JETTLe
Journal of Emerging Technology in Teaching and Learning
Volume 2 Issue 1 Year 2026, Pages 38-47
ISSN: 3090-8272
DOI: https://doi.org/10.26877/jettle.v2i1.2853

QUR'AN-INTEGRATED TEACHING MATERIALS FOR THE HUMAN REPRODUCTIVE SYSTEM: ENHANCING STUDENTS' LEARNING AUTONOMY

Asna Nofiyanti, Endah Rita Sulistya Dewi, Muhammad Syaipul Hayat
Master of Science Education Study Program, Universitas Persatuan Guru Republik Indonesia Semarang, Indonesia
asnanofiyanti@gmail.com

ABSTRACT

The rapid development of science and technology has provided both opportunities and challenges for adolescents. Increased access to digital information, including pornographic content, may influence students' sexual behavior during puberty and potentially lead to risky behaviors that negatively affect reproductive health. This situation reflects a lack of self-regulation among students, which is a key aspect of the independence dimension in the Pancasila Student Profile. This study aimed to develop and evaluate Qur'an-integrated teaching materials on the human reproductive system to strengthen students' learning autonomy and self-regulation. This research employed a Research and Development (R&D) approach using the ADDIE model. The study involved two groups consisting of an experimental class and a control class selected through purposive sampling. Data were collected using a student questionnaire and analyzed using t-test and N-gain analysis to examine the effectiveness of the developed teaching materials. The results showed that the experimental class achieved an N-gain score of 0.62 (moderate category), while the control class obtained 0.08 (low category). These findings indicate that the Qur'an-integrated teaching materials were more effective in improving students' independence compared to conventional learning materials. The developed materials integrate scientific concepts of the human reproductive system with Qur'anic values to promote both conceptual understanding and character development. This study contributes to science education by providing an alternative approach to integrating religious values into biology learning to support students' self-regulation and responsible behavior.

Keywords: Qur'an-integrated Learning; Human Reproductive System; Teaching Materials Development; Learning Autonomy; Science Education; Pancasila Student Profile

(Received 2025-10-07, Revised 2026-03-03, Accepted 2026-03-09, Available Online by 2026-03-10)

INTRODUCTION

In the era of Society 5.0, rapid advances in science and technology have significantly influenced various aspects of human life, including education. These developments require educational systems to equip students with the competencies needed to face future challenges. Science education plays an important role in developing students' critical thinking, creativity, and problem-solving skills by enabling them to connect scientific knowledge with real-life contexts [1]. Therefore, science learning needs to be adaptive to technological development and responsive to contemporary social challenges faced by students.

The rapid development of digital technology has also increased students' access to various sources of information. While this access can support learning, it also exposes adolescents to information that may not always be developmentally appropriate [2]. During puberty, adolescents experience significant physical and psychological changes that shape their

curiosity about sexuality and interpersonal relationships [3]. These developmental changes often lead students to seek information related to sexual matters, particularly through digital media [4]. Consequently, unrestricted access to online content may expose adolescents to inappropriate materials such as pornographic media, which can influence their attitudes and behavior [5].

Exposure to inappropriate sexual content may contribute to risky adolescent behaviors that have implications for reproductive health. Previous studies have highlighted concerns related to early sexual activity among adolescents, including the risk of sexually transmitted infections and unintended pregnancies [6][7]. In Indonesia, reports from the National Population and Family Planning Agency (BKKBN) indicate a significant number of teenage pregnancies each year, highlighting the importance of strengthening reproductive health education among adolescents [8][9]. In addition, adolescent pregnancy can lead to various health, psychological, and social consequences [10][11]. The spread of sexually transmitted diseases, including HIV/AIDS, also remains a concern, with a considerable proportion of cases occurring among young people [12][13].

These challenges highlight the importance of developing students' self-regulation and personal responsibility during adolescence. Self-regulation enables students to manage their emotions, behaviors, and decisions in response to internal and external influences [14]. Within the Indonesian educational context, self-regulation is closely related to the independence dimension of the Pancasila Student Profile, which emphasizes students' ability to understand themselves and manage their learning and behavior responsibly.

One educational strategy to strengthen students' independence is through reproductive health education delivered in science learning, particularly through the topic of the human reproductive system. Learning about the reproductive system enables students to understand the anatomy and physiology of male and female reproductive organs while also promoting awareness of reproductive health and responsible behavior. Through this learning process, students can develop a better understanding of the changes occurring during adolescence and learn how to manage these changes in a responsible manner.

