

# Development of Wordwall-Based Gamification Media Integrated with Google Sites for Islamic Religious Education: A Study of Marriage in Islam

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## ABSTRACT

This study aimed to develop, test the feasibility, and evaluate the effectiveness of Wordwall-based gamification media integrated with Google Sites on the material of Marriage in Islam for grade XI students at SMAN 1 Cibungbulang. The underlying problem of this research is the performance gap between students' characteristics as digital natives and the reality of classroom learning which is still dominated by conventional lecture methods, resulting in low motivation and a high student failure rate of 60% below the minimum mastery criteria. The research employed Research and Development (R&D) with a mixed-methods approach. The media development procedure was designed by integrating the ADDIE (Analyze, Design, Develop, Implement, Evaluate) instructional model and the MDLC (Multimedia Development Life Cycle) framework as the development framework. Validation results from experts indicated exceptionally high feasibility, with scores from the instructional design expert reaching 97.60%, the material expert at 97.00%, and the media expert at 89.00%. User trials also demonstrated highly positive results, including one-to-one trials of 94.66%, small group trials of 93.33%, large-scale operational field trials of 89.54%, and responses from the Islamic Religious Education (PAIBP) teacher at 90.00%. The effectiveness of the media was evaluated using a one-group pre-test/post-test design, calculated using Normalized Gain (N-Gain) among 35 students, which yielded an average score of 0.73, falling into the high category. Consequently, this Wordwall-based gamification media integrated with Google Sites is declared highly feasible and effective for classroom implementation.

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## 1. INTRODUCTION

National education is essentially a conscious and planned effort to optimize students' spiritual, religious, personal, and noble moral potential. In line with the mandate of Law Number 20 of 2003 [1] concerning the National Education System, learning processes in schools should be delivered in an interactive, inspiring, enjoyable, and motivating manner that challenges students. This

emphasis is reinforced by Regulation of the Minister of Education, Culture, Research, and Technology Number 16 of 2022 concerning Process Standards, which instructs the integrated use of information and communication technology to ensure learning efficiency and effectiveness [2]. Within the Islamic value system, the importance of mastering knowledge is also placed at a highly esteemed level, as stated by Allah SWT in QS. Al-Mujadilah (58): 11, which affirms that Allah will raise those who believe and those who possess knowledge by several degrees. These theological and juridical foundations require Islamic Religious Education (PAI) educators not only to master the material doctrinally, but also to be creative and innovative in conveying messages of Islamic law through media relevant to contemporary developments [3].

In recent years, a substantial body of empirical research has examined the role of Wordwall in enhancing the quality of interactive learning. A systematic literature review based on PRISMA guidelines, which screened 40 empirical articles from 81 studies, revealed that Wordwall significantly promotes learning motivation, learning outcomes, engagement, collaboration, communication, and concept mastery across all educational levels. At the cognitive level, Wordwall has been shown to improve academic achievement and knowledge retention; at the affective level, students consistently perceive Wordwall-based activities as enjoyable, motivating, interactive, and conducive to active classroom participation [4][5]. Furthermore, Wordwall has been demonstrated to foster collaboration, communication, learner confidence, and autonomy [6]. However, the existing literature also exhibits notable limitations, including small sample sizes, predominantly perception-based analyses, lack of control groups, short intervention durations, and limited geographic diversity, with most studies conducted within Indonesian educational contexts [7].

Google Sites has been extensively studied as a robust alternative Learning Management System (LMS). An in-depth literature synthesis demonstrated that Google Sites as an interactive learning medium achieves exceptionally high effectiveness, with average validity exceeding 90%, significant gains in cognitive understanding (average N-Gain of 0.74), and over 80% improvement in collaboration, learning motivation, and autonomous learning [8]. The cloud-based nature, zero server cost, and integration with Google Workspace make Google Sites an especially rational and inclusive LMS solution for resource-constrained schools [9]. A study on Google Sites as a lightweight cloud LMS architecture reported the highest functional evidence score for course management (mean 3.44), with performance management (mean 3.41) and content delivery (mean 3.39) also demonstrating high evidence levels [10]. However, these functions may still appear fragmented when materials, activity links, feedback mechanisms, communication channels, and productivity tools are managed separately.

Research on the integration of Wordwall and Google Sites has begun to emerge. One study developed and analyzed the feasibility of project-based learning (PjBL) gamification media using Wordwall and Google Sites on colloid system materials to enhance student creativity. The results showed that the media obtained a "very feasible" rating from material expert validation (average 4.4), media expert validation (average 4.5), teacher assessment (average 4.7), and student responses reaching 88.9% in the "very good" category. Another study on social studies learning demonstrated that interactive learning media based on Google Sites assisted by Wordwall achieved 93.3% from material experts, 98.3% from media experts, 91.1% in small-group trials, 93.08% in large-group trials, 100% teacher response, with N-Gain results indicating improvement in student learning outcomes from pre-test to post-test [11]. In mathematics logarithm materials, interactive learning media based on Google Sites assisted by Wordwall was rated 92% valid by media experts, 95% valid by material experts, 84% practical by small-group students, and 77% practical by large-group students. Furthermore, a study on Indonesian language learning employed the ADDIE model to develop interactive learning media based on Google Sites assisted by Wordwall with 23 fifth-grade students, achieving 98.67% feasibility and proving the media effective in improving learning outcomes [12][13][14].

Despite the aforementioned studies, several critical gaps remain. First, existing Wordwall research has predominantly focused on English vocabulary learning, mathematics, and language acquisition, with extremely limited investigation in Islamic Religious Education (PAI). Second, studies on the integration of Wordwall and Google Sites have mostly centered on science, mathematics, and language subjects, and no study has yet examined this integration in the teaching

of Islamic marriage law (Fiqh Munakahat). Third, existing integration studies have largely employed simple N-Gain analysis for effectiveness evaluation, lacking systematic application of an integrated ADDIE and MDLC framework. Fourth, most studies have utilized small sample sizes and lack in-depth exploration of cognitive load management among senior high school students dealing with complex religious legal materials. Fifth, it remains unclear how effective this integrated media is in enhancing students' deep understanding of Islamic marriage legal concepts.

