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# DEVELOPING A GOOGLE SITES-BASED ISLAMIC RELIGIOUS EDUCATION MODULE WITH SELF-REGULATED LEARNING: PRELIMINARY LEARNING OUTCOMES

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**Kata Kunci:**
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**ABSTRAK**

Penelitian ini mengembangkan dan mengevaluasi secara awal modul Pendidikan Agama Islam (PAI) berbasis Google Sites yang mengintegrasikan tahapan self-regulated learning (SRL) di pendidikan tinggi. Pengembangan produk mengikuti ADDIE, dengan analisis kebutuhan dari lima dosen dan lima mahasiswa, serta penilaian kualitas modul oleh lima ahli. Implementasi dilakukan selama 12 pekan pada 150 mahasiswa semester dua Universitas Pendidikan Indonesia melalui desain satu kelompok pretest–posttest dengan convenience sampling. Data respons terhadap 20 butir berskala lima poin dianalisis pada skor total; pemetaan butir yang terverifikasi ke tujuh dimensi literasi keagamaan tidak tersedia. Berdasarkan asumsi bahwa urutan responden pretest dan posttest sama, skor meningkat dari rerata 63,69 menjadi 72,67 ($t(149) = -37{,}007$ untuk pretest minus posttest; $p < 0{,}001$; Cohen's $d_z = 3{,}022$). Rata-rata N-Gain individual 0,278 berkategori rendah; 66% responden mengalami peningkatan rendah dan 34% sedang. Reliabilitas skor total tinggi (alpha pretest = 0,955; posttest = 0,931). Seluruh sepuluh indikator kualitas modul memperoleh I-CVI = 1,00 jika nilai 4–5 dinilai relevan, tetapi ambang ini masih memerlukan konfirmasi protokol. Temuan menunjukkan perubahan skor dalam satu kohort dan kelayakan rancangan awal, bukan bukti pengaruh kausal atau peningkatan tujuh dimensi literasi keagamaan.

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**Keywords:**

Digital Module; Google Sites; Self-Regulated Learning; Islamic Religious Education; Learning Outcomes

**ABSTRACTS**

This study developed and preliminarily evaluated a Google Sites-based Islamic Religious Education (IRE) module organized around the forethought, performance and self-reflection phases of self-regulated learning (SRL). ADDIE guided development; five lecturers and five former IRE students contributed needs-analysis evidence, and five experts rated ten module-quality indicators. A 12-week one-group pretest–posttest implementation involved 150 second-semester students at Universitas Pendidikan Indonesia, recruited by convenience sampling. Responses to 20 five-point items were analyzed as a total-score composite because authenticated item wording and a seven-domain scoring key were unavailable. Assuming the pretest and posttest workbook rows correspond to the same students, mean scores increased from 63.69 to 72.67 ($t(149) = -37.007$ for pretest minus posttest, $p < .001$; paired Cohen's $d_z = 3.022$). The mean individual normalized gain was low (0.278); 66% of students showed low gains and 34% medium gains. Total-score internal consistency was high (Cronbach's alpha = 0.955 at pretest and 0.931 at posttest). All ten module indicators had I-CVI = 1.00 if ratings of 4–5 were classified as relevant, a threshold awaiting protocol confirmation. The findings document preliminary within-cohort score changes and an SRL-aligned design but do not establish a causal module effect or improvement across seven distinct religious-literacy dimensions.

## A. INTRODUCTION

Islamic Religious Education (IRE) at university level is expected to cultivate informed interpretation of Islamic teachings, reflective judgment and the capacity to discuss religious questions in contemporary social and digital contexts. Web-supported learning can broaden access to instructional materials, but the availability of digital resources does not itself demonstrate improved understanding or religious practice. Prior work has examined digital Qur'an learning in IRE (Affandi et al., 2021), virtual-reality representations of religious practices (Asril et al., 2023), mobile Islamic studies learning (Ahmad et al., 2025) and digital learning management (Faqihuddin et al., 2026; Zakiyyah et al., 2024). These studies establish a relevant technological background while leaving open the instructional question of how learners are guided to plan, monitor and evaluate their own engagement with religious content.

Self-Regulated Learning (SRL) provides a pedagogical account of active learning management rather than simply recommending independent access to digital materials. An iterative cycle of forethought, performance, and self-reflection is central to SRL theory (Zimmerman, 2002), while related scholarship elaborates self-regulatory processes in educational and online-learning environments (Dabbagh & Kitsantas, 2012; Panadero, 2017; Zimmerman & Schunk, 2011). For IRE, forethought may involve identifying prior conceptions and setting learning aims; performance may involve checking source credibility and interpreting course materials; and reflection may involve evaluating understanding and planning further inquiry. These are theoretically plausible instructional mechanisms, not outcomes established by the presence of Google Sites or its embedded applications alone. Empirical evaluation must therefore distinguish the design of SRL opportunities from measurement of students' enacted regulatory strategies (Rahmawati et al., 2025).

Islamic educational traditions cannot be reduced to rote transmission. Alongside textual preservation and memorization, historical scholarship included reasoning, interpretation and debate, and contemporary IRE continues to negotiate the relationship between received sources, ethical reflection and plural social settings (Aktan, 2018; Berger, 2021; Saada & Magadlah, 2021). In this study, a digital module is considered a means of organizing such learning activities, rather than a replacement for religious teaching or a direct indicator of spirituality. Claims about moral behavior, spiritual development or interfaith competence require measures aligned to those particular constructs.

Google Sites is an accessible platform for assembling readings, embedded multimedia, external forms and guided activities. Its distinctive value for the present study is not that it supplies an original technology, but that it allows an instructional sequence to be organized across SRL phases. The proposed module links advance goal setting and preparation to engagement with Islamic course content and subsequent self-evaluation. This instructional configuration can be examined through a development-and-implementation study, while its effectiveness relative to other teaching models would require an appropriately designed comparison. Evidence about student engagement or sustained religious conduct must likewise be derived from observations, recorded reflections or validated measures rather than assumed from the digital format.

The gap addressed in this article is narrower than a general lack of technology in religious education. Existing scholarship provides evidence about particular media and

about SRL in online settings, yet the currently cited studies do not establish how a Google Sites-mediated IRE module can operationalize all three SRL phases within one documented university learning sequence, or how its development evidence and short-term questionnaire outcomes should be interpreted together. This is a contextual design-and-evaluation gap, not evidence that no similar intervention exists. A further measurement problem arises because religious knowledge, reflective learning, attitudes, digital source evaluation and civic or interfaith engagement are related but nonidentical outcomes. The module may address all of these aims pedagogically while the available composite score may not validly measure each of them.

