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DEVELOPMENT OF *MULTIPLE INTELLIGENCE-BASED LEARNING BY RESEARCH* MODEL IN ISLAMIC EDUCATION CURRICULUM

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ABSTRACTS

Background: Low student engagement in research and limited accommodation of diverse intelligences are key challenges in Islamic higher education, hindering inclusive and productive learning. Purpose: This study aims to develop a Learning by Research model integrated with Multiple Intelligence theory to enhance students' research and scientific publication skills while optimizing their diverse intellectual potentials. **Method**: Using a Research and Development (R&D) approach, the model was developed and tested through iterative stages, including expert validation, limited trials, and broader implementation in experimental classes. **Results**: The model significantly improved students' research skills, scientific article writing, and engagement of multiple intelligences, with average performance rising from 60% to 85%. It emphasizes six key aspects: integration of theory and practice, student-centered learning, stakeholder collaboration, technology utilization, adaptive learning, and scientific publication orientation. **Conclusion**: This model offers a transformative, inclusive approach to curriculum design in Islamic higher education, fostering research culture and addressing contemporary educational challenges.

A. INTRODUCTION

The fundamental problem in the curriculum learning system in the Islamic Education Study Program is the low learning outcomes and learning outcomes (Setiawan, Yusuf, and Nihayati 2017) . The lecture process in the curriculum tends to focus on cognitive evaluation through numbers, without any real contribution in the form of applicable learning products or scientific work, and there are only a few courses, such as PPL, KKN, and Thesis, which have the potential to provide research-based learning(Leighton and Gierl 2011; Ssemugenyi 2023a) . However, the implementation of these three courses in the curriculum is still stuck in old patterns that are formal and administrative. According to a study(Putra and Jazuli 2024) , students carry out KKN only as a form of fulfillment of curriculum academic obligations, PPL is only limited to teaching practice, and thesis is not interpreted as an opportunity to develop scientific research that can be published widely.

This situation has a direct impact on the low research and publication culture of students and lecturers in the education curriculum. Research-based learning is a learning model that integrates research in the learning process(Syarnubi, Syarifuddin, and Sukirman 2023) . Research components include background, procedures, implementation, research results, discussion and publication of research results(Brew and Saunders 2020) . Data from the last three years (2022-2024) show that research productivity and scientific publications are still far from ideal. Less than 50% of all study program lecturers are consistently involved in research activities, and only a handful of students have experience writing scientific publications(Listiawan 2016; Yuliawati 2012) . This phenomenon indicates a methodological void in the design of the learning curriculum, where research is not integrated as an integral part of the curriculum. The low productivity can be attributed to the weak exploration of students' multiple intelligences in the curriculum and the focus on cognitive aspects only, but the learning challenges in the 21st century require a more holistic and transformative curriculum approach.

The main problem faced in the context of the learning curriculum in the Islamic Education Study Program is not only the low cognitive learning outcomes of students, but also the absence of a strong research culture in the curriculum(Demirel Ucan and Wright 2019) . Students are not accustomed to undergoing a learning process in a curriculum that requires them to explore issues in depth through research activities. Most of the lecture processes in the curriculum still adhere to the repetitive model of lectures, thesis assignments, and class presentations, which do not optimally develop critical thinking, analytical, and problem-solving skills(Saeed 1999) . As a result, students are not methodologically prepared in the curriculum to conduct quality scientific research, and students sometimes do not understand the importance of publications as part of academic outcomes in the university curriculum.

On the other hand, the learning curriculum that has been implemented has not provided sufficient space to accommodate the various forms of intelligence that students have(Baker et al. 2021) . The tendency to measure learning outcomes in the curriculum only from logical-mathematical and linguistic aspects has ruled out the possibility of other intelligences such as intrapersonal, motor, musical, and naturalist(Slavuj, Meštrović, and Kovačić 2017) . In fact, the reality on the ground shows that students have a diversity of intelligences which, if optimized in the curriculum, can be a strong foundation for contextual and productive learning

processes. The absence of learning models in the curriculum that can integrate research on the development of multiple intelligences is one of the weaknesses that needs to be addressed immediately(Klein 2003; Garlick 2003; Järvelä et al. 2025). While previous studies have explored research-based learning and multiple intelligences separately, there is a critical gap in the literature regarding a holistic curriculum model that integrates both approaches to simultaneously foster research skills and accommodate diverse intelligences in Islamic higher education) (Palarimath et al. 2024; Rasri et al. 2024) Therefore, it is important to formulate a learning approach in the curriculum that can fill the methodological void and become the foundation of educational innovation in Islamic higher education.

The main objective of this research is to develop a *Learning by Research-based learning* model integrated with the *Multiple Intelligence* approach in the Islamic higher education curriculum, especially in the Islamic Education Study Program. *Multiple Intelligence* is a constructive criticism that views humans or learning that focuses only on certain aspects of intelligence that are hegemonic with intellectual intelligence(Ahmad Walela 2024) . This model is designed to improve student competence in conducting research activities systematically and oriented towards the output of accredited scientific publications in the curriculum. Pedagogically, this model also aims to accommodate the diversity of students' multiple intelligences, as proposed in Howard Gardner'*s Multiple Intelligences* theory, so that all students' potential can be optimized in the curriculum learning process. Thus, this research is not only directed to strengthen students' research and publication skills, but also to encourage the transformation of learning curricula that are more adaptive, integrative, and based on developing intellectual capacity holistically in facing the dynamics of the 21st century and the era of Society 5.0.

