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Development Of Case Based Learning Rps And Student Responses To Learning Outcomes In The Physics Education Program

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Abstract: The integration of science and religion presents a challenge in higher education, particularly in courses that link scientific knowledge with the teachings of the Qur'an. The Case Based Learning (CBL) approach is considered effective in enhancing students' understanding and engagement through the analysis of real-life cases. This study aims to develop a Semester Learning Plan (RPS) based on CBL for the course Science in the Qur'an using the 4D development model (Define, Design, Development, Disseminate). The Define phase includes identifying issues, setting learning objectives, and planning the necessary resources. The Development phase focuses on the creation and validation of the RPS, which is reviewed by content and language experts. Subsequently, trials were conducted with small and large groups to assess the practicality and effectiveness of the RPS. The results indicate that the CBL-based RPS is highly practical, with practicality scores of 90.62% for the small group and 92.96% for the large group. Additionally, the RPS proved effective in improving students' learning outcomes, with significant improvements in understanding and analytical skills. This study shows that the CBL-based RPS can enrich learning by integrating science and religious teachings, making a positive contribution to education in the fields of physics and Islamic studies.

Keywords: *Student Responses, Learning Outcomes*

1. Introduction

Science education, particularly within the Physics Education Program, plays a vital role in developing students' critical and analytical thinking abilities. With the rapid advancements in technology and scientific knowledge, the teaching of physics is expected to not only develop students' theoretical understanding but also their ability to apply this knowledge in everyday life. One of the major challenges in physics education is bridging the gap between the abstract concepts taught and the understanding that students can easily grasp. Therefore, there is a need for a more holistic, contextual, and real-world-relevant approach to teaching. According to Hmelo-Silver (2018), problem-based learning (PBL) allows students to become more engaged in the learning process by solving realistic problems, which in turn enhances their understanding and skills.

In the Physics Education Program, the course "Science in the Qur'an" offers an opportunity to bridge modern physics with the teachings of the Qur'an. This approach provides deeper insights into how science and religion can complement each other, enriching students'

understanding of both fields. The course integrates physics concepts with relevant verses from the Qur'an, so that students not only learn physics in the context of science but also in the context of religion, teaching them to see the connections between scientific knowledge and spiritual values. This is in line with Kolb's (2019) perspective, which asserts that learning that connects experience with reflection enriches students' understanding in both scientific and spiritual dimensions.

Along with the evolving education policies in Indonesia, the government is now promoting problem-based learning, or Case Based Learning (CBL), as a teaching method expected to enhance students' engagement and creativity. This is reflected in the "Merdeka Belajar" program, which aims to provide students with more autonomy in designing and solving learning problems, leading to a more comprehensive and applicable knowledge base (Gijbels et al., 2021). Although this policy is specifically regulated by the Directorate General of Vocational Education Regulation No. 27/2022, the implementation of Merdeka Belajar has also influenced non-vocational higher education institutions to adopt the same principles—directing teaching toward more independent, contextual, and problem-based learning.

In this context, Case Based Learning is a highly relevant method, particularly in the course *Science in the Qur'an* within the Physics Education Program. CBL engages students in real-life case studies, enabling them to connect physics concepts with everyday phenomena and the relevant teachings from the Qur'an. In CBL, students are given the opportunity to think critically and develop problem-solving skills by analyzing cases that involve both physics theories and Qur'anic verses, leading to a more holistic and contextual understanding. Savery (2017) explains that CBL encourages students to become more actively involved in the learning process by linking theoretical concepts to real-world applications.

However, the implementation of Case Based Learning will not be optimal without careful planning. In higher education, problem-based learning such as CBL requires a well-designed Semester Learning Plan (RPS). Typically, in conventional teaching, RPS is structured for 14 sessions covering various topics. However, in a CBL-based RPS, the learning process should be divided into two meeting patterns: seven face-to-face sessions that focus on narrowing or combining related topics, and the next seven sessions conducted outside the classroom, such as in laboratories or field settings, using project-based CBL methods that fully involve students in applying what they have learned. This flexible and project-based time allocation allows students to convert the theories they have learned into practical applications relevant to real life and Qur'anic principles. This approach aligns with the findings of Gijbels et al. (2021), which show that case-based approaches can deepen students' understanding by facilitating contextual and applicable learning.

Therefore, it is essential to develop a carefully designed RPS based on Case Based Learning, ensuring that the learning process not only focuses on understanding physics theory but also connects this understanding with religious teachings through more applicable and contextual approaches. This study aims to explore how the development of a Case Based Learning -based RPS in the *Science in the Qur'an* course can improve students' learning outcomes in the Physics Education Program. Additionally, this study will assess student responses to this method to

determine how well they can integrate physics learning with Qur'anic teachings in a more applicable and contextual framework. It is hoped that this approach will help students not only master physics as a science but also understand the application of scientific knowledge in their spiritual lives and daily experiences, as emphasized by Hmelo-Silver (2018), who highlights the importance of learning experiences that connect theory with practice for deeper understanding.

2. Materials and Methods

The type of research conducted in this study is Research and Development (R&D). The development model used in this research is adapted from the 4-D (Four-D) Model. The *define* phase is carried out to gather information about the needs of the users (needs assessment). The *design* phase involves designing the Semester Learning Plan (RPS) for the *Science in the Qur'an* course. The *development* phase is conducted to produce the Case Based Learning (CBL)-based RPS, which is then validated by experts and evaluated based on student responses and learning outcomes. The final stage of the Case Based Learning RPS development is the *disseminate* phase. The product is considered to have reached the final production (development) stage when testing in the development phase results in a product that receives positive evaluations from both lecturers and students. Once the product is proven to be suitable for use, it is ready for wider implementation.