For conceptual clarity, religious literacy is treated here as an educational construct rather than a synonym for religiosity, religious adherence, or spiritual development. Drawing on religious-literacy scholarship already cited in this study (Hannam et al., 2020; Moore, 2007; Prothero, 2007), the proposed framework distinguishes knowledge of religious concepts, their contextual interpretation, reflective judgment, evaluation of digital religious information, attitudes toward religious difference, interfaith communication, and ethical-civic reasoning. These domains provide a framework for interpreting the instructional objectives; they should not be understood as empirically established subscales until each questionnaire item is linked to a domain and dimensionality has been examined.

This study therefore pursued three linked objectives: (1) to develop a Google Sites-based university IRE module structured around the forethought, performance and self-reflection phases of SRL; (2) to report the needs-analysis and module-validation evidence available from the ADDIE development process; and (3) to estimate change in the observed 20-item IRE-related questionnaire composite over 12 weeks among participating students. The study contributes a transparent account of an SRL-aligned instructional design and preliminary within-cohort learning outcomes. It does not claim a novel SRL theory, a causal effect of Google Sites, or demonstrated change across seven dimensions of religious literacy without an authenticated item-to-domain key. The corresponding research questions concern design feasibility, observed score change and limits of interpretation.

## B. METHOD

### *Research Design*

The study used an educational Research and Development (R&D) approach in which ADDIE—Analysis, Design, Development, Implementation and Evaluation—organized the construction of a Google Sites-based IRE learning module (Branch, 2009). ADDIE is the instructional-development framework, not an experimental design. The implementation evaluation used a one-group pretest–posttest structure: the same cohort was intended to complete a 20-item questionnaire before and after a 12-week teaching period. No random allocation, untreated group, conventional-instruction comparison group or interrupted time series was reported. Accordingly, the analysis estimates observed within-cohort change, while history, maturation, practice effects and concurrent educational experiences remain possible alternative explanations. Qualitative needs-analysis materials, module expert ratings and paired-questionnaire scores were analyzed as complementary evidence streams; their integration is descriptive rather than a formally reported mixed-methods integration protocol.

### *ADDIE Model Research Steps*

During Analysis, coded accounts from five IRE lecturers (L1–L5) and five students who had previously taken IRE (S1–S5) identified four categories of needs: teaching-method limitations, reduced student engagement, constrained learning resources and digital literacy gaps (Table 1 and Figure 1). During Design, learning activities were arranged around forethought, performance and self-reflection (Table 2 and Figure 2). During Development, the prototype assembled Google Sites pages and linked materials and was rated on ten module-quality indicators by five experts (Table 3). During Implementation, second-semester UPI students engaged with the module over 12 weeks through preparation, self-directed tasks, discussion and reflection (Table 4). Evaluation combined recorded pretest–posttest scores with the documented expert-rating table. Detailed dated design logs, version histories, individual engagement traces and original observation forms were not included in the supplied research record; the manuscript therefore reports the documented stages without asserting unverified iterations or changes attributable to particular expert comments.

***Research Participants***

This study was conducted at Universitas Pendidikan Indonesia (UPI), Indonesia, and involved several groups of participants at successive stages of module development and evaluation. During the analysis stage, data were collected from five Islamic Religious Education (IRE) lecturers (coded: L1–L5) and five students who had previously taken the IRE course (coded: S1–S5), in order to identify instructional needs and **challenges.** During the Development stage, five experts in instructional media and digital learning technology (coded: E1–E5) were engaged to provide feedback and validate the module prototype. During the 12-week Implementation stage, the module was evaluated with 150 second-semester students enrolled in the Islamic Religious Education (IRE) course at UPI. The study used convenience sampling, recruiting participants from the available IRE student cohort rather than applying probability sampling. Because the 150 implementation participants were recruited using convenience sampling, the findings should be interpreted within the observed study context rather than generalized to different educational settings.

For the implementation cohort, convenience sampling was based on IRE-course participation and willingness to take part; the evaluation workbook contains 150 complete pretest records and 150 complete posttest records. The source workbook does not include anonymous participant IDs, so correspondence of the two sheets by row position is assumed for provisional paired analyses and must be verified against the original enrollment or response records. The program of study, exact enrollment criteria and demographic distribution were not available in the supplied materials and are therefore not inferred. This single-institution and nonprobability sample limits generalizability.

***Data Collection***

The study drew on four documented data sources. First, the needs-analysis coding table identifies difficulties reported by five lecturers and five former IRE students; Table 1 and the NVivo project map associate categories and codes with respondent labels. Because verbatim interview transcripts, interview guides and coding logs were not supplied, these records are presented as coded summaries, not as direct quotations or independently audited thematic prevalence. Second, the module-validation table records ten criteria rated from 1 to 5 by five experts; the available indicators concern layout, accessibility, content alignment and multimedia/interaction.

The raters' qualifications, selection rationale and narrative feedback require confirmation from the original validation forms. Third, a pretest and a posttest workbook contain responses to 20 five-point items (Q1–Q20) for 150 records at each occasion. Original item wording, the validated seven-domain scoring key, potential reverse-coded items and participant IDs were absent. Thus the total score can be analyzed descriptively, but domain-specific claims cannot be verified. Fourth, classroom activities and observations are described in the original study, although primary observation logs were not supplied; no unrecorded behavioral or spiritual outcome is inferred from them. The study states that participation was voluntary and confidential, but the original ethics-approval or consent documentation was not among the uploaded records and should be checked before submission (Faqihuddin, 2026).

***Data Analysis***

The data analysis process in this study followed a systematic sequence aligned with the ADDIE model, incorporating both qualitative and quantitative approaches to ensure a comprehensive evaluation of the developed module. Qualitative data—collected through interviews and observations—were analyzed using the Miles and Huberman model, which includes data reduction, data display, and conclusion drawing with verification. (Miles & Huberman, 1994) To support thematic analysis and coding, NVivo 12 software was utilized, enabling the researchers to process textual data with structured handling of the recorded text. On the quantitative side, the data—primarily derived from pretest and posttest questionnaires—were analyzed using paired sample t-tests to assess statistically significant differences in students' religious literacy before and after using the module. The original manuscript described SPSS version 26; the figures reported here were rechecked from the available Excel dataset and must be interpreted subject to the row-matching assumption. The implementation outcomes were examined through a one-group pretest–posttest evaluation without a control group; therefore, paired-samples analyses assess the mean change over the implementation period rather than isolate the intervention's causal effect. The evaluation focused on seven core dimensions of religious literacy: conceptual knowledge, contextual application, reflective awareness, digital religious literacy, religious attitudes, interfaith dialogue, ethical and civic engagement.