Based on a literature study of previous studies, research-based learning approaches have been developed as a strategy to improve students' critical thinking and problem-solving skills in the curriculum. Various models have been designed to encourage active and participatory learning through small research activities, case studies, and project learning(Tveit et al. 2023; Prince and Felder 2006) . However, most of these models do not systematically incorporate students' different intelligences into the curriculum instructional design process(Stefaniak and Xu 2020; Brown and Green 2018; Eglington and Pavlik 2023) . On the other hand, the multiple intelligences approach introduced by Howard Gardner has been widely adopted to identify and optimize individual potential in curriculum learning, but its use is still limited to thematic or activity-based learning contexts, rather than within a comprehensive academic research framework(Lima et al. 2024; Ahmad Walela 2024) This research addresses the gap by proposing a novel model that synergistically combines research-based learning with multiple intelligences, offering a comprehensive framework that enhances both research competency and intellectual diversity within the Islamic Education curriculum.

In addition, there is no learning model that simultaneously integrates the two approaches of learning through research and multiple intelligences into a holistic learning curriculum design that can be effectively applied in Islamic higher education, especially in Islamic education learning programs(Palarimath et al. 2024; Rasri et al. 2024) . Existing models tend to be partial, with research focused only on the completion of final assignments (e.g. thesis) and multiple intelligence approaches

applied only to individual or group project-based learning in the curriculum, without being oriented towards publishable research outcomes(Swaminathan 1989; Rahaman and Pattnaik 2024). The absence of an integrated model that bridges these two dimensions creates a significant gap, as it limits the potential to foster a robust research culture while leveraging students' diverse intelligences for academic and scientific contributions. The lack of integration may create a gap between the need to strengthen the research culture and the importance of embracing students' multiple possibilities in the curriculum learning process.

Moreover, the absence of a learning curriculum that explicitly encourages scientific publications as an important outcome of the student research process(Fankhauser et al. 2021). In Islamic universities, the potential of students to produce scientific works tends to be less optimally developed because the culture of research and scientific writing is not an integral part of all courses in the curriculum(Woodend, Syeda, and Roy 2024). Therefore, there is an urgent need to design a learning model in the curriculum that not only improves research skills but also strategically integrates students' multiple intelligences and is oriented towards knowledge production through scientific publications(Abu-Zaid et al. 2016). This research fills this gap by developing a curriculum-integrated model that not only enhances research and publication skills but also leverages multiple intelligences to create a transformative learning experience tailored to the needs of Islamic higher education. The gap between the two above is the basis of research on the development of multiple intelligence-based learning through the research model in the curriculum.

This research offers innovation in the form of developing a multiple intelligence approach and a research-based learning model that is systematically integrated in the curriculum, a combination that has not been widely explored in the context of Islamic higher education, especially Islamic religious education study programs. The learning model in this curriculum not only provides a solution to the weak culture of research and scientific presentations of lecturers and students, but also becomes a transformative pedagogical approach that can embrace the diverse intelligences of students through the integration of theory and practice. The main reason for developing this model is the urgent need for learning strategies in the curriculum that adapt to the challenges of the information disruption era and Society 5.0, where students not only master academic content but also think critically, collaboratively, creatively, and communicatively to produce quality scientific research. Through an orientation towards scientific publications and active student participation in multiple intelligence-based research projects in the curriculum, this learning model is expected to become a strategic policy as well as a practical reference for improving the quality of learning and achieving academic outcomes in Islamic universities.

B. METHOD

This research uses a research and *development* (R&D) approach that refers to the R&D model developed by Borg and Gall, then simplified by Sukmadinata (2010: 184), as cited in(Rahayuningtyas and Yuliyani 2020) . The main objective of this study was to develop a research-based learning model that integrates the multiple intelligence paradigm in the curriculum of the Islamic Education Study Program, Faculty of Tarbiyah, State Islamic Institute (IAIN) Parepare. The development of this

model was triggered by initial findings that showed significant weaknesses in learning outputs and outcomes in the curriculum of the study program, coupled with the low level of productivity of scientific publications by both lecturers and students. In addition, the learning process in the existing curriculum has not been able to accommodate the diversity of student intelligence, such as linguistic, logical-mathematical, or interpersonal intelligence, which should be an integral part of the teaching strategy in the curriculum. In fact, in terms of resources, the institution has very supportive potential, with more than 50% of lecturers with doctoral degrees, 70% of whom hold the rank of Head Lector , and as many as 577 active students who have not been fully facilitated in research activities and scientific publications, as mentioned by(Goodall 2006) . Therefore, this research is designed to create a learning model that not only improves students' research skills, but also optimizes their intelligence potential in the academic context of the curriculum.

This research procedure follows Sukmadinata's R&D model, which consists of three main stages in curriculum development. The first stage is the preliminary stage, which includes a series of activities to build a foundation for model development in the curriculum. First, an in-depth literature study related to the concepts of learning by research and multiple intelligences was conducted to understand the theoretical principles relevant to curriculum design. This study involved a review of journals, books, and scientific articles that discuss the research-based learning approach and multiple intelligence theory. Second, needs analysis was conducted through observation of the learning process in the classes of the Islamic Education Study Program, interviews with lecturers and students to explore their perceptions of the curriculum, as well as document studies such as curriculum and academic reports to evaluate current conditions. Third, a description of the current factual model in the field was compiled to identify weaknesses and opportunities for improvement in the curriculum.

