of *self-determination theory* and found that gamification elements that support the basic psychological needs of autonomy, competence, and connectedness significantly increase learners' intrinsic motivation (Outside 2023). In the context of memorizing the Qur'an, the intrinsic motivation of students is greatly influenced by their

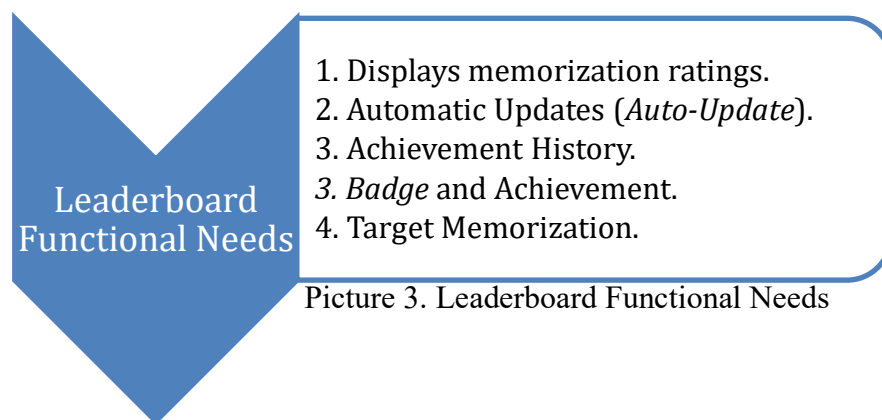
understanding of the spiritual virtues of memorizing the Qur'an, but this motivation needs to be strengthened by tangible and sustainable support mechanisms.

Needs of Islamic Boarding School Managers.

Islamic boarding school managers, including leaders, academics, and student affairs, have needs at the managerial and strategic levels. First, managers need aggregate data on the overall *achievement of the tahfīz* program : what percentage of students are *on track*, how many are late from the target, and how many have completed the program. Second, managers need reports that can be communicated to guardians of students regularly and transparently, because parental involvement is a supporting factor for student motivation. Third, managers need *evidence-based* data for decision-making related to resource allocation, such as adding ustaz *tahfīz* to certain student groups or adjusting memorization targets based on collective performance analysis. This reporting need is strengthened by Ridwan's finding that a web-based monitoring system that presents data in graph and table formats has proven to be very helpful for parents in monitoring the progress of their children's memorization.

Leaderboard Functional Needs

Based on the analysis of user conditions and needs above, the leaderboard for *learning tahfīz* Al-Qur'an in Islamic boarding schools needs to have a number of core functions.



Picture 3. Leaderboard Functional Needs

Displays memorization ratings.

The ranking feature is at the heart of the concept *leaderboard*. In context *tahfīz*, rankings need to be designed in layers: macro rankings that display the overall position of students in one program, and micro rankings that display positions in groups *Halaqah* or equivalent level. This layered design adopts the principle of *Macro-Micro Leaderboard* put forward by Park and Kim they recommend that *leaderboard* macros and micro should be designed and used simultaneously, and all elements used to measure learner achievement should be integrated into *leaderboard* micro (Park and Kim 2021).

Systematic review The latest by Li also found that the design *leaderboard* absolute versus relative differences produce different impacts on learner motivation and engagement, and recommend that designers consider the type of *leaderboard* that are appropriate to the context and characteristics of the learner (Li and others 2024).

Automatic Updates (*Auto-Update*).

The leaderboard should be updated automatically whenever there is a new deposit or evaluation data input. Updates *real-time* or close to *real-time* ensure that the information displayed is always current and relevant. This feature eliminates the need for manual recapitulation which has been one of the main obstacles in monitoring in Islamic boarding schools. Aprilian demonstrated that the monitoring system *tahfīz* based *Copyright* Integrated ones are able to overcome reporting delays and significantly improve data accuracy (Aprilian, Fatah, and Basir 2023).

Achievement History.

The system needs to store and display a chronological record of each student's memorized journey, including the date of deposit, memorized juz and surah, evaluation scores, and correction records from ustaz. This history serves a dual function: as a portfolio of achievements for students and as an analytical database for ustaz and managers.

Badge and Achievement.

