

Expert Validation of a Guided Inquiry-Based WordPress Student Worksheet Integrated with Islamic Values on the Circulatory System

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Abstract

This study aimed to develop and validate a guided inquiry-based student worksheet (LKPD) supported by WordPress and integrated with Islamic values for the circulatory system. The study used Research and Development with the Plomp model. This manuscript reports the expert-review stage of the prototyping phase. Three validators were selected purposively: one expert in teaching-material design, one expert in science/biology content, and one expert in Qur'anic exegesis and Hadith. Validation used domain-specific instruments consisting of 30, 26, and 17 items, respectively. Each item was rated on a four-point scale, analyzed as a percentage of the maximum score, and supplemented with qualitative comments for product revision. The teaching-material, subject-matter, and Islamic-values validation scores were 95.0%, 90.0%, and 92.5%, respectively, producing an overall mean of 92.5% in the very valid category. The lowest sub-aspect was the integration of Islamic values within the subject-matter instrument (75.0%), which prompted revisions to connect religious sources, scientific explanations, and reflection activities more coherently. The results indicate that the revised LKPD is sufficiently valid to proceed to practicality and effectiveness testing. The main limitation is that each domain was assessed by one expert; therefore, inter-rater agreement and learning outcomes were not examined.

Keywords: Circulatory System; Guided Inquiry; Islamic Values; Student Worksheet; WordPress

INTRODUCTION

Science education is expected to develop conceptual understanding, scientific processes, and scientific attitudes through learning activities that allow students to investigate natural phenomena. However, the circulatory system contains structures and processes that are difficult to observe directly, while practical activities are not always conducted in junior high school classrooms. This condition can make the topic difficult to understand without structured learning support (Ramlawati et al., [2022](#)).

The learning problem is also related to the limited variety of teaching materials. Textbooks remain the main resource in many classrooms, whereas students need materials that guide them through questions, investigations, data interpretation, and conclusions. Student worksheets can provide this structure and support student-centered learning when their content, instructions, and activities are designed systematically (Hersandi & Rosyid, [2023](#); Nata & Manuaba, [2022](#)). In practice, worksheets are often dominated by summaries and routine questions, so students have limited opportunities to investigate a problem. A guided inquiry-based worksheet is intended to address this limitation by providing scaffolding while students formulate ideas, collect evidence, analyze data, and construct conclusions (Damanik et al., [2022](#); Nurak et al., [2022](#)).

The guided inquiry sequence used in this study consists of six stages: presenting questions, formulating hypotheses, designing experiments, conducting experiments, analyzing

data, and drawing conclusions. The teacher or worksheet provides the initial problem and guiding questions, while students complete the investigation through progressively structured activities (Diniya, [2019](#); Nurak et al., [2022](#)).

In the developed LKPD, these stages were operationalized through a contextual problem concerning the circulatory system, a prediction or hypothesis field, an investigation plan, guided observation or experimentation, data tables and analysis questions, and a conclusion section. This mapping was used to ensure that guided inquiry was represented in the actual learning tasks rather than only stated as a theoretical label. WordPress was used to extend the worksheet into a web-supported learning resource. The product organizes content through linked pages and menus, provides navigation between learning sections, accommodates embedded visual and audiovisual resources, and can be accessed through computers or mobile devices. These functions support flexible access to learning materials and activities (Iswari, [2021](#)).

The worksheet also integrates Islamic values because science learning in an Islamic school context is expected to connect scientific understanding with reflection on faith, responsibility, and the ethical use of knowledge. This integration should not replace scientific explanations; instead, relevant Qur'anic verses, Hadith, and contributions of Muslim scholars are positioned as reflective and contextual elements (MZ et al., [2019](#); Sopwan, [2022](#)).