This study distinguishes itself from previous research in several key aspects. First, innovation in subject context: this is the first study to integrate Wordwall-based gamification with Google Sites for the topic of Fiqh Munakahat in Islamic Religious Education, filling a gap in gamification media within religious legal education. Second, framework integration: this study innovatively integrates the ADDIE instructional design model with the MDLC multimedia development life cycle framework systematically, rather than employing a single development model. ADDIE is used to ensure macro-level instructional quality, while MDLC is embedded within the Develop phase of ADDIE to guide systematic assembly at the multimedia technical level. Third, explicit application of cognitive load theory: Richard Mayer's cognitive load principles are strictly applied in the technical design of Wordwall quizzes by placing instructional text visually close to relevant stimulus images, avoiding redundant repetition, and limiting non-essential graphic elements to reduce students' visual confusion. Fourth, systematic effectiveness validation: a multi-tiered validation system is employed, comprising rigorous expert validation, one-to-one trials, small-group trials, and large-group operational field trials, along with normalized gain analysis. Fifth, targeted resolution of practical problems: in response to criticism that standalone Wordwall use may fragment and incompletely present learning materials, Google Sites serves as a learning hub that integrates all instructional components.

Fiqh Munakahat (Islamic marriage law) holds particular instructional importance as a core topic in the senior high school Islamic Religious Education curriculum [15]. This topic encompasses the legal basis and definition of marriage, the pillars and validity requirements of a marriage contract, criteria for guardians and witnesses, provisions concerning the dowry, the concept of mahram, the rights and obligations of husband and wife, prohibited forms of marriage, provisions concerning divorce, the waiting period (iddah), and the pillars and requirements of reconciliation (rukuk) [16]. The complexity of this material requires contextual and interactive presentation so that students do not merely memorize legal rules verbally, but can internalize the wisdom of marriage as preparation for their future social lives.

However, the current teaching of Fiqh Munakahat faces significant challenges [17]. In Indonesian senior high schools, this material is often presented in a dogmatic manner, with teachers predominantly using one-way lectures and linear PowerPoint presentations, resulting in students' difficulty in comprehensively understanding the legal provisions of Islamic marriage. A study on Indonesian youth examined the interpretation of Fiqh al-Munakahāt in the digital era and found that marriage values in religious education require more contextual teaching approaches [18]. Furthermore, research on PAI textbooks revealed that Fiqh Wanita (women's jurisprudence) materials contain systematic gender bias, constructing a domesticating understanding of marital roles in grade XI by emphasizing wives' domestic obligations and restricting women's legal authority [19]. More concerning, the marriage materials rarely address Indonesian marriage law (Law No. 1 of 1974), requiring students to read it independently on the internet [20].

At the adolescent development level, grade XI students are in late adolescence and, according to Jean Piaget's cognitive theory, are at the formal operational stage, possessing the capacity for logical and systematic abstract thinking [21]. However, when religious material dense with legal theory is presented without adaptive visual reconstruction, students tend to memorize mechanically without deeply understanding its essence. Empirical data from the research site revealed that of 307 grade XI students, 184 students (60%) obtained scores below the minimum mastery standard of 75, with only 40% achieving mastery [22]. This performance gap underscores the urgency of implementing transformative and enjoyable learning innovations to improve students' learning motivation and overall learning outcomes.

In summary, the distinctive instructional context of Fiqh Munakahat—its dense legal theory, the characteristics of students' cognitive developmental stage, the limitations of current teaching

methods, and the demand for contextualized religious education in the digital era—makes it an ideal field for examining the effectiveness of integrating Wordwall-based gamification with Google Sites. This study aims to develop an adaptive digital learning media product that combines visual, interactive, and accessibility aspects without neglecting religious values, thereby providing an innovative solution for teaching Fiqh Munakahat in Islamic Religious Education.

Based on observations and situational analysis in grade XI at SMAN 1 Cibungbulang, the students were found to be digital natives with very good device ownership and readiness. Unfortunately, this technological potential has not been optimized in teaching and learning activities, as teachers still predominantly use static conventional methods such as one-way lectures and linear PowerPoint presentations. This gap affects students' concentration and active participation due to the lack of variety and challenge in the media used in class.

Based on an in-depth interview with the PAI teacher at SMAN 1 Cibungbulang, Heni Hernawati, S.Pd.I, it was revealed that many students had difficulty understanding the legal provisions of marriage in Islam comprehensively. This directly affected their low cognitive learning outcomes. Of the total population of 307 grade XI students, 184 students (60%) obtained scores below the standard of 75 and were declared not to have met the Learning Objective Mastery Criteria (KKTP). In contrast, only 40% of students achieved mastery, consisting of 95 students (30.9%) in the Good category (scores of 75–90) and 28 students (9.1%) in the Very Good category (scores above 90). These statistical data reinforce the urgency of implementing transformative and enjoyable learning innovations to improve students' learning motivation and overall learning mastery.

One highly relevant alternative solution is the application of interactive gamification-based learning media. Gamification can transform a rigid learning atmosphere into a more dynamic one through the integration of game elements such as points, time limits, immediate feedback, and healthy competition [23]. The gamification platform selected by the researchers in this study was Wordwall, which provides various highly engaging interactive quiz templates. However, the standalone use of Wordwall is often criticized because it can make the presentation of learning material fragmented and incomplete. Therefore, a central platform in the form of Google Sites is needed to function as a learning hub. By integrating Wordwall-based gamification into Google Sites, all learning components—from literacy materials, visual stimulus videos, guidance on scriptural evidence, contemporary MUI Fatwa documents, to interactive evaluation activities—can be accessed by students in an organized, systematic, and flexible manner.