In addition to scientific knowledge, integrating moral and religious values into science learning may further support students' character development. In the Indonesian context, integrating Qur'anic values into science education can provide ethical guidance that encourages students to develop self-control and responsible attitudes. Qur'anic teachings related to modesty, self-restraint, and moral conduct can help students develop stronger self-regulation when facing challenges related to adolescence.

Therefore, there is a need to develop innovative teaching materials that integrate scientific knowledge with religious values in order to strengthen students' independence and character development. This study aims to develop Qur'an-integrated teaching materials on the human reproductive system and examine their effectiveness in improving the independence dimension of the Pancasila Student Profile.

LITERATURE REVIEW

1. Teaching Materials

According to Minister of Education, Culture, Research, and Technology Regulation No. 262/M/2022 concerning Learning Outcomes in Early Childhood Education, Elementary, and Secondary Education, learning in the Independent Curriculum focuses on achieving learning

outcomes (CP), where teachers are given the freedom to select, develop, and use various learning resources. This emphasizes that teaching materials are all forms of materials used by teachers to help students achieve predetermined competencies and CP.

According to Prastowo (2019), teaching materials are defined as "all forms of materials, both written and unwritten, used by teachers in carrying out the learning process in the classroom." In the context of the Independent Curriculum, teaching materials can include main textbooks, teaching modules, Student Worksheets (LKPD), digital media, videos, and contextual learning resources in the surrounding environment.[15].

The innovation in this research is that the developed teaching materials are integrated with Quranic verses related to the human reproductive system. In addition to the Quranic content, indicators are also developed from the independent dimension.

2. Integration of the Qur'an into the Material of the Human Reproductive System

The integration of science and the Qur'an is an effort to combine scientific knowledge with Islamic values. According to Amin Abdullah (2016), the paradigm of scientific integration-interconnection is intended to ensure that science is not separated from moral and spiritual values. In the context of education, this integration is expected to produce students who are faithful, knowledgeable, and have good morals. The Qur'an itself contains many kauniyah verses that encourage people to think about natural phenomena and life (QS. Ali Imran: 190–191). Therefore, science materials, including the human reproductive system, can be integrated with Qur'anic values to make learning more meaningful and build students' spirituality [16].

3. The Quranic Perspective on Human Reproduction

The Qur'an explains the process of human development from a drop of semen (nutfah), then a clot of blood ('alaqah), then a lump of flesh (mudhghah), until becoming a perfect human being (QS. Al-Mu'minun: 12–14). This explanation is in line with the stages of modern embryology studied in reproductive biology. According to Harun Yahya (2005), the Qur'an's explanation of human development strikingly aligns with modern scientific findings, particularly in the field of embryology. Therefore, integrating Qur'anic verses with material on the reproductive system can strengthen students' belief in the greatness of Allah SWT.

4. The Urgency of Integrating the Qur'an in Science Learning

The integration of the Qur'an in science learning, especially the human reproductive system, has several urgencies, including increasing students' spirituality through an understanding that the reproductive process is a sign of Allah's greatness (QS. An-Najm: 45–46), building a religious character that is in line with the Pancasila Student Profile, encouraging contextual learning because students are invited to relate science to the teachings of their religion (Syamsuddin, 2020), avoiding the secularization of science by positioning science as a means of strengthening faith, not just technical knowledge [17].

5. The Independent Dimension in the Pancasila Student Profile

The independent dimension is defined as a student's ability to manage themselves and their learning process responsibly. According to the Education Standards, Curriculum, and Assessment Agency (2021), independent learners are self-aware of their potential, strengths, and weaknesses, and are able to set life goals and employ effective learning strategies. The main indicators of the independent dimension are self-awareness: understanding one's

potential, feelings, interests, and motivations. Self-regulation: the ability to manage thoughts, emotions, and behavior to achieve desired goals.