Analytical procedures for the quantitative evidence were specified as follows: sum the 20 coded Likert responses per occasion (theoretical range 20–100); assess internal consistency using Cronbach's alpha and corrected item–rest correlations separately for pretest and posttest; test the distribution of posttest-minus-pretest differences using Shapiro–Wilk; estimate the paired mean difference with a two-sided paired t-test and 95% confidence interval; and use a two-sided Wilcoxon signed-rank test as a sensitivity analysis when the paired differences depart from normality. Cohen's d_z was defined as the mean of the paired differences divided by the standard deviation of the differences; its interval was derived from the noncentral t distribution. The normalized gain for each record was g = (posttest – pretest)/(100 – pretest); the mean of individual gains was reported separately from gain based on group means. These analyses were recomputed from the supplied Excel workbook, rather than representing an additional independent SPSS export. All inferential estimates are conditional on correct row-wise respondent pairing.

A 20-item, five-point Likert instrument (Q1–Q20) was administered before and after implementation. The original wording of the items and an authenticated item-to-

domain codebook were not included in the analysis files; therefore, the intended seven-domain framework cannot yet be verified against the observed questionnaire content. The available responses permit total-scale internal-consistency and item-discrimination analyses, but they do not independently establish content validity or seven-dimensional construct validity. Recalculation from the 150 pretest and 150 posttest records yielded Cronbach's alpha values of 0.955 and 0.931, respectively. Corrected item–rest correlations ranged from 0.638 to 0.758 at pretest and from 0.525 to 0.707 at posttest. The originally reported $r > 0.67$ corresponds to uncorrected pretest item–total correlations (0.676–0.787), not to corrected item–rest correlations at both measurement occasions (Cronbach, 1951). Prior to the module implementation, a pretest was conducted to measure students' baseline religious literacy levels. Students then engaged in a learning program using a Google Sites-based digital module designed with interactive, contextually relevant Islamic content enriched with visual media. Upon completion, a posttest was administered using the same instrument. Normality tests based on 150 paired records yielded Shapiro–Wilk statistics of $W = 0.9865$, $p = 0.1521$ for pretest scores; $W = 0.9811$, $p = 0.0366$ for posttest scores; and $W = 0.9666$, $p = 0.0010$ for the paired posttest-minus-pretest differences. Since the paired differences deviated from normality, the paired-samples t-test was supplemented with a Wilcoxon signed-rank sensitivity analysis. With $N = 150$, the paired t-test was retained as an analysis of the mean difference, while both analyses were interpreted without a causal comparison group. For each student, normalized gain was calculated as $g = (\text{posttest} - \text{pretest})/(100 - \text{pretest})$, using the theoretical maximum total score of 100 (20 items scored 1–5). No participant had a pretest total of 100, so the denominator was positive in every case.

Operational framework for seven proposed religious-literacy domains

1. Conceptual knowledge: Recognition and accurate explanation of key Islamic teachings, concepts, and textual meanings.
2. Contextual application: Reasoned application of religious concepts to educational, interpersonal, and everyday situations.
3. Reflective awareness: Critical self-examination of understanding, assumptions, and learning decisions; not a direct measure of spirituality.
4. Digital religious literacy: Appraisal of credibility, context, and possible misinformation in digital religious content.
5. Religious attitudes: Self-reported openness, respect, and ethical orientation concerning religious matters; not observable behavior unless independently documented.
6. Interfaith dialogue: Ability to understand religious differences and communicate respectfully across faith traditions.
7. Ethical and civic engagement: Reasoning about moral responsibility, social participation, and civic conduct in religiously diverse contexts.

This seven-domain specification is a proposed interpretive framework, not a validated seven-factor measurement model. Domain assignment for Q1–Q20, item wording, reverse-scoring rules (if any), and content expert judgments on the questionnaire must be supplied before computing or interpreting domain-level scores. The seven-domain framework is therefore conceptual; no Q1–Q20 item is assigned to a domain without its original wording and verified scoring key.

Operationally, the seven domains articulate intended learning objectives; no statement in this manuscript treats these domain definitions as a confirmed seven-

factor measurement solution. Item–rest correlations and Cronbach's alpha address total-score internal consistency. They do not establish content coverage, discriminant validity or dimensional structure. An authenticated questionnaire, expert item-review forms and a domain mapping are prerequisites for domain-level scores. Consequently, all claims of observed change below refer to the available 20-item composite unless explicitly stated otherwise.

## C. RESULT AND DISCUSSION

The documented ADDIE process yielded an SRL-structured Google Sites IRE module and a recorded evaluation of 150 pretest and 150 posttest questionnaires. The needs analysis identified four instructional problems (Table 1); the module design incorporated forethought, performance and reflection (Table 2); and expert ratings of ten module-quality indicators ranged from four to five (Table 3). In the provisional row-paired quantitative analysis, posttest composite scores were higher than pretest scores, and both parametric and nonparametric tests indicated a within-cohort difference. Nevertheless, the mean individual normalized gain was low (0.278), and the available item codes did not identify which of the proposed seven religious-literacy domains each item measured. The evidence therefore supports development documentation and observed composite-score change, not verified seven-domain improvement or causal superiority over other modes of IRE instruction.

### Needs Analysis

**Table 1. Coded needs-analysis problems in university IRE (source-attributed summaries)**

| Problem Category | Code | Problems Faced | Code | Source |
|---|---|---|---|---|
| Problems in Teaching Methods | PTM | Monotonous and uninteresting learning for students | PTM1 | L1, L2 |
| | | Lack of variation in learning media used in the classroom | PTM2 | L2, L3 |
| | | Teachers limited in using new technology to support learning | PTM3 | L1, L4, L5 |
| Problems in Student Engagement | PSE | Students feel disengaged and bored during Islamic Education lectures | PSE1 | L3, S1, S3 |
| | | Difficulty in understanding abstract or philosophical religious concepts | PSE2 | S2, S4, S5 |
| | | Passive participation and low classroom interaction | PSE3 | L2, S1, S4 |
| Problems in Learning Resources | PLR | Limited access to updated, engaging, and relevant Islamic education materials | PLR1 | L3, L5, S2 |
| | | Over-reliance on printed textbooks | PLR2 | L2, S3, S5 |
| | | Absence of multimedia or digital-based learning integration | PLR3 | L1, L3, S1 |

| Problem Category | Code | Problems Faced | Code | Source |
|---|---|---|---|---|
| Digital Literacy Gap | DLG | Students lack skills in evaluating religious information from online sources | DLG1 | S2, S3, S4 |
| | | Lecturers feel unprepared to design digital religious learning content | DLG2 | L5, L2, L4 |