Features *Badge* or a digital badge is given as a marker of the achievement of a certain stage. In context *tahfīz*, *Badge* It can be designed to mark achievements such as completing one juz, completing one small muṣḥaf (juz 30 or juz 1), consistency of daily deposits over a certain period, or passing an evaluation with perfect grades. Ahmad in a study on gamification development for memorization revision *tahfīz* shows that gamification elements designed based on the MDA framework are highly accepted among expert teachers and students, confirming that digital reward mechanisms are well received in the context of Qur'anic education (Ahmad and others 2024).

Target Memorization.

The leaderboard should be integrated with a clear and measurable goal-setting system. Each student has a daily, weekly, monthly, and semester periodic target which is displayed as *progress bar* on the leaderboard. Visualization of comparisons between targets and actual achievements helps students understand their position independently and encourages self-regulation (*self-regulated learning*) in the process of memorizing. Che Hassan specifically proposed a GLAM-Q framework that integrates adaptive learning analytics to provide personalized and formative memorization activities, including setting targets that adapt to the individual profiles of students (Che Hassan et al. 2023).

Non-Functional Needs

In addition to functional needs, the leaderboard for *tahfīz learning* in pesantren must also meet a number of non-functional requirements that guarantee the quality and acceptance of the system. The leaderboard for memorization (tahfiz) learning in Islamic boarding schools (pesantren) must meet various non-functional requirements to ensure quality, fairness, and user convenience. In terms of design and transparency, the system interface should be intuitive, responsive across devices, and incorporate Islamic-themed visuals such as geometric ornaments and calligraphy. Assessment and badge-awarding criteria must be communicated transparently based on quantity, quality of memorization, and consistency of contributions. Furthermore, rankings should not only measure absolute achievement but also consider individual growth through a relative leaderboard (comparison between groups/peers) to avoid demotivating students at the bottom (Bai and others 2021).

The most crucial distinguishing feature of this system is the obligation to uphold Islamic ethical principles based on the maqāṣid al-sharī'ah framework, particularly the protection of reason (*ḥifẓ al-'aql*) and honor (*ḥifẓ al-'ird*). The leaderboard is required to eliminate the potential for envy and *riyā'* (showing off) while prioritizing the sincerity of the intention to memorize the Quran. Its development requires balancing competition with collaboration through paired *murāja'ah* features or group achievements of *halaqahs*, incorporating spiritual motivation in the form of verses or hadith, and ensuring the system does not become a means of humiliating students who experience memorization difficulties (Li and others 2024).

Conceptual Design of Leaderboard Leaderboards on Learning to Memorize the Qur'an in Islamic Boarding Schools