3. Results and Discussion

1. Literature Review

1.1 Case Based Learning (CBL) Semester Learning Plan (RPS) Design

Case Based Learning is a constructivist learning approach where problems are presented in a case-based format. It is often defined as a teaching method that requires students to actively engage in real-world or hypothetical problem situations, which reflect the kinds of experiences naturally encountered in the discipline being studied (Ertmer, 1995). The problems presented in CBL should be directly relevant to students' everyday experiences, ensuring that the connection between CBL learning and its practical application in students' lives is clear.

Case Based Learning offers students the opportunity to analyze content by first introducing core knowledge domains and encouraging them to explore other areas of knowledge that may be relevant to solving the problem presented in the case. A case is defined as a scenario that presents a realistic and relevant problem within the context of the material being studied (Mayer, 2002). The cases in CBL involve problems that relate to the students' environment, conditions, situations, or potential future scenarios. A case is essentially a story with a message, in which students can analyze and consider possible solutions (Ertmer, 1995). CBL engages students in learning through realistic narratives, giving them the chance to integrate multiple sources of information within an authentic context (Yadav, 2011). CBL presents students with a realistic problem scenario, which can be examined retrospectively by analyzing how the case was solved, or interactively, by allowing students to actively try to solve the case (Mayer, 2002).

One of the main benefits of using cases in learning is that it allows students to apply theory to real-world contexts, think critically about complex situations, and decide on the appropriate actions to take. It also helps students develop self-knowledge, compare and evaluate their own

perspectives with those of others (Williams, 2005). CBL helps with the transfer of knowledge, allowing students to apply what they have learned in the classroom to real-world situations (Saleewong, 2012). Moreover, CBL bridges the gap between theory and practice (Flynn, 2001), ensuring that students not only understand the theoretical concepts but can also apply them in specific practical situations. This approach prevents students from simply knowing the theory without being able to apply it, or from carrying out practical tasks without understanding the theory behind them.

Based on these expert views, it can be concluded that CBL is a complex learning approach closely linked to case scenarios that present realistic and relevant problems related to the material being studied. In CBL, students actively participate in integrating multiple sources of information within a given context and attempt to solve the cases based on their prior knowledge and experiences.

Case Based Learning is a learning paradigm that is distinct from Problem-Based Learning (PBL) (Williams, 2005). The difference lies in the fact that PBL does not require prior knowledge or experience related to the material being studied, whereas CBL requires students to have prior knowledge that can assist in solving the case. While both PBL and CBL have similar goals, each has unique characteristics. In PBL, the problem drives the learning process, while in CBL, students are required to use their previous knowledge to resolve the case (Williams, 2005). Additionally, the problems presented in PBL do not have to be case-based or related to the students' personal experiences or environment. Instructors can use various types of problems to help students acquire new knowledge beyond their immediate environment. In contrast, CBL typically begins with identifying problems from the students' environment, and these problems may be issues that students are likely to face in the future (Bridges, 1999).

2. Research Results and Discussion

2.1 Research Findings

The research and development of the Case Based Learning (CBL) syllabus (RPS) used a limited 4D research and development design model. The researcher conducted testing on the CBL-based syllabus developed by experts. The development of the CBL-based syllabus in this study followed the 4D development model (Define, Design, Develop, Disseminate).

2.2 Results of the Define Stage

In the Define stage of the 4-D model for developing the Case Based Learning (CBL) syllabus for the course *Science in the Qur'an*, the process begins by identifying the main issues faced by students, namely the difficulty in relating scientific concepts to the teachings of the Qur'an and a lack of engagement in the learning process. The learning objectives are then formulated, with the general aim being to enhance students' understanding of the integration between science and the teachings of the Qur'an.

The specific objectives include students' ability to explain scientific concepts found in the Qur'an, analyze relevant scientific cases, and actively participate in group discussions. The target students are identified as those with diverse backgrounds in both science and religious knowledge, with varying interests, levels of prior understanding, and learning styles. Success

criteria are established, with at least 75% of students expected to achieve scores above the Minimum Mastery Criteria (KKM) and actively participate in discussions.

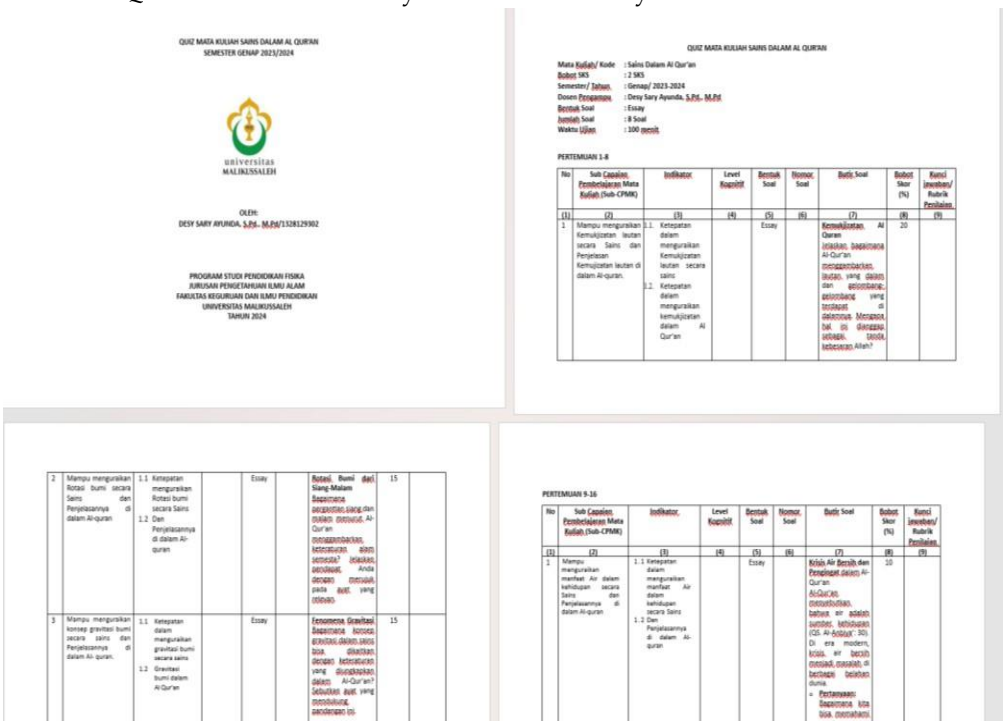
The learning plan is then developed by organizing activities that cover the content related to *Science in the Qur'an*, case selection, and allocating sufficient time for case analysis and group discussions. Finally, a needs analysis is conducted to identify and gather relevant learning resources and determine the training needs for instructors in applying the Case Based Learning method. With these steps, the Define stage provides a solid foundation for the development of a more effective and targeted syllabus.