Previous studies have addressed parts of this problem separately. Ramlawati et al. ([2022](#)) developed a circulatory-system worksheet to strengthen science-process skills, but the product did not combine WordPress support and Islamic values. Damanik et al. ([2022](#)) and Wulandari et al. ([2023](#)) developed guided inquiry worksheets for other biology topics, demonstrating the feasibility of inquiry-oriented worksheet design without focusing on the same technological and value-integration combination. Research by Fazira and Jayanti ([2023](#)) developed guided inquiry worksheets integrated with Islamic values on environmental pollution, while Sabtu et al. ([2023](#)) examined the use of Islamic-integrated guided inquiry worksheets in science learning. These studies establish the relevance of value integration, but they do not specifically validate a WordPress-supported circulatory-system LKPD through separate teaching-material, subject-matter, and Islamic-values experts.

WordPress-based teaching materials have also been developed in other subject areas (Iswari, [2021](#)). Nevertheless, using WordPress as a delivery platform does not automatically ensure pedagogical quality. The content structure, guided inquiry sequence, scientific accuracy, technological operability, and theological relevance must be evaluated as connected components. Accordingly, the research gap lies in the absence of a product that combines the circulatory-system topic, guided inquiry activities, WordPress-supported access, and Islamic-values integration within one validated worksheet for junior high school science. The distinct contribution of this study is the domain-specific expert validation of those components and the documentation of revisions made in response to expert feedback.

The product was designed for Grade VIII students to identify blood components and their functions, explain the organs and pathways of circulation, analyze common circulatory disorders, and complete guided investigations while reflecting on relevant Islamic values. Therefore, this study aimed to develop and determine the expert validity of a guided inquiry-based WordPress student worksheet integrated with Islamic values on the circulatory system. Claims regarding practicality, student engagement, motivation, and learning outcomes were outside the scope of this manuscript.

METHODS

This study used the Research and Development (R&D) method to design and evaluate a guided inquiry-based student worksheet supported by WordPress and integrated with Islamic values on the circulatory system. The development procedure followed the Plomp model, which provides systematic stages for designing, reviewing, and refining educational products (Plomp, [2013](#); Sugiyono, [2015](#)).

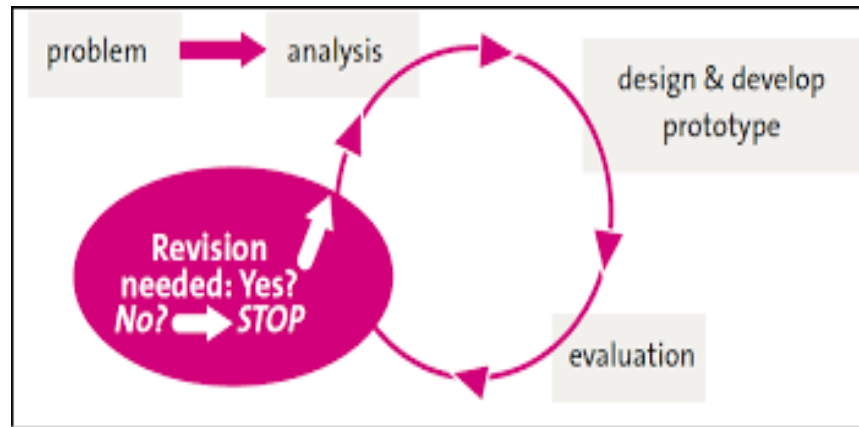


Figure 1. Research Design of Development Study Using the Plomp Mode
(Source: Plomp & Nieveen, 2010)

The Plomp model consists of preliminary research, the prototyping phase, and the assessment phase. The complete development study included subsequent user evaluations; however, this article reports only the validity stage conducted through self-evaluation, expert review, and revision of the initial prototype.

Preliminary research included curriculum analysis, analysis of student and teacher needs, analysis of learning resources, and identification of technological support at SMP IT Al-Fityah Pekanbaru. The findings were used to formulate product specifications, learning objectives, guided inquiry activities, and the placement of Islamic-value components. During the prototyping phase, the initial LKPD was reviewed by the researcher for writing, layout, and content consistency. The prototype was then submitted to three expert validators. Each validator completed one domain-specific review round and provided quantitative ratings and written suggestions. The product was revised after the review; the revisions included correcting the concept map and learning objectives, clarifying guided inquiry stages, improving the placement of Islamic values, and adding relevant Islamic scholarship.