Based on these considerations, this study focuses on developing an adaptive digital learning media product that combines visual, interactive, and accessibility aspects without neglecting religious values [25]. Specifically, the study addresses the following research questions: how is Wordwall-based gamification media integrated with Google Sites developed for the topic of Marriage in Islam; what is the feasibility level of the media based on expert assessments and user responses; and how effective is the media in improving the learning outcomes of grade XI students at SMAN 1 Cibungbulang, Bogor Regency? Theoretically, this development research is expected to provide a scientific contribution to educational technology, particularly by enriching the literature on innovations in the teaching of Islamic marriage jurisprudence (fiqh munakahat), which has traditionally been considered conventional [26]. Practically, the resulting product is expected to provide tangible benefits for students through meaningful and interactive learning experiences, provide practical instructional support for PAI teachers in improving their TPACK (Technological Pedagogical Content Knowledge) competence, and make a tangible contribution to school digitalization efforts at SMAN 1 Cibungbulang [27].

## **Theoretical Review**

### **The Concept of Development in Educational Technology**

Research and Development (R&D) in education is understood as a structured scientific approach to researching, designing, producing, and establishing the validity of a learning product through iterative cycles. From a theoretical perspective, the R&D process is a systematic effort to validate developed educational products through field trials and continuous revision based on empirical evidence, thereby ensuring that the final product is suitable for use in an actual instructional environment [28]. The R&D approach goes beyond merely producing physical artifacts; it

encompasses methodical inquiry into the design, development, and evaluation of programs, teaching procedures, and pedagogical models so that they meet scientific criteria of validity, practicality, and effectiveness [29][33].

Educational technology itself is a dynamic discipline that develops in line with advances in knowledge and the demands of the times. This field encompasses in-depth study and ethical practice designed to facilitate learning and improve individual performance through the creation, use, and management of appropriate technological resources [30]. Based on its theoretical foundation, the field of educational technology is divided into five closely interrelated domains:

First, the Design domain emphasizes planning learning conditions by developing instructional strategies rooted in learning psychology. Second, the Development domain focuses on realizing instructional designs in physical or digital forms through the use of hardware and software technologies. Third, the Utilization domain emphasizes the systematic use of learning resources and media in real classroom environments. Fourth, the Management domain includes the organization, supervision, and administration of all educational technology resources. Fifth, the Evaluation domain encompasses activities to evaluate the effectiveness of products, programs, and learning processes through problem analysis and formative and summative trials.

In this study, the primary focus is to realize the instructional concept of the topic of Marriage in Islam in the form of interactive multimedia, which explicitly falls within the Development domain. The connection between this research activity and the Development domain is demonstrated by translating theoretical design into a concrete digital product using Google Sites as the main portal, producing integrated multimedia assets such as a marriage-contract simulation video and MUI Fatwa documents, integrating Wordwall as an interactive gamification engine, and systematically conducting formative validity testing with experts.

### **Instructional Development Models**

Within the discipline of educational technology, there are several systematic and comprehensive instructional system design frameworks or models. Each has varying characteristics, focuses, and scales of implementation:

The ADDIE model is one of the most popular instructional frameworks and serves as a foundation for many other development models. ADDIE is an acronym for five generic and systematic phases: Analyze, Design, Develop, Implement, and Evaluate. Its strength lies in its descriptive as well as prescriptive structure, in which each phase provides rigorous formative evaluation guidance to ensure alignment between learning objectives and the resulting product. However, ADDIE requires strong coordination to prevent goal creep beyond the initial project plan [31].

The Multimedia Development Life Cycle (MDLC) model is a framework specifically designed to produce multimedia-based applications or software that interactively combine text, images, sound, video, and animation. According to Luther (1994), as developed by Sutopo (2012), the MDLC model consists of six sequential technical stages: Concept, Design, Obtaining Content Material, Assembly, Testing, and Distribution. Its advantage lies in the precision of its technical documentation, such as storyboard development and digital asset management, which greatly facilitates the assembly of complex multimedia products [32].

The ASSURE model is an instructional design model specifically designed for the micro level of classroom instruction, with a strong orientation toward the practical use of learning media and technology. This model guides teachers through six sequential steps: analyzing learner characteristics, formulating standards and learning objectives, selecting strategies and media, utilizing technology, involving active student participation, and conducting evaluation and revision. It is highly practical for classroom implementation by teachers, but less adequate for designing complex macro-level instructional systems.

The Dick and Carey model applies a highly detailed and structured systems approach to instructional program design. This model consists of ten interrelated stages that are linear and systemic, beginning with identifying general instructional goals, conducting instructional analysis, analyzing learner and learning-context characteristics, writing specific performance objectives, developing assessment instruments, formulating instructional strategies, producing instructional materials, and conducting formative evaluation and revision. This model is highly reliable for large-

scale projects requiring high quality standards, but it demands very deep theoretical analytical skills and considerable development time.

In this study, the researchers chose to integrate the ADDIE and MDLC models. ADDIE was used as the macro-level instructional framework to ensure pedagogical quality, while MDLC was specifically integrated into the Develop phase of ADDIE to guide the detailed and systematic assembly of multimedia technical aspects.

### **Concepts of Learning and Learning Theories**

Learning is essentially understood as a process of cognitive, affective, and behavioral transformation in individuals that is relatively lasting and stable, resulting from the accumulation of experience, practice, and participatory interaction with the surrounding environment. The learning process involves dynamic synergy among educators, learners, and learning resources within a structured learning ecosystem, in which periodic evaluation plays an important role as an instrument for improving instructional quality. Five major schools of learning theory underlie this process:

First, Behaviorism views learning as an observable change in behavior resulting from stimulus and response. This theory emphasizes the importance of positive reinforcement in shaping desired behavioral patterns. Second, Cognitivism emphasizes that learning is an internal mental process within the human mind. Behavioral changes reflect the organization of cognitive elements and active thinking processes. Third, Constructivism asserts that learning is an individual process through which students construct new meaning and understanding based on active experience and prior knowledge.

Fourth, Humanism views learning as a process centered on self-actualization, emotional growth, and the holistic fulfillment of each individual's positive potential and uniqueness. Fifth, Connectivism is a learning theory for the digital era. It emphasizes that knowledge is distributed across digital networks and that learning involves the ability to dynamically connect information nodes with the assistance of technology.