2.3 *Results of the Design Stage*

In designing the Case-Based Learning (CBL)-based syllabus (RPS) for the *Science in the Quran* course, the design process was conducted by considering students' needs analysis and topic analysis related to science in Quranic verses. The learning approach was designed to encourage active student engagement in case discussions and scientific phenomena related to the Quran, both through face-to-face interactions and independent assignments. The goal of this design is to create a learning experience that is both flexible and effective.

After designing the syllabus, the next step was to develop assessment instruments to comprehensively measure students' learning outcomes. These instruments include:

1. **Quiz Design**: To Evaluate Students' Quick Understanding Of Basic Scientific Concepts In The Quran And Their Ability To Connect Theory With Practice.


QUIZ MATA KULIAH SAINS DALAM AL QUR'AN
SEMESTER GENAP 2023/2024

universitas MALIKUSSALEH

OLEH:
DESY SARY AYUNDA, S.Pd., M.Pd/1328129302

PROGRAM STUDI PENDIDIKAN FISIKA
JURUSAN PENGETAHUAN ILMU ALAM
FAKULTAS KEGURUAN DAN ILMU PENDIDIKAN
UNIVERSITAS MALIKUSSALEH
TAHUN 2024

QUIZ MATA KULIAH SAINS DALAM AL QUR'AN

Mata Kuliah/ Kode : Sains Dalam Al Qur'an
Bobot SKS : 2 SKS
Semester/ Tahun : Genap/ 2023-2024
Dosen Pengampu : Desy Sary Ayunda, S.Pd., M.Pd
Bentuk Soal : Essay
Jumlah Soal : 8 Soal
Waktu Ujian : 100 menit

PERTEMUAN 1-8

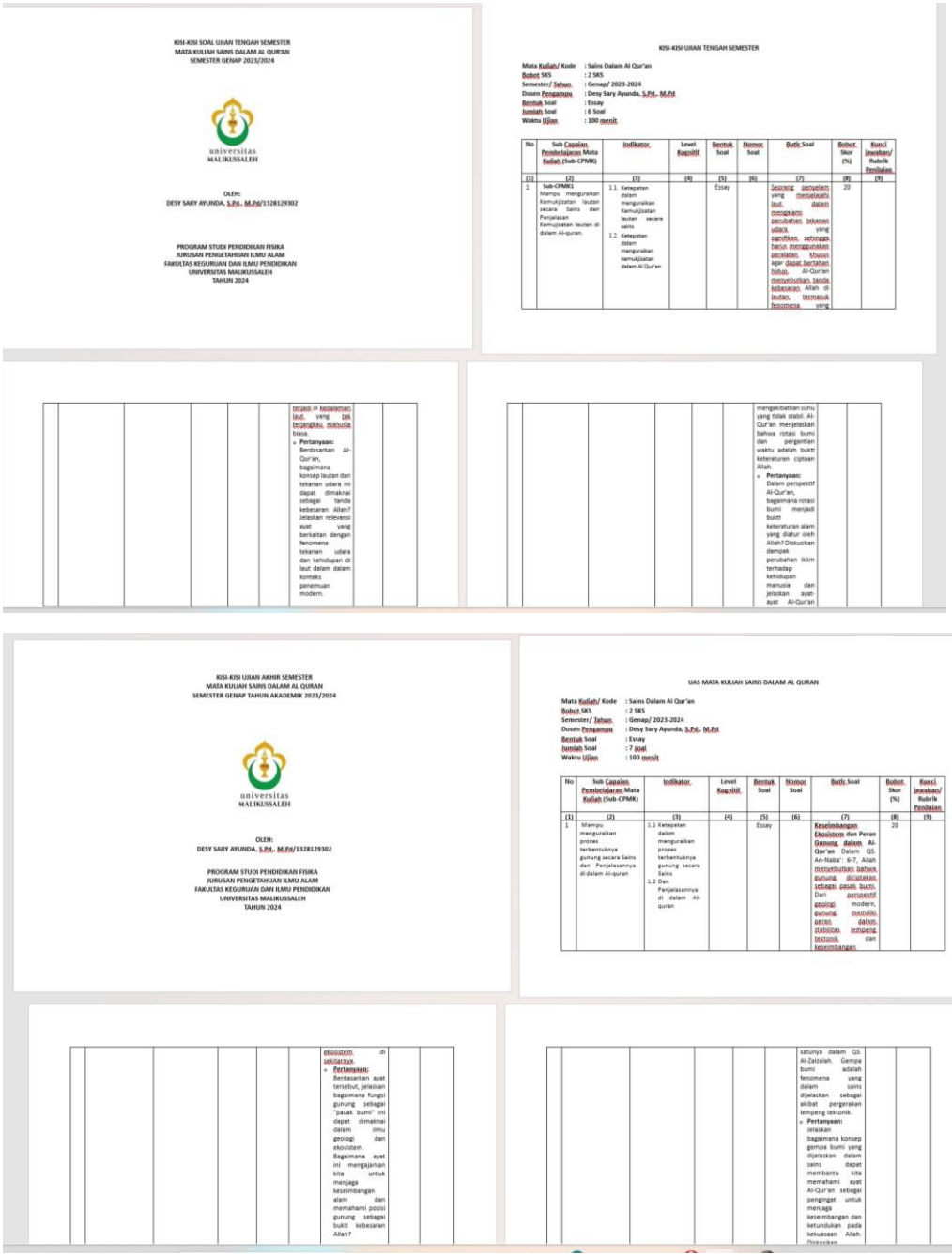
No	Sub Capaian Pembelajaran Mata Kuliah (Sub-CPMK)	Indikator	Level Kognitif	Bentuk Soal	Nomor Soal	Butir Soal	Bobot Skor (%)	Kunci jawaban/ Rubrik Penilaian
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	Mampu menguraikan Kemukjizatan lautan secara Sains dan Penjelasan Kemujizatan lautan di dalam Al-quran.	1.1 Ketepatan dalam menguraikan Kemukjizatan lautan secara sains 1.2 Ketepatan dalam menguraikan kemukjizatan dalam Al Qur'an		Essay		Kemukjizatan Al Quran Jelaskan, bagaimana Al-Qur'an menggambarkan, lautan, yang dalam dan gelombang-gelombang yang tersingkap di dalamnya. Mengapa hal ini dianggap sebagai tanda kebesaran Allah?	20	

