



# Optimization of Students' Character Values Through Process Skill-Based Learning

Selamat Karo-Karo<sup>1\*</sup>

<sup>1</sup> Universitas Darma Agung, Indonesia

Received: March 18, 2024

Revised: July 29, 2024

Accepted: August 25, 2024

Published: August 31, 2024

Corresponding Author:

Selamat Karo-Karo

[selamatkaro@gmail.com](mailto:selamatkaro@gmail.com)

DOI: [10.29303/jppipa.v10iSpecialIssue.7376](https://doi.org/10.29303/jppipa.v10iSpecialIssue.7376)

© 2024 The Authors. This open access article is distributed under a (CC-BY License)



**Abstract:** The purpose of this paper is to determine the optimization of student character values through process-based learning skills in class IX of SMP Negeri 1 Pulau Rakyat Asahan. This research was conducted at SMP Negeri 1 Pulau Rakyat Asahan. The research method used was to provide questionnaires, literature studies and documentation. From the results of the research and discussion, it can be seen that the decline in behavioral values in society can be actualized through the tendency of non-educational behavior that is increasingly concerning, such as: violence, anarchy, pornography, corruption, acts of terrorism, to various modes of crime through information technology systems. This indicates that efforts to build character through the development of moral values integrated into learning in schools have not been successful, there are still many teachers at various levels of education in the learning process using lecture methods, textual and less based on scientific processes. One of the contributing factors is because the teacher's understanding of the lesson itself is not correct, as a result the material taught has not been taught in accordance with the nature of learning which refers to the process and product but only as a product (content). Process skill-based learning is learning that develops various skills such as: observation, classification, interpretation, prediction, asking questions, hypothesizing, conducting experiments, communicating experimental results (communication), so that students can have the experience of activities that involve cognitive skills (minds on), manual or psychomotor skills (hands on) and social skills (hearts on). Through learning material based on process skills, it is expected that various scientific attitudes can be developed such as: patience, honesty, thoroughness, tolerance, etc., which are the basic capital in building student character optimally. However, implementing learning material based on process skills requires the support of teacher readiness, both in determining strategies and learning instruments.

**Keywords:** Character values; Optimization; Process skills-based learning; Scientific attitudes

## Introduction

Based on Science and Technology (IPTEK), humans can obtain knowledge supplies to survive productively in their lives (Dari et al., 2022; Sari et al., 2024; Sudarsih, 2023). It can be said that IPTEK is a basic need in improving the quality of human resources. Globalization that has touched almost all areas of people's lives, can lead us to a world of almost limitless

openness that is full of opportunities and challenges. Therefore, so that people do not get caught up in the flow of life that can erode the values of its identity as a nation, maturity is needed as a filter in attitudes and actions. Schools have a moral responsibility to play an active and synergistic role in collaborating with related parties to prepare superior quality human resources who have professional competence, culture and character. However, it seems that the current flow of

### How to Cite:

Karo-Karo, S. (2024). Optimization of Students' Character Values Through Process Skill-Based Learning. *Jurnal Penelitian Pendidikan IPA*, 10(SpecialIssue), 671-678. <https://doi.org/10.29303/jppipa.v10iSpecialIssue.7376>

globalization and the acceleration of the development of science and technology today is not comparable to the development of human moral awareness itself (de Hoyos Guevara et al., 2021; Hariram et al., 2023; Mensah, 2019; Roblek et al., 2020; Tavares et al., 2022).

Learning basically has specific scientific characteristics that are different from other sciences. According to Sopwan (2022), the learning process includes at least 4 things, namely: product (content), process, attitude and technology. Thus, if taught in accordance with the nature of learning, it is a strategic means to develop various aspects of learning (cognitive, affective, and psychomotor) which are the basis for building student character. Through process skills, students can be given active experiences that involve cognitive skills (minds on), manual skills (hands on) and social skills (hearts on). Various activities that can develop process skills include: observing, grouping, interpreting, predicting, asking questions, hypothesizing, conducting experiments, communicating experimental results (communication). Through process skills activities, it is hoped that scientific attitudes can be developed such as: patience, honesty, thoroughness, tolerance, etc., where these attitudes are the basic capital in building strong moral character in students. Based on this description, ideally the learning process refers to the process, product, and even its application in community life.