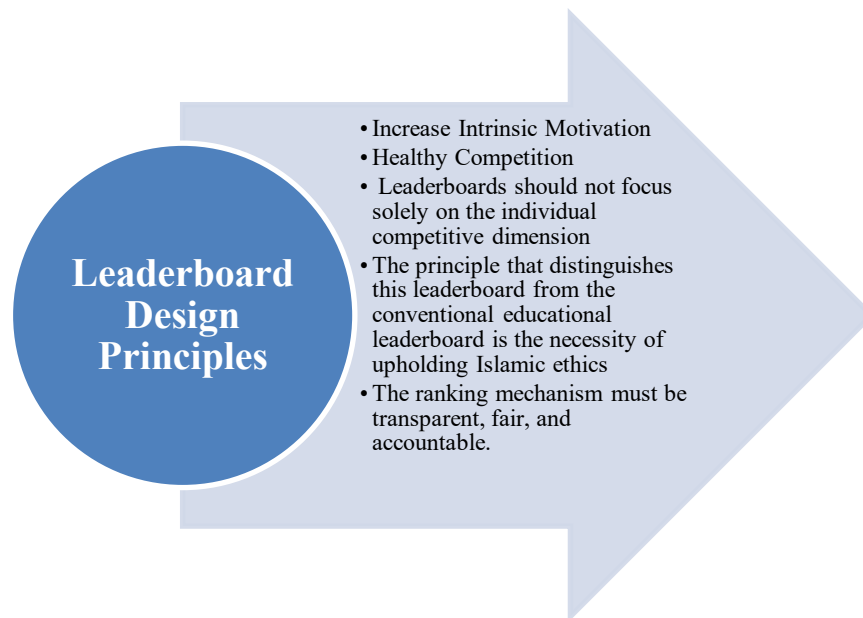
Leaderboard Development Objectives

The development of a leaderboard for learning *tahfīz Al-Qur'an* in Islamic boarding schools aims to answer the problems that have been identified in the needs analysis of sub-chapter 4.1. Specifically, these development goals include four main dimensions. *First*, increasing the motivation of students in memorizing the Qur'an through an immediate and continuous visual feedback mechanism. The integration of game design elements into the learning environment produces a moderate positive effect on students' academic performance (Zeng and others 2024). The leaderboard is designed to transform the repetitive and potentially monotonous memorization process into a more dynamic and meaningful learning experience for students. *Second*, provides an efficient monitoring instrument for *ustaz* in monitoring the progress of student memorization in real-time. *Third*, produce analytical data that can be used by pesantren managers as a basis for strategic decision-making related to the *tahfīz* program. *Fourth*, building a learning ecosystem that integrates competitive and collaborative dimensions within the framework

of Islamic values, as emphasized by Che Hassan et al. 2023 in the framework of Gamification Learning for Al-Quran Memorisation GLAM-Q which advocates the integration of adaptive learning analytics in the context of memorizing the Qur'an (Che Hassan et al. 2023).

Leaderboard Design Principles

The design of the leaderboard for tahfīz learning in Islamic boarding schools must be based on principles that accommodate pedagogical, psychological, and theological aspects at the same time.



Picture 4. Leaderboard Design Principles

Increase Intrinsic Motivation.

The first and most fundamental principle is that the leaderboard should be designed to strengthen rather than replace the intrinsic motivation of students in memorizing the Qur'an. Luarn 2023 in his study from the perspective of self-determination theory affirms that gamification elements are most effective when they support three basic psychological needs: autonomy, competence, and connectedness (Outside 2023). In the context of tahfīz, this principle means that the leaderboard must provide space for students to set their personal goals of autonomy, feel progress that means competence, and feel part of a halaqah community that supports each other.

Healthy Competition.

A systematic review of empirical studies on the use of leaderboards in higher education found that the impact of leaderboards on student motivation and engagement is highly dependent on the design used (Li and others 2024). Absolute leaderboards that display the entire rankings openly have the potential to be frustrating for students at the

bottom of the rankings, while relative leaderboards that present comparisons to similar groups tend to be more evenly supportive. Therefore, the competition in the tahfiz leaderboard must be designed in a managed manner comparing students in equal groups, not as a whole so that all students feel a realistic opportunity to improve their position. Leaderboards should not focus solely on the individual competitive dimension.

Collaborative features need to be integrated, for example through halaqah group rankings, paired murājaja'ah achievements, or collective challenges. Ratinho and Martins 2023 in their systematic review found that the element of cooperative and collaborative learning is one of the most effective gamification strategies in increasing the motivation of students at the secondary school and higher education levels (Ratinho and Martins 2023).

The principle that distinguishes this leaderboard from the conventional educational leaderboard is the necessity of upholding Islamic ethics.

Competition in memorizing the Qur'an must be based on the spirit of fastabiq al-khayrāt to compete in goodness; QS. al-Baqarah [2]: 148 and it is not a competition that gives birth to ḥasad envy or riyā' to show off. The design of the leaderboard should include elements that remind students of the spiritual dimension of memorization, such as verse quotes about the virtues of memorizing the Qur'an and motivational messages based on hadiths.

The ranking mechanism must be transparent, fair, and accountable.

All students know the criteria used, how scores are calculated, and how rankings are determined. There is no privilege or weighting that is discriminatory. Sportsmanship also means that the leaderboard values the process of consistency, effort, and growth rather than solely the end result.

Leaderboard Components

The leaderboard for learning tahfiz Al-Qur'an is designed with seven main components that are integrated with each other.

1. Profile of Santri. Each student has a profile page that displays the basic identity of the name, halaqah group, supervisor, photo or avatar, as well as a summary of memorization achievements. This profile is an entry point for students to see their personal history and development.
2. Number of Memorization. This component displays the accumulation of student memorization in juz, surah, and page units. The visualization uses a progress bar that shows the percentage of achievement against the overall program target, for example, 30 juz provides a quick overview of the position of the students in their memorization journey.
3. Value of Murāja'ah. This component records and displays the results of the evaluation of the repetition of murāja'ah memorization. The quality of murāja'ah is a critical

indicator that reflects the strength of student memorization retention, not just the speed of adding new memorization. The value of murāja'ah is factored into the overall score to ensure that the leaderboard encourages the quality of memorization, not just the quantity.