2	Mampu menguraikan Rotasi bumi secara Sains dan Penjelasannya di dalam Al-quran	1.1 Ketepatan menguraikan Rotasi bumi secara Sains 1.2 Dan Penjelasannya di dalam Al-quran		Essay		Rotasi Bumi dan Siang-Malam Bagaimana perspektif siang dan malam menurut Al-Qur'an menggambarkan, ketergantungan siang semata? Jelaskan pendapat Anda dengan merujuk pada ayat yang relevan.	15	
3	Mampu menguraikan konsep gravitasi bumi secara sains dan Penjelasannya di dalam Al-quran.	1.1 Ketepatan dalam menguraikan gravitasi bumi secara sains 1.2 Gravitasi bumi dalam Al Qur'an		Essay		Fenomena Gravitasi Bagaimana konsep gravitasi dalam sains bisa dikaitkan dengan ketercakupan yang diungkapkan dalam Al-Qur'an? Sebutkan ayat yang mendukung pandangan ini.	15	

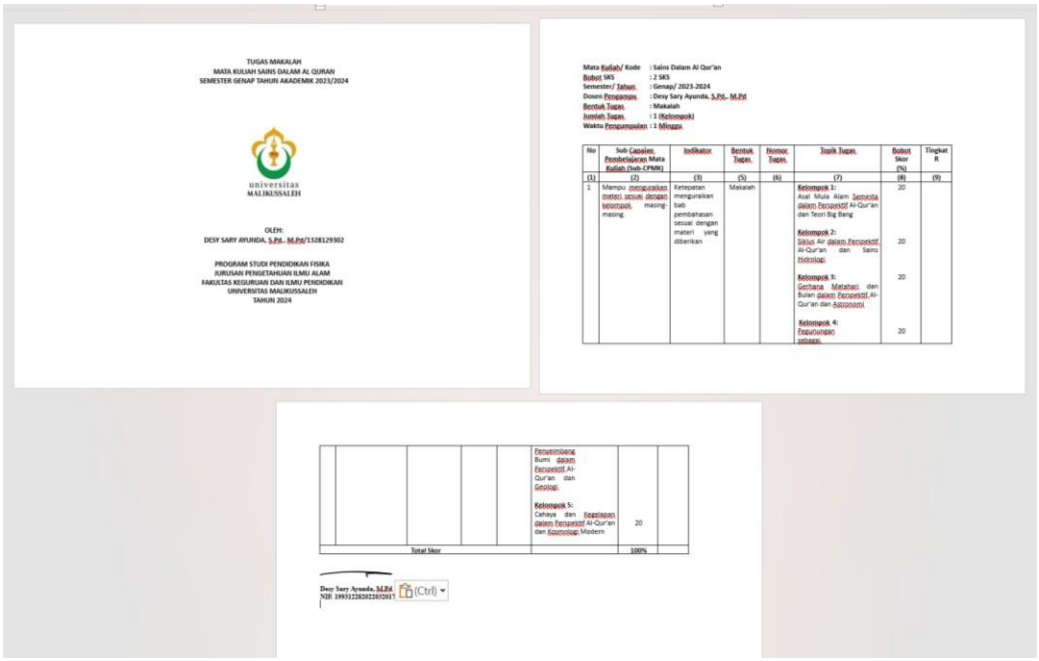
PERTEMUAN 9-16

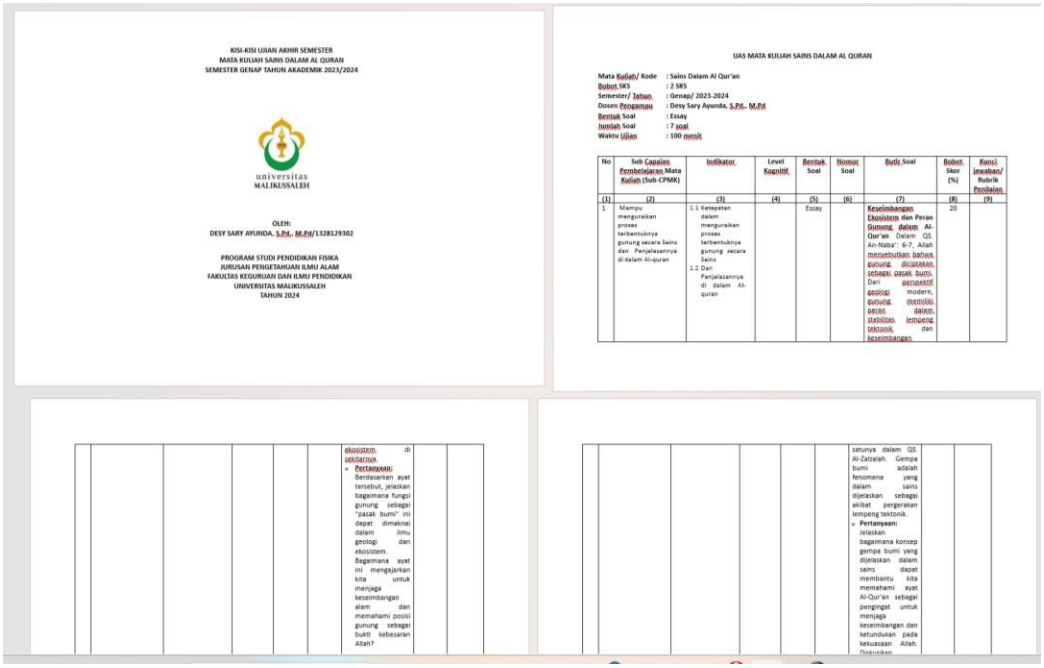
No	Sub Capaian Pembelajaran Mata Kuliah (Sub-CPMK)	Indikator	Level Kognitif	Bentuk Soal	Nomor Soal	Butir Soal	Bobot Skor (%)	Kunci jawaban/ Rubrik Penilaian