### **Gamification in Learning**

Gamification in learning is defined as an instructional design approach that adapts digital game mechanics, aesthetics, and elements to non-game environments in order to package learning tasks as enjoyable, challenging, and meaningful activities. Through gamification, academic activities are transformed into structured "missions" equipped with instant feedback, thereby stimulating students' intrinsic and extrinsic motivation, extending their focus, and encouraging independent learning. Important elements of gamification include points as rewards for task achievement, timers to train thinking agility, game lives to provide tolerance for errors, leaderboards as a means of healthy competition, and badges as symbols of competency recognition.

### **Islamic Religious Education and Marriage Fiqh**

Islamic Religious Education (PAI) in formal schools is a constitutional mandate aimed at equipping students with sound faith, piety, noble character, and practical skills for applying religious teachings in society. Marriage Fiqh (Munakahat) is one of the essential topics in the grade XI senior high school PAI curriculum and is dense with Islamic legal theory. Its scope includes the legal basis and definition of marriage, the pillars and validity requirements of a marriage contract, criteria for guardians and witnesses, provisions concerning the dowry, the concept of mahram, the rights and obligations of husband and wife, prohibited forms of marriage, provisions concerning divorce, the waiting period (iddah), and the pillars and requirements of reconciliation (rujuk). The complexity of this material requires contextual and interactive presentation so that students do not merely memorize legal rules verbally, but can internalize the wisdom of marriage as preparation for their future social lives.

### **Wordwall and Google Sites Platforms**

Wordwall is a web-based digital platform specifically designed to help educators create various interactive learning quizzes packaged as educational games. Users can choose from dozens of activity templates and instantly transform the same question content into different game formats.

In addition, the platform provides real-time task-result tracking, which is highly valuable for formative assessment.

Google Sites is a free web-hosting service from Google that enables users to design websites quickly and functionally without requiring computer programming (coding) skills. The platform has a highly responsive and user-friendly interface and is closely integrated with the Google Drive ecosystem, making it ideal as a digital learning hub that brings together all instructional materials in an organized manner.

## 2. METHOD

This research was conducted at SMA Negeri 1 Cibungbulang, Bogor Regency, West Java Province. The research subjects were 35 grade XI students in the 2025/2026 academic year. The entire research process, from needs analysis, media design and production, expert validation, to field implementation and effectiveness testing, was conducted over a seven-month period from December 2025 to May 2026.

This study employed Research and Development (R&D) with a Mixed Methods approach. The mixed-methods approach was used in parallel to obtain comprehensive data:

First, qualitative data were collected to analyze students' learning needs in the field through interviews and observations and to gather comments, revision suggestions, and constructive feedback from expert validators. Second, quantitative data were collected to measure media feasibility based on Likert-scale scores from expert validation questionnaires and teacher and student responses, as well as to measure improvements in students' cognitive learning outcomes by analyzing differences between pre-test and post-test scores using the Normalized Gain (N-Gain) test.

The media development procedure was designed by integrating 21 procedural steps in the ADDIE instructional model according to Branch (2009) with six technical multimedia phases in the MDLC model according to Luther-Sutopo (2012). The integrated synergy of the two models was implemented sequentially as follows:

**Table 1. Synergy of the ADDIE and MDLC Development Procedures**

| ADDIE Stage | MDLC Stage                   | Integrated Procedure Steps                                                                                                                                                                                                                                         | Activity Output Description                                                                                                                                                                                           |
|-------------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Analyze     | -                            | 1. Validate the performance gap.<br>2. Establish general instructional objectives.<br>3. Confirm target student characteristics.<br>4. Identify resource requirements.<br>5. Determine the media delivery method.<br>6. Develop the development project plan.      | The researchers produced a needs analysis document based on data on students' summative scores who had not achieved mastery, the device-readiness profile of grade XI students, and the school's internet facilities. |
| Design      | Concept & Design             | 7. Conduct instructional analysis of the material.<br>8. Formulate specific objectives (IKTP).<br>9. Develop learning strategies.<br>10. Estimate development costs.                                                                                               | Produced the basic media concept, Google Sites navigation menu architecture, and draft scenarios for interactive quiz questions for the Wordwall storyboard.                                                          |
| Development | Obtaining Content & Assembly | 11. Produce digital learning content.<br>12. Develop the visual appearance of the media.<br>13. Prepare practical guidance for students.<br>14. Prepare technical guidance for teachers.<br>15. Conduct formative revision testing.<br>16. Conduct limited trials. | Collected assets (tutorial videos, scriptural evidence texts, and MUI Fatwa documents), assembled them in Google Sites, and embedded Wordwall quiz links into a unified media product.                                |
| -           | Testing                      | 17. Test the functional quality of the media.<br>18. Conduct expert validation of material, media, and design.<br>19. Conduct formative product revision.                                                                                                          | Produced a gamification media product that had been validated and revised according to expert feedback.                                                                                                               |
| Implement   | Distribution                 | 20. Provide operational training for PAI teachers.                                                                                                                                                                                                                 | The media were directly implemented in the Marriage Fiqh                                                                                                                                                              |

|          |   |                                                          |                                                                                                                                                                         |
|----------|---|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Evaluate | - | 21. Prepare students' devices in the classroom.          | learning process in grade XI at SMAN 1 Cibungbulang.<br><br>Produced N-Gain score analysis, satisfaction-response questionnaire analysis, and a final product revision. |
|          |   | 22. Distribute access links/QR codes.                    |                                                                                                                                                                         |
|          |   | 23. Establish criteria for evaluating outcomes.          |                                                                                                                                                                         |
|          |   | 24. Select a cognitive effectiveness testing instrument. |                                                                                                                                                                         |
|          |   | 25. Conduct learning-outcome evaluation.                 |                                                                                                                                                                         |

To facilitate the creation of varied interactive quizzes without access limitations, the researchers used the paid Premium version of Wordwall, while Google Sites was efficiently developed using a free belajar.id institutional account. The selection of various interactive game templates on the Wordwall platform was adapted to the needs of concept reinforcement.