The WordPress product was structured as linked web pages rather than a fixed printed page count. Seven principal content sections were used: identity and learning instructions; competencies and objectives; concept map; blood components; circulatory organs and pathways; circulatory disorders and health maintenance; and evaluation with Islamic reflection. The site provided menu-based navigation, linked learning sections, visual resources, and mobile access. The same core content was retained in the printable LKPD format.

The study was conducted from September to May in the 2023-2024 academic year. Three validators were selected purposively according to their expertise and minimum master's-level qualification: one teaching-material expert, one science/biology subject-matter expert, and one expert in Qur'anic exegesis and Hadith. Teachers and students were not included in the validity analysis reported in this manuscript. The instruments used a four-point rating scale (1 = not valid, 2 = less valid, 3 = valid, and 4 = very valid). The validity percentage was calculated as: $\text{validity (\%)} = (\text{total score obtained} / \text{maximum possible score}) \times 100\%$. Qualitative comments were analyzed descriptively and used as the basis for revision. Because only one expert represented each domain, Aiken's V and inter-rater agreement were not calculated; this is acknowledged as a methodological limitation.

Table 1. Validation Instrument Specifications

Validator Domain	Number of Items	Assessment Aspects	Data Produced
Teaching material	30	graphics; learning media and language; operability; guided inquiry; technology	scores and written suggestions
Subject matter	26	content feasibility; presentation; Islamic-values integration; guided inquiry	scores and written suggestions
Islamic values	17	appropriateness of Qur'anic verses and Hadith;	scores and written

Validator Domain	Number of Items	Assessment Aspects	Data Produced
		integration with content; religiosity-oriented indicators	suggestions

Table 2. Criteria for Interpreting Validity Percentages

No	Percentage (%)	Assessment Criteria
1	0%-20%	Not Valid
2	21%-40%	Less Valid
3	41%-60%	Moderately Valid
4	61%-80%	Valid
5	81%-100%	Very Valid

(Source: Riduwan, [2019](#))

Scores of 81%-100% were interpreted as very valid, 61%-80% as valid, 41%-60% as moderately valid, 21%-40% as less valid, and 0%-20% as not valid. These categories were used to determine whether the prototype could proceed to the next evaluation stage after revision.

RESULT AND DISCUSSION

The validity stage produced a revised prototype of the guided inquiry-based WordPress LKPD integrated with Islamic values. The final prototype retained the same intended learning objectives and content sequence while incorporating expert corrections to the concept map, learning objectives, inquiry prompts, scientific presentation, and placement of religious sources. The web-supported LKPD used seven linked content sections: identity and instructions, competencies and objectives, a concept map, blood components, circulatory organs and pathways, circulatory disorders and health maintenance, and evaluation with Islamic reflection. WordPress was used for menu-based navigation, linked sections, embedded visual resources, and access through mobile or desktop devices. The web structure did not replace the worksheet activities; it provided a digital route to the same guided tasks.

The six guided inquiry stages were mapped into the worksheet as follows: presenting questions through a contextual circulatory-system phenomenon; formulating hypotheses through prediction fields; designing experiments through planning prompts; conducting experiments or observations through step-by-step procedures; analyzing data through tables and guiding questions; and drawing conclusions through evidence-based summaries followed by an Islamic reflection. This mapping made the inquiry model visible in the product components.

Teaching Material Validation

Teaching-material validation was conducted by one lecturer with a master's qualification and expertise in the design and development of instructional materials. The 30-item instrument assessed graphics, learning media and language, practicality and operability from an expert-design perspective, guided inquiry, and technology. The term operability in this subsection refers to expert judgment of instructions and interface design, not observed teacher or student use.

The expert reviewed the LKPD and provided comments concerning the concept map, alignment of learning objectives with the Basic Competency, and the presence of Islamic elements on the cover and in the content. The prototype was revised before the validation results were interpreted.

Table 3. Suggestions and Revisions from the Teaching-Material Expert

Teaching-Material Expert Review	
Suggestion	Revision Completed
Revise the concept map section in the LKPD.	The concept map was revised for clarity and coherence.
Reconsider the learning objectives in relation to the Basic Competency (KD).	The learning objectives were aligned with the Basic Competency.

