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Design of a Problem Based Ubiquitous Learning Model to Improve Thinking Abilities Student Critical

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Abstract: Education plays a crucial role in honing students' critical thinking skills. To achieve this goal, a study developed and tested the validity of the Problem-Based Ubiquitous Learning (PBU-L) model. This model combines Problem-Based Learning (PBL) and Ubiquitous Learning (U-Learning), enabling students to learn collaboratively anywhere and anytime. This study employed a research and development (R&D) method with the ADDIE model, but focused solely on the design and validation stages. The subjects were 20 elementary school teacher education (PGSD) students at Syiah Kuala University. Data were collected through model validation sheets and learning tools assessed by six experts. Validity testing using the Aiken's V method showed that the PBU-L model and Semester Learning Plan (RPS) had high validity, with an average coefficient of 0.89. These results demonstrate that the PBU-L model is feasible for implementation. Overall, this model is designed to support active, collaborative, and contextual learning, highly relevant for enhancing critical thinking skills in the digital age.

Keywords: Critical thinking; Learning Model; Problem Based Ubiquitous

Introduction

Education plays a vital role in shaping the future of individuals and the progress of a nation. To ensure the holistic development of critical thinking in students throughout their studies, the development of innovative learning models is essential (Serdyukov, 2017).

One model that has gained increasing attention in recent years is the Problem-Based Learning (PBL) model, known for its ability to train critical thinking skills through a real-world, collaborative, and independent problem-based approach. However, this model is more optimal when combined with the Ubiquitous Learning (U-Learning) approach, which allows students to learn anytime and anywhere through digital devices (Siswanti & Indrajit, 2023). This combination gives birth to the Problem-Based Ubiquitous Learning (PBU-L) model. This approach offers unique opportunities for students to build conceptual understanding, problem-solving skills, and collaboration skills through real-life experiences (Jaenudin et al., 2020). PBU-L is particularly suitable for elementary education students, where students can create a flexible, collaborative, and contextual learning environment.

The relevance of PBL is supported by expert theories. Piaget's (1952) constructivist theory suggests that learning is not simply receiving information, but rather an active process of discovery undertaken by students (Semmar & Al-Thani, 2015). PBL facilitates this by providing hands-on and collaborative learning experiences.

Furthermore, Vygotsky's perspective contributes significantly. His social learning theory (1978) emphasizes that collaboration is a fundamental aspect of PBL in elementary education. Thus, the ideas of these two figures complement and support the implementation of PBL, making it highly relevant for fostering students' cognitive and social development at a crucial stage in elementary education (Chen & Which, 2019).

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Although Problem-Based Learning (PBL) has proven effective in education, its implementation presents its own challenges. Today's students, familiar with technology, exhibit characteristics of self-directed learners, possessing independence, and tending to determine their own learning materials and methods (Iftode, 2020). Although they are often referred to as digital natives (Lewis, 2018), many students at this level lack essential skills such as critical thinking and problem-solving, primarily due to a lack of appropriate guidance (Järvelä et al., 2018).

One crucial aspect of designing a PBL model is its integration with technology (Chayomchai, 2020). The rapid advancement of information and communication technology has transformed the educational landscape **(Alam, 2020)**, making it crucial to incorporate the concept of "ubiquitous learning" (U-Learning) into learning design.

U-Learning allows students to access educational resources anytime and anywhere. By utilizing technology and online materials, students can transcend the physical boundaries of the classroom to experience personalized, independent, and collaborative learning (Martin et al., 2013). Furthermore, U-Learning supports real-time communication, customizable learning environments, and access to a variety of multimedia resources. This not only enriches students' understanding through exploration and interaction but also encourages them to take responsibility for their learning, in line with the demands of 21st-century education.

This research aims to develop a Ubiquitous Project-Based Learning (U-PjBL) model specifically designed for elementary school students. This model integrates technology and student developmental characteristics to enhance critical thinking skills and create a supportive, student-centered learning environment.

The U-PjBL model was developed with reference to several theories, namely socio-constructivist learning theory, Computer-Supported Collaborative Learning (CSCL) , and information processing theory . These theories highlight the importance of social interaction and collaboration, which are also the basic principles in the PBU-L model. With this theoretical foundation, this model is expected to meet the learning needs of elementary school teacher education students while improving their critical thinking skills.