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	Mampu menguraikan manfaat Air dalam kehidupan secara Sains dan Penjelasannya di dalam Al-quran	1.1 Ketepatan dalam menguraikan manfaat Air dalam kehidupan secara Sains 1.2 Dan Penjelasannya di dalam Al-quran		Essay		Kriteria Air Bersih dan Pengaruh dalam Al-Qur'an Al-Qur'an menyebutkan bahwa air adalah sumber kehidupan (QS. Al-Anbiya' 30). Di era modern, kriteria air bersih menjadi masalah di berbagai belahan dunia. • Pertanyaan: Bagaimana kita bisa memahami	10	

2. Mid-Term and Final Exam Blueprint: Developing essay-based questions to assess students' understanding of the material, analytical skills, and critical thinking abilities.



3. Paper Assignments: Designed to develop students' research and academic writing skills, focusing on the analysis of scientific phenomena from the perspective of the Quran.





4. Student Assignments Based on Project-Based Learning (PjBL) and Case-Based Learning (CBL): Students work in groups on major projects involving the application of scientific concepts in the context of the Quran (PjBL) and analyze and discuss scientific cases relevant to Quranic verses (CBL).

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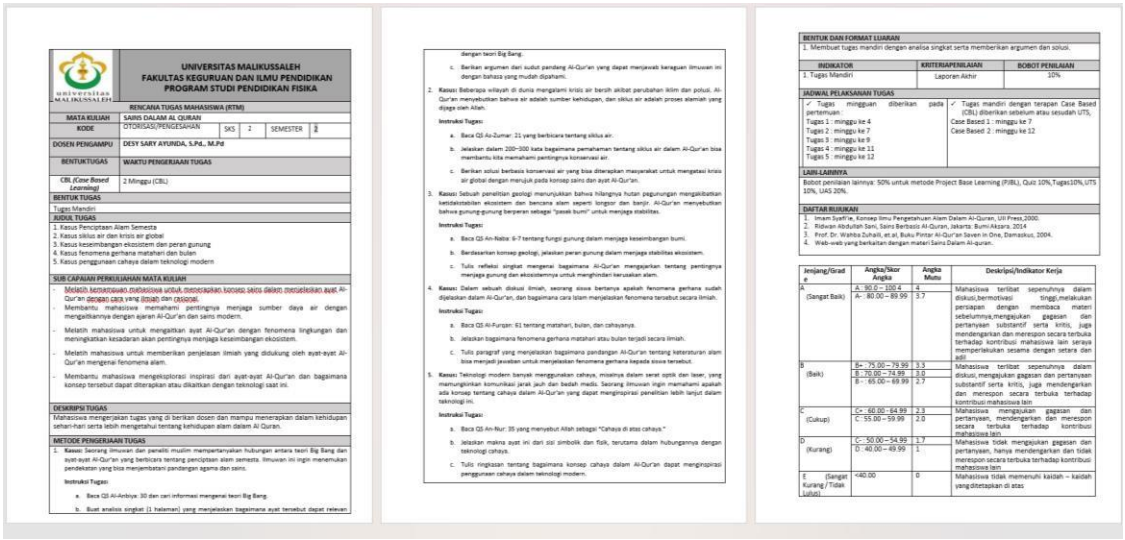