Teaching-Material Expert Review	
Suggestion	Revision Completed
Add Islamic elements to the LKPD cover and content.	Islamic visual and content elements were added where relevant.

Table 4. Teaching-Material Validation Results

No	Assessment Aspect	Expert Rating	Validation Criteria
1	Graphics	97.5%	Very Valid
2	Learning Media and Language	100%	Very Valid
3	Practicality and Operability	91.6%	Very Valid
4	Guided Inquiry	100%	Very Valid
5	Technology	91.6%	Very Valid

The results of the data analysis for each assessed aspect are presented in Figure 2.

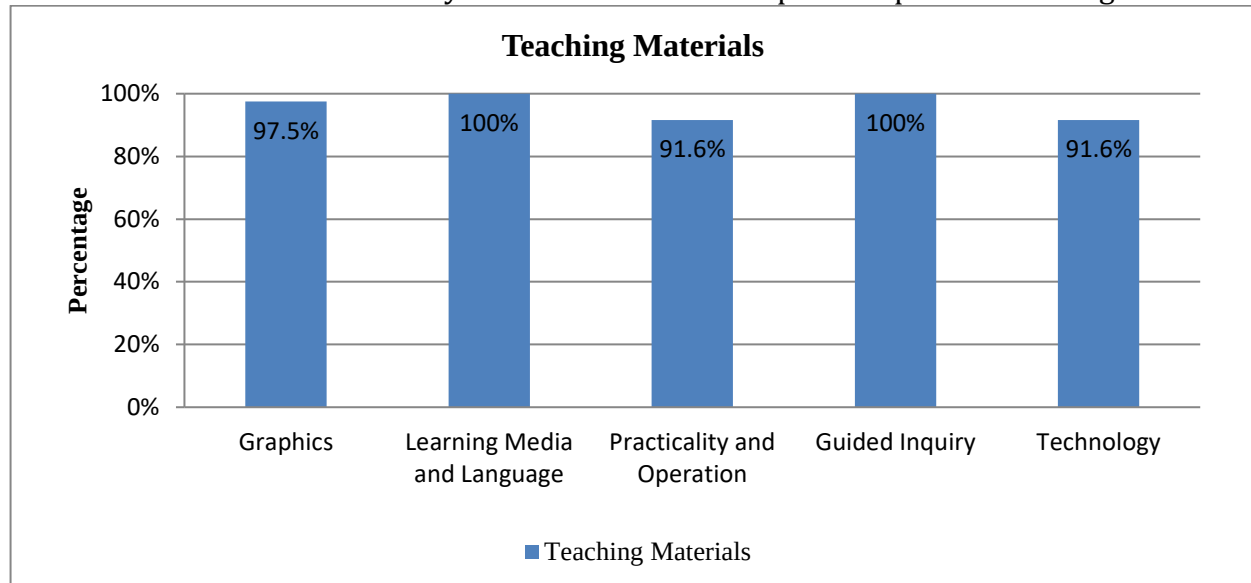


Figure 2. Teaching-Material Validation

The teaching-material expert gave an average score of 95.0%, categorized as very valid. Graphics obtained 97.5%, while learning media and language and guided inquiry each obtained 100%. These values indicate strong agreement between the product and the instrument criteria, but they should not be interpreted as proof that the product is flawless or effective in classroom use. The two 100% scores resulted from all items in those aspects receiving the highest rating from the single validator. The qualitative comments nevertheless identified revisions to the concept map, learning objectives, and Islamic visual elements. Thus, the written feedback was treated as equally important as the numerical score and was incorporated into the revised prototype.

The practicality and operability aspect and the technology aspect each obtained 91.6%. At this stage, these scores represent expert judgments about clarity of instructions, navigation, and the suitability of WordPress functions. They do not constitute a practicality test with teachers or students. User-based evidence is still required to determine loading performance, mobile usability, and ease of completing activities.