U-Learning is a learning approach that utilizes information and communication technology (ICT) to create a learning environment without physical limitations. U-Learning is a computing paradigm that allows students to access relevant learning content anywhere and anytime, in a manner that suits them best (Pizarro, 2021). Through this approach, students can learn and develop skills by utilizing a variety of learning resources accessible through various devices. These learning resources are designed to create learning environments and facilitate continuous student progress (Suartama et al., 2021).

The main characteristics of U-Learning, according to Ogata & Yano (2004), include: Permanence: All student work and learning processes are recorded permanently and continuously, unless intentionally deleted. Accessibility: Learning is self-paced, where students can access all data, videos, and documents according to their needs. Immediacy: Students can obtain information quickly at any location, enabling them to find instant solutions to problems they face. Interactivity: Students can interact synchronously or asynchronously with teachers and peers. Learning activity situation: The problems presented in learning are sourced from real life, so that knowledge can become a natural part of students' lives.

U-Learning environments have four essential criteria: context awareness, interactivity, personalization, and flexibility (Virtanen et al., 2018). Context awareness refers to the ability of a system or application to recognize and respond to environmental situations. Interactivity is the degree to which users engage and participate, creating a two-way learning experience. Personalization is a strategy that adapts learning content to individual preferences or needs. Finally, flexibility provides students with the opportunity to learn according to their schedule, goals, or educational needs.

Problem-Based Learning (PBL) is a collaborative, inquiry-based teaching model. Through this approach, students integrate, apply, and construct knowledge as they work together to find solutions to complex problems (Guo et al., 2020). PBL has several advantages, including encouraging inquiry, focusing on learning objectives, encouraging participation and collaboration, utilizing technology, and most importantly, distinguishing it from other models by creating tangible artifacts that solve authentic problems (Krajcik & Shin, 2014).

The primary benefit of PBL is that it provides students with the opportunity to immerse themselves in the scientific world (Larkin, 2016). Students engage in scientific practices, such as asking fundamental questions, constructing, and applying knowledge to find solutions. These practices have been shown to increase student engagement (Lavonen et al., 2017) and help them understand the connection between scientific practices and the real world (Hasni et al., 2016). Problems occurred based on the findings in the field that the availability of time and space was limited during the learning process (Triwahyuni & Pradana, 2025).

PBL integrates four key ideas: optimizing learning effectiveness, encouraging students to actively construct understanding, fostering collaboration in authentic environments, and utilizing cognitive tools (Krajcik & Shin, 2014; Terrón-López et al., 2015). Compared to traditional teaching, PBL has demonstrated better academic outcomes (Chen & Which, 2019), improved critical thinking skills (Sasson et al., 2018), and contributed to the development of students' intrapersonal and interpersonal competencies (Kaldi et al., 2011).

PBL implementation can be carried out through several approaches, such as structured, top-down, and bottom-up (Jeon et al., 2014). The structured approach divides learning into several modules with clear tasks, so students can achieve predetermined goals effectively. The steps in structured PBL include:

Student Orientation to the Problem: Present a real and relevant problem and then explain the learning objectives. This stage motivates students to actively participate in the problem-solving process. Organizing Students: Students form groups and organize tasks related to the given problem. Guiding Investigations: Students are encouraged to seek and gather necessary information, both individually and in groups. Developing and Presenting Results: After finding a solution, students plan and compile a report or product as the result of their investigation. They then present it, for example through a presentation, to the class. Analyzing and Evaluating the Problem-Solving Process: Students reflect on the entire learning process. At this stage, students analyze what they have learned and evaluate the effectiveness of the solutions they developed.

Critical thinking is an essential skill every individual needs to solve problems and make rational decisions in life (Poce et al., 2019). This skill is often equated with higher-order thinking, as it requires one to avoid passively accepting all information. Instead, information must be thoroughly evaluated before being considered valid (Nugraha et al., 2017).

According to Apriandi et al. (2023); Rachmadtullah (2015), critical thinking is an evaluative process that involves analyzing the gap between reality and truth, formulating solution steps, and applying them in daily life in accordance with applicable norms.

Critical thinking skills can be developed through problem-based learning, which challenges students to apply various skills, such as analyzing, arguing, classifying, proving, and drawing conclusions. These skills also include identifying information sources, utilizing prior knowledge, connecting ideas, and drawing conclusions.