In the technical design of the Wordwall quizzes, the researchers strictly applied Richard Mayer's cognitive load principles to reduce students' visual confusion. This was achieved by placing instructional text visually close to the relevant stimulus images, avoiding redundant repetition of identical spoken and written information, and limiting non-essential graphic elements that could distract students' focus from legal reasoning.

Students' cognitive performance was measured using a written test consisting of 10 essay items (pre-test and post-test) that had been validated and statistically declared reliable, with a Cronbach's Alpha coefficient of 0.672. The essay items were designed to cover various cognitive levels of Bloom's taxonomy (C2 to C5), as presented in the table below:

**Table 2. Blueprint of the Pre-Test and Post-Test Items for Marriage Fiqh**

| No. | Competency Indicator                                                                                              | Cognitive Dimension | Item No. | Essay Assessment Description                                                                                                 |
|-----|-------------------------------------------------------------------------------------------------------------------|---------------------|----------|------------------------------------------------------------------------------------------------------------------------------|
| 1   | Explain the definition of marriage etymologically and in terms of Islamic legal terminology.                      | C2 (Understand)     | 1        | Assesses understanding of the linguistic and shar'i terminology of the marriage contract.                                    |
| 2   | Analyze the meaning of QS. Ar-Rum: 21 concerning the purpose of married life as a couple.                         | C4 (Analyze)        | 2        | Evaluates the depth of understanding of the evidence concerning sakinah, mawaddah, and rahmah.                               |
| 3   | Differentiate the causes of variations in the legal status of marriage based on an individual's actual condition. | C2 (Understand)     | 3        | Analyzes the conditions that establish marriage as obligatory, recommended, permissible, disliked, or prohibited.            |
| 4   | Examine the validity of a marriage without the presence of a lineage guardian or shar'i witness.                  | C4 (Analyze)        | 4        | Analyzes the resolution of marriage-contract validity cases based on the pillars of marriage.                                |
| 5   | Evaluate the implementation of the concept of family leadership (Qawwam) and the balance of financial support.    | C4 (Analyze)        | 5        | Analyzes the rights and obligations of husbands and wives in family harmony.                                                 |
| 6   | Identify and classify categories of women whom a man is prohibited from marrying (Mahram).                        | C2 (Understand)     | 6        | Differentiates the causes of mahram status arising from lineage (nasab), affinity (mushaharah), or breastfeeding (radha'ah). |
| 7   | Evaluate the validity of temporary marriage (Mut'ah) based on its time limitation.                                | C5 (Evaluate)       | 7        | Provides an assessment of the shar'i legal status of the phenomenon of temporary marriage.                                   |
| 8   | Explain the status, philosophical significance, and ease of giving the mahar (dowry).                             | C2 (Understand)     | 8        | Analyzes the position of the dowry within the pillars of marriage.                                                           |
| 9   | Detail the wisdom of marriage in preserving the purity of offspring and family lineage.                           | C2 (Understand)     | 9        | Describes the implications of marriage for social lineage stability.                                                         |
| 10  | Provide examples of personal commitment readiness in facing the ideal stage of marriage.                          | C3 (Apply)          | 10       | Assesses the application of honesty, discipline, and responsibility among students at school.                                |

The essay scoring rubric was objectively developed using a score range of 0 to 5 for each item. A score of 5 was awarded for an answer that was very complete, logical, and accurate according to Islamic law, while a score of 0 was given when the student provided no answer at all

### 3. RESULTS AND DISCUSSION

#### *Results of the Analysis Stage (Analyze)*

During the initial needs analysis stage, the researchers collected quantitative data from a Likert-scale questionnaire completed by grade XI students at SMAN 1 Cibungbulang. The needs analysis showed that the majority of students experienced a high level of boredom with conventional lecture methods. Qualitative analysis of open-ended responses from 131 students revealed several major learning difficulties:

Students found it difficult to memorize Qur'anic evidence texts quickly because the classroom environment was often noisy and not conducive to learning. Drowsiness and fatigue frequently affected students, especially when PAI lessons were scheduled in the afternoon after the second break. In addition, students complained that religious learning materials were presented in an overly theoretical and monotonous manner without visualization, digital games, or real-world practice. Students explicitly expected a new technology-based learning product that was interactive, enjoyable, light on data usage, and presented visualizations, videos of exemplary stories, and game-based exercises that could stimulate their learning motivation.

#### *Results of the Design Stage (Design)*

Based on the needs analysis, the researchers designed an integrated gamification media architecture. Google Sites was developed as the main mobile-friendly portal, while Wordwall Premium quizzes were embedded directly into the relevant material pages. The flow of learning materials and activities was systematically designed in the form of a media storyboard as follows:

**Table 3. Storyboard of the Marriage Fiqh Gamification Media**

| N o. | Google Sites Page Name              | Description of Content and Media                                                                                                                                         | Wordwall Gamification Mechanics and Aesthetics                                                 |
|------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| 1    | Homepage                            | Module identity, basic competencies, operational technical guidance, and digital attendance.                                                                             | -                                                                                              |
| 2    | Pre-Instructional                   | Menu for completing the students' initial ability test (Pre-Test). Integrated Google Form link.                                                                          | -                                                                                              |
| 3    | Aperception & Stimulus              | Displays a YouTube video on "Social Risks of Early Marriage among Adolescents".                                                                                          | Open the Box quiz containing reflective questions after watching the video.                    |
| 4    | Module I: Basic Concepts            | Definition of marriage in linguistic and shar'i terms, as well as an analysis of the five legal statuses of marriage.                                                    | True or False game featuring rapid statements concerning the classification of marriage laws.  |
| 5    | Module II: Islamic Legal Provisions | Arabic-Latin text of the evidence from QS. Ar-Rum: 21, marriage-sermon video, infographics on the pillars of marriage, and the requirements for guardians and witnesses. | Match Up game matching the pillars of marriage with their validity criteria.                   |
| 6    | Module III: Mahram Law              | Interactive table classifying women whom one is prohibited from marrying (nasab, mushahah, and radha'ah).                                                                | Flying Fruit game in which students must catch the fruit containing the correct mahram answer. |
| 7    | Module IV: Obligations & Rights     | Presentation of the rights and obligations of husbands and wives, MUI Fatwa on family matters, and the wisdom of marriage.                                               | Type the Answer game using short-answer items to recall important Marriage Fiqh terms.         |
| 8    | Final Evaluation                    | Menu for completing the students' final ability test (Post-Test). Integrated Google Form link.                                                                           | Strengthening through the Wordwall leaderboard.                                                |

#### *Results of the Feasibility Test by Experts (Development)*

To test the feasibility of the product before broad implementation, the researchers conducted validation with three experts in their respective fields. The assessment used a 1–5 Likert scale, which was subsequently analyzed in percentage form.