The second stage is model development, which begins with the preparation of model components, such as learning objectives, teaching principles, syntax or learning steps, social systems that support classroom interactions, and support systems such as media or learning facilities in the curriculum. The initial draft of the model was validated by five experts, namely two learning by research experts, two multiple intelligence experts, and one model development expert, to ensure quality and relevance to the curriculum. The validation process involved structured interviews and a detailed review of the model's components, focusing on its theoretical foundation, practicality, and alignment with the Islamic Education curriculum. Experts provided feedback on aspects such as clarity of learning objectives, feasibility of the syntax, and integration of multiple intelligences, which was documented in a validation checklist. Based on this feedback, revisions were made to refine the model's structure, including clarifying the sequence of learning steps, enhancing the integration of multiple intelligences through specific activities tailored to diverse intelligence types, and ensuring alignment with curriculum goals. For instance, experts suggested incorporating more adaptive learning strategies to better accommodate interpersonal and intrapersonal intelligences, which were integrated into the revised model. The revised draft was then tested on a limited basis in one class with 35 students, followed by a Focus Group Discussion (FGD) to evaluate the initial results. The limited trial class was purposively selected from the fourth-semester students of the Islamic

Education Study Program, as this group had sufficient academic exposure to engage in research-based activities and represented a diverse range of intelligence profiles. A wider trial was conducted on three fourth-semester experimental classes and one control class to compare the effectiveness of the model in the curriculum. The experimental classes (PAI A, B, and C) and the control class (PAI D) were selected based on their similar academic performance and demographic characteristics, ensuring comparability, with each class consisting of approximately 35-40 students randomly assigned to maintain balance in the trial. The trial results were analyzed to refine the final product.

The third stage is product testing and socialization of results in the curriculum. At this stage, the efficacy of the model is tested through comparative analysis of learning outcomes between pretest and posttest to measure the improvement of students' research and article writing skills in the context of the curriculum. The refined model is then socialized through seminars and implemented as part of the learning development policy in the curriculum at the study program level. The research data consisted of qualitative data, such as the results of classroom observations, interviews with lecturers and students, curriculum documents, and discussions in FGDs, as well as quantitative data in the form of research productivity and publications tracked through Google Scholar and institutional repositories, plus the results of the research skills test. Data analysis was carried out descriptively-qualitatively to understand perceptions and learning dynamics in the curriculum, and comparatively to assess the effectiveness of the model in improving research skills, scientific article writing skills, and optimizing students' multiple intelligences, thus ensuring that this model is relevant and applicable in curriculum design.

C. RESULT AND DISCUSSION

The research results are in accordance with the stages of the development of the *Research and Development* (R&D) model simplified by Sukmadinata. The discussion is carried out sequentially according to the problem formulation and refers to three main focuses, namely: (1) student research skills, (2) scientific article writing skills, and (3) optimization of multiple intelligences in the learning process integrated with the curriculum. Each finding was analyzed based on the results of the validity test, quantitative pretest and posttest data, and reviewed through the theoretical approach of research-based learning, *multiple intelligence*, and the relevance of the study program curriculum. To strengthen external validity, the results obtained were also compared with previous findings and related to the needs of Islamic higher education in the *Society* 5.0 era.

The stages in developing the model were carried out as follows:

Conceptualizing the Model

First, the preparation of model components that include the foundation of model development, goals, objectives, scope, conception, principles, social system, support system, instructional impact, and accompaniment with reference to the expected results, namely the creation of a model to improve student research skills using multiple intelligence paradigm in the context of learning integrated with the curriculum at the Islamic Education Study Program, State Islamic Institute (IAIN) Parepare, South Sulawesi, Indonesia.

Product Draft Validation Test

Second, the product draft validation test was conducted through consultation with experts consisting of experts in learning models, *multiple intelligence,* and research-based learning to obtain an assessment of the validity of the product in line with the curriculum of the Islamic Education Study Program, Institut Agama Islam Negeri (IAIN) Parepare, ensuring the model supports the improvement of student research skills.

Table 1. From the results of discussions with experts, important notes were raised including:

No.	Model Development Potential	Challenges	Recommendations
1	Urgency of *learning by research*	Learning is too theoretical	Problem posing method
2	Integration with *critical thinking* based learning	Textual, formalistic, symbolic and exclusive mindset	Students go directly to the field to find something new
3	*Problem solving*		Integration of theory and practice
4	*Collaboration*		Mini research
5	*Communication*		Article publication
6	*Multiple intelligence* in learning		Student centered
7	Students like challenges		Contextual teaching and learning
8	Field facts available		Problem solving
9	Study program profile *(multiple intelligences)*		Cooperative learning
10	Digital reference availability		Constructivism
11	Learning anywhere and anytime		Clear lecture out put
12	Research materials available		Research themes
13	Research location is easy to reach		Journal link
14	*Student centered learning*		Creating an academic atmosphere
15	Learning models that accommodate all aspects of intelligence		Building a shared commitment
16	Prospect of model development		21st century learning trends (critical thinking, creativity, collaboration and communication)
17	High commitment to development		Contextual
18	Academic guidance system		Problem solving
19	Potential lecturers and students		Digital teaching materials

20	Multiple intelligence	Integration of research in lectures
21	Distinction of Islamic education study program (*multiple intelligences* based learning)	Curriculum Socialization

Findings from literature studies and interviews with experts indicate that the learning model developed should be able to encourage students to think critically in analyzing problems and finding solutions through real research projects that are integrated with the curriculum. Learning activities are structured to accommodate most aspects of multiple intelligences according to student characteristics, with a student-centered approach. Learning combines theory and field practice through simple mini research to enhance analytical skills and the ability to find data-based solutions. Students are given access to relevant and up-to-date digital resources to support the mini research, in line with curriculum requirements. The *multiple intelligence-based learning by research learning* model encourages students to publish research results, with lecturers providing feedback to improve research quality.