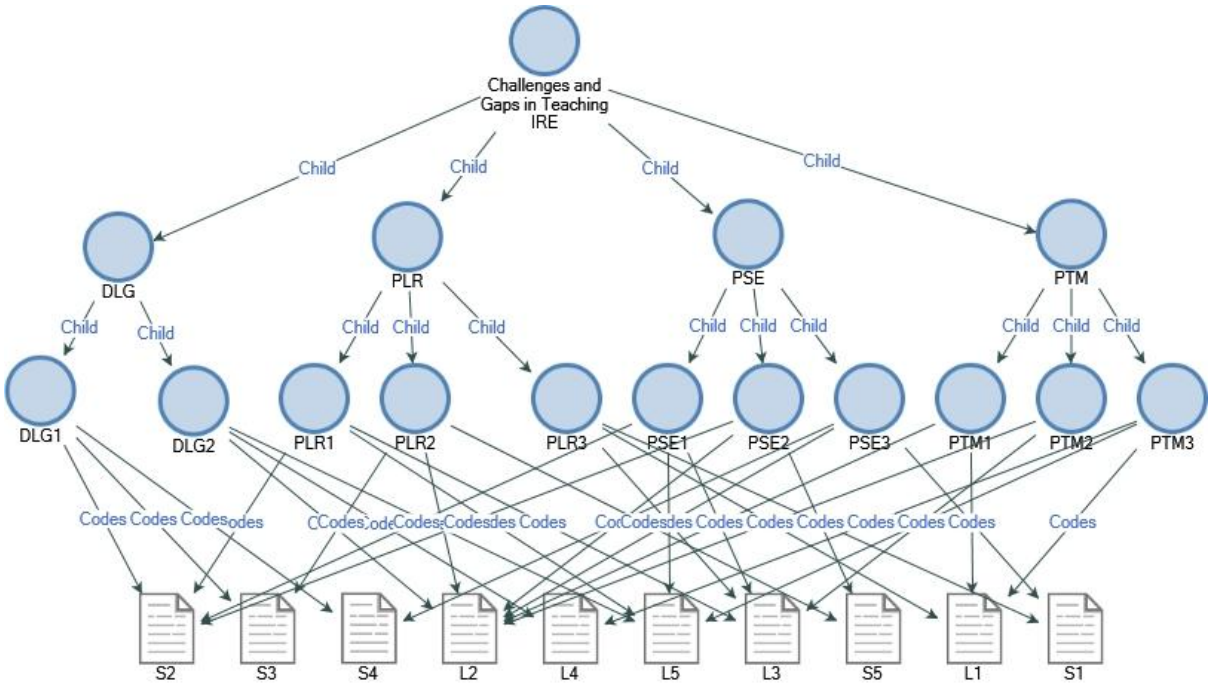



**Figure 1. NVivo project map of coded challenges in IRE teaching**

The need analysis was conducted to identify instructional challenges and contextual gaps in the delivery of Islamic Religious Education (IRE) at the higher education level. Data were gathered through semi-structured interviews with five lecturers (coded L1–L5) and five students (S1–S5) who had completed IRE courses. The findings revealed several key issues that informed the design of the digital module. First, in terms of teaching methodology, participants expressed dissatisfaction with conventional pedagogical approaches. Lecturers L1 and L2 noted that learning activities were often monotonous and unengaging (PTM1), while L2 and L3 emphasized the lack of variation in instructional media (PTM2). Moreover, several lecturers (L1, L4, L5) acknowledged their limited capacity to utilize digital tools effectively in the classroom (PTM3), indicating a need for capacity-building in educational technology.

Second, challenges related to student engagement were highlighted by both lecturers and students. Respondents reported that students often experienced disengagement (PSE1), especially in sessions dominated by lecture-based delivery. Students S2, S4, and S5 found it difficult to grasp abstract or philosophical religious concepts (PSE2), and both lecturers and students observed passive learning behaviors

and a lack of intrinsic motivation (PSE3). These findings underscore the necessity for a more interactive and student-centered learning environment.

Third, issues surrounding learning resources were prominent. Many respondents pointed to the over-reliance on printed textbooks and a lack of multimedia content (PLR1, PLR2), limiting students' ability to contextualize religious teachings in real-life settings. The absence of integrated digital platforms (PLR3) was seen as a major hindrance to active and reflective learning, especially in an increasingly digital academic landscape.

Additionally, the analysis identified a digital literacy gap (DLG) among both students and instructors. Students (S2, S3, S4) expressed difficulty in discerning the credibility of online religious information (DLG1), while lecturers (L2, L4, L5) admitted to lacking confidence in designing meaningful digital content (DLG2). This dual gap indicated the urgency of equipping both groups with competencies in ethical and critical digital engagement. These findings informed the rationale for developing a Google Sites-based digital module that not only integrates multimedia and web-based tools but also employs a self-regulated learning (SRL) framework to promote autonomy, metacognition, and contextual application of Islamic knowledge. The integration of SRL components—goal setting, self-monitoring, and reflection—into the module design aims to address the cognitive and affective needs of learners while enhancing their religious literacy in a meaningful, interactive, and flexible learning environment.

Table 1 reports the source codes for the four challenges rather than quotation-level excerpts. For example, PTM codes describe reports about teaching variation and lecturer digital capacity; PSE codes concern participation and difficulty with abstract concepts; PLR codes concern learning-resource availability; and DLG codes concern appraisal of online religious information and instructional-design readiness. The underlying transcripts were unavailable for audit, so claims about participants' precise wording, frequency, saturation or independent code verification are not made. The documented coding nevertheless explains the design choices in Table 2.