4. Deposit consistency. This component records the pattern of attendance and frequency of student deposits. Consistency is calculated based on the ratio of actual deposit days to scheduled deposit days. Students who deposit consistently every day get a higher consistency score than students who deposit large but irregular amounts.
5. Award Badge. Digital badges are given as a marker of the achievement of certain milestones. Ahmad et al. 2024 show that the reward element in tahfīz gamification designed using the MDA framework has received high acceptance from expert teachers and students (Ahmad and others 2024). In this design, badges are categorized into several tiers: Memorization Badge completing 1 juz, 5 juz, 10 juz, 15 juz, 20 juz, 30 juz, 7 consecutive days deposit consistency badge, 30 days, 90 days, perfect murājaja'ah score quality badge, passing the tasmi' exam without errors, and the Collaboration Badge completing the paired murājaja'ah challenge.
6. Memorization Level. The level system provides a multi-level structure to the students' memorization journey. Each level represents a specific cumulative achievement and is given a name that is Islamically meaningful, for example: Level 1 – Al-Mubtadi' Beginner, 1–3 juz, Level 2 – Al-Mutaqaddim Developing, 4–10 juz, Level 3 – Al-Māhir Mapro, 11–20 juz, Level 4 – Al-Hāfīz Memorizer, 21–29 juz, and Level 5 – Hāfīz al-Qur'ān al-Kāmil Perfect Memorizer, 30 juz. The level increase is not only determined by the number of memorization, but also by the quality standards of murāja'ah and the consistency of deposits at the previous level.
7. Weekly Targets. Each student has a weekly target that is set collaboratively between the student and the supervisor. This target is displayed as a progress bar on the leaderboard and is updated weekly. The achievement or failure to meet the weekly target affects the consistency score and becomes the basis for ustaz to intervene early if the student shows signs of difficulty.

Evaluation Mechanism

The ranking on the leaderboard is based on a composite score calculated from five key indicators with proportional weighting. Park and Kim recommend that all elements used to measure student achievement in an educational environment should be integrated into a micro leaderboard, and that macro and micro leaderboards should be designed and used simultaneously (Park and Kim 2021). Adopting these principles, the following five indicators are designed to reflect the quantity, quality, and consistency aspects of memorization in a balanced manner. Weight Gain Increase: 25%. This indicator measures the volume of new memorization that has been successfully deposited and validated by ustaz in a certain period. The unit of measurement uses a standard muṣḥaf page. The

addition of memorization reflects the productivity and progress of students in expanding the scope of their memorization.

Smoothness Weight: 25%. The fluency indicator measures the ability of students to recite memorization fluently without excessive pauses, word mistakes, or forgetting verses. Ustaz provides a smoothness rating on a scale of 1–10 per deposit session. This indicator ensures that the speed of memorization does not compromise the quality of memorization. Tajwīd Weight: 20%. The assessment of tajwīd includes the correctness of the pronunciation of makhārij al-ḥurūf, the application of the laws of tajwīd iẓhār, idghām, iqlāb, ikhfā', mad, and so on, as well as the beauty of the recitation of taḥsīn al-ṣawt. Ustaz gives a tajwīd score on a scale of 1–10. Presence of Deposit Weight: 15%. This indicator records the ratio of student attendance in scheduled deposit sessions. Consistent attendance signifies the commitment and discipline of the students to the tahfīz program. The percentage of attendance is calculated from the number of sessions attended divided by the number of sessions scheduled in the assessment period. Murāja'ah Consistency Weight: 15%. The last indicator measures the regularity of students in repeating old memorization. The consistency of murāja'ah is calculated based on the frequency and results of periodic murāja'ah evaluations. This indicator is very important because the biggest challenge in tahfīz is not to add new memorization, but to keep the memorization that has been mastered unforgettable.

The composite score is calculated by the formula:

Total Score = $0.25 \times \text{Memorization Score} + 0.25 \times \text{Fluency Score} + 0.20 \times \text{Tajwīd Score} + 0.15 \times \text{Attendance Score} + 0.15 \times \text{Murāja'ah Score}$ This total score determines the position of the students on the leaderboard. A relatively balanced weighting between the quantity of memorization addition and the quality of fluency, tajwīd, murāja'ah is designed to prevent quantity-seeking behavior and encourage a holistic tahfīz approach.

The leaderboard workflow is designed as a closed-loop cycle consisting of the following six stages.