Method

This research uses a research and development (R&D) approach. R&D is a systematic method aimed at developing and testing the validity of a product (Creswell & Creswell, 2018). In other words, this research not only produces a product but also tests its effectiveness. The process includes design validation by experts and trials to assess the feasibility of the revised product.

The main objective of this research is to develop a Project-Based Ubiquitous Learning (PBUL) learning model to improve students' critical thinking skills. To achieve this objective, the research procedure used is the ADDIE development model popularized by Dick and Carry in 1996. The ADDIE model is considered more rational and comprehensive because it involves five structured development stages, namely Analysis, Design, Development, Implementation, and Evaluation.

The activities at each stage of ADDIE model development are as follows: Analysis: This stage focuses on identifying problems and needs; Design: This design stage includes developing the model framework, learning objectives, and evaluation strategies. In the design aspect, testing this model requires a number of other tools, such as lesson plans, materials, student worksheets, evaluations, and an LMS; Development: At this stage, the product (PBUL model) begins to be developed and validated by experts; Implementation: The validated model is tested in a real learning context; and Evaluation: This final stage aims to evaluate the effectiveness and feasibility of the model that has been implemented.

This model was chosen because its stages are easy to understand and highly suitable for developing the learning model to be created. This research limits its scope to the model design stage, with the output being a learning model that has been validated by a validator. Although it does not reach field implementation, this validation ensures that the developed model has a strong theoretical foundation and is worthy of being used as a basis for further research that will test its effectiveness in practice. The following is a diagram of the stages of the ADDIE model as shown in Figure 1.

Participants

The trial subjects in this research on the development of the PBU-L model in Islamic Religious Education learning were 20 students of the Elementary School Teacher Education study program at Syiah Kuala University who were taking the Islamic Religious Education course.

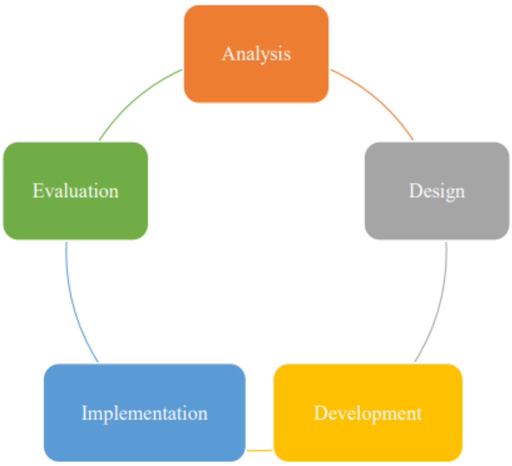

Figure 1. Stages of the ADDIE Model

Data Collection and Analysis

The developed product model underwent validation testing to validate the learning model. The model validation instrument refers to the characteristics of the learning model, including aspects of supporting theory, syntax, social systems, reaction principles, and support systems, as well as instructional and accompanying impacts (Joyce & Weil, 2023). This research focused on testing the validity of the PBU-L learning model and its practicality. To measure the validity of the learning device, this study used an instrument in the form of a learning device validation sheet. The purpose of this validation sheet was to assess the validity of the developed learning device.

Validity Test

The validation instrument for the PBU-L model consisted of a validity and practicality sheet using a critical thinking skills test developed by Saenab et al. (2021). Six learning experts were involved as validators, and validation was conducted on the PBU-L model. Scores were then calculated using an average formula and compared against the validation assessment criteria.

Result and Discussion

Result

The validity of the PBU-Learning learning model was analyzed through a validity test involving learning technology experts. The assessment was based on the construct, content, and usefulness of the model in improving students' critical thinking skills. The construct aspect assessed the model's suitability to the principles of problem-based learning and ubiquitous learning technology, while the content aspect examined the relevance of the material and learning stages to the learning outcomes of the Islamic Religious Education (PAI) course. The usefulness of the model was analyzed in terms of flexibility of use, effectiveness in increasing student engagement, and its suitability to technological developments in higher education. The validation results from the experts were analyzed using the Aiken index method to determine whether the model met the validity criteria or still needed improvement before wider implementation.