METHODOLOGY

This study employed a Research and Development (R&D) approach using the ADDIE instructional design model, which consists of five stages: Analysis, Design, Development, Implementation, and Evaluation. The R&D approach was chosen to develop and evaluate Qur'an-integrated teaching materials for the human reproductive system. In the analysis stage, the researchers identified students' needs, learning problems, and relevant curriculum requirements related to the human reproductive system topic. This stage also examined the need to integrate Qur'anic values to strengthen students' independence and self-regulation. During the design stage, the structure of the teaching materials was planned, including the integration of scientific concepts with relevant Qur'anic verses. Learning objectives, instructional strategies, and assessment indicators related to the independence dimension of the Pancasila Student Profile were also developed. In the development stage, the teaching materials were produced and refined based on expert validation and preliminary revisions. The materials were designed to integrate biological concepts of the human reproductive system with Qur'anic perspectives that encourage moral awareness and self-regulation. The implementation stage involved testing the developed teaching materials in two groups consisting of an experimental class and a control class. The experimental class used the Qur'an-integrated teaching materials, while the control class used conventional learning materials. The participants were selected using purposive sampling. To measure the improvement of the independence dimension, data were collected using a structured student questionnaire. The questionnaire employed a five-point Likert scale ranging from 1 to 5, representing very poor, poor, fair, good, and very good. The questionnaire measured key indicators of the independence dimension, including self-understanding and self-regulation. Finally, in the evaluation stage, the effectiveness of the teaching materials was analyzed by comparing the pretest and post-test results. Data analysis was conducted using t-test analysis to examine differences between the experimental and control groups, as well as N-gain analysis to determine the level of improvement in students' independence.

RESULTS

The results obtained after students filled in the independence dimension questionnaire is as shown at Table 1.

Table 1. Average Results of the Overall Score of the Independent Questionnaire

Activities	Class	N	Average
Pre-test	Experiment	37	75.72
	Control	36	75.32
Post-test	Experiment	37	90.86
	Control	36	77.31

The data is also presented in the form of diagram 1.

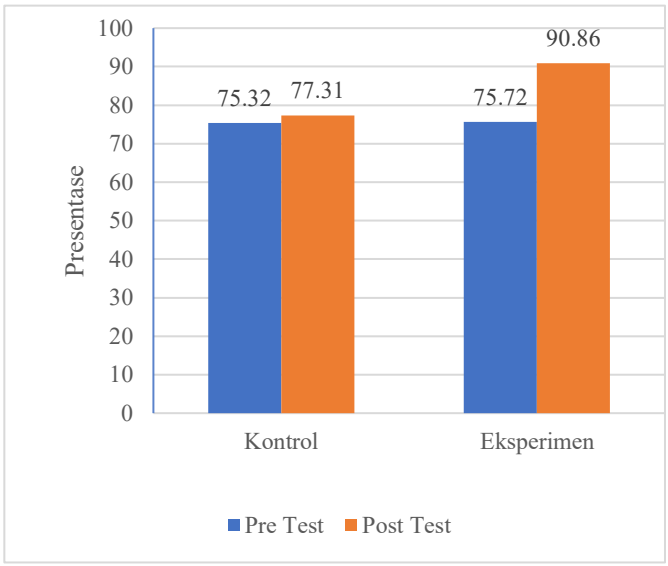

Figure 3. Average Results of the Overall Score of the Independent Dimension Questionnaire

To obtain information about the improvement of each element of the independent dimension, the results will be presented in each element. The presentation of each element can be seen in Table 2 and Figure 2 below.

Table 2. Summary of Values for Each Independent Dimension Element

No	Indicator Independent Dimension	Control Class		Experimental Class	
		Pretest	Posttest	Pretest	Posttest
1	Self-Understanding	68.06	72.22	66.49	89.86
2	Self-Regulation	78.96	79.86	80.34	91.35

The summary of the values of each element of the Independent Dimension can be presented in the following figure 4.

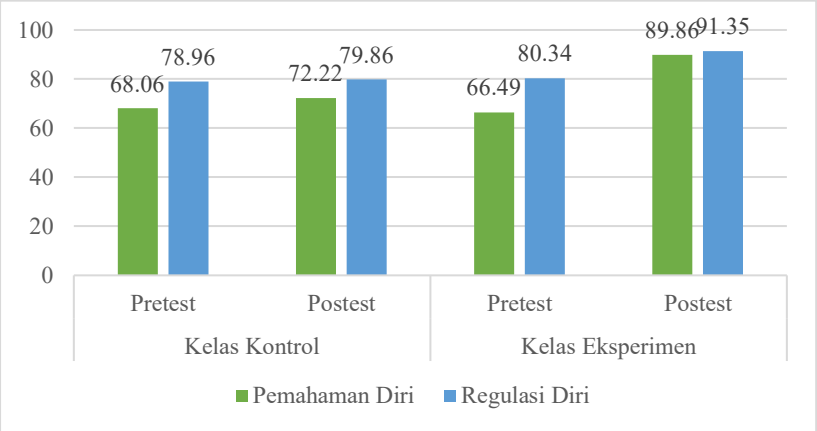

Figure 4. Summary of Values for Each Independent Element

The normality, homogeneity and t-test values can be seen in table 3 below.