Validation test results by learning design experts indicate that the development of multiple intelligence-based learning by research learning model can be continued with some notes, in accordance with the curriculum needs of the Islamic Education Study Program. Validation test results by experts indicate that the developed model has met the three main requirements for developing learning models, namely aspects of availability and clarity of syntax, aspects of model construction, and language aspects. The learning syntax aspect includes pre-instructional activities (introduction), instructional activities, evaluation, and follow-up activities that are aligned with the curriculum. Model construction aspects include student abilities, lecturer abilities, learning process, integration with *multiple intelligence*, infrastructure facilities, and assessment aspects. Meanwhile, the language aspect is reviewed from the spelling and clarity of the message. The model developed based on these principles can be seen in the following figure.

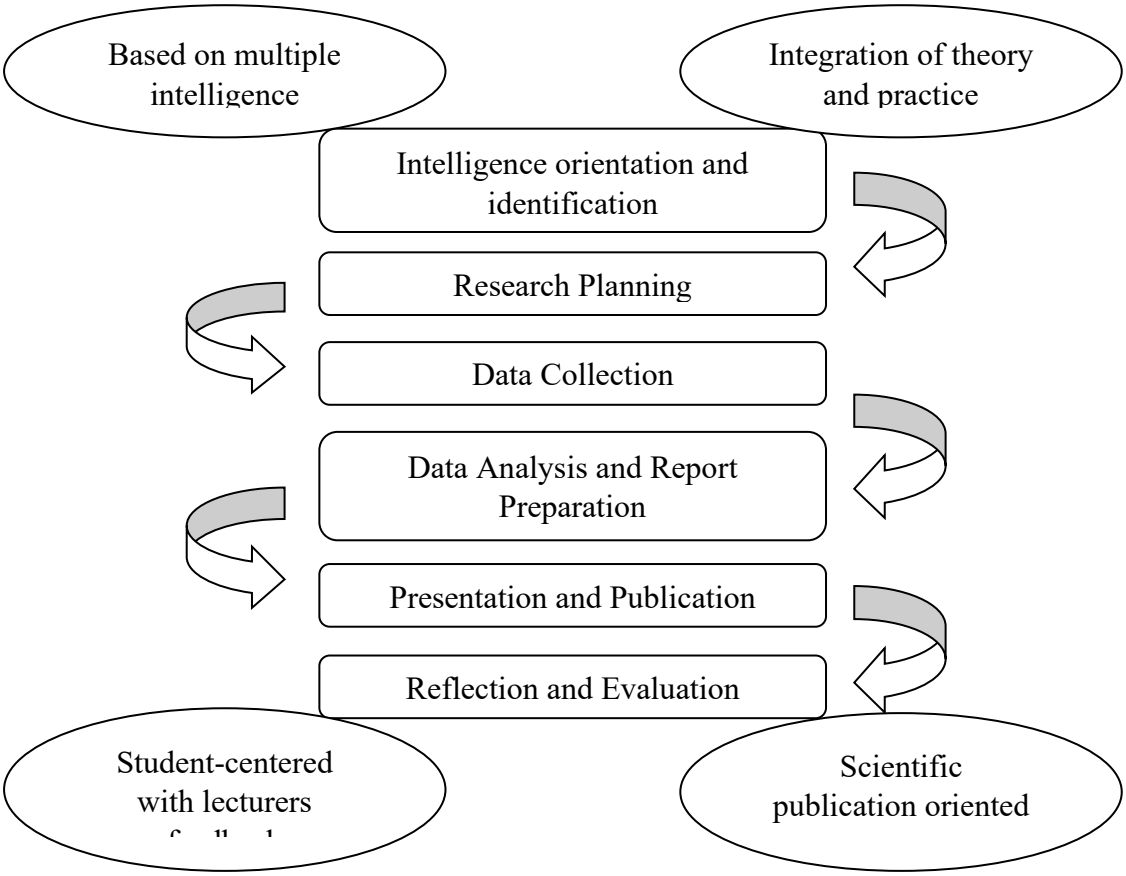

Figure 1: *Learning by Research* Model using *Multiple Intelligence* Paradigm

Revision of the Initial Draft

Third, the step taken is the revision of the initial draft of the learning by research learning model based on multiple intelligence after discussion with experts, taking into account constructive inputs to ensure the model is in line with the curriculum of the Islamic Education Study Program, State Islamic Institute (IAIN) Parepare, so as to support the development of student research skills according to curriculum needs.