**Google Sites-based Digital IRE Module with SRL Approach**

**Table 2. SRL phases, intended learning processes and module components**

| SRL Phase | Learning Objectives | Google Sites Features & Supporting Applications | Student Activities |
|---|---|---|---|
| **Forethought** | Building independent learning readiness and intrinsic motivation; planning goals & strategies | • **Padlet**: Goal setting board<br>• **YouTube Embed**: Inspirational Islamic lectures | • Formulating personal learning goals<br>• Completing readiness checklist<br>• Expressing motivation<br>• Planning self-directed learning schedule |

| SRL Phase | Learning Objectives | Google Sites Features & Supporting Applications | Student Activities |
|---|---|---|---|
| **Performance** | Applying active learning strategies and monitoring goal achievement | • **Google Sites Content Pages**: interactive materials (text, video, audio)<br>• **Google Docs Viewer**: primary and supplementary readings<br>• **Canva / Google Slides**: step-by-step visualizations | • Reading, watching, and listening to content<br>• Tracking progress toward learning goals |
| **Self-Reflection** | Analyzing performance, evaluating strategies, and planning future improvements | • **Google Forms**: Self-evaluation & feedback<br>• **Google Docs**: Learning journals-<br>• **Kahoot! / Quizizz / Wordwall**: gamified reflection | • Completing self-evaluation and reflection<br>• Creating spiritual reflection videos<br>• Writing learning journals<br>• Participating in interactive reflections/quizzes |

The module design uses the (Zimmerman, 2002) sequence to connect goal definition, strategic study and reflection. In forethought, students are prompted to state learning goals and plan access to course material. During performance, linked readings, videos and formative exercises provide opportunities to monitor progress and evaluate source information. During self-reflection, self-assessment prompts and learning journals invite students to compare their learning with their initial goals. These functions constitute planned affordances; the available datasets do not quantify how often individual students used each function, whether reflection deepened, or whether faith practice changed. Thus the pedagogical contribution lies in the intentional sequence and its documentation rather than in a claim that embedding familiar applications automatically changes learner dispositions.

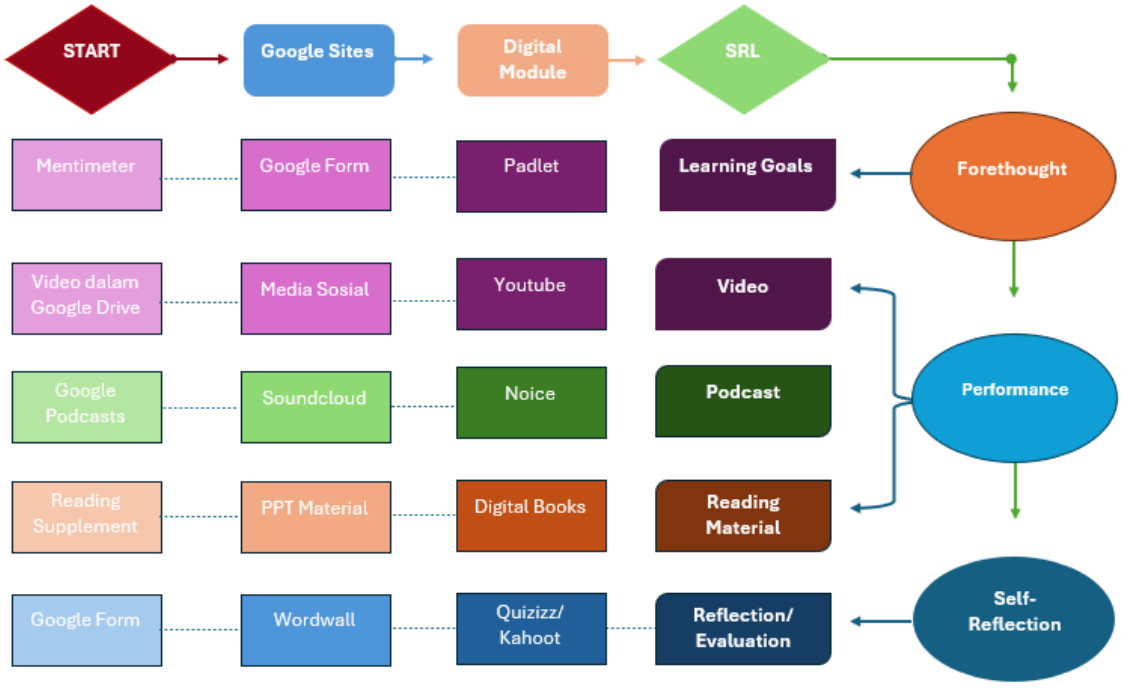



Figure 2. Intended digital learning workflow across the SRL cycle

Figure 2 illustrates the proposed integration of digital resources across the SRL cycle. Its boxes identify an instructional workflow, not measured interaction frequency. Google Sites provides the organizing page structure; applications such as Forms, Padlet and video/media services are external resources linked or embedded for specific instructional activities.

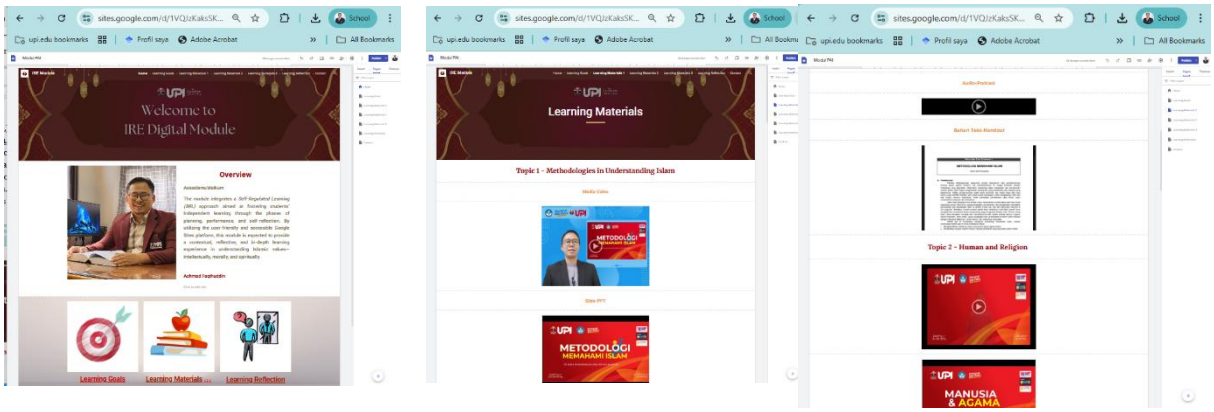



Figure 3. Screenshots of the developed Google Sites IRE module

**Expert Validation**

Five experts (E1–E5) assessed ten documented indicators of module quality spanning visual display, navigation and accessibility, IRE content and interactive/multimedia components (Table 3). The available ratings were 47 scores of 5 and three scores of 4; no rating was below 4, and the mean rating was 4.94/5. The table records evaluations of the instructional module, not direct validation of the separate 20-item student questionnaire. The experts' qualifications, recruitment basis and qualitative recommendations were not included in the supplied record and therefore cannot be reconstructed from scores alone.