The results of Aiken's content validity test for the development of the PBU-L learning model indicate that the instrument has high validity. In the RPS Component aspect, Aiken's coefficient of 0.90 reflects that all important elements in the RPS such as course identity, learning outcomes, learning strategies, and assessment methods have been compiled completely and systematically. The statement "The contents of the RPS reflect the CPL targets imposed on the course" obtained a V value of 0.78, which indicates high validity and is considered quite representative by the validators.

Based on the PBU-L Model development process which includes literature study, needs analysis, model design, expert validation, and initial trials. The literature study was used to understand the concept of Problem-Based Ubiquitous Learning (PBU Learning) and its relevance in improving students' critical thinking skills (Wadtan et al., 2024) in Islamic Religious Education (PAI) courses. The needs analysis was conducted by identifying challenges in PAI learning, both from the perspective of lecturers and students, so that the developed model can address these needs. After the model was designed, validation was carried out by experts to ensure that the learning syntax, problem-based approach, and technology integration in learning were in accordance with academic standards. The final stage of development involved initial trials on a limited scale to see how this model was applied in the classroom. The following is the resulting model.

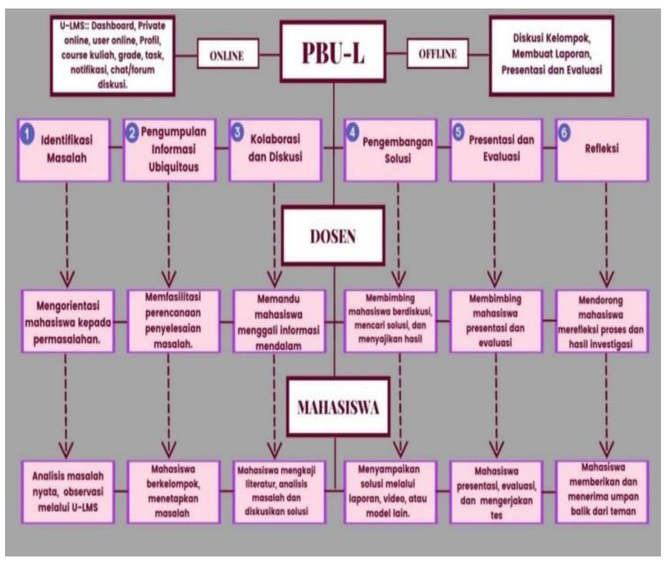

Figure 2. The PBUL model that has been developed

Discussion

Gathering, Collaboration and discussion, Solution development, Presentation and evaluation, and Reflection. The syntax of the Problem Based Ubiquitous Learning (PBU-L) model is a sequence of learning stages that integrates the Problem Based Learning (PBL) approach with the support of ubiquitous learning technology. This syntax was developed to support active, collaborative, and contextual learning that takes place flexibly through the use of a digital platform based on the Learning Management System (U-LMS). This model is designed in six main stages, namely:

Problem Identification: Students are introduced to a relevant and contextual real-world problem. The lecturer presents the problem through the U-LMS platform, and students conduct initial explorations individually or in groups. This stage stimulates student engagement and curiosity about the learning context.

Ubiquitous Information Gathering, where students develop problem-solving plans by gathering various supporting information from digital sources, electronic libraries, field observations, and online learning resources. This process is flexible and mobile, utilizing unlimited access across time and space through digital devices.

Collaboration and Discussion: Students work in groups to discuss and analyze problems in depth, exchange information, and formulate various alternative solutions. Lecturers act as facilitators, encouraging reflective discussions both online in the U-LMS forum and offline in class.

Solution Development, where students design solutions based on the results of discussions and analysis. Solutions are developed in the form of concrete products such as reports, infographics, videos, or interactive digital models, which are then uploaded to the U-LMS platform for further review.

Presentation and Evaluation: Students present their solutions online and/or offline. Lecturers and other students provide feedback. Evaluation is conducted to assess the effectiveness of the solutions and students' thinking processes. In addition to product evaluation, student participation and contributions to discussions and collaborations are also assessed.

Reflection: Students reflect on their learning experiences, problem-solving processes, and the effectiveness of the solutions they have developed. Reflection can be expressed in a reflective journal or a reflective discussion forum on the U-LMS. Lecturers encourage in-depth reflection so that students can develop metacognition and awareness of continuous learning.