First, the Instructional Design Expert Test was conducted with Dr. Umi Fatonah, M.Pd. (Lecturer at Universitas Ibn Khaldun Bogor). The quantitative analysis results are presented in the table below:

**Table 4. Feasibility Results for the Instructional Design Aspect**

| No                                                    | Instructional Design Assessment Dimension                                                         | Empirical Score ( $\Sigma x$ ) | Ideal Score (SMI) | Feasibility Percentage | Interpretation Criterion |
|-------------------------------------------------------|---------------------------------------------------------------------------------------------------|--------------------------------|-------------------|------------------------|--------------------------|
| 1                                                     | Suitability of the media strategy to the characteristics of grade XI senior high school students. | 23                             | 25                | 92.00%                 | Highly Feasible          |
| 2                                                     | Accuracy of the strategy in facilitating mastery of Marriage Fiqh concepts.                       | 24                             | 25                | 96.00%                 | Highly Feasible          |
| 3                                                     | Ability of the media to encourage critical thinking (HOTS) and case problem-solving.              | 25                             | 25                | 100.00%                | Highly Feasible          |
| 4                                                     | Level of contextual relevance of cases to adolescents' real-life problems.                        | 25                             | 25                | 100.00%                | Highly Feasible          |
| 5                                                     | Relative Advantage compared with static learning media.                                           | 25                             | 25                | 100.00%                | Highly Feasible          |
| Cumulative Average of the Instructional Design Aspect |                                                                                                   | 122                            | 125               | 97.60%                 | Highly Feasible          |

Based on Table 4, the instructional design aspect obtained a very high average score of 97.60%, with a maximum score (100%) for its ability to stimulate critical thinking (HOTS) through the presentation of contemporary marriage case studies.

Second, the Learning Media Expert Test was conducted with Dr. Yeni Raini, M.Pd., CPTNA. (Lecturer at Universitas Ibn Khaldun Bogor) to assess the visual aesthetic and multimedia functionality aspects. The assessment results are presented in the table below:

**Table 5. Feasibility Results for the Learning Media Aspect**

| No.                                             | Learning Media Assessment Dimension                                                | Empirical Score ( $\Sigma x$ ) | Ideal Score (SMI) | Feasibility Percentage | Interpretation Criterion |
|-------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------|-------------------|------------------------|--------------------------|
| 1                                               | Clarity of narration, typography, readability, and visual color contrast.          | 22                             | 25                | 88.00%                 | Highly Feasible          |
| 2                                               | Appropriateness of background music, video resolution, and audio quality.          | 23                             | 25                | 92.00%                 | Highly Feasible          |
| 3                                               | Attractiveness of integrating Google Sites features and Wordwall gamification.     | 22                             | 25                | 88.00%                 | Highly Feasible          |
| 4                                               | Functional quality of navigation, button interactivity, and interface ease of use. | 22                             | 25                | 88.00%                 | Highly Feasible          |
| Cumulative Average of the Learning Media Aspect |                                                                                    | 89                             | 100               | 89.00%                 | Highly Feasible          |

Based on Table 5, the learning media aspect obtained an average score of 89.00%, which falls within the highly feasible criterion, demonstrating that the product operates stably and is aesthetically appealing.

Third, the Learning Material Expert Test was conducted with H. Ahmad Khotib, M.Ag. (PAI Teacher at Pondok Pesantren Al-Itqon Bogor) to assess the accuracy of the Islamic legal content. The assessment results are presented in the table below:

**Table 6. Feasibility Results for the Learning Material Aspect**

| No | Learning Material Assessment Dimension                                    | Empirical Score ( $\Sigma x$ ) | Ideal Score (SMI) | Feasibility Percentage | Interpretation Criterion |
|----|---------------------------------------------------------------------------|--------------------------------|-------------------|------------------------|--------------------------|
| 1  | Clarity of narration, typography, readability, and visual color contrast. | 22                             | 25                | 88.00%                 | Highly Feasible          |

|                                                 |                                                                                    |    |     |        |                 |
|-------------------------------------------------|------------------------------------------------------------------------------------|----|-----|--------|-----------------|
| 2                                               | Appropriateness of background music, video resolution, and audio quality.          | 23 | 25  | 92.00% | Highly Feasible |
| 3                                               | Attractiveness of integrating Google Sites features and Wordwall gamification.     | 22 | 25  | 88.00% | Highly Feasible |
| 4                                               | Functional quality of navigation, button interactivity, and interface ease of use. | 22 | 25  | 88.00% | Highly Feasible |
| Cumulative Average of the Learning Media Aspect |                                                                                    | 89 | 100 | 89.00% | Highly Feasible |

Based on Table 6, the material aspect as a whole obtained an average feasibility percentage of 97.00%. This confirms that all Qur'anic verse quotations, references to fiqh munakahat books, MUI Fatwa documents, and Marriage Law No. 16 of 2019 presented in the media were valid and accurate.