Table 3. Results of Normality Test, Homogeneity Test and t-Test on Independent Value Scores

Activity	Class	Norm.	Hom.
Pre-Test	Experiment	0.082	0.099
	Control	0.070	
Post-Test	Experiment	0.094	0.082
	Control	0.121	

The N-Gain test is used to determine the effectiveness of learning devices as shown in Figure 5 below.

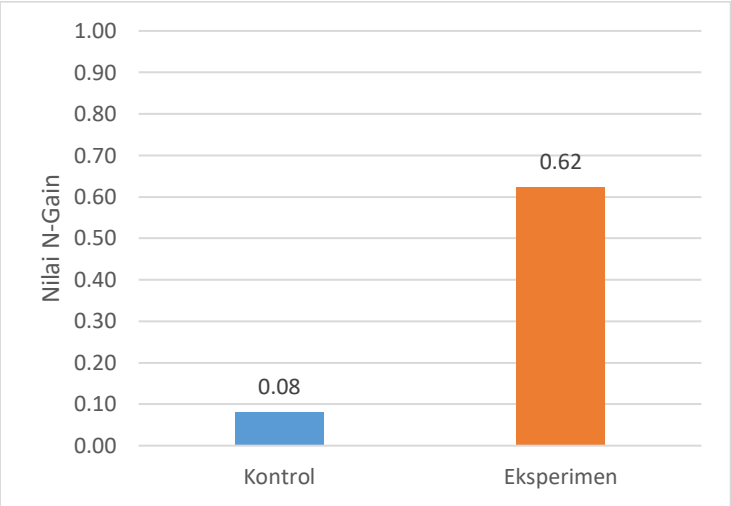

Figure 5. N-gain Improvement of Pancasila Student Profile in Independent Dimension

The results for each percentage for the experimental class were 0.62, while the percentage for the control class was 0.08. To obtain information about the improvement of each element of the independent dimension, the results will be presented in each element. The presentation of each element of the independent dimension can be seen in the following table.

Table 4. Comparison of Independent Dimension N-Gain Values

No	Independent Dimension Indicator	N-Gain Control	Interpretation	Experiment	Interpretation
1	Self-Understanding (17-20)	0.13	Low	0.70	Currently
2	Self-Regulation (21-28)	0.04	Low	0.56	Currently

The comparison of the independent dimension N-Gain values can be presented in the following figure 6.