However, in the practice of learning in schools, these ideal conditions have not been fully realized, for example in science learning. In general, teachers at various levels of education teach using lecture methods, textual and less based on scientific processes, as a result the development of the three aspects (cognitive, psychomotor, affective) in students is less balanced. One of the contributing factors is because teachers tend not to understand the nature of learning correctly. Sometimes learning is not understood as a process and product, but only as a product (content), as a result in the learning process is the same as transferring knowledge alone, so that learning tends to be verbal and oriented towards students' cognitive abilities. Meanwhile, the development of the three aspects (cognitive, affective, psychomotor) in a balanced manner is a requirement of the curriculum. The development of high thinking skills (cognitive) and skills (psychomotor) without being balanced with adequate behavior (affective) is very dangerous and can harm others when someone has to live in the midst of society. Intellectual education without being accompanied by moral education will only be a flame in the night for robbers to fulfill their lusts and selfish desires alone. Based on this, process skills-based learning is an alternative effort to develop cognitive, affective, and psychomotor aspects as a basis for building student character.

## Method

This research was conducted in class IX of SMP Negeri 1 Pulau Rakyat Asahan. The research method used is by providing questionnaires, literature studies and documentation. The questionnaire given is about the character which is directly filled out by all students in in class IX of SMP Negeri 1 Pulau Rakyat Asahan. The sample in this study was all grade IX students at SMP Negeri 1 Pulau Rakyat Asahan with the total number of samples being 93 people. Data collection techniques using the documentation method are by collecting information, both from findings in the field, books, journals, research reports and other literature that support the topic of the writing. This is in accordance with the opinion of Sugiyono (2019), that documentation is a record of past events. Documentation can be in the form of writing, pictures, or someone's monumental work. Data analysis techniques are carried out by making research notes where in processing research notes, all sources read are analyzed to arrive at a conclusion as a result of answering the problem formulation. The steps taken in the data collection process are: a) Collecting existing information either through books, documents, online journals, articles, and other secondary sources, and b) Analyzing data to enable researchers to draw conclusions about the problems being studied.

## Result and Discussion

### *Character Education for Students*

The results research of Arifudin (2016), show that there is a close relationship between views on science and views on learning. Teachers' views influence the way teachers learn and teach. If in reality in schools many teachers teach using the lecture method, it indicates that the views of these teachers towards science are only as a collection of knowledge that is ready to be transferred to students. This is supported by Rustaman et al. (2019) statement, the results of his research on prospective teacher students revealed that the teaching style of prospective teachers tends to be influenced by how their teachers used to teach them. According to Kartadinata (2018), education is a humanitarian problem that must be addressed with human development itself. Humans are rational beings with the ability to control other living things. Because humans have reason, humans are also defined as rational beings and can use and empower their reason (Ministry of National Education, 2008). In addition to being rational, humans in this case students must also have noble and noble morals through education. Without education there will be no progress in all aspects of life, including student values and morals.

Therefore, education is a means for students to develop through the learning process. If education is implemented properly, it is expected to produce students who have intelligent and quality personalities and can utilize progress well. Education that transfers values, knowledge, experience and skills to the younger generation is an effort by the older generation to prepare the function of life for the next generation, both physically and spiritually (Kurniawan, 2017). Through educational outcomes, the education system receives feedback on the working methods and educational processes that have taken place, because educational outcomes are an indicator of the effectiveness and efficiency of the educational process.

Students excel not only in academics but also in non-academics, moral education must be encouraged optimally to support student character as self-identity in the midst of the digitalization era. Character education is very important for students, because its role has a major influence on the life of the nation in the future. With character education, we can find out and strengthen the identity of the student, because this character education aims to shape the student to be better. The growth of individuals into whole people can occur with character education that begins early (Chrisiana, 2005). Character education is a science designed to realize a nation that is seen by the world and God, that the nation has morals, good character and dignity (Setiawati, 2017). Character education is a movement that educates individual humans as the successors of the future of the nation (Wulandari et al., 2017).

Character education has a very close relationship with moral education where the goal is to form and train personal abilities continuously to improve oneself towards a better life. Noble morals are important, but what is more important is how those noble moral values are applied in everyday life so that they become a characteristic of the student's culture. Culture is a habit or tradition that carries certain values, which grow and develop in everyday life in various areas of life. Culture can be formed and developed by anyone, anywhere. Forming a noble moral culture means trying to develop traditions or customs in a place full of noble moral values.