During this formative development phase, the researchers carried out a series of important revisions based on constructive feedback from the experts:

The homepage layout was restructured so that the title text would not overlap with the background image; the main navigation menu text was bolded to improve contrast; and a discussion-response field was added directly below the stimulus video on the social risks of early marriage. In terms of content sequence, the design expert requested that the link for the initial ability test (Pre-Test) be placed before students watched the stimulus video. Meanwhile, the media expert suggested adding detailed written operational instructions on how to access the Google Sites portal and technical instructions for independently playing Wordwall quizzes on the homepage. Finally, the material expert suggested enriching the diversity of references by including social research articles related to family disharmony in the digital era.

### Results of the User Formative Trial (Testing)

After revisions based on expert assessments, the media were tested gradually with actual users:

The one-to-one trial was conducted with 3 grade XI students representing varying levels of academic ability. The questionnaire results showed a percentage of 94.66%, indicating very high feasibility. At this stage, a functional problem was identified: the duration of the Wordwall quiz games installed by the researchers was too short, triggering students' cognitive anxiety (game anxiety). In response, the researchers revised the media by proportionally extending the time allocated for completing the quizzes.

The small-group trial was conducted with 15 grade XI students using a Likert-scale questionnaire. Data analysis showed a cumulative feasibility level of 93.33%, consisting of ease of access (93.33%), visual appearance and content (93.33%), Wordwall gamification (94.66%), and instructional usefulness (92.00%). At this stage, a digital accessibility problem was identified: some students had low-RAM smartphones that loaded the web pages slowly. An innovative solution was implemented by providing school laboratory Chromebooks to ensure digital equity in the classroom. The large-group operational field trial was conducted with 35 grade XI students. The student satisfaction questionnaire yielded a cumulative feasibility score of 89.54%, comprising learning design (88.91%), marriage material (88.86%), and gamification and media design (90.85%). The PAIBP teacher at SMAN 1 Cibungbulang also gave a very positive response, with a feasibility evaluation score of 90.00%.

**Table 7. Recapitulation of the Overall Media Feasibility Level**

| No . | Feasibility Testing Stage                         | Feasibility Percentage | Criterion Classification |
|------|---------------------------------------------------|------------------------|--------------------------|
| 1    | Instructional Design Expert Validation            | 97.60%                 | Highly Feasible          |
| 2    | Learning Material Expert Validation               | 97.00%                 | Highly Feasible          |
| 3    | Learning Media Expert Validation                  | 89.00%                 | Highly Feasible          |
| 4    | Initial Field Trial (One-to-One)                  | 94.66%                 | Highly Feasible          |
| 5    | Main Field Trial (Small Group)                    | 93.33%                 | Highly Feasible          |
| 6    | Operational Field Trial (Large Group)             | 89.54%                 | Highly Feasible          |
| 7    | PAIBP Teacher Satisfaction Response Questionnaire | 90.00%                 | Highly Feasible          |
|      | Cumulative Average Product Feasibility            | 92.87%                 | Highly Feasible          |

### Results of the Cognitive Effectiveness Test

The cognitive effectiveness test was conducted with 35 grade XI students at SMAN 1 Cibungbulang by comparing essay scores before (pre-test) and after (post-test) using the Wordwall-based gamification media integrated with Google Sites. The students' cognitive performance data are presented in full in the table below:

**Table 8. Pre-Test Scores, Post-Test Scores, and N-Gain Calculation for 35 Students**

| No. | Student | Pre-Test Score | Post-Test Score | Difference (Post – Pre) | Maximum Difference (100 – Pre) | Individual N-Gain | Effectiveness Category |
|-----|---------|----------------|-----------------|-------------------------|--------------------------------|-------------------|------------------------|
| 1   | S1      | 26             | 82              | 56                      | 74                             | 0.76              | High                   |
| 2   | S2      | 52             | 92              | 40                      | 48                             | 0.83              | High                   |
| 3   | S3      | 32             | 100             | 68                      | 68                             | 1                 | High                   |
| 4   | S4      | 66             | 96              | 30                      | 34                             | 0.88              | High                   |
| 5   | S5      | 52             | 100             | 48                      | 48                             | 1                 | High                   |
| 6   | S6      | 26             | 92              | 66                      | 74                             | 0.89              | High                   |
| 7   | S7      | 72             | 96              | 24                      | 28                             | 0.86              | High                   |
| 8   | S8      | 34             | 68              | 34                      | 66                             | 0.52              | Moderate               |
| 9   | S9      | 72             | 90              | 18                      | 28                             | 0.64              | Moderate               |
| 10  | S10     | 56             | 90              | 34                      | 44                             | 0.77              | High                   |
| 11  | S11     | 36             | 72              | 36                      | 64                             | 0.56              | Moderate               |
| 12  | S12     | 30             | 90              | 60                      | 70                             | 0.86              | High                   |
| 13  | S13     | 32             | 96              | 64                      | 68                             | 0.94              | High                   |
| 14  | S14     | 34             | 94              | 60                      | 66                             | 0.91              | High                   |
| 15  | S15     | 24             | 96              | 72                      | 76                             | 0.95              | High                   |
| 16  | S16     | 70             | 90              | 20                      | 30                             | 0.67              | Moderate               |
| 17  | S17     | 42             | 84              | 42                      | 58                             | 0.72              | High                   |
| 18  | S18     | 56             | 78              | 22                      | 44                             | 0.5               | Moderate               |
| 19  | S19     | 44             | 70              | 26                      | 56                             | 0.46              | Moderate               |
| 20  | S20     | 80             | 92              | 12                      | 20                             | 0.6               | Moderate               |
| 21  | S21     | 64             | 94              | 30                      | 36                             | 0.83              | High                   |
| 22  | S22     | 56             | 94              | 38                      | 44                             | 0.86              | High                   |
| 23  | S23     | 44             | 62              | 18                      | 56                             | 0.32              | Moderate               |
| 24  | S24     | 56             | 78              | 22                      | 44                             | 0.5               | Moderate               |
| 25  | S25     | 46             | 78              | 32                      | 54                             | 0.59              | Moderate               |
| 26  | S26     | 32             | 96              | 64                      | 68                             | 0.94              | High                   |
| 27  | S27     | 62             | 72              | 10                      | 38                             | 0.26              | Low                    |
| 28  | S28     | 42             | 82              | 40                      | 58                             | 0.69              | Moderate               |
| 29  | S29     | 60             | 98              | 38                      | 40                             | 0.95              | High                   |
| 30  | S30     | 50             | 90              | 40                      | 50                             | 0.8               | High                   |
| 31  | S31     | 40             | 88              | 48                      | 60                             | 0.8               | High                   |