For transparent reconstruction of the reported Content Validity Index (CVI), a threshold of 4 or 5 on the five-point ratings produces I-CVI = 1.00 for each indicator and S-CVI/Ave = 1.00; the same results follow for universal agreement under that threshold. Using a stricter threshold of 5 only, three indicators have I-CVI = 0.80 and seven have I-CVI = 1.00, giving S-CVI/Ave = 0.94 and S-CVI/UA = 0.70. The authors must confirm which relevance rule was prespecified in the original validation protocol. CVI is an agreement-on-relevance index and cannot independently establish student learning, module usability in practice, or validity of the questionnaire's seven dimensions (Polit et al., 2007; Yusoff, 2019).

Table 3. Module expert ratings and item-level CVI (reconstructed from documented ratings)

| Aspect | Module-quality indicator | E1 | E2 | E3 | E4 | E5 | I-CVI |
|---|---|---|---|---|---|---|---|
| Visual display | Page layout and navigation | 5 | 5 | 5 | 5 | 5 | 1.00 |
| Visual display | Readable colors and font | 5 | 5 | 5 | 4 | 5 | 1.00 |
| Visual display | Supportive images/icons | 5 | 4 | 5 | 5 | 5 | 1.00 |
| Navigation/access | Menus and links accessible | 5 | 5 | 5 | 5 | 5 | 1.00 |
| Navigation/access | Access on smartphones/tablets | 5 | 5 | 5 | 5 | 5 | 1.00 |
| IRE content | Alignment with learning objectives | 5 | 5 | 5 | 5 | 5 | 1.00 |
| IRE content | Alignment with Islamic sources | 5 | 5 | 5 | 5 | 5 | 1.00 |
| IRE content | Encourages reflection/exploration | 5 | 5 | 5 | 5 | 5 | 1.00 |
| Interactivity | Multimedia supports understanding | 5 | 5 | 5 | 5 | 5 | 1.00 |
| Interactivity | Quizzes and reflective evaluation | 5 | 4 | 5 | 5 | 5 | 1.00 |

**Implementation of Google Sites-Based Digital IRE Module**

Implementation was organized over 12 weeks in a second-semester UPI IRE learning context. Table 4 describes the intended before-class preparation, goal setting, independent learning, group dialogue, reflection and final evaluation tasks. The sequence has similarities to blended or flipped learning because preparation precedes discussion; however, the study did not independently test a flipped-classroom treatment and does not claim such a causal comparison. Learning activities are described here as instructional provisions, not as confirmed changes in student motivation, ethical behavior or spiritual awareness.

**Table 4. Learning activities organized before, during and after class**

| Implementation Step | Activity Description | Supporting Tools and Applications | Student Activities |
|---|---|---|---|
| **1. Preparation of Materials (Before-Class)** | Students study materials through Google Sites, with interactive content and reading materials from digital sources | - Google Sites: Interactive learning pages (text, video, audio)- Google Docs: Main reading materials- YouTube Embed: Inspirational Islamic lectures | - Read and watch the learning materials independently before class- Complete the readiness evaluation form |
| **2. Goal Setting (Forethought)** | Students plan personal learning goals and strategies using Google Forms and Padlet | - Google Forms: Goal Setting & Readiness Checklist- Padlet: Concept map or KWL Chart- Google Calendar: Set learning schedule | - Set personal learning goals- Plan strategies for studying the material before face-to-face sessions |
| **3. Independent Learning (Performance)** | Students study and complete tasks independently according to the set schedule | - Google Sites: Interactive learning pages- H5P/Quizizz: Interactive quizzes and formative assessment | - Complete learning tasks and quizzes independently after class or as homework |
| **4. Group Discussion (During-Class)** | Face-to-face sessions for discussion, problem-solving, and sharing understanding of the material | - Google Meet / Zoom: Video conferencing platform for class discussion- Jamboard: Visual collaboration for ideas | - Participate in class discussions about the material studied- Complete group tasks based on SRL principles |
| **5. Self-Reflection (Self-Reflection)** | Students reflect on their learning and evaluate their understanding through Google | - Google Forms: Learning Reflection & Self-Assessment- Flipgrid: Student self-reflection videos | - Fill out self-reflection forms- Create reflective videos on understanding and |

| Implementation Step | Activity Description | Supporting Tools and Applications | Student Activities |
|---|---|---|---|
| | Forms or Flipgrid | | application of the material |
| **6. Final Evaluation (Summative Evaluation)** | Collect final data to assess students' learning outcomes after discussion and reflection activities | - Google Forms: Post-test Evaluation- Kahoot! / Quizizz: Gamified final evaluation | - Complete post-test evaluations- Analyze achievement of learning goals and the effectiveness of the module |

The Google Sites-based Digital IRE Module was implemented over 12 weeks with second-semester IRE students at Universitas Pendidikan Indonesia (UPI), integrating technology-supported instruction with self-regulated learning activities. This module utilizes Google Sites as the primary platform to deliver interactive, flexible, and easily accessible learning materials for students.

Google Sites was the central access point for course readings, multimedia and linked exercises. The design offered opportunities for independent study, formative feedback and reflection. No verified individual-level usage logs were supplied, so degree of exposure, engagement and adherence to the proposed sequence cannot be quantified from the available materials.

The implementation therefore demonstrates the feasibility of presenting a coherent set of SRL-oriented activities within one digital module in the documented teaching setting. Claims that the intervention changed thinking, autonomy, reflection or civic conduct must remain provisional until separate observation records, validated subscale measures or comparable behavioral evidence are available.

**Effectiveness of the Google Sites-based Digital IRE Module**

Across the 150 available pretest and 150 posttest records, all 20 coded items had complete responses. Cronbach's alpha was 0.955 at pretest and 0.931 at posttest, indicating high internal consistency of the total-score composites at both occasions. Corrected item–rest correlations were 0.638–0.758 at pretest and 0.525–0.707 at posttest; the corresponding uncorrected item–total correlations were 0.676–0.787 and 0.580–0.748. These findings support total-score consistency and positive item association, but do not establish that seven distinct religious-literacy dimensions were measured. A high alpha should not be interpreted as proof of construct validity or of the absence of redundant items.