The technology result supports the use of WordPress as a delivery platform because the material can be organized through linked pages, visual resources, and menu-based navigation. This finding is consistent with Iswari (2021), who reported that WordPress can support web-based teaching materials, although the educational value of the platform depends on the quality of the learning design embedded in it.

The strong guided inquiry score is also consistent with previous development studies that reported high feasibility for inquiry-oriented worksheets in biology and science (Damanik et al., 2022; Wulandari et al., 2023). The present product extends those designs by combining the inquiry sequence with WordPress support and Islamic-values integration on the circulatory

system. Overall, the teaching-material validation indicates that the layout, instructional communication, inquiry structure, and technological organization met the expert criteria after minor revisions. Further testing should examine whether the same strengths are experienced by teachers and students in actual use. Table 4 and Figure 2 summarize the expert ratings after the revision process.

Subject-Matter Validation

Subject-matter validation was conducted by one science education lecturer with a master's qualification and experience in science and biology teaching. The 26-item instrument assessed content feasibility, presentation, integration of Islamic values, and the implementation of guided inquiry. The review examined scientific accuracy, curriculum alignment, organization of the material, and coherence between scientific and religious content.

The validator identified inconsistencies in subsection structure, insufficient visibility of the guided inquiry stages, and an initial separation between Islamic values and the scientific substance of the LKPD. These comments were used to revise the sequence, labels, and integration points in the product. The revision standardized headings and writing, made the six inquiry stages explicit in each activity, and placed relevant Islamic sources and reflection prompts within the corresponding scientific sections rather than as detached additions.

Table 5. Suggestions and Revisions from the Subject-Matter Expert

Subject-Matter Expert Review	
Suggestion	Revision Completed
Improve the consistency of writing and the structure of each subsection.	Writing and subsection structure were standardized.
The guided inquiry stages are not clearly visible.	Inquiry labels, prompts, and activity sequences were clarified.
Islamic integration is separated from the structure and substance of the LKPD.	Religious sources and reflection prompts were connected to the relevant scientific content.

Table 6. Subject-Matter Validation Results

No	Assessment Aspect	Expert Rating	Validation Criteria
1	Content Feasibility	100%	Very Valid
2	Presentation	93.7%	Very Valid
3	Integration of Islamic Values	75%	Valid
4	Guided Inquiry	96.4%	Very Valid

The results of the data analysis for each assessed aspect are presented in Figure 3.

