

Integrating Deep Learning and Islamic Values in Science Education: Fostering Healthy Lifestyles Among Elementary School Students

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Abstract: This study aims to apply the Deep Learning approach in science subjects to foster students' healthy attitudes towards the gift of hearing through in-depth scientific understanding and the reinforcement of Islamic spiritual values. This study uses a field study method with a quantitative approach. The research subjects consisted of 120 fifth-grade students at SDN 050 Cibiru. Data were collected through observation, interviews, and tests of concept understanding and healthy lifestyle attitudes. Data analysis was conducted by comparing the pre-test and post-test results using descriptive statistical tests. The results showed that the application of Deep Learning in science education significantly improved students' conceptual understanding of the human auditory system. In addition, there was an increase in healthy lifestyle attitudes, such as awareness of maintaining ear hygiene and avoiding the habit of listening to loud sounds. Students also demonstrated an understanding of spiritual values related to gratitude and responsibility for the gift of hearing. The application of Deep Learning in science learning is effective in fostering healthy lifestyles based on Islamic values. The integration of technology, innovative learning strategies, and spiritual values can strengthen character education in elementary schools. This article makes an important contribution to the development of learning strategies that synergize science and faith in the elementary education environment.

Keywords: Deep Learning; Education; healthy lifestyle; hearing sounds

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INTRODUCTION

Science education plays an important role in shaping students' conceptual understanding and scientific attitudes from elementary school onwards. However, preliminary observations at SDN 050 Cibiru of 120 fifth-grade students showed that only 46% of students could correctly answer questions about the function of the ear and the hearing process, while 35% of them had a habit of listening to music at high volume using earphones. This fact shows that in addition to a low level of scientific conceptual understanding, students' awareness of the importance of maintaining healthy hearing is also weak.

This problem illustrates that science education in elementary schools is still oriented towards cognitive mastery, without emphasizing the integration of spiritual values and healthy living. In fact, from an Islamic educational perspective, maintaining health is part of obedience to Allah SWT as He says: "And do not throw yourselves into destruction" (QS. Al-Baqarah: 195), and "O you who believe, obey Allah and His Messenger and do not turn away from him while you hear (his call)" (QS. Al-Anfal: 20).

Education that is oriented towards the formation of the mind, heart, and behavior is part of the vision of modern Islamic education. Tursinawati et al. (2024) explain that the integration of religious and scientific values in elementary schools can strengthen students' spiritual beliefs in understanding natural phenomena. This finding is reinforced by Alam and Rachmadhani (2023), who state that the integration of science and religion in primary education can strengthen students' moral character and responsibility towards God's creation.

On the other hand, developments in modern pedagogy show that the Deep Learning approach is effective in developing students' higher-order thinking, collaborative, and reflective abilities. Chen and Singh (2023), through a systematic review, found that Deep Learning has a significant impact on the development of conceptual understanding and problem-solving skills at various levels of education. Research by Ismail et al. (2024) also shows that Deep Learning can improve literacy and active engagement of elementary school students in project-based learning. Meanwhile, Wiwin Kusrianto et al. (2023) argue that the use of digital-based deep learning significantly improves science learning outcomes at the secondary level.

However, although various studies have shown the effectiveness of Deep Learning in the context of science education, most of these studies have not addressed the integration of spiritual values and religious character in it. In the Indonesian context, the integration of science and Islamic values is still not a major focus in science learning in elementary schools. Therefore, a learning model is needed that not only develops deep thinking skills but also fosters students' spiritual awareness and responsibility for the gift of hearing given by Allah Swt.

This research gap forms an important basis for the research conducted at SDN 050 Cibiru, namely to integrate the Deep Learning approach with Islamic educational values in science learning, particularly in the subject of the auditory system (ears).

The novelty of this research lies in its effort to present science learning that emphasizes the synergy between mastery of scientific concepts and the formation of religious character through understanding the function and importance of maintaining ear health as a form of gratitude for the gift of hearing. Thus, the objectives of this study are to analyze the application of the Deep Learning approach in science learning on the subject of the auditory system at SDN 050 Cibiru. Assess its effect on improving students' understanding of scientific concepts and healthy lifestyles. Examine the integration of Islamic values in the science learning process to foster spiritual awareness of the gift of hearing.

The Deep Learning approach in the context of education focuses on meaningful and reflective learning processes, not merely memorizing information (Chen & Singh, 2023). This model requires cognitive, affective, and psychomotor involvement of students through collaborative activities, problem solving, and reflection. In science learning, Deep Learning can be applied through experiments, scientific projects, and discussions based on natural phenomena (Ismail et al., 2024). In addition, the results of research by Wiwin Kusrianto et al. (2023) show that the use of Deep Learning-based digital media can increase student engagement and learning outcomes because it encourages them to understand concepts in depth and apply them. This approach also supports student-centered learning and builds intrinsic motivation.