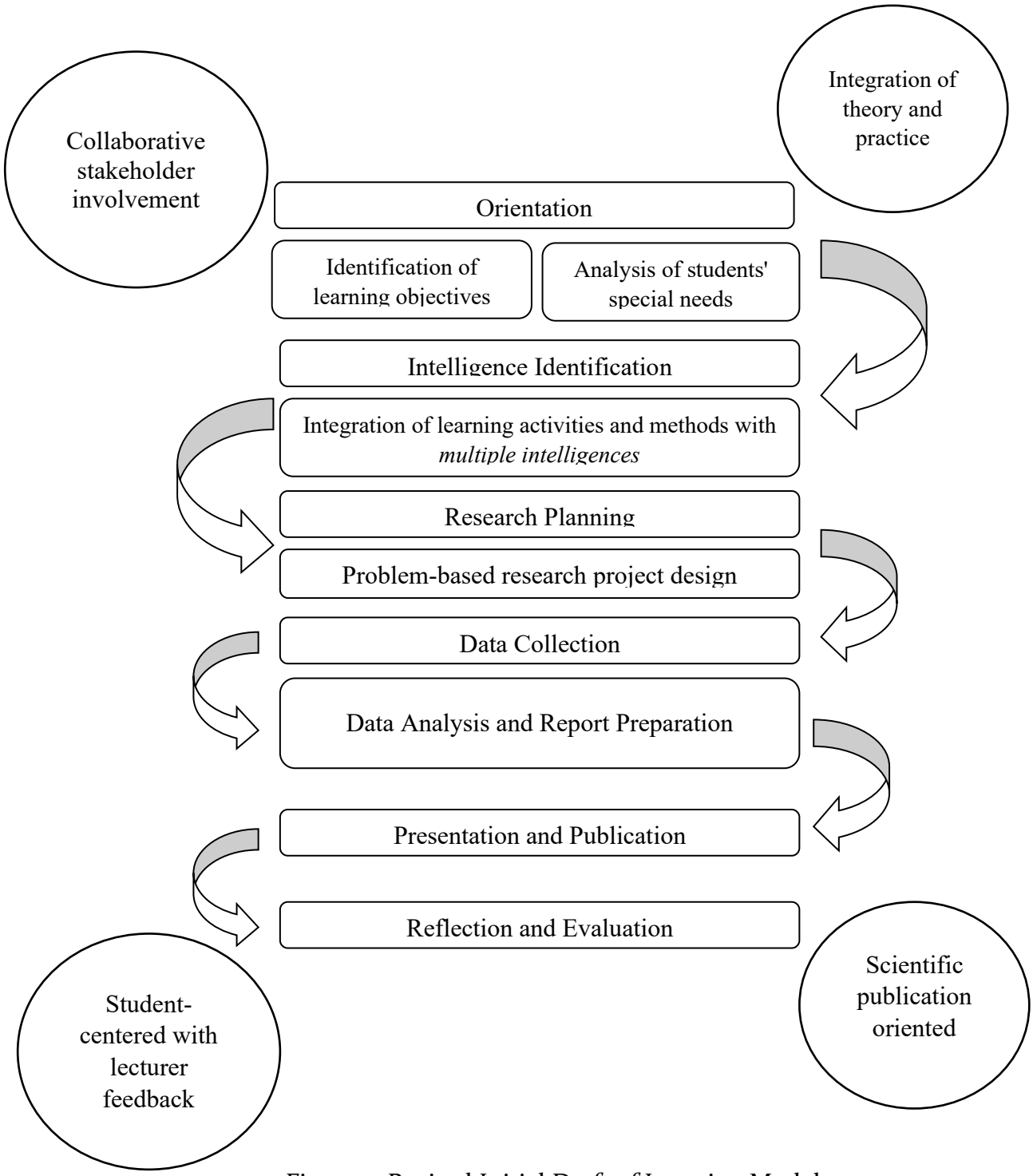

Figure 2: Revised Initial Draft of Learning Model

Limited Test of Model

Fourth, the limited test of the model was carried out after the researchers conducted a *Focus Group Discussion* (FGD) to maximize the revised product, ensuring that the *multiple intelligence-based learning by research* model was in line with the curriculum and ready to be tested in a limited class. The pilot test was conducted on one fourth-semester class of 35 students in the Qur'an and Hadith Learning course, a special course in the curriculum of the Islamic Education Study Program, State Islamic Institute (IAIN) Parepare. The selection of this course is based on the argument that the course is a course distingtifying the study program that supports the research-based learning approach and multiple intelligence.

The results of the limited trial showed a difference in the percentage of research skills, writing articles, and maximizing students' intelligence before and after the application of the *multiple intelligence-based learning by research* model that is aligned with the curriculum of the Islamic Education Study Program, Institut Agama Islam Negeri (IAIN) Parepare. Before the model was implemented, the percentage of students' ability only ranged from an average of 60%, but after the trial of the model integrated with the curriculum, the percentage increased to 85%. This shows a significant increase in the ability to research, write articles, and maximize student intelligence in the learning process.

Table 2: Average Percentage of Research Ability, Article Writing and Intelligence Maximization of Students Before and After Implementing *Learning By Research Learning* Model Based on *Multiple Intelligence*.

No	Type of Student Ability					
	Before the Model is Applied			After the Model is Applied		
	Research ability	Article writing	Maximization of intelligence in learning	Research skills	Article writing	Intelligence maximization in learning
1	60 %	60 %	60 %	85 %	85 %	85 %

From the table, it is described that there is an increase in the percentage of students' abilities in the three main aspects of this model development research, which is in line with the curriculum of the Islamic Education Study Program, State Islamic Institute (IAIN) Parepare. The first aspect is students' research skills, the second aspect is students' article writing skills, and the third aspect is the maximum use of the variety of intelligences that students have. The average student's ability increased from 60% before the implementation of the model to 80% after the implementation of *multiple intelligence-based learning by research learning* model integrated with the curriculum.