According to Marzuki (2013), character education includes three main elements, namely: knowing the good, loving the good, and doing the good. Character education not only teaches students what is right and wrong, but more than that, character education also instills good habits so that students understand, are able to feel, and are ready to do good. Thus, character education carries the same mission as moral education or moral education.

The function of character education is to develop basic abilities in students so that they think intelligently, behave ethically and ethically, and do good and useful things for themselves, their families, and society (Maswardi, 2015). In addition, it is also to build a multicultural national life, build a civilized, noble national civilization, contribute to the development of human life, build attitudes of citizens who love peace, are creative, independent and live side by side with other nations. Basically, the purpose of character education is to improve the quality of performance and the results of the implementation of education that leads to the formation of character or noble morals of students in a comprehensive, integrated, and balanced manner, in accordance with graduate competency standards (Kurniasih et al., 2017). With character education, it is hoped that students will be able to independently improve and use their knowledge, study and internalize, personalize character values and noble morals so that they are manifested in everyday behavior. The goal of character education focuses on developing all of students' potential, so that they can develop into individuals who are ready to face the future and are able to survive the challenges of a dynamic era with commendable and irrefutable behavior (Kurniasih et al., 2017).

The goals of character education for students are: (1) Many students hurt each other because of their weak awareness of moral values, (2) Providing moral values to students is one of the very important functions of civilization, (3) The role of schools as character educators becomes increasingly important when many children receive little moral guidance from parents, society, or religious institutions, (4) still have universally accepted moral values such as care, trust, respect, and responsibility, (5) Democracy has a special need for moral education because democracy is a rule of, for and by society, (6) There is no value-free education. Schools teach value-free education. Schools teach everyday values through design or without design, (7) Commitment to character education is important if we want to and continue to be good teachers, and (8) Effective character education makes schools more civilized, cares about society, and refers to increased academic performance. These reasons show that character education really needs to be instilled as early as possible to anticipate increasingly complex problems in the digital era.

One of the problems currently facing our education world is the problem of multidimensional crisis and moral degradation, as well as the problem of national disintegration, so that character education is considered an effective alternative solution to deal with the nation's increasingly worsening moral problems (Mentari, 2017). For example, children no longer respect their parents,

free lives of teenagers, dare to try and use illegal drugs (narcotics) (Mentari, 2017). Moral problems also arise due to the lack of media and family control, as well as globalization and cultural invasions from outside forcing some young generations to follow foreign cultures so as to set aside their own culture. Moral character education is the key to perfecting students' character and strengthening national civilization, upholding the integrity of values and humanity. To train and develop students with character in accordance with the ideology of the Indonesian state and strengthen it, character education needs to be held in schools (Susanti, 2013). It is clear that character education is part of an effort to form habits that are based on moral and ethical values. Character education is an effort to form good traits, attitudes, and mentalities and of course can bring benefits to oneself, family, society, and the country.

Efforts to implement character education as well as possible require a holistic approach, namely the integration of character development into all aspects of life, including campus life. Referring to the concept of a holistic approach and various efforts made by educational institutions, it must be believed that the character education process must be carried out continuously, so that the moral values embedded in the child's personality do not only reach a certain level of education or only appear in the family environment (Suyanto, 2010). In addition, the moral practices shown so as not to seem formal, but are actually deeply rooted in their souls. Thus it can be said that character education for students is very important. Therefore, teachers and academics on campus must instill good character values in students at every opportunity.

Character education means teaching the development of good morals in students so that they have noble values and noble characters and apply these values in their own lives as members of society and as productive, nationalistic, and religious citizens. Character education is the core values that must be obtained if society wants to live and work together peacefully (Koesoema, 2007). Values such as wisdom, respect for others, personal responsibility, a sense of destiny, suffering and peaceful conflict resolution are values that need to be prioritized in character education.

Character education is an effort to form students' basic abilities and develop self-strength in terms of mental, self-control, personality, intelligence and skills, education, and the application of these values for oneself, family, friends, teachers and the environment. Character education also supports students' social, emotional and moral development. In simple terms, character education can be seen as a positive thing done by a teacher and influences the character of the students he teaches (Hariyanto, 2013). This is very important in the digital era because every aspect influences the

formation of this character, both external and internal. An example of an external aspect is the influence of teachers or the environment, because in the digital era, things on social media can influence students' character. An example of an internal aspect is parents who have a blood and spiritual relationship with their children.