Islamic education emphasizes a balance between knowledge and faith. According to Tursinawati et al. (2024), integrating Islamic values into science education can increase students' religious awareness and strengthen their spiritual character. Similar findings were reported by Alam and Rachmadhani (2023), who found that a religion-based approach to science can foster gratitude for Allah's creation while encouraging ethical behavior towards the environment and personal health. Verses from the Qur'an such as (QS. Al-Baqarah: 195) and (QS. Al-Anfal: 20) provide a spiritual foundation that maintaining physical health and using one's hearing properly are part of Allah SWT's mandate that must be upheld.

Science learning has great potential to instill character values such as responsibility, discipline, and concern for the environment. Mandasari et al. (2022) emphasize that active learning able to develop character dimensions through direct learning experiences. Therefore, the Deep Learning approach, which emphasizes meaningful experiences, can be an effective strategy in fostering a healthy lifestyle while strengthening religious character education.

RESEARCH METHODS

This study used a quantitative method with a pre-experimental design (one-group pretest-posttest design) aimed at determining the effectiveness of the Deep Learning approach in improving students' understanding of the auditory system and fostering healthy lifestyles based on Islamic values. This approach was chosen because it is suitable for measuring changes in knowledge and attitudes before and after the learning treatment.

The research subjects were 80 fifth-grade students at SDN 050 Cibiru, selected using total sampling technique, as the entire population in one class was

included in the learning process. The research was conducted over four weeks in the even semester of the 2024/2025 academic year.

The instruments used consisted of two forms, science knowledge test – used to measure students' understanding of the concepts of the auditory system (ears), the hearing process, and the relationship between sound and waves. Healthy lifestyle questionnaire – used to measure students' level of awareness in maintaining hearing health, such as avoiding loud noises, maintaining ear hygiene, and being grateful for the gift of hearing as a blessing from Allah Swt. Both instruments have been validated by science and Islamic education experts to ensure their content validity and reliability.

The research procedure consists of three main stages, students are given a knowledge test and a healthy lifestyle questionnaire before the implementation of Deep Learning. This initial data is used to determine students' level of understanding and awareness before the intervention. Deep Learning Implementation Stage, at this stage, science learning is carried out using a Deep Learning approach that involves observation activities, simple experiments on sound and hearing, the use of digital media and visual simulations, as well as reflections based on Islamic values. Teachers act as facilitators who encourage students to think critically, discuss, and relate scientific phenomena to religious teachings.

After the learning process was completed, students were given the same tests and questionnaires again to measure changes in their knowledge and attitudes toward healthy living after the application of Deep Learning.

Data was collected in three ways, written tests to measure students' cognitive aspects regarding the concept of hearing. Likert scale questionnaires to measure changes in students' attitudes towards healthy living. Observations during learning to see student involvement and response in the Deep Learning process.

Data was analyzed quantitatively using descriptive and simple inferential statistics. Descriptive statistics were used to calculate the mean, percentage, and standard deviation of the pre-test and post-test results. A paired sample t-test was used to determine the significant difference between the pre-test and post-test results. If the data was not normally distributed, the Wilcoxon signed rank test was used as an alternative. In addition, a qualitative analysis was conducted on the observation results to strengthen the interpretation of quantitative data, especially in understanding how the Deep Learning approach affects students' behavior and spiritual awareness.

RESEARCH RESULTS AND DISCUSSION

This study was conducted on 80 fifth-grade students at SDN 050 Cibiru to measure the effect of applying Deep Learning in science learning on students' understanding of concepts and attitudes towards healthy living. Before the treatment, students were given a pre-test and questionnaire to determine their initial abilities and attitudes towards hearing health. After learning using the Deep Learning approach, a post-test and questionnaire were conducted again.

Descriptively, the results of the comparison of scores before and after the application of Deep Learning are presented in Table 1 below:

Table 1. Descriptive Results of Pre-test and Post-test

Variabel	N	Mean	SD	SE	Koefisien Variasi
Before Deep Learning	79	69.19	16.24	1.83	0.235
After Deep Learning	79	84.38	7.92	0.89	0.094

The data in Table 1 shows that the average student score increased from 69.19 before learning to 84.38 after the application of Deep Learning. The decrease in standard deviation from 16.24 to 7.92 indicates that the variation in scores between students has become smaller, which means that student understanding has become more uniform.