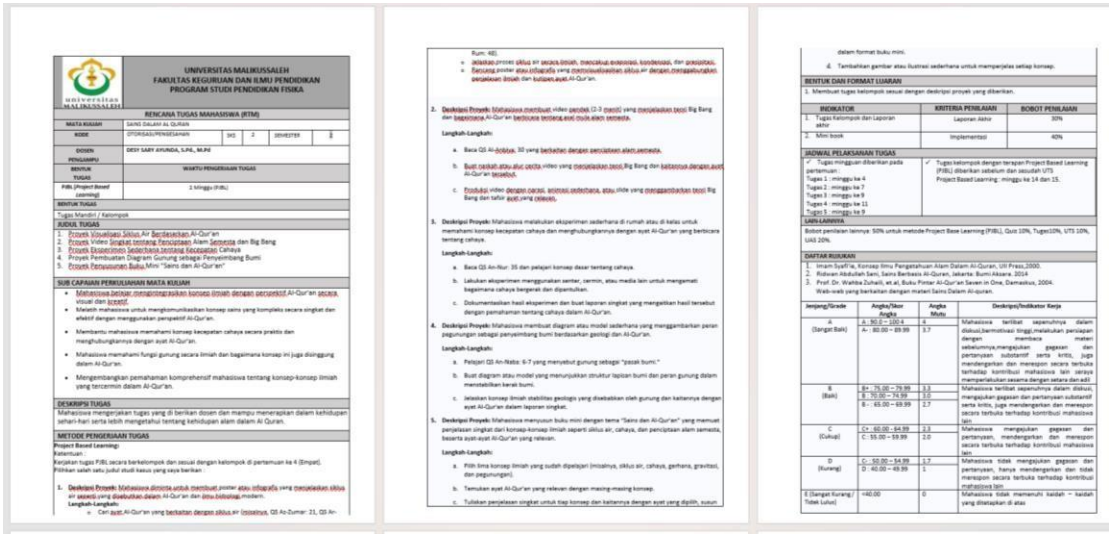

Student Assignments Based on Project-Based Learning (PjBL) and Case-Based Learning (CBL): Students work in groups on major projects involving the application of scientific concepts in the context of the Quran (PjBL) and analyze and discuss scientific cases relevant to Quranic verses (CBL).

2.4 Results of the Development Stage

The goal of the Development stage is to create a valid and feasible Case Based Learning (CBL) syllabus (RPS) that can be used effectively in the learning process. The first step in this stage was to identify real-world cases relevant to the course content. The second step involved

the researcher designing the structure of the RPS for the *Science in the Qur'an* course based on Case Based Learning.

The developed RPS was then validated through a validation questionnaire filled out by three expert validators in the fields of content and language. The RPS was evaluated across three aspects: content validity, construct validity, and language validity. Each aspect was assessed by the three validators. In addition, practicality testing was conducted with input from both lecturers and students. The results of the content and language expert validation are presented in the table below.

Table 4.1 Validation Results of the Case Based Learning (CBL) Syllabus (Content Experts)

Validator Name	Percentage (%)	Validation Criteria
NF	97,4	Valid
MM	89,5	Valid

Tabel 4.2 Hasil Validasi RPS berbasis *Case Based Learning* (Ahli bahasa)

Validator Name	Percentage (%)	Validation Criteria
NF	97,4	Valid
MM	89,5	Valid

Based on Table 4.1, it can be seen that the average percentage score from the four validators falls within the valid criteria. During the validation process, the validators provided feedback on the Case Based Learning (CBL) syllabus. This feedback was highly valuable for the researcher to further refine the CBL syllabus to ensure its validity. The suggestions from the validators will be revised as part of the formative evaluation. The suggestions provided by the validators can be seen in Table 4.4.

Table 4.2 Suggestions from Validators for Improvement of the Case Based Learning (CBL) Syllabus

Improvement Suggestion	After Revision
Develop a rubric to assess case analysis and student participation in discussions.	Develop a clear rubric for both individual and group assessments, covering case analysis and presentations.
Prepare guiding questions that encourage students to explore the relationship between science and religious teachings.	Provide guiding questions that encourage in-depth exploration and discussion of the integration of science and religion.
Provide a variety of resources, such as tafsir, scientific articles, and documentary videos on science in the Qur'an.	Present a diverse range of learning resources, including tafsir, articles, and documentaries, to enrich discussions.

2.4.1 Results of the Product Trial in a Small Group

After expert validation, the next step in the development stage was a limited field trial to assess the practicality of the developed Case Based Learning (CBL) syllabus. This limited trial

was conducted with ten students who had previously completed the course. The results of the practicality test with these students can be seen in Table 4.3.

Table 4.3 Results of the Practicality Analysis of the Student Response Questionnaire for Students Who Have Completed the Science in the Qur'an Course

No.	Practicality Test Question for the Course Syllabus (RPS)	Max Score	Score	Remarks
1	Does the RPS include clear and measurable learning objectives?	4	4	Very Practical
2	How does the RPS support the development of students' analytical skills?	4	4	Very Practical
3	Are the cases used relevant to the material and the students' context?	4	3	Practical
4	How effective is the learning strategy applied in the RPS in facilitating discussion?	4	4	Very Practical
5	Is there a balance between theory and practice in the planned learning?	4	3	Practical
6	How does the RPS integrate student feedback during the learning process?	4	4	Very Practical
7	How good is the assessment rubric developed to evaluate students' case analysis?	4	3	Practical
8	Are the prepared guiding questions able to encourage in-depth discussion?	4	4	Very Practical
9	How does the RPS facilitate cooperation and collaboration among students?	4	4	Very Practical
10	To what extent does the RPS create an inclusive and supportive learning environment?	4	3	Practical
11	Is there a clear evaluation method to measure students' learning outcomes?	4	4	Very Practical
12	How does the RPS address challenges or obstacles that may arise during learning?	4	3	Practical
13	Are the teaching materials and learning resources relevant and up-to-date?	4	4	Very Practical
14	How well does the RPS prepare students to link science with religious teachings?	4	4	Very Practical
15	Is there room for adjustments to the RPS based on student feedback?	4	3	Practical
16	How could the RPS be improved to enhance the effectiveness of future learning?	4	4	Very Practical
	Total	**64**	**58**	**Very Practical**