The first stage is problem identification. At this stage, the lecturer provides a case study relevant to the learning material. Following this, students are asked provocative questions related to the case study, which address the importance of understanding morality in Islam. The learning process begins by orienting students to a real-world problem that can be accessed and observed through the U-LMS platform. Students analyze contextual problems sourced from their surroundings, digital information, or case studies provided by the lecturer. This activity occurs online through the U-LMS dashboard, which allows students to access course information, discussion forums, and visual or written materials for observation. The lecturer plays a crucial role in this stage by providing guidance and initial stimulation to help students understand the context of the problem comprehensively. Students are then directed to begin analyzing real-world problems individually or in groups, using features such as forums, online assignments, and notifications available on the platform.

The second stage is the information gathering stage. At this stage, students are encouraged to seek information from various sources, including digital sources and classical texts. The next stage is where students are encouraged to engage in discussion and collaboration. At this stage, students will learn in groups by forming study groups and defining problems to be solved based on the initial identification results. In a ubiquitous context, information gathering is not limited to the classroom or library but can occur anytime through digital devices. Students access literature, e-journals, learning videos, or documented field observations online. This process demonstrates the key characteristics of ubiquitous learning: flexibility, contextuality, and technology-based. The lecturer's role is as a facilitator, maintaining students' focus on learning objectives and ensuring that all information gathering processes lead to logical and scientific problem-solving.

The third stage, Collaboration and Discussion, takes place in a combined online and offline mode. In this stage, students are encouraged to exchange information from literature reviews, observational data, and personal reflections to explore the information more deeply. Lecturers guide this collaborative process to ensure it remains productive and focused. Students engage in in-depth discussions about the problem and potential solutions using both online LMS discussion forums and offline group discussion forums. These discussions are reflective, argumentative, and open-ended, as students begin to develop a shared understanding of the root of the problem and various alternative solutions. Lecturers help broaden students' horizons by providing feedback, prompting questions, or additional learning resources.

The next stage is solution development. At this stage, the formed student groups will discuss appropriate solutions to the problems presented in the first stage. The solutions can be related to everyday life. At this stage, students can also develop learning modules to emphasize the importance of morality in problems that occur both in the real world and in cyberspace. These solutions are not limited to theory but also have practical applications and can be applied in modern society. Students begin to develop concrete solutions to the problems previously analyzed and discussed. Lecturers provide guidance so that the solutions developed are rational, data-driven, and communicative. Students then compile the results of the solutions in various forms such as written reports, video presentations, infographics, and interactive digital models that can then be uploaded via U-LMS. This activity requires students not only to think critically and creatively, but also to have good communication and collaboration skills. In this process, students not only present solutions but also practice how to convey ideas in a structured manner to a wide audience.

In the next stage, presentation and evaluation, students who have discussed the solutions presented will be asked to present them in front of the class or virtually using online learning tools. This presentation is followed by a question-and-answer session among students to obtain feedback on the solutions presented. In the final stage, reflection, students are asked to write a journal or essay to evaluate what they have learned during the lesson. The lecturer guides the formative and summative evaluation process. The evaluation includes assessing the content and quality of the solutions, active participation in discussions, and mastery of concepts, which are tested through individual tests. During this stage, students are also encouraged to conduct self- and group evaluations of the learning process. The use of U-LMS allows for detailed review of student activity records, including discussion logs, assignment revisions, and participation during the lesson.

The final stage is reflection, where students revisit the learning process they have undergone, analyze the strengths and weaknesses of the approach used, and formulate lessons learned for future improvement. The lecturer acts as a reflection facilitator and provides prompting questions so that students not only see the final result but also become aware of their thinking and learning processes. This reflection is reinforced by peer feedback, both through the U-LMS discussion forum and directly in group discussions. Students are encouraged to provide and receive constructive criticism, an important step in developing metacognition and awareness of lifelong learning.

Overall, the stages and flow of the PBU-L model flow synchronously between online and offline activities, with U-LMS as the center of online learning activities, and group discussions, presentations, and evaluations as part of offline activities. The role of the lecturer is central but not dominant; the lecturer becomes a facilitator, guide, and evaluator who actively accompanies each stage, while students are positioned as the main actors who are active, critical, and reflective. Thus, this model encourages the development of critical thinking skills, problem-solving, collaboration, and student learning independence, which are very important in the context of 21st-century learning and the industrial revolution 4.0. Based on the stages of the PBU-L model implementation, this model is very appropriate for use in Islamic Religious Education lessons, especially to improve students' critical thinking skills.