The increase in student scores can also be seen in Figure 1, which shows a significant shift in the average learning outcomes after the Deep Learning-based learning intervention.

Descriptives

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Sebelum DeepLearning	79	69.190	16.243	1.828	0.235
Sesudah DeepLearning	79	84.380	7.917	0.891	0.094

Descriptives Plots

Sebelum DeepLearning - Sesudah DeepLearning

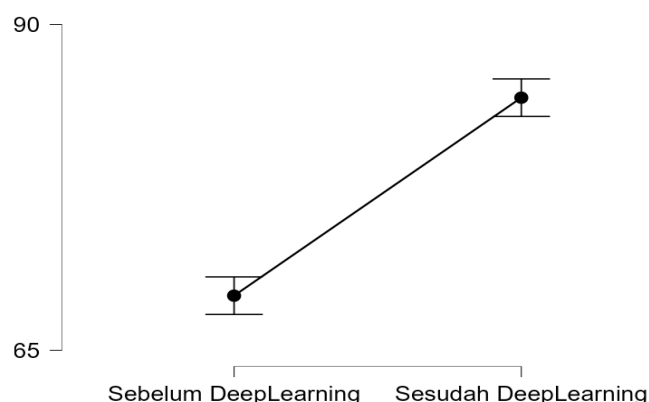


Figure 1. Comparison of Scores Before and After Deep Learning

(The figure shows an increase in the average student score from around 69 to 84.)

Normality Assumption Test

Before conducting the difference test, a normality test was performed using the Shapiro–Wilk test to determine whether the data was normally distributed.

Table 2. Normality Test Results (Shapiro–Wilk)

Variabel	W	p
Before – After Deep Learning	0.869	< .001

The test results show that the significance value $p < .001$, which means that the data is not normally distributed. Thus, further analysis uses two approaches, namely the paired samples t-test to see the general trend and the nonparametric Wilcoxon Signed Rank Test to ensure that the test results remain valid.

Difference Test (t-Test and Wilcoxon)

Table 3. Results of the t-Test and Wilcoxon Test

Measure 1	Measure 2	Test	Statistic	df	p
Before Learning	Deep Before Learning	Student	-14.844	78	< .001
After Deep Learning	After Deep Learning	Wilcoxon	-6.901	—	< .001

Paired Samples T-Test

Measure 1	Measure 2	Test	Statistic	z	df	p
Sebelum DeepLearning	- Sesudah DeepLearning	Student	-14.844		78	< .001
		Wilcoxon	0.000	-6.901		< .001

Assumption Checks

Test of Normality (Shapiro–Wilk)

	W	p
Sebelum DeepLearning - Sesudah DeepLearning	0.869	< .001

Note. Significant results suggest a deviation from normality.

The t-test results show a value of $t = -14.844$ with $p < .001$, indicating a significant difference between the values before and after the application of Deep Learning. These results are confirmed by the Wilcoxon test, which also shows a value of $z = -6.901$, $p < .001$, so it can be concluded that the application of Deep Learning has a significant effect on improving student learning outcomes.

The increase in the average score from 69.19 to 84.38 is not just a statistic, but a reflection of the change in the way students learn and understand science. Through the Deep Learning approach, students not only memorize concepts

about the ear and sound, but they truly explore the process of hearing as a miracle of God's creation that should be appreciated.

During the learning process, the classroom atmosphere became more lively. Students were invited to experiment, discuss, and reflect on how the ear works and how to take care of it. They learned that maintaining hearing health is not just a medical habit, but part of their spiritual responsibility for the blessings that God has entrusted to them. This change is evident: children begin to be careful in using earphones, talk about the importance of safe sound, and even associate gratitude with their ability to hear.

Scientifically, the results of this study reinforce the findings of Ismail et al. (2024), which state that Deep Learning can increase student engagement and learning meaning. Furthermore, this study is also in line with Tursinawati et al. (2024), which emphasizes that the integration of spiritual values in science can foster religious awareness and positive character in students.

Statistical tests show very significant results ($p < 0.001$), but the deeper meaning is evident in the changes in students' attitudes and enthusiasm for learning. The Deep Learning approach makes science learning a space for awareness to grow, not just mastery of theory. Children learn to interpret each scientific concept with their hearts—realizing that learning about the ear also means learning to be grateful and to take care of the gift of hearing.

In the context of education that supports independent learning, these results prove that Deep Learning can liberate students' ways of thinking. They are no longer passive recipients of knowledge, but discoverers of meaning in their own learning process. This is in line with Ki Hadjar Dewantara's philosophy, which emphasizes that education is essentially an effort to humanize humans.