Broad Trial

Fifth, is a broad trial. This step was carried out in the experimental class and control class. The experimental class consists of 3 classes in semester 4, while the control class in one class in the same semester, the characteristics of the class that is used as the experimental subject and the control class have relatively the same characteristics. The next step is to conduct a pre-test, and from the pre-test, the percentage of research skills, writing articles and maximizing the use of students' diverse intelligence is obtained, which shows a percentage around 66%, then a post-test is carried out after a broad trial of the **curriculum-based** model and an increase in the percentage of research skills, writing articles and maximizing students' diverse intelligence is obtained at a level of 87%. This means that there is an increase in percentage after a broad trial.

Table 3. Percentage of Ability to Research, Write Articles and Maximize Intelligence Types in Learning

Type of ability	Experimental design	Experimental class identity	Control class identity	Characteristics of experimental and control classes
		3 classes (PAI A, B, C)	1 class (PAI D)	Relatively the same
Research ability	Pre-test	63 %	-	-
	Post test	85 %	-	-
Article writing ability	Pre test	61 %	-	-
	Post test	87 %	-	-
Maximization of intelligence types in learning	Pre test	65 %	-	-
	Post test	86 %	-	-

From the percentage increase, before and after the application of the learning model, it can be analyzed the effectiveness of using the model to help students improve their research skills, write articles and maximize the variety of intelligence in learning. The percentage increase is seen from around 60-65% increasing to 85-87%. It can be postulated that the use of learning models is effective in achieving learning objectives, namely improving research skills, writing articles and maximizing *multiple intelligence*-based *intelligence* in the context of curriculum-based learning in Islamic education study programs, State Islamic Institute (IAIN) Parepare, South Sulawesi, Indonesia.

Final Product Refinement Step

Sixth, the final product refinement step. Model refinement is done on all aspects of the model developed, namely *learning by research learning* model using *multiple intelligence* paradigm that contains important elements of the model, namely the foundation of model development, goals, objectives, scope, conception, principles, steps, social system, support system, instructional and accompanying effects, curriculum-based learning design and model assessment.

Product Testing and Socialization of Results

Seventh, the next stage is product testing and socialization of results. At this stage, it is carried out to see the ability to apply the model by paying attention to the reality before and after treatment. The results of the product test of the *learning by research learning* development model with a curriculum-based *multiple intelligence* approach can be seen from the experts' assessment.

Table 4
Assessment Results from Experts Can Be Seen in the Recapitulation

Aspect	Indicator	Percentage	Criteria
Availability of Syntax	Pre-instructional activities (Introduction)	78 %	Valid

Aspect	Indicator	Percentage	Criteria
	Instructional activity	79 %	Valid
	Evaluation activities	83 %	Very valid
	Follow-up activities	81 %	Very valid
Construction	Student ability	78 %	Valid
	Lecturer ability	81, 35 %	Very valid
	Learning process	81 %	Very valid
	Integration with *multiple intelligence*	78 %	Valid
	Assessment	82 %	Very valid
	Facilities and infrastructure	78 %	Valid
Language	Spelling	78 %	Valid
	Clarity	81 %	Very valid

Based on Table 4, results of the recapitulation of the percentage of assessments from expert validators, it shows that the model found is categorized as valid and has fulfilled important elements including aspects of syntax availability (pre-instructional or introductory activities), instructional activities, evaluation activities, and follow-up activities, construction aspects consisting of student abilities, lecturer abilities, learning processes, integration with *multiple intelligence,* assessment, facilities and infrastructure and language aspects consisting of spelling and clarity. At the end of the validation test sheet, the validator provides a recommendation that the model developed based on the curriculum is feasible to be tested with several points of improvement.