Stage 1: Students Deposit Memorization. Students make memorization deposits to ustaz in scheduled halaqah sessions. The deposit can be in the form of new memorization of sabaq, repetition of the latest memorization of sabaq para, or repetition of old memorization of manzil/murāja'ah.

Stage 2: Ustaz Conducts Assessment. Ustaz listened to the students' deposits and gave an assessment of four aspects: smoothness, tajwīd, the number of pages successfully deposited, and special correction notes. Assessments are input directly through the system interface either through mobile devices or computers during the deposit session or immediately thereafter.

Stage 3: System Login Data. The assessment data input by ustaz is automatically stored in the system database. The system validates the data to ensure the completeness and consistency of inputs and records the timestamp of each transaction.

Stage 4: Scores are calculated. The system calculates the composite score of students based on the weighting formula that has been set. The calculation is carried out automatically every time there is a new data input, without the need for manual intervention.

Stage 5: Updated Leaderboard. The leaderboard is updated in real-time or near real-time after the score is calculated. The daily, weekly, and monthly rankings are updated according to their respective periods. Badges are given automatically when students reach certain milestones. The memorization level is updated when the student meets the level upgrade requirements.

Stage 6: Students Receive Feedback. Students can access the leaderboard at any time to see their ranking position, achievement history, badges earned, and comparison to weekly targets. Feedback is informative and motivational and displays messages of encouragement that are contextualized with student achievements, not just ranking numbers. This feedback is a trigger for students to set new goals and return to Phase 1, so that the cycle continues continuously.

Leaderboard Display Design

The leaderboard interface design is conceptualized in six interconnected main pages. Dashboard Home Page. The main page displays a summary of key information: current student rankings, positions in the macro and micro leaderboards, recent composite scores, progress bars towards weekly targets, recent badges earned, and important notifications such as murājaja'ah reminders or congratulations on achievements. The design of the main courtyard prioritizes simplicity and readability, with visual elements in the form of elegant Islamic geometric ornaments. Daily Rating. This page displays the ranking of students based on achievements on the current day. Daily rankings provide the most immediate feedback and encourage students to be consistent every day. The display uses a color-differentiated leaderboard for the top three positions, with an up/down indicator compared to the previous day.

Weekly Rankings. Weekly rankings show the accumulated scores over a week. Weekly periods provide a more stable picture than daily ratings and reduce the impact of daily fluctuations. This page also displays the achievement of each student's weekly target what percentage of the target is met. Monthly Rankings. The monthly rankings provide a medium-term perspective on the consistency and growth of students. This page includes a trend chart showing the movement of students' rankings from week to week throughout the current month, as well as comparisons with previous months. Details of the development of students. The details page displays a complete profile of the individual student's development: chronological history of deposits, memorization growth graphs over time, details of scores per fluency indicator, tajwīd, attendance, murājaja'ah, correction notes from ustaz, and improvement recommendations. This page is mainly used by ustaz and managers to conduct an in-depth analysis of student performance. Achievement

badges. The badge page displays a gallery of all badges available in the system along with their acquisition criteria, as well as badges that have been collected by students. Badges that have not yet been obtained are displayed in a greyed out version as a visual motivator. Each badge is accompanied by a brief description of the achievement it represents and the date of acquisition.

Conceptual Model of Leaderboard

The conceptual model of the leaderboard illustrates the systemic relationships between the seven main components in a gamified tahfīz learning ecosystem. Students play the role of the main subjects who carry out memorization activities. Students interact directly with ustaz through memorization deposit sessions. Ustaz has a dual role: as a supervisor who validates memorization and as an evaluator who inputs memorization data into the system. The memorization data includes quantitative information on the number of pages, juz, surah and qualitative fluency values, tajwīd, correction notes. The accumulated memorization data forms the basis for the assessment component, which calculates a composite score based on a weighting formula of five indicators. The results of this assessment automatically update the leaderboard system including daily, weekly, and monthly rankings, as well as badge and level determination.

The updated leaderboard system produces feedback received by students in the form of ranking visualizations, achievement notifications, and contextual motivational messages. This feedback affects the students' learning motivation, both intrinsic motivation, satisfaction with personal progress, sense of competence and extrinsic motivation, social recognition, badges, rankings, which in turn encourage students to continue and improve memorization activities, so that the cycle repeats. The relationship between these components is not linear but cyclical and interactive. Ustaz not only receives data from students but also uses information from the leaderboard to adjust guidance strategies. Islamic boarding school managers access aggregate data from the leaderboard system for managerial decision-making. Thus, this conceptual model places the leaderboard not as a separate instrument, but rather as an integral component in the broader tahfīz learning ecosystem.