Table 5. Total-score item reliability diagnostics

| Measure | Pretest | Posttest |
|---|---|---|
| **Cronbach's alpha** | **0.955** | **0.931** |
| **Corrected item–rest r (range)** | **0.638–0.758** | **0.525–0.707** |
| **Uncorrected item–total r (range)** | **0.676–0.787** | **0.580–0.748** |
| **Complete 20-item records** | **150** | **150** |

The observed mean item scores were higher at posttest for every coded item (mean differences of 0.373–0.513 points on the five-point response scale). Nevertheless, because

the available workbook identifies items only as Q1–Q20 and contains no item text or validated mapping to the seven theoretical domains, dimension-specific pretest–posttest estimates, reliability coefficients, and conclusions about moral, spiritual, interfaith, digital, or civic improvement cannot currently be reported. Table 6 reports observed item-level diagnostics within Results, without assigning any item to an unverified domain.

Seven proposed domains cannot be treated as seven empirically tested outcomes: the workbook supplies only the response codes Q1–Q20, and neither item stems nor an authenticated dimension key is available. Table 6 instead presents each item's observed pretest and posttest mean and corrected item–rest correlation. This is a transparent item-level report, not a substituted or invented domain-level analysis. The lack of dimension-specific evidence is a substantive limitation of the present evaluation.

**Table 6. Item-level pretest–posttest statistics (Q1–Q20)**

| Item code | Mean pretest | Mean posttest | Corrected item–rest r (pretest) | Corrected item–rest r (posttest) |
|---|---|---|---|---|
| Q1 | 3.20 | 3.71 | 0.730 | 0.651 |
| Q2 | 3.12 | 3.51 | 0.702 | 0.602 |
| Q3 | 3.17 | 3.61 | 0.746 | 0.707 |
| Q4 | 3.29 | 3.76 | 0.674 | 0.560 |
| Q5 | 3.21 | 3.71 | 0.748 | 0.622 |
| Q6 | 3.27 | 3.77 | 0.659 | 0.581 |
| Q7 | 3.23 | 3.61 | 0.723 | 0.696 |
| Q8 | 3.19 | 3.63 | 0.696 | 0.567 |
| Q9 | 3.21 | 3.66 | 0.752 | 0.656 |
| Q10 | 3.18 | 3.55 | 0.638 | 0.555 |
| Q11 | 3.17 | 3.60 | 0.687 | 0.633 |
| Q12 | 3.18 | 3.65 | 0.700 | 0.620 |
| Q13 | 3.09 | 3.60 | 0.695 | 0.624 |
| Q14 | 3.17 | 3.58 | 0.758 | 0.640 |
| Q15 | 3.14 | 3.63 | 0.662 | 0.568 |
| Q16 | 3.15 | 3.58 | 0.646 | 0.525 |
| Q17 | 3.19 | 3.69 | 0.692 | 0.583 |
| Q18 | 3.16 | 3.60 | 0.676 | 0.538 |
| Q19 | 3.18 | 3.57 | 0.725 | 0.638 |
| Q20 | 3.19 | 3.66 | 0.706 | 0.652 |

The 150 paired records contained no missing responses across the 20 pretest and 20 posttest items. Shapiro–Wilk tests yielded $W = 0.9865$, $p = 0.1521$ for pretest totals and $W = 0.9811$, $p = 0.0366$ for posttest totals. For the paired difference (posttest minus pretest), $W = 0.9666$, $p = 0.0010$, indicating a departure from normality. Given the relatively large sample ($N = 150$), the paired t-test was retained for mean-change inference and cross-checked using a two-sided Wilcoxon signed-rank test, $V = 0$, $p < 0.001$. Both tests supported a within-cohort difference, although no causal inference about the module relative to other instructional conditions is justified. Matching is

assumed by row order, because participant IDs were not included in the supplied workbook.

A paired-samples analysis of the 150 completed record pairs yielded the following descriptive and inferential statistics. Pretest total scores were M = 63.6867 (SD = 15.5672), and posttest total scores were M = 72.6733 (SD = 14.0591). The mean score increase (posttest minus pretest) was 8.9867 points (SD of individual changes = 2.9741), 95% CI [8.5068, 9.4665]. With the SPSS difference defined as pretest minus posttest, $t(149) = -37.007$, $p < 0.001$ (exact $p \approx 5.29 \times 10^{-77}$); the difference sign therefore indicates a higher posttest score. Of the 150 paired observations, 148 showed an increase, two were unchanged, and none decreased. Cohen's paired-samples effect size was $d_z = 3.022$, with a 95% CI [2.642, 3.399] based on inversion of the noncentral t distribution. A two-sided Wilcoxon signed-rank sensitivity test also showed a difference ($V = 0$, $p < 0.001$). The large $d_z$ measures the mean change relative to the SD of within-person differences; it does not establish superiority over conventional teaching or identify the module as the sole cause of improvement.

Table 7. Total-score paired comparison (provisional row-matched analysis)

| Statistic | Value |
|---|---|
| **Paired observations** | **150 (ID-level linkage not provided)** |
| **Pretest, mean ± SD** | **63.6867 ± 15.5672** |
| **Posttest, mean ± SD** | **72.6733 ± 14.0591** |
| **Mean change, post – pre** | **8.9867 (95% CI 8.5068–9.4665)** |
| **Paired-samples t test** | **t(149) = –37.007 for pre – post; p < .001** |
| **Cohen's d_z** | **3.022 (95% CI 2.642–3.399)** |
| **Wilcoxon signed-rank** | **V = 0; two-sided p < .001** |
| **Shapiro–Wilk for paired differences** | **W = 0.9666, p = .0010** |

Normalized gain was recalculated for every participant from the same 20-item total-score pairs using $g = (\text{posttest} - \text{pretest})/(100 - \text{pretest})$, where 100 is the maximum achievable score. The mean of the 150 individual normalized gains was 0.2776 (median = 0.2675), which falls in the low-gain category under the conventional cutoffs: low, $g < 0.30$; medium, $0.30 \le g < 0.70$; and high, $g \ge 0.70$. In total, 99 students (66.0%) had low gains, 51 (34.0%) had medium gains, and none had high gains, reproducing the category distribution reported previously. The normalized gain calculated from the two group means was 0.2475, which differs mathematically from the mean of individual gains; both are low. Accordingly, the observed mean normalized gain was classified as low (0.278), even though the average total score increased significantly. These gains indicate that the statistical significance of score changes should not be confused with uniformly strong educational progress.

Table 8. Normalized-gain distribution based on 150 assumed matched records

| Gain category | Count | Percentage |
|---|---|---|
| **Low (g < 0.30)** | **99** | **66.0%** |
| **Medium (0.30 ≤ g < 0.70)** | **51** | **34.0%** |
| **High (g ≥ 0.70)** | **0** | **0.0%** |

| Gain category | Count | Percentage |
|---|---|---|
| **Mean individual N-Gain** | **0.2776** | **Low category** |
| **Gain from group means** | **0.2475** | **Low category** |

The available summary statistics establish a statistically significant pretest–posttest difference within the observed cohort, but they do not by themselves demonstrate construct validity, isolate a causal effect of the digital module, or verify all dimensions of religious literacy. This study also opens avenues for further development of digital learning models that are deeper and more participatory, grounded in spiritual values.