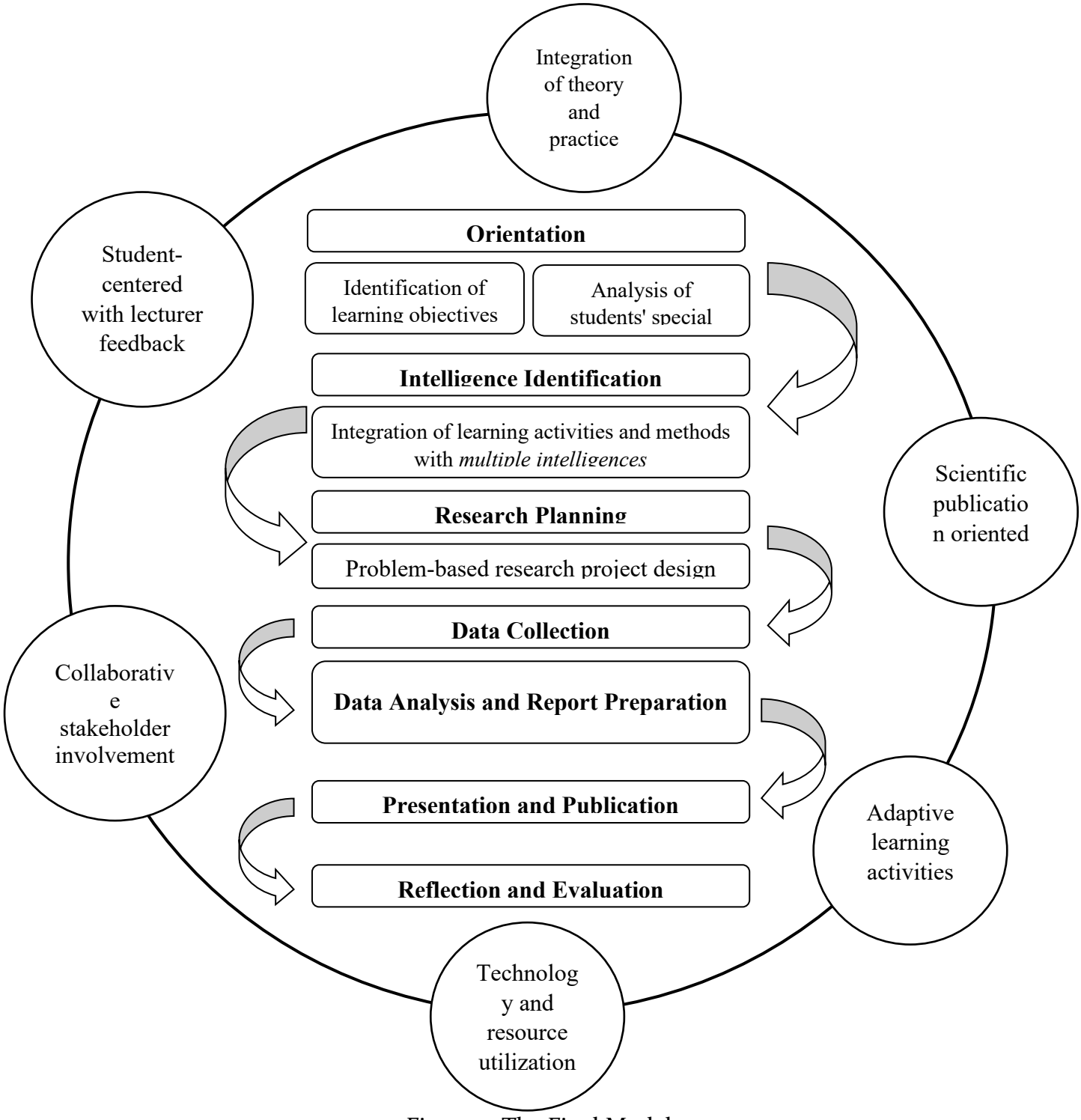

Figure 3: The Final Model

From the model found, there are six aspects of the *mutiple intelligence-based learning by research* development model found by the researchers. The six aspects are *integration of theory and practice, student centered with lecturer feedback, collaborative stakeholder involvement, technology and resource utilization, adaptive learning activities,* and *scientific publication oriented*.

Discussion/Analysis

The six main aspects in the research-based learning development model based on multiple intelligence start from the *integration of theory and practice*, which emphasizes that in the context of learning, theory and practice cannot be separated because both have an inherent and complementary relationship. Theory is needed to strengthen the conception or theorization of *learning*, especially now that there is a paradigmatic shift in education. For example, there has been a shift from a *teacher-centered oriented* paradigm to student-centered oriented learning, as well as a change from a single-source-based learning paradigm to *multi-source* learning. This theorization is supported by practical aspects in the context of curriculum-based learning, where teaching and learning activities are no longer only oriented towards the transfer of knowledge, but also towards the development of skills, values, and contextual learning experiences. Therefore, the integration of theory and practice is not only an option, but an urgent need in the era of research-based education transformation and multiple intelligence.

The next aspect is *student centered with lecturer feedback*, which is learning that places students as the center of the learning process and is supported by active feedback from lecturers. This paradigm means that students act as active learning subjects in discovering, exploring, and constructing theories learned and integrating them into learning practices in the field. With this approach, students are not just recipients of information, but as creative learning agents. In this case, lecturers still play an important role, namely as facilitators, mentors, as well as critical feedback on the learning process and products carried out by students. Lecturers provide critical notes, constructive input, substantial corrections, and direct learning outputs to be in accordance with applicable academic and curriculum standards. This interaction fosters a lively, collaborative and dialogical learning dynamic, which enables the creation of an academic climate that supports research-based learning and multiple intelligences.

Next is *collaborative stakeholder* involvement in the context of learning. One of the main innovations in the development of a *curriculum-based learning by research* model is the active involvement of *stakeholders,* both from the internal campus environment such as lecturers, heads of study programs, and education personnel, as well as external stakeholders such as alumni, education practitioners, government agencies, and business and industry. The reality that often occurs in conventional learning systems is the lack of *stakeholder* involvement, which causes the learning process to be decontextualized and detached from the reality of field needs. Therefore, the aspect of collaboration and *stakeholder* involvement is a new element that is very strategic in bridging the academic world and the real world. Through this involvement, the real needs and challenges in society can enter the classroom and become material for study in learning. Students can also develop relevant and impactful research projects based on the input and support of these stakeholders.

The next aspect is *technology and resource utilization*, which is the use of technology and various learning support resources. In the context of developing *multiple intelligence-based learning by research* model, technology utilization becomes very important as an inherent part in supporting the effectiveness and efficiency of the learning process. Various technological tools can be used, ranging from online learning platforms, data analysis software, to artificial intelligence to support the

research and learning process. Students can access scientific information through Google Scholar, ResearchGate, or other digital libraries, as well as utilize applications or digital instruments that can identify their multiple intelligence potential. In addition, the utilization of other resources such as experts, campus facilities and infrastructure, and research communities are also important supporting factors. All of this is done to create a learning culture that is conducive, modern, and relevant to the applicable curriculum. Therefore, mastery of technology and maximum utilization of resources is a necessity in the implementation of this learning model.

Next is *adaptive learning activities*. Adaptive learning is an approach that is oriented towards meeting the individual needs of each student through the arrangement of learning paths, the use of relevant resources, and the provision of personalized feedback. In the context of *curriculum-based* learning, this approach is very relevant because each student has different intelligence potential. Therefore, learning activities must be designed flexibly to suit each individual's learning style, strengths and weaknesses. Learning strategies such as *blended learning, flipped classroom*, and project-based learning can be combined according to students' characteristics. By implementing adaptive learning, lecturers are able to provide a more personalized and meaningful learning experience for students. This is also in line with the spirit of a curriculum that is responsive to the diversity and needs of learners in this digital era.