Through this approach, teachers are no longer the center of information, but rather guides who ignite curiosity. Meanwhile, students grow as critical thinkers, grateful individuals, and those who care about their health and their environment. The results of this study not only demonstrate the success of the method, but also illustrate a more holistic educational journey — one that touches the mind, heart, and behavior.

Discussion

The results of the study show a significant increase in student learning outcomes and healthy attitudes after the application of the Deep Learning approach in science learning. Based on descriptive analysis, the average student score increased from 69.19 to 84.38, with a decrease in standard deviation from 16.24 to 7.92. This means that the improvement did not only occur in a small number of students, but was evenly distributed among most of the students. Statistically, the t-test and Wilcoxon test results showed a p-value < 0.001 , which means that the improvement was very significant.

This improvement reflects that Deep Learning is effective in deepening students' understanding of the concept of human hearing (the ear). This approach encourages students to not only know what and how the hearing process occurs, but also why it is important in their lives. The observation results

support this finding: students who were initially passive and less concerned about ear health began to show positive behavioral changes, such as limiting the use of earphones, avoiding loud noises, and cleaning their ears properly.

Secara pedagogis, perubahan ini menunjukkan keberhasilan pembelajaran yang bersifat holistik – menyentuh ranah kognitif, afektif, dan psikomotorik. Hal ini sejalan dengan pandangan Bybee (2013) bahwa pembelajaran sains harus mengembangkan keterampilan berpikir kritis dan kreatif, bukan sekadar concept mastery. In addition, Hmelo-Silver's (2004) research also confirms that experiential learning improves students' ability to connect theory with real life, as seen in this study.

Furthermore, Deep Learning provides space for students to experience a deep learning process through exploration, collaboration, and reflection. Activities such as demonstrating sound vibrations, observing resonance, and discussing the function of the human ear engage students actively and meaningfully. This process is in line with the constructivist theories of Vygotsky (1978) and Piaget (1969), which emphasize that knowledge is constructed through social interaction and personal experience.

From a spiritual perspective, this learning also successfully fosters students' religious awareness. When they understand how the complexity of the auditory system works, students are invited to reflect on the greatness of Allah SWT and be grateful for the gift of hearing as part of their religious responsibility. This principle is in line with Allah's words in Q.S. Al-Anfal: 20, which emphasizes the importance of hearing and obeying His commands, and QS. Al-Baqarah: 195 about maintaining physical health as a form of worship. Thus, the Deep Learning approach not only strengthens cognitive abilities but also instills the value of tazkiyah an-nafs (self-purification) through meaningful learning.

Conceptually, the results of this study reinforce the findings of Ismail et al. (2024) that Deep Learning can improve student engagement and learning outcomes in elementary schools. Tursinawati et al. (2024) also showed that the integration of science and Islamic values can shape students' religious character in the context of science learning. In other words, this study confirms that Deep Learning can be a bridge between modern science education and Islamic spiritual values.

From a character education perspective, the results of this study show that when students understand science within a religious framework, they not only become more academically intelligent, but also wiser and more responsible towards themselves and their environment. Learning about hearing becomes a gateway to the formation of self-awareness and gratitude for God's gifts.

Thus, it can be concluded that the application of Deep Learning in science learning is not only effective in improving learning outcomes, but also becomes a vehicle for fostering a healthy lifestyle, spiritual awareness, and faithful character in elementary school students. These results show a close relationship between knowledge, faith, and charity in the context of holistic and transformative Islamic education.

The Application of Deep Learning in Science Education

Deep learning in the context of education refers to a learning approach that encourages students to understand concepts in depth, connect new knowledge with previous experiences, and apply it in real contexts. "Deep learning is a learning approach that allows students to learn more deeply and meaningfully through direct and interactive experiences."

"Deep learning can help students develop critical and creative thinking skills, as well as improve their problem-solving abilities." (Downes, 2010) The application of deep learning in science learning of hearing (ear) material can be done in several ways, such as:

Project-Based Learning, students can be invited to make a model of the human ear using child-friendly materials such as plasticine, which they can then present in their own language.

Technology Integration, the use of Augmented Reality (AR) to visualize the structure of the ear and the hearing process can improve students' understanding.

Simulation of the Hearing Process, by using online learning applications or simulation software, students can learn about the hearing process interactively and visually. They can understand how the ear works and how sound is processed by the brain. According to Prensky (2001), "technology-based learning can increase student motivation and engagement in the learning process."