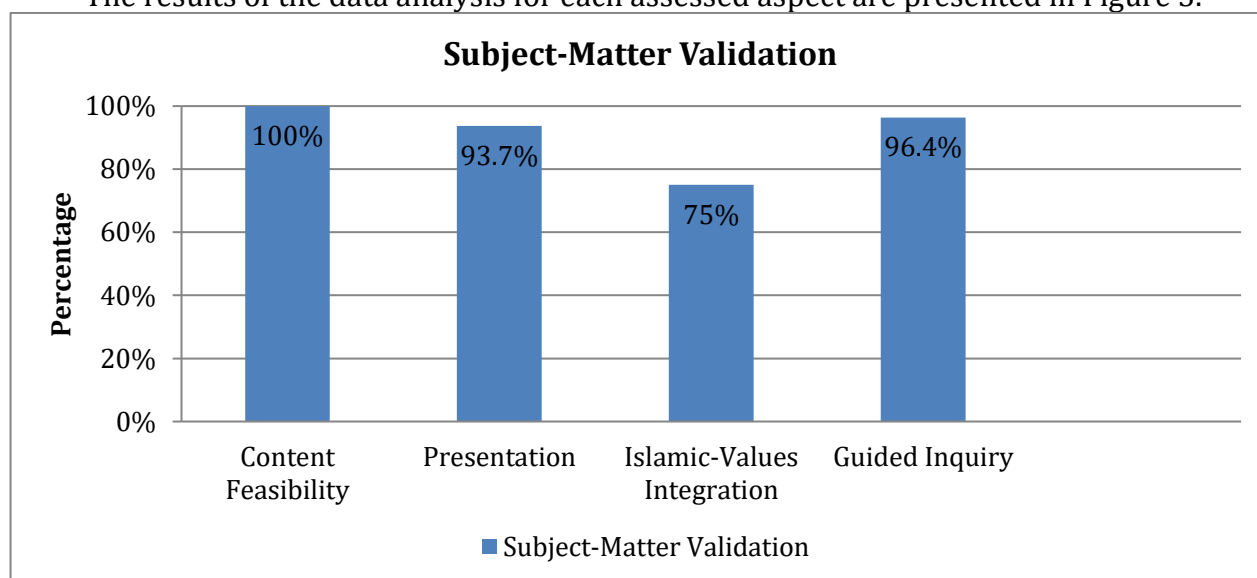


Figure 3. Subject-Matter Validation

The subject-matter expert gave an overall score of 90.0%, categorized as very valid. Content feasibility obtained 100%, presentation 93.7%, Islamic-values integration 75.0%, and guided inquiry 96.4%. The profile shows that scientific content and inquiry structure were evaluated more highly than the initial integration of Islamic values. The 100% content-feasibility score indicates that the assessed items on curriculum alignment and concept accuracy received the highest rating from the validator. It does not eliminate the need for continued checking during classroom implementation, particularly because the judgment was provided by one expert.

The 75.0% score for Islamic-values integration was the most critical result because value integration is a central claim of the product. The initial prototype placed several religious elements separately from the scientific discussion, so the relationship between the selected sources, the biological concept, and the intended reflection was not consistently clear.

The revision addressed this weakness by placing religious sources in the relevant subsection, adding focused reflection prompts, and distinguishing theological meaning from empirical scientific explanation. The addition of Ibn al-Nafis also connected the topic to the history of scientific scholarship without using historical or religious content as a substitute for biological evidence.

A similar pattern was reported by Fazira and Jayanti (2023), whose Islamic-values validation score was lower than their media and material scores. This comparison suggests that meaningful values integration requires more than inserting verses or Hadith; it requires contextual, conceptual, and theological alignment across the learning activity. The guided inquiry score of 96.4% indicates that the revised material reflected the inquiry sequence through questions, hypotheses, procedures, analysis, and conclusions. This result is consistent with the structure emphasized in guided inquiry worksheet studies (Damanik et al., 2022; Wulandari et al., 2023). Overall, the subject-matter validation supports the scientific feasibility of the LKPD while identifying Islamic-values integration as the main area requiring refinement. The reported score represents expert validity and does not establish learning effectiveness.

Islamic-Values Integration Validation

Validation of Islamic-values integration was conducted by one lecturer with a doctoral qualification and expertise in Qur'anic exegesis and Hadith. The 17-item instrument assessed the appropriateness of selected Qur'anic verses and Hadith, their connection with circulatory-system content, and indicators intended to support religious reflection. The religiosity-related indicators evaluated the suitability of the product design; they did not measure changes in student religiosity.

The review focused on source accuracy, contextual relevance, and the distinction between theological reflection and scientific explanation. The validator recommended adding a relevant Hadith in the appropriate section and including Ibn al-Nafis to represent the contribution of Muslim scholarship to the history of circulation studies.

The revision added these elements and clarified their pedagogical function. Scriptural sources were presented as reflective connections, while biological mechanisms continued to be explained using scientific concepts and evidence.