|                                      |     |       |       |       |       |      |      |
|--------------------------------------|-----|-------|-------|-------|-------|------|------|
| 32                                   | S32 | 56    | 88    | 32    | 44    | 0.73 | High |
| 33                                   | S33 | 60    | 94    | 34    | 40    | 0.85 | High |
| 34                                   | S34 | 62    | 72    | 10    | 38    | 0.26 | Low  |
| 35                                   | S35 | 62    | 96    | 34    | 38    | 0.89 | High |
| Cumulative Average Cognitive Results |     | 49.37 | 87.14 | 37.77 | 50.63 | 0.73 | High |

Based on Table 8, an empirical comparison shows that the students' average initial cognitive pre-test score before using the media was 49.37. This score increased substantially after implementation of the interactive gamification media, with the average final post-test score reaching 87.14, representing a net score increase of 37.77 points. The cognitive effectiveness analysis using the Normalized Gain formula yielded an average class score of 0.73. According to Hake's effectiveness criteria, a score of 0.73 falls within the High classification. This finding empirically demonstrates that the developed learning media was highly effective in improving students' cognitive understanding of Marriage Fiqh in Islam.

### In-Depth Discussion and Analysis of Socio-Technical Implications

The development of Wordwall-based gamification media integrated with Google Sites was specifically designed to address pedagogical challenges related to low cognitive learning outcomes and student boredom in PAI learning at SMA Negeri 1 Cibungbulang. The structural integration of the macro-level ADDIE instructional design model and the micro-level MDLC technical cycle successfully accommodated the design of media that was visually engaging while remaining methodologically and scientifically robust.

*Google Sites played a vital role in this study as a single-point information anchor (learning hub). The use of this centralized web platform successfully addressed one of the major weaknesses of standalone Wordwall use, which has often been criticized in previous studies for tending to fragment the visualization of learning materials. By combining Islamic legal evidence texts, marriage-contract simulation videos, MUI Fatwa documents, and navigation buttons for interactive exercises within a single web portal, students' cognitive load could be managed efficiently, helping maintain stable learning concentration within a comfortable digital environment.*

The integration of Wordwall gamification mechanics—such as Maze Chase quizzes, Open the Box challenges, and Flying Fruit answer-catching activities—provided strong external stimulation for students' learning motivation. The timer trained students' cognitive agility in making quick decisions, while the game-lives feature provided a psychologically safe tolerance for making mistakes and learning independently through trial and error.

Furthermore, the dynamic leaderboard psychologically stimulated a climate of healthy competition in the classroom. The immediate feedback students received after completing each quiz functioned as cognitive reinforcement that instantly corrected theological misconceptions. The synergy of these elements was empirically shown to substantially improve cognitive learning mastery among grade XI students.

Nevertheless, the successful implementation of this media depends heavily on adequate internet connection stability and the hardware readiness of students' devices. Older devices with low RAM capacity experienced lag when rendering Google Sites pages containing rich interactive multimedia visualizations. The provision of school-loaned Chromebooks represented a valuable institutional commitment to eliminating the digital gap in the classroom, creating an atmosphere of digital equity in which all students could access learning materials with comparable visual performance.

Preventing digital distraction is also an important concern. Teachers must remain actively involved as instructional facilitators in the classroom to monitor students' attention so that it is not diverted by social-media application notifications or instant messages during device-based learning.

#### 4. CONCLUSION

Based on all of the research findings and data analyses presented above, the following conclusions can be drawn:

The development procedure for Wordwall-based gamification media integrated with Google Sites on the topic of Marriage in Islam was successfully implemented systematically through the integration of the ADDIE instructional model and the MDLC multimedia technical cycle. The synergy of these two models successfully translated the theory-dense legal content of Marriage Fiqh into a centralized digital learning medium (learning hub) that is interactive, enjoyable, and relevant to the characteristics of digital-native students.

The feasibility level of the gamification media product was assessed as very high by experts and users. Validation by the instructional design expert reached 97.60%, the material expert 97.00%, and the media expert 89.00%; the one-to-one trial reached 94.66%, the small-group trial 93.33%, the large-group operational field trial 89.54%, and the PAIBP teacher satisfaction response 90.00%. All results were classified as “Highly Feasible” for implementation without requiring major revisions.

The use of Wordwall-based gamification media integrated with Google Sites was shown to be highly effective in improving the cognitive learning outcomes of grade XI students at SMAN 1 Cibungbulang on the topic of Marriage in Islam. This cognitive effectiveness was empirically demonstrated by the increase in the students’ mean score from 49.37 on the pre-test to 87.14 on the post-test, as well as an average class Normalized Gain Score of 0.73, classified as High.

Theoretically, these findings strengthen the implementation of Jean Piaget’s constructivist learning theory and the principles of digital gamification, demonstrating that complex religious material can be understood deeply when students are actively engaged in a challenging, structured digital learning environment. Practically, this learning hub provides a concrete solution for PAI teachers in addressing limitations in face-to-face instructional time in general classrooms and supports the acceleration of digital curriculum transformation at SMAN 1 Cibungbulang.

As an instructional recommendation, PAI teachers are expected to use this innovative media sustainably and begin developing similar gamification quizzes on the Wordwall platform for different religious topics to maintain consistent student motivation. School principals are advised to facilitate technology-literacy training programs for educators to accelerate learning digitalization. Finally, future researchers are encouraged to test the effectiveness of this interactive media on a broader inter-school geographical scale and to investigate more deeply and comprehensively the implications of gamification media use for the development of students’ affective aspects (mental attitudes) and psychomotor aspects (marriage-contract simulation practices).

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