Based on the table of practicality survey results conducted by the small group, the practicality test for the Case Based Learning (CBL) syllabus can be calculated using the following formula:

$$\text{The result} = \frac{total\ skor\ yang\ diperoleh}{skor\ maksimum} \times 100\%$$

The result = $\frac{58}{64}$ x 100%
= 90, 62 %

Table 4.3 shows that the average response of students who have completed the Science in the Qur'an course regarding the use of the Case Based Learning (CBL) syllabus is 90.62%, categorized as very practical.

Additionally, the researcher conducted interviews with students who had completed the course to provide further insights into the practicality of using the Case Based Learning (CBL) syllabus. The conclusions drawn from the responses of the students regarding the use of this CBL-based syllabus in their learning process include the following: They felt more engaged in the learning process as they were encouraged to discuss real-life cases relevant to daily life, making the material taught feel more meaningful. Many students expressed that the syllabus helped them develop analytical skills, especially when analyzing various perspectives during group discussions. They appreciated the opportunity to collaborate with peers, which allowed them to learn from each other and share ideas.

The guiding questions prepared by the lecturer were deemed very helpful in deepening their understanding and fostering richer discussions. Furthermore, students valued the opportunity to provide feedback on the material, allowing the lecturer to adjust the syllabus in the future. The inclusive and supportive learning environment made students feel comfortable asking questions and contributing to discussions. Students also felt there was a good balance between theory and practice, which solidified their understanding. The clear assessment rubric helped them understand what was expected in case analyses. Overall, this syllabus encouraged students to continue learning and seek additional information outside the classroom, demonstrating that this approach is effective in enhancing their understanding and participation.

2.4.2 Results of Product Trial in Large Groups

The implementation stage of the Case Based Learning (CBL) syllabus was carried out through a trial in several larger classes. The goal of this trial was to assess both the practicality and effectiveness of the developed syllabus. The practicality of the syllabus was observed through student responses after participating in lessons using the CBL approach, particularly in terms of their engagement and motivation during discussions and case analyses. Meanwhile, the effectiveness of the syllabus was evaluated based on student learning outcomes, which included assessments of their understanding of concepts and critical thinking abilities after engaging in Case Based Learning. In this way, feedback from students and the results of evaluations served as the foundation for refining and further developing the existing syllabus.

1. Product Practicality Test

The trial of the Case Based Learning (CBL) syllabus was conducted with students from the Physics Education Program at Malikussaleh University, consisting of 25 students. The purpose of this trial was to assess the practicality and effectiveness of the syllabus in enhancing students' understanding of concepts and analytical skills. Data were collected through practicality questionnaires and evaluations of learning outcomes after the implementation of the syllabus.

The results of this trial are expected to provide insights for further improvement and development of the applied syllabus.

Table 4.4 Recap of the Practicality Test Results for Physics Education Students

No.	Practicality Test Question for the Syllabus	Max Score	Score	Remarks
1	Does the syllabus include clear and measurable learning objectives?	4	4	Very Practical
2	How does the syllabus support the development of students' analytical skills?	4	4	Very Practical
3	Are the cases used relevant to the material and the students' context?	4	3.5	Practical
4	How effective is the learning strategy applied in the syllabus for facilitating discussion?	4	4	Very Practical
5	Is there a balance between theory and practice in the planned learning?	4	3	Practical
6	How does the syllabus integrate student feedback during the learning process?	4	4	Very Practical
7	How well is the assessment rubric developed to evaluate students' case analysis?	4	3.5	Practical
8	Are the prepared guiding questions able to encourage in-depth discussion?	4	4	Very Practical
9	How does the syllabus facilitate cooperation and collaboration among students?	4	4	Very Practical
10	To what extent does the syllabus create an inclusive and supportive learning environment?	4	3	Practical
11	Is there a clear evaluation method to measure students' learning outcomes?	4	4	Very Practical
12	How does the syllabus address challenges or obstacles that may arise during the learning process?	4	3	Practical
13	Are the teaching materials and learning resources relevant and up-to-date?	4	4	Very Practical
14	How well does the syllabus prepare students to link science with religious teachings?	4	4	Very Practical
15	Is there room for adjustments to the syllabus based on student feedback?	4	3.5	Practical
16	How could the syllabus be improved to enhance future learning effectiveness?	4	4	Very Practical
	The Total	**64**	**59,5**	

Based on the table of practicality survey results conducted with 25 students, the practicality test for the Case Based Learning (CBL) syllabus can be calculated using the following formula:

$$\text{The result} = \frac{total\ skor\ yang\ diperoleh}{skor\ maksimum} \times 100\%$$

$$\text{The result} = \frac{59,5}{64} \times 100\%$$

$$= 92,96\ \%$$

Based on the table above, the results of the practicality test for the Case Based Learning (CBL) syllabus show that students provided positive feedback, with a total score of 92.96%, rating the syllabus as very practical for learning. Most of the aspects evaluated received high scores, with several questions achieving a score of 4, indicating that the syllabus is highly practical. Students felt that the learning objectives were clear and measurable, and the strategies applied successfully facilitated in-depth discussions. Overall, the syllabus provides a strong foundation for learning, with integration of feedback, relevant teaching materials, and the ability to link science with religious teachings, making it a valuable tool in an educational context.