Table 7. Suggestions and Revisions from the Islamic-Values Integration Expert

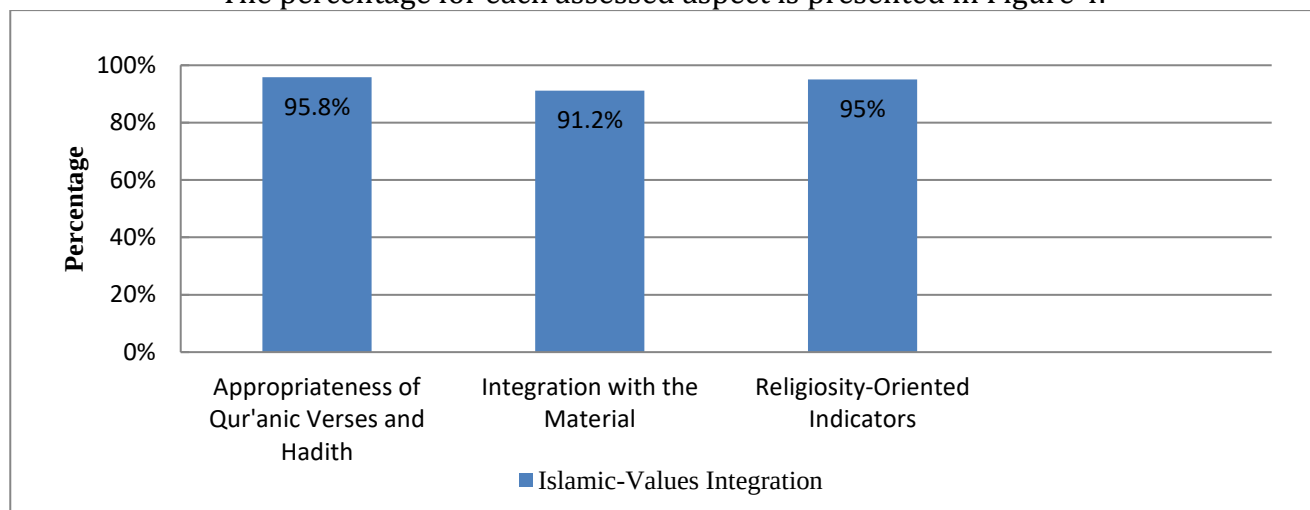
Islamic-Values Integration Expert Review	
Suggestion	Revision Completed
Add the Hadith concerning stages of human creation to the relevant section.	The Hadith was added as a reflective value connection and distinguished from the scientific explanation.
Add Ibn al-Nafis as a Muslim scholar associated with pulmonary circulation.	A short profile of Ibn al-Nafis and his contribution was added.

The overall assessment results from the Islamic-values integration expert are presented in Table 8.

Table 8. Islamic-Values Integration Validation Results

No	Assessment Aspect	Expert Rating	Validation Criteria
1	Appropriateness of Qur'anic Verses and Hadith	95.8%	Very Valid
2	Integration of Qur'anic Verses and Hadith with the Material	91.2%	Very Valid
3	Religiosity-Oriented Product Indicators	95%	Very Valid

The percentage for each assessed aspect is presented in Figure 4.

**Figure 4.** Islamic-Values Integration Validation

The appropriateness of Qur'anic verses and Hadith obtained 95.8%, integration with the material obtained 91.2%, and religiosity-oriented product indicators obtained 95.0%, producing an average of 92.5% in the very valid category. The high scores were given after the expert reviewed the relevance and placement of the sources and recommended specific revisions. These results indicate that the revised religious components were considered appropriate for the intended science-learning context. However, the scores describe the validity of the designed content and reflection activities; they do not demonstrate changes in students' religious attitudes. Such outcomes require implementation data and appropriate measurement in future research.

CONCLUSION

The guided inquiry-based WordPress student worksheet integrated with Islamic values on the circulatory system obtained an overall expert-validity mean of 92.5%, categorized as very valid. The teaching-material, subject-matter, and Islamic-values experts gave scores of 95.0%, 90.0%, and 92.5%, respectively. The results support the content, design, inquiry sequence, technological organization, and Islamic-values components as sufficiently valid to proceed to subsequent evaluation stages after revision. The most important revision concerned the 75.0% score for Islamic-values integration within the subject-matter assessment. The revised product connected religious sources with relevant scientific sections, clarified reflection activities, and maintained a distinction between theological reflection and scientific explanation. High or maximum scores in other aspects were interpreted together with the validators' written comments rather than as evidence of perfect product quality. This study is limited to expert validation with one validator in each domain. It does not provide evidence regarding user practicality, accessibility in actual classroom conditions, student engagement, motivation, religiosity, or learning outcomes. Future studies should involve multiple raters, calculate inter-rater validity, and conduct teacher-student practicality and effectiveness tests with broader samples.

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