STEM-Based Projects, students can create STEM-based projects related to the ear and the hearing process, such as making a model of the ear or creating a simple hearing aid. This can help them understand concepts more deeply and develop critical thinking skills. According to Thomas (2012), "STEM education can help students develop critical and creative thinking skills."

Reflection and Discussion, encourage students to reflect on their experiences related to hearing and discuss how their lives would be different without the ability to hear.

Fostering an Islamic Healthy Lifestyle Through Learning

By understanding the complexity of the auditory system and how important this sense is in everyday life, students can be encouraged to reflect on and live a healthy lifestyle with the gift of hearing. Activities such as writing a healthy lifestyle journal, sharing stories about memorable hearing experiences, or conducting social activities to help friends with hearing impairments can reinforce these values. Several quotes that emphasize children's health are as follows:

"Children's health is the most valuable investment in the future." (WHO)

"Good nutrition and regular physical activity are the keys to optimal child health." (Dr. Irwin Redlener, Director of the Center for Children's Health at Columbia University). These statements are in line with Islamic principles that instruct believers to maintain a balance between physical and spiritual needs, as stated in QS. Al-Qasas: 77

"Children who have a healthy lifestyle will have better cognitive and physical abilities." (Dr. Jane D. Brown, Professor of Public Health at the University of North Carolina)

"Children's mental health is just as important as their physical health." (Dr. Daniel J. Siegel, Professor of Psychiatry at the University of California, Los Angeles)

"A healthy and safe environment is very important for children's health." (Dr. Philip J. Landrigan, Director of the Center for Children's Health and the Environment at Icahn University) In science education, fostering a healthy lifestyle can be done in several ways, such as:

1. Connecting Material to Everyday Life: Students can understand how the ear and the process of hearing play an important role in everyday life, such as in communication and social interaction. According to Dewey (1938), "experience-based learning can help students understand concepts more deeply and develop critical thinking skills."

2. Appreciating Blessings: From an Islamic educational perspective, this lesson also contains moral and spiritual values as explained by Al-Ghazali (1097) in *Ihya Ulumuddin*, that gratitude is a form of recognition of Allah's blessings, which is manifested through the proper and beneficial use of those blessings. Thus, maintaining ear health and avoiding habits that can damage hearing is a tangible form of gratitude. Such education fosters the awareness that knowledge is not separate from faith, but rather reinforces it.

Elementary School Students

"Elementary school students are at a very important stage of cognitive development, so learning must be designed to meet their needs." (Piaget, 1969)

This statement refers to the theory of cognitive development proposed by Jean Piaget. According to Piaget, elementary school children are generally in the concrete operational stage, which occurs around the ages of 7–11. At this stage, they begin to be able to think more logically, but still rely on objects and real experiences to understand concepts.

In the context of learning, this statement emphasizes that education for elementary school students must be designed to suit their cognitive characteristics. This means:

Learning must be concrete, using real objects or concrete examples so that children can understand concepts better.

Children begin to understand cause-and-effect concepts and think logically, so methods such as experiments or problem-solving exercises will be very effective. Teaching should not be too abstract, as they are not yet fully capable of thinking hypothetically or abstractly.

Social interaction and discussion with peers can help them develop a better understanding.

This statement emphasizes the importance of a curriculum and teaching strategies that are appropriate for students' cognitive development so that they can learn optimally.

“Learning based on experience and activities can help elementary school students develop critical and creative thinking skills.” (Dewey, 1938), Dewey believed that children learn well when they are actively involved in the learning process rather than just passively receiving information.

CONCLUSION

This study proves that the application of Deep Learning methods in science education on the subject of “Hearing Sounds (Ears)” has a significant effect on improving learning outcomes and shaping healthy lifestyles among fifth-grade students at SDN 050 Cibiru. Through a learning process that emphasizes exploration, reflection, and active involvement, students demonstrate a deeper conceptual understanding and more conscious behavior regarding the importance of maintaining hearing health.

The application of Deep Learning also succeeded in creating a more enjoyable, interactive, and meaningful learning atmosphere, so that each student had the opportunity to develop according to their potential. This learning not only strengthened cognitive aspects but also fostered affective and spiritual awareness, where students learned to be grateful for the gift of hearing and practiced healthy living behaviors in their daily lives.

Thus, the Deep Learning approach is worthy of being applied as a science learning strategy in elementary schools because it is able to harmoniously integrate scientific knowledge, character values, and spiritual awareness. This model is a relevant learning alternative for realizing liberating education that is oriented towards the holistic development of students' potential—both intellectually, emotionally, and behaviorally.

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