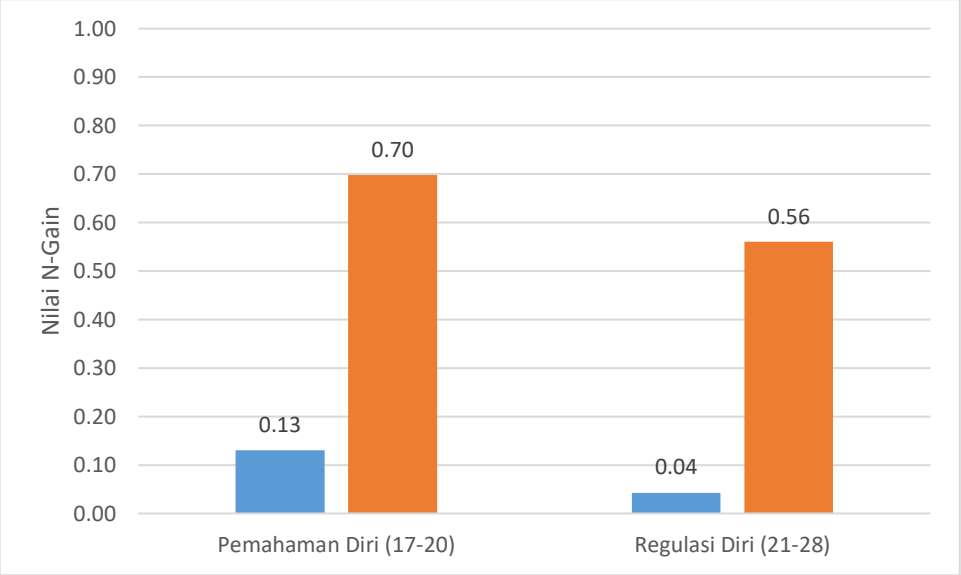

Figure 6. Comparison Diagram of N-Gain Values for Each Element

DISCUSSION

The findings indicate that the implementation of Qur'an-integrated teaching materials contributed to improvements in the independence dimension of the Pancasila Student Profile. The pretest results showed relatively similar scores between the experimental class (75.72) and the control class (75.32), indicating comparable initial conditions. However, the posttest results revealed a substantial increase in the experimental class (90.86) compared with the control class (77.31). This improvement suggests that integrating Qur'anic values into science learning materials can positively influence students' learning autonomy and self-regulation.

A closer examination of the self-regulation element shows that students in the experimental class experienced a more substantial improvement compared to those in the control class. The experimental class increased from a pretest score of 80.34 to a posttest score of 91.35, whereas the control class showed only a slight increase from 78.96 to 79.86. These findings suggest that the integration of religious values within science learning may encourage students to regulate their emotions and behavior more effectively, particularly in relation to social interactions and adolescent developmental challenges. The questionnaire responses indicated that students became more aware of appropriate interactions with the opposite sex and demonstrated improved emotional control. One example highlighted in the learning materials is the Qur'anic command to guard one's gaze toward the opposite sex as a form of self-regulation, which aligns with previous studies emphasizing the role of moral and religious values in guiding adolescent behavior [18].

The effectiveness of the intervention was further supported by the N-gain analysis. The experimental class achieved an N-gain score of 0.62, categorized as moderate improvement, while the control class obtained 0.08, categorized as low improvement. These results indicate that Qur'an-integrated teaching materials are more effective in strengthening students' independence compared with conventional learning materials. When examining each element of the independence dimension, the experimental class demonstrated an N-gain score of 0.69 for self-understanding and 0.56 for self-regulation, both within the moderate category. The higher score in self-understanding suggests that students developed greater awareness of themselves and their developmental challenges during adolescence. Similar studies have also

applied N-gain analysis to evaluate the effectiveness of innovative learning approaches in science education [19].

From the perspective of adolescent development, self-understanding plays an important role in helping students recognize the physical and psychological changes experienced during puberty. Adolescents often face challenges such as peer influence, curiosity about sexuality, and exposure to inappropriate content. Integrating Qur'anic values within learning materials may provide moral guidance that helps students develop self-control and responsible behavior. Previous studies have suggested that adolescents with strong moral and religious foundations are more capable of avoiding risky behaviors and maintaining positive social conduct [20][21].

The findings also revealed observable behavioral changes among students in the experimental class. Students demonstrated increased awareness in maintaining respectful communication with peers, avoiding inappropriate interactions, and engaging in positive school activities such as extracurricular programs and student organizations. These behaviors reflect improvements in self-awareness and self-regulation, which are essential aspects of the independence dimension within the Pancasila Student Profile. Similar findings have been reported by Pitaloka (2024), who found that character-based educational programs can strengthen students' independence and responsible behavior in school contexts [22].

Overall, the results suggest that integrating Qur'anic values with science learning materials can provide a meaningful educational approach that supports both cognitive understanding and character development. This integrative approach may help students navigate the challenges of adolescence while fostering responsible and self-regulated learning behaviors.

CONCLUSION

This study developed and evaluated Qur'an-integrated teaching materials on the human reproductive system using the ADDIE development model. The findings indicate that the developed materials were effective in improving students' learning autonomy within the framework of the Pancasila Student Profile. The N-gain analysis showed that the experimental class achieved a moderate improvement (0.62), whereas the control class demonstrated a low improvement (0.08). These results suggest that integrating Qur'anic values with scientific content can enhance students' self-understanding and self-regulation in learning. The integration of religious values into science education provides a meaningful approach that not only supports students' conceptual understanding but also promotes character development and responsible behavior during adolescence. This study contributes to the growing discussion on the integration of faith-based perspectives in science learning. The developed teaching materials may serve as a practical reference for teachers in designing value-based biology instruction. Future research should explore the implementation of similar integrative approaches in other science topics and educational contexts.

ACKNOWLEDGMENT

Thank you for all the assistance from all parties who helped during the implementation of the research. To Dr. M. Syaipul Hayat, M.Pd and Prof. Dr. Endah Rita Sulistya Dewi, M.Si from the Master of Science Education Study Program, Universitas Persatuan Guru Republik Indonesia Semarang, thank you for all your guidance.