Validity results of learning devices that support the implementation of the PBU-Learning model

The validity of learning tools that support the implementation of the PBU-Learning model is assessed through content validity and readability tests. The content validity test process is applied to four main components, namely the Semester Learning Plan (RPS), Materials, Student Worksheets (LKM), the Learning Management System (LMS) platform, and Evaluation Sheets. Content validity aims to assess the extent to which the learning tools have represented the expected learning constructs and objectives. The method used in this validation process is the Aiken's V method, which allows measuring the level of expert agreement on the relevance of the instrument content based on a predetermined assessment scale. Validation is carried out by a number of experts who have competence in the fields of educational technology, pedagogy, and curriculum development, by providing assessments of the substance, construction, and usability aspects of the tools. The results of the Aiken's V value analysis for RPS can be seen in the Table 1.

Based on Table 1, the results of the content validity test on the Semester Learning Plan (RPS) using the Aiken's method indicate that the developed RPS is in the valid category and is very suitable for use as a lecture reference. In the RPS Component aspect, the Aiken's coefficient of 0.90 reflects that all important elements in the RPS such as course identity, learning outcomes, learning strategies, and assessment methods have been compiled completely and systematically. However, although it is considered very high, input from the validator suggests the need for a stronger emphasis on the integration between learning outcomes and assessments, so that the integrated learning flow is more explicit. The RPS Compilation aspect obtained a score of

0.89, indicating that the structure and systematics of the document have met the rules of academic writing. However, there is still room for improvement in the clarity of the narrative in several sections of the explanation of the learning strategy which is considered less concrete in describing the implementation process.

Table 1. Results of the Content Validity Test of Aiken's Semester Learning Plan (RPS) Assessment Aspects of RPS Components

Assessment Aspects	Statement	Validator value			Rater Scale			$\sum s$	V	$\sum V/$ Aspect
		I	II	III	S 1	S 2	S 3			
RPS Components	a. All components are complete and comply with applicable RPS guidelines	4	3	4	3	2	3	8	0.89	0.9
	b. The structure of the RPS is easy to follow and each section is written systematically.	4	4	4	3	3	3	9	1	
	c. Learning activities are in accordance with the components of the PBU-L model	4	4	4	3	3	3	9	1	

Meanwhile, in the RPS Content aspect, a coefficient value of 0.85 indicates that the content is in accordance with the scientific substance of Islamic Religious Education and the context of student needs. However, this value is the lowest among other aspects, indicating that there are several parts of the content, especially in the selection of primary references and integration with current phenomena, which still need to be strengthened to be able to reflect the relationship between theory and practice more clearly. For the Language Use aspect, a value of 0.89 shows that the sentences in the RPS have used standard and communicative language, but the validator noted that the consistency of academic terms and adjustment of language to the level of student understanding need more attention, especially in explaining indicators and learning activities. Finally, the Time aspect received a perfect score of 1.00, indicating that the allocation of time per week, distribution of activities, and estimation of student workload have been arranged very well, proportionally, and realistically to support the achievement of competencies effectively.

Table 2. Results of the Content Validity Test of Aiken's Semester Learning Plan (RPS) Assessment Aspects of RPS Preparation

Assessment Aspects	Statement	Validator value			Rater Scale			$\sum s$	V	$\sum V/$ Aspect
		I	II	III	S 1	S 2	S 3			
Preparation of RPS	a. RPS is designed in accordance with the specified CPL	3	3	3	2	2	2	6	0.67	0.89
	b. The contents of the RPS reflect the CPL targets imposed on the course.	4	3	3	3	2	2	7	0.78	
	c. Learning is designed to be student-centered	4	4	4	3	3	3	9	1	
	d. Learning activities are able to develop student competencies, especially critical thinking competencies.	4	4	4	3	3	3	9	1	
	e. Learning activities consist of the context of learning experiences and evaluation.	4	4	4	3	3	3	9	1	