Implications of Implementation in Islamic Boarding Schools

The implementation of the leaderboard is expected to yield four main benefits: a increase in students' motivation and consistency in memorization through visual feedback and gradual rewards; b Efficiency of Ustaz monitoring through automation of recapitulation and early warning; c Transparency and accountability of the tahfīz program through structured and auditable data; and d the involvement of guardians of students through a more open reporting mechanism. These benefits are consistent with Zeng's meta-analysis findings that show the positive impact of gamification on academic performance, as well as the systematic review of Ratinho and Martins 2023 that confirm

the positive influence of gamification strategies on student motivation. (Zeng and others 2024).

Some potential challenges that need to be anticipated include: a resistance from some pesantren circles who view gamification as too "worldly" an approach to the context of Qur'an learning; b digital literacy gap between ustaz and students; c limited technological infrastructure in rural Islamic boarding schools; d Novelty effect risk where motivation increases at the beginning of implementation but decreases over time (Ratinho and Martins 2023). Li et al. 2024 also noted that empirical studies on leaderboards in education are still dominated by short intervention durations, and longer longitudinal studies are needed to validate long-term effectiveness (Li and others 2024).

Implementation is recommended using a phased approach: a Phase piloting trials on one or two halaqah groups over a semester to collect initial data and user feedback; b Phase of refinement of design improvements based on test findings, including adjustment of indicator weights and badge mechanisms; c Phase of gradual expansion of implementation to all tahfīz programs in Islamic boarding schools; d Evaluation phase of systematic impact assessment on student motivation, consistency, and memorization achievements.

The most critical aspect of implementation is ensuring that the leaderboard is in harmony with the culture and traditions of the pesantren. Some of the necessary adjustments include: a involvement of kyai or pesantren leaders from the planning stage to gain legitimacy and institutional support; b alignment of the terminology of the system with terms commonly used in Depositor, Tasmi', Murāja'ah, Halaqah Islamic Boarding Schools so that it feels familiar and not foreign; c the inclusion of spiritual elements of prayer before opening the system, citations of verses and hadiths on the interface, the use of calligraphy and Islamic ornaments in the visual design so that the leaderboard does not appear as a "secular" device that is forced into the pesantren environment; d Determination of access time limits that are in line with the daily schedule of the pesantren so that the use of the system does not interfere with worship and other learning activities. Akhror et al. 2025 show that the adaptation of digital monitoring applications to the specific needs of Islamic educational institutions has received high validation from stakeholders, indicating that the adoption of technology in Islamic boarding schools can be successful if it is designed with adequate contextual sensitivity. (Akhror and others 2025)

D. Closing

Based on the discussions that have been carried out, two main conclusions are obtained. *First*, the results of the needs analysis show that the learning of *tahfīz* Al-Qur'an in Islamic boarding schools currently faces four fundamental problems that are interrelated: a decrease in student motivation due to *boredom (fujur)*, the absence of a comprehensive visualization of memorization development, the lack of an incremental

reward mechanism, and the difficulty of ustaz in monitoring the development of students quickly and accurately. Analysis of the needs of three groups of ustaz users, students, and pesantren managers resulted in functional needs in the form of macro-micro layered ranking features, automatic updates, achievement history, *award badges*, and *integration of memorization targets*, as well as *non-functional needs* that include *ease of use*, *transparency*, *fairness*, *conformity with Islamic ethics*, and *an attractive and responsive display*. Second, the resulting conceptual design integrates the seven core components of the student profile, the number of memorization, *the value of murāja'ah*, the consistency of deposits, the award badge, the level of memorization with Islamic nomenclature (*Al-Mubtadi'* to *Hāfiẓ al-Qur'ān al-Kāmil*), and weekly targets with a composite score scoring mechanism of five indicators that reflect the aspects of quantity, quality, and consistency memorization in a balanced manner. The workflow is designed as a six-stage closed cycle from memorization deposit to motivational feedback. The overall design is based on five principles of increasing intrinsic motivation, healthy competition, collaboration, Islamic values, and sportsmanship that distinguish it from *conventional education leaderboards* and places it as an integral component in the *tahfīẓ learning ecosystem* in Islamic boarding schools.

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