**DISCUSSION**

The most important result is the contrast between a highly significant composite-score increase and a low average normalized gain. The mean within-person score increased by 8.99 points across 12 weeks, and the paired t-test and Wilcoxon analysis point in the same direction. Yet the mean individual N-Gain was 0.278, and approximately two-thirds of the cohort had gains below 0.30. These findings are not contradictory: the exceptionally large paired d_z is calculated using the small variability of individual score differences (SD 2.97), whereas normalized gain describes achievement relative to each respondent's remaining scale headroom. Neither statistic isolates the contribution of the module from maturation, repeated testing, other course experiences or the passage of time. The interpretation should therefore emphasize observed change, the choice of metric and the limits of inference, not an unqualified claim of strong educational impact.

SRL provides a plausible design rationale for how the intervention might support IRE learning. Forethought tasks invite students to identify goals and existing understanding; performance tasks organize encounters with religious sources and formative exercises; and self-reflection tasks offer opportunities to compare initial expectations with later judgments. These functions are consistent with the SRL regulatory cycle (Zimmerman, 2002) and with analyses of personal learning environments and learner agency (Dabbagh & Kitsantas, 2012). However, the dataset does not contain a separate SRL scale, interaction logs or coded reflections. It remains unknown whether students actually improved their planning, monitoring or reflection, or whether those mechanisms mediated the observed composite-score change. A future comparison design should assess those processes directly.

Conceptual precision is also essential. Religious-literacy knowledge, contextual reasoning, reflective awareness, evaluation of online religious claims, attitudes toward religion, interfaith communication and ethical or civic engagement are distinct constructs that require appropriately formulated questions and independent validity evidence. Sources discussing religious literacy as contextual understanding (Moore, 2007; Prothero, 2007; Jenuri et al., 2025; Suresman et al., 2026) provide a conceptual starting point, not validation for this particular 20-item questionnaire. The high total-score alphas (0.955 and 0.931) indicate internal consistency but cannot confirm a seven-factor structure. Since the authenticated item wording and mapping were not available, the present findings concern the IRE-related questionnaire composite, and no conclusion is drawn about discrete moral or spiritual development.

The pedagogical contribution is better characterized as a contextualized instructional sequence than as a new technological invention. Previous work on digital

Qur'an learning (Affandi et al., 2021), virtual-reality-supported Islamic learning (Asril et al., 2023), mobile religious learning (Ahmad et al., 2025) and online SRL measurement (Barnard et al., 2009) addresses related but different units of analysis. The present module links forethought, performance and reflection within a single Google Sites course space and documents needs-analysis codes, development features, expert ratings and preliminary student scores. Such integration has practical value for course design; the current evidence does not establish that this exact combination is theoretically unprecedented or more effective than another platform.

Needs-analysis and expert-rating evidence supports the module's contextual relevance but should not be overstated. Coded reports from five lecturers and five students highlight perceived limits in teaching variation, access to resources, engagement and digital credibility assessment. The validation table indicates high ratings for ten specific module-quality criteria under either of the transparent dichotomization thresholds. Nevertheless, the available file provides no verbatim interview excerpts, audit trail of qualitative coding, expert biographies, revision log or usability-testing traces. Consequently, these results document reported categories and ratings, not the depth of users' lived experience or the causal effectiveness of any single feature. They also cannot establish that Islamic values were preserved in learners' practice; the presence of Islamic content is not the same outcome as ethical conduct or spirituality.

Practical constraints must be considered before broader adoption. The learning sequence depends on sustained connectivity, access to appropriate devices, institutional support and lecturers' ability to maintain linked external services. Accessibility depends not only on whether pages load on a phone but also on design choices, bandwidth requirements and equitable participation. Where components are hosted across Google Sites, Forms, multimedia applications and third-party tools, broken links, shifting platform policies and fragmented learner data can impede continuity. These constraints deserve prospective measurement rather than generic assumptions that every student experiences the module as universally accessible, interactive or flexible.

Three methodological limitations are decisive. First, the one-group pretest–posttest design does not identify a causal treatment effect, and nonprobability recruitment at a single university restricts transferability. Second, respondent IDs are absent from the uploaded pretest and posttest sheets; paired estimates remain provisional until row correspondence is verified. Third, the missing questionnaire stems and validated domain key prevent construct-level and seven-domain interpretation; the documented module CVI is not a substitute for questionnaire validation. Future studies should pre-register domain definitions, provide the complete item bank and expert content-review evidence, assess the factor structure, record SRL process data, report qualitative quotations with consent and employ a comparison group when feasible. These steps would distinguish short-term questionnaire changes from enduring religious literacy and ethical outcomes.

## CONCLUSION

This development study documents a Google Sites-based IRE module at Universitas Pendidikan Indonesia organized around forethought, performance and self-reflection within an ADDIE process. Expert ratings of ten module-quality criteria

were high, and the observed 20-item total score increased from M = 63.69 to M = 72.67 during a 12-week one-group implementation with 150 second-semester students. On the assumed row-wise pairing, the difference was statistically significant ($t(149) = -37.007$, $p < .001$; $d_z = 3.022$), but the mean individual normalized gain was low (0.278), with 66% of students in the low-gain category. These findings constitute preliminary development and within-cohort evaluation evidence; they do not establish module causality, superiority to conventional instruction or demonstrated enhancement of all seven proposed religious-literacy dimensions.

The high total-score Cronbach's alpha estimates are evidence of internal consistency rather than proof of multidimensional religious-literacy construct validity. Without item wording, domain-specific scoring and supporting validity evidence, the measured change is best described as a change in the available IRE-related questionnaire composite, not as demonstrated improvement across all seven religious-literacy domains.

Interpretation is limited by the lack of a comparison group, convenience sampling at one university, absent participant IDs in the two workbook sheets and unavailability of original item wording and a validated dimension key. The module-quality CVI should not be treated as proof of questionnaire validity or behavioral/spiritual change. Follow-up research should authenticate respondent pairing, publish instrument and expert-validation documentation, evaluate specific SRL processes and religious-literacy domains, and compare the module with a suitable alternative instructional condition. The principal contribution is a documented SRL-aligned digital IRE instructional design and cautious evidence about observed short-term composite scores.

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