Table 2 shows that the results of Aiken's content validity test on the aspect of Semester Learning Plan (RPS) preparation indicate that most statements have a high level of validity. In the statement "RPS is designed in accordance with the established CPL", Aiken's V value of 0.67 indicates that this statement has moderate validity and still needs improvement to be more in line with the targeted graduate learning outcomes (CPL). In contrast, the statement "RPS content reflects the CPL targets imposed on the course" obtained a V value of 0.78, which indicates high validity and is considered quite representative by the validators. Three other statements, namely "Learning is designed to be student-centered", "Learning activities are able to develop student competencies, especially critical thinking competencies", and "Learning activities consist of the context of learning experiences and evaluation", each received an Aiken's V value of 1.00, which indicates very high validity. This means that these three statements are considered very relevant and worthy of use as indicators in assessing the quality of RPS preparation. Overall, the average V value in this aspect is 0.89, which indicates that the RPS preparation aspect has a very good level of content validity.

Next h calculation results Semester Learning Plan Sheet (RPS) instrument in the assessment aspect of RPS content can be observed in Table 3.

Table 3. Results of the Content Validity Test of Aiken's Semester Learning Plan (RPS) Assessment Aspects of RPS Content

Assessment Aspects	Statement	Validator value			Rater Scale			$\sum s$	V	$\sum V/$ Aspect
		I	II	III	S_1	S_2	S_3			
RPS Contents	a. The RPS contains the name of the university, faculty, study program, course code, semester, credits, and the name of the lecturer.	4	4	4	3	3	3	9	1	0.85
	b. The RPS contains the relationship between the Achievements of Study Program Graduates and the Achievements of Course Graduates.	4	4	3	3	3	2	8	0.89	
	c. RPS contains a brief description of the course	3	4	4	2	3	3	8	0.89	
	d. RPS contains study materials/teaching materials related to the abilities to be achieved in the RPS	4	3	3	3	2	2	7	0.78	
	e. RPS contains learning activities designed and developed based on the achievements of course graduates.	4	4	4	3	3	3	9	1	
	f. RPS contains the use of learning methods used in learning activities.	4	4	4	3	3	3	9	1	
	g. The RPS contains the time allocation provided to achieve the skills at each stage of learning.	4	3	3	3	2	2	7	0.78	
	h. RPS contains assessment indicators to achieve capabilities at each stage	3	3	3	2	2	2	6	0.67	
	i. RPS contains learning resources that are adapted to graduate achievements, main material, learning activities, and indicators.	4	3	3	3	2	2	7	0.78	
	j. RPS contains indicator criteria and assessment weights	3	3	3	2	2	2	6	0.67	

Assessment Aspects	Statement	Validator value			Rater Scale			$\sum s$	V	$\sum V/$ Aspect
		I	II	III	S_1	S_2	S_3			
	k. The RPS contains learning experiences that are manifested in descriptions of tasks that must be completed by students during 1 semester.	4	3	4	3	2	3	8	0.89	

Table 3 shows that the results of Aiken's content validity test on the content aspect of the Semester Learning Plan (RPS) indicate that most statements obtained high to very high validity values, although there were several elements that still needed improvement. The average Aiken's V value for this aspect was 0.85, which indicates that in general the statements in the RPS content component were considered valid and relevant by experts.

Overall, Aiken's validity test shows that the content of the RPS is quite good and most of its components have met the content validity criteria.

Conclusion

The Problem Based Ubiquitous Learning (PBU-L) learning model development process was developed through the ADDIE (Analysis, Design, Development, Implementation, Evaluation) stages, but in this study only reached the systematic design stage. In the analysis stage, the need for a learning model that is able to integrate Islamic values, problem-based strategies, and digital technology to improve students' critical thinking skills in Islamic Religious Education (PAI) courses was identified. The design and development stage resulted in a model containing components, syntax, and learning tools based on PBU. Initial implementation showed that the model can be applied effectively in the context of Islamic Religious Education (PAI) learning in higher education. Validity of the PBUL Learning Model: Validation results by experts indicate that the PBU-Learning model meets the criteria for content, construct, and language validity. This model is considered pedagogically relevant, contextual to Islamic Religious Education learning needs, and adaptive to technological developments and student characteristics. The clarity of its structure, the integration of its components, and its orientation toward developing critical thinking make this model worthy of further application.

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