To assess the effectiveness of this model, it is useful to compare it with similar models in educational research. For instance, the Problem-Based Learning (PBL) model, as discussed by Ssemugenyi (2023), emphasizes student-centered inquiry and critical thinking but does not explicitly integrate multiple intelligences, limiting its ability to address diverse learner profiles (Ssemugenyi 2023b) Similarly, Tveit et al. (2023) explored a collaborative learning model in nursing education, which fosters active participation but lacks a focus on tailoring activities to diverse intelligences (Janes et al. 2023). In contrast, the proposed model uniquely integrates research-based learning with multiple intelligences, achieving a significant improvement in research skills and publication output (from 60% to 85%) while accommodating diverse learner needs, making it more comprehensive for the context of Islamic higher education.

Despite its effectiveness, the implementation of this model faced several challenges. One major challenge was the initial resistance from some lecturers who were accustomed to traditional, lecture-based teaching methods, which required additional training to adopt the student-centered and research-oriented approach. Another challenge was the variability in students' familiarity with research processes, which necessitated scaffolding and additional support to ensure all students could engage effectively with the model's research components. Furthermore, access to digital resources, such as reliable internet and software, was inconsistent in some instances, posing logistical barriers that required creative solutions like offline alternatives and resource-sharing strategies. These challenges highlight the need for institutional support, including professional development for lecturers and infrastructure improvements, to ensure the model's scalability and sustainability.

The steps or syntax of *learning by research* based on *multiple intelligence* are as follows:

1. Orientation: Identification of learning objectives and analysis of students' special needs. In this first step, the mapping of learning objectives is carried

out, namely triggering students' research abilities and manifested in the form of the ability to write research results in the form of articles by integrating eight types of intelligence as theorized by Howard Gardner in the context of curriculum-based *multiple intelligence*.

2. Intelligence identification: integration of learning activities and methods with *multiple intelligences*. This step is carried out by conducting an initial mapping of the types of intelligence commonly used by students in learning and student intelligence that has not been actualized in the learning process, then integrating it in the context of learning configured in the form of approaches, strategies and curriculum-based learning methods.
3. Research planning: problem-based research project design. In the context of research design, the learning model is carried out using a problem-based research design by exploring actual problems in PAI learning, applying research steps such as observation, data collection, data analysis, and writing research results in the form of curriculum-based articles.
4. Data collection. Data collection is an important part of the learning model design, this step is carried out by providing *project-based* assignments using a *project-based learning* approach, by directly involving students in the research locus to obtain data in accordance with the characteristics of the research methods that have been determined within the curriculum framework.
5. Data analysis and report preparation. This step is carried out by analyzing the data according to the characteristics of the data that has been found, if the characteristics of the data are quantitative, then the data analysis technique uses a statistical formula, if the type of data is qualitative, then the data analysis technique uses the Miles and Huberman analysis paradigm or cycle, then compiling a research report that follows the format of the research report that has been designed and the curriculum-based article template.
6. Presentation and publication. The next step is to present the redacted research results in the form of an article. In the presentation, lecturers and experts assess the possible shortcomings of the research conducted, the validity of the methodology used, the *novelty* value of the research conducted, and its relevance to the applicable curriculum. After this step, students are then given the opportunity to revise their draft articles, then the next process is to submit articles to national journals.
7. Reflection and evaluation. This step is the last stage, by conducting reflection and evaluation. Both of these are intended to see the effectiveness of the model, its strengths and weaknesses, and the benefits gained from using the model in the context of the curriculum. From the results of reflection and evaluation, improvements are made to improve the learning model.

CONCLUSION

This study shows that the development of a *learning by research* model based on *multiple intelligence* is systematically able to improve the quality of learning in the Islamic Education Study Program, especially in strengthening research skills, scientific article writing skills, and optimizing student multiple intelligence. The model developed has gone through the validation stage, limited trials, and extensive trials, and shows significant effectiveness in overcoming the weak culture of research and

publication in religious universities. The implications of these findings indicate that the integration of the research approach with multiple intelligence mapping can be used as a pedagogical strategy in building adaptive, participatory, and scientific output-oriented learning and is in line with curriculum development. To adopt this model, other educational institutions are recommended to begin with training faculty on research-based and multiple intelligence approaches, providing technological infrastructure such as access to digital libraries, and adapting local curricula to incorporate research activities integrated with student intelligence mapping. Furthermore, future research could explore the application of this model in other disciplines beyond religious education, such as sciences or humanities, to test its generalizability, as well as investigate its long-term impact on the quality of students' scientific publications. This model can be recommended as one of the learning alternatives that are relevant to be applied in the development of research-based higher education curriculum and multiple intelligences.

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Rustan Efendy: Designed the research, developed the learning model concept, and wrote the draft manuscript.
Abdul Rahim Karim: Performed data analysis, validated the model, and revised the manuscript.
Muh Akib D: Collected primary data, conducted interviews, and contributed to the analysis of research results.
Arfian Alinda Herman: Developed research instruments, conducted observations, and provided input on the model design.
Fakhriyah Nur: Conducted model testing in the experimental class and prepared the test results report.
Muhammad Arhad: Contributed to the literature review, theoretical analysis, and final manuscript preparation.

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