Additionally, the researcher has also collected valuable data regarding the responses of physics education lecturers through a distributed questionnaire. This data was systematically organized and presented in the following table, which facilitates the analysis and understanding of the perceptions and opinions of the lecturers regarding various aspects of the development of the Case Based Learning (CBL) syllabus.

Table 4.5 Recap of the Practicality Test Results for Physics Education Lecturers

No.	Practicality Test Question for the Syllabus	Max Score	Score	Remarks
1	Does the syllabus include clear and measurable learning objectives?	4	3.5	Practical
2	How does the syllabus support the development of students' analytical skills?	4	4	Very Practical
3	Are the cases used relevant to the material and the students' context?	4	4	Very Practical
4	How effective is the learning strategy applied in the syllabus for facilitating discussion?	4	3	Practical
5	Is there a balance between theory and practice in the planned learning?	4	4	Very Practical
6	How does the syllabus integrate student feedback during the learning process?	4	3.5	Practical

7	How well is the assessment rubric developed to evaluate students' case analysis?	4	4	Very Practical
8	Are the prepared guiding questions able to encourage in-depth discussion?	4	3	Practical
9	How does the syllabus facilitate cooperation and collaboration among students?	4	4	Very Practical
10	To what extent does the syllabus create an inclusive and supportive learning environment?	4	3.5	Practical
11	Is there a clear evaluation method to measure students' learning outcomes?	4	4	Very Practical
12	How does the syllabus address challenges or obstacles that may arise during the learning process?	4	3	Practical
13	Are the teaching materials and learning resources relevant and up-to-date?	4	4	Very Practical
14	How well does the syllabus prepare students to link science with religious teachings?	4	3.5	Practical
15	Is there room for adjustments to the syllabus based on student feedback?	4	4	Very Practical
16	How could the syllabus be improved to enhance future learning effectiveness?	4	3	Practical
	Total	64	58	

Based on the table of practicality survey results conducted with 25 students, the practicality test for the Case Based Learning (CBL) syllabus can be calculated using the following formula:

$$\text{The result} = \frac{total\ skor\ yang\ diperoleh}{skor\ maksimum} \times 100\%$$

$$\text{The result} = \frac{58}{64} \times 100\%$$

$$= 90{,}62\ \%$$

The results of the practicality test for the Case Based Learning (CBL) syllabus show an overall positive assessment, with a total score of 90.62%, ranging between 3, 3.5, and 4. Several aspects, such as learning objectives and support for analytical skills, received high scores, indicating that the syllabus provides good clarity and relevance for instructors. The cases used were generally considered relevant, and the learning strategies and assessment rubrics were also

rated as very practical, effectively supporting discussion and collaboration among students. Overall, the syllabus has strong potential to enhance the student learning experience.

This Case Based Learning syllabus is deemed suitable for use in the Physics Education program because it provides clear learning objectives, supports the development of students' analytical skills, and integrates scientific concepts with religious teachings, making it highly relevant for the educational context in this field.

2. Product Effectiveness Test

The effectiveness of the Case Based Learning (CBL) syllabus can be assessed through the evaluation results and the students' achievement in learning the material on science in the Qur'an. This evaluation aims to measure the level of success in students' understanding and application of the concepts taught through the CBL approach. By analyzing the learning outcomes, the researcher can evaluate how effective this method is in enhancing students' understanding of the integration between science and the teachings of the Qur'an. The evaluation results will provide a clear picture of the impact of implementing the CBL-based syllabus on the teaching and learning process, as well as on students' academic achievements.

The table below shows the results of the evaluation of students' learning completeness after participating in lessons with the CBL-based syllabus, which includes mastery of the material, active participation in discussions, and the ability to analyze cases related to science in the Qur'an.

Table 4.6 Recap of Effectiveness Test Results for Class A1 Students

No	Student Name	Exam Score	Letter Grade	Remarks
1	Student 1	80	A-	Effective
2	Student 2	85	A-	Effective
3	Student 3	75	B+	Effective
4	Student 4	85	A	Effective
5	Student 5	90	A	Effective
6	Student 6	75	B+	Effective
7	Student 7	85	A	Effective
8	Student 8	80	B+	Effective
9	Student 9	80	A-	Effective
10	Student 10	75	B+	Effective
11	Student 11	80	B+	Effective
12	Student 12	85	A-	Effective
13	Student 13	80	A-	Effective
14	Student 14	90	A	Effective
15	Student 15	90	A	Effective
16	Student 16	75	B+	Effective
17	Student 17	85	A-	Effective
18	Student 18	80	A-	Effective
19	Student 19	80	B+	Effective
20	Student 20	80	A-	Effective
21	Student 21	75	B+	Effective
22	Student 22	90	A	Effective

23	Student 23	80	A-	Effective
24	Student 24	85	A-	Effective
25	Student 25	90	A	Effective

The evaluation of the effectiveness of the Case Based Learning (CBL) syllabus shows a significant improvement in students' learning mastery of science material in the Qur'an. By using this CBL-based syllabus, students are not only encouraged to understand scientific concepts but also to deeply connect them with the teachings of the Qur'an. The evaluation aimed to assess students' understanding, active participation in discussions, and their ability to analyze the cases provided. The data indicates that all students achieved good to excellent scores (A, A-, and B+). This demonstrates that the CBL-based syllabus is effective in enhancing students' understanding and analytical skills. Furthermore, the evaluation results also provide valuable feedback for the instructors to refine and improve the syllabus, making the learning experience more relevant and engaging for students in the future.

3. Disseminate Stage

In this stage, the research team disseminates and introduces the Case Based Learning (CBL) syllabus to both lecturers and students.

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