CONFLICT OF INTEREST STATEMENT

This research was not funded by any party.

REFERENCES

[1] Alwanda RI, Alviasyah EN, Lailatul SF, Jariyah IA. The urgency of 21st-century skills in science learning in junior high schools in welcoming the era of society 5.0. Science Education and Development Journal Archives 2024;2:44–50.

[2] Tohirin. Integration-based guidance and counseling in schools and madrasas. Higher Education Book Division, RajaGrafindo Persada; 2007.

[3] Isnawan F. A Criminological Study of the Phenomenon of Youth Brawls in Indonesia and Its Management. Gorontalo Law Review 2023;6:62–74.

[4] Wardhani DT. Adolescent development and sexuality. Sosio Informa 2012;17.

[5] Alwi A. OverviewAdolescent Sexual Behavior in Indonesia: Literature Review. Healthy Tadulako Journal (Tadulako Health Journal) 2023;9:94–9.

[6] Setyawan SA, Gustaf MAM, Pambudi ED, Anwar S. Student Free Sex In The Perspective Of Criminology And Law. Law Research Review Quarterly 2019;5:135–58.

[7] Resky F, Ahri RA, Ikhtiar M. Free Sex Behavior in Review of the Influencing Factors in SMA Negeri 1 Wawonii, Konawe Islands Regency. Window of Health: Jurnal Kesehatan nd;1:241–53.

[8] Sari RP, Astuti VW. Teenage pregnancy in Indonesia: determinants and outcomes.Aisyah Journal: Journal of Health Sciences 2022;7:949–56.

[9] BodyNational Population and Family Planning. Adolescent Reproductive Health Education. 2023.

[10] Handayani L, Rahayu HS, Olivia C, Meirini I, Qurniasih N. Efforts to Improve Adolescent Health in Avoiding Premarital Pregnancy. Journal of Community Service and Educational Research 2024;2:338–42.

[11] Indarti J, Al Fattah AN, Dewi Z, Hasani RDK, Mahdi FAN, Surya R. Teenage pregnancy: obstetric and perinatal outcome in a tertiary center in Indonesia. Obstet Gynecol Int 2020;2020:2787602.

[12] Fitriani RK, Salim LA. Knowledge of HIV Transmission and Factors Related to the Incidence of HIV/AIDS in Adolescents in Indonesia. Indian Journal of Forensic Medicine & Toxicology2021;15:1459–64.

[13] Buaton A, Sinaga AS, Sitorus MA, Province B, Utara S. KNOWLEDGE AND EXPOSURE INFORMATION OF ADOLESCENTS ABOUT REPRODUCTIVE HEALTH. vol. 2. 2019.

[14] Wahyu S, Taufik T.The Relationship between Understanding of Intelligent Character and Students' Tendency for Free Sexual Behavior. Neo Counseling Journal 2022;4:7–11.

[15] Prastowo A. Creative guide to making innovative teaching materials to create interesting and fun learning methods 2019.

[16] Abdullah A. Islam as a cultural capital in Indonesia and the Malay world: A convergence of Islamic studies, social sciences and humanities. Journal of Indonesian Islam2017;11:307–28.

[17] Zain Z,Vebrianto R. Integration of science and Islamic knowledge in the science learning process. National Seminar on Information, Communication and Industrial Technology, 2017, p. 703–8.

[18] Ilham DM,Saepudin A, Surbiantoro E. Educational Implications of the Quran Surah An-Nur Verses 30-31 on the Command to Maintain One's Perspective on Moral Education. Bandung Conference Series: Islamic Education, vol. 2, 2022, p. 596–605.

[19] Listyawati M. Development of Integrated Science Learning Tools in Junior High School. Journal of Innovative Science Education 2012;1.
[20] Mujib A,Mudzakir J. Nuances of Islamic Psychology, 2nd ed., Jakarta, PT. RajaGrafindo Persada 2002.
[21] Daradjat Z. Special methods for teaching Islamic religion. 2016.
[22] Pitaloka WD, Patmisari P. Strengthening the Profile of Pancasila Students in the Dimensions of Independence and Mutual Cooperation through Scout Extracurricular Activities. Ainara Journal (Journal of Research and PKM in the Field of Educational Sciences) 2024;5:89–99.