#### *Character Education in the Digital Era*

Character education in the digital era presents different challenges and opportunities. Research shows that the digital era offers positive opportunities for the implementation of character education. Academic intelligence is necessary, but not enough. Habits formed on campus are basic patterns in seeing and experiencing, thinking and feeling, acting, being happy, and even suffering, so campus involvement in building student character is very important. The modern era challenges teachers to produce students who can position themselves between rapid changes and stressful lives. In addition, teachers have a moral obligation to encourage students to grow into humans whose lives are meaningful and rooted in noble values, strong self-awareness, and the ambition to help others (Hasibuan, 2015).

Students in the digital era have been spoiled with sophisticated technology, such as searching for learning materials through the Google site, traditional games have been abandoned. The characteristics of the digital generation are as follows: 1) The digital generation is busy creating accounts on social media to prove to the world that they exist, 2) The digital generation tends to be more open, outspoken, and thinks more aggressively, 3) The digital generation tends to want to gain freedom. They don't like being regulated and restrained. They want to be in control and the internet offers freedom of expression, 4) The digital generation always accesses with Google, Yahoo, or other sites. Their learning ability is much faster because all information is at their fingertips (Sukiman, 2016).

Today's students are highly integrated with technology, such as gadgets and video games. Now, students spend more time with media every day. Here are some things that parents must do for their children in digital parenting: a) Increase and update their knowledge about the internet and gadgets. Parents cannot supervise their children if they are not tech-savvy, b) If there is internet at home, position it in the family room and who can see what children do in accessing the internet, c) Limit the time children spend using gadgets and the internet, d) Provide understanding and awareness together about the negative impacts of the internet or gadgets.

The development of the era that prioritizes technology and makes everything instant and easy to obtain, not only has a positive impact on life, but also

adds to the burden and responsibility of people's lives, especially students in the digital era. Although the digital era brings many positive things, such as easy access, fast information search from anywhere, easy learning that can be done anywhere, this digital era also brings many negative effects that are inhibiting and must be minimized. This is because the digital era is also related to the development of the era which includes many aspects such as social, political, economic, and cultural. The digital era itself is an era where almost everyone in the scope of life uses technology in all aspects. Technology is developing so rapidly and offers convenience, but it also brings millions of disasters and heavier responsibilities than the previous era.

Students now not only have to stand in front of officials to demand a just government, but also have to struggle to face the currents of this digital era. Students must eradicate hoaxes or fake news that are spread unreasonably, and minimize all deviations that occur due to moral degradation. Therefore, digitalization must be taken seriously, the role of technology must be managed and controlled properly so that the digital era can bring benefits to life and avoid negative impacts and excessive use.

The role of students as educated people is very important in the digital era like today, but their role must also be supported by all campus residents so that they can fight together to face this digital era by forming strong characters. Character education is very important when present to understand cognitively and be able to feel what is allowed and what is not allowed as provisions when they graduate later.

It is important to understand the values that apply in society because it is beneficial for the students. Teaching character education is also beneficial for schools because it will create more views in society, so that it can be a choice for parents for their children's education. The importance of instilling character education in students which includes discipline, creativity in thinking, speaking, acting, and habituation with positive thinking and paying attention to material during the learning process. Positive actions are taken to make it a good habit. Student ethics mastery is very urgent when character education is faced with security issues, fraud, and other issues, which are negative effects of the use of internet technology.

Character education can start from the smallest things, such as: saying hello and greeting when entering and leaving a room, respecting elders, getting used to helping each other when in trouble, and other small things that can develop students' character. The right way to character education begins with the understanding that the future of students is in the hands of teachers. Therefore, they imitate and learn what teachers do. Students apply what they learn to help each

other, and it becomes a habit for them to care about the environment around them. Learning to respect each other from the smallest things can also be applied to students, appreciating what they can achieve, be it work, assignments, and others. This can increase tolerance and respect for differences between students.

Based on the description above, it can be stated that if we want to produce teachers who can teach according to the characteristics and nature of their learning, then teachers need to be given a correct understanding of character. By understanding correctly, it is hoped that these teachers can teach or teach correctly and ultimately produce students who develop "completely" both in terms of cognitive, affective, and psychomotor aspects. Therefore, in learning there are at least two things that need to be understood, namely in terms of specific scientific characteristics and the nature of character learning which refers to the process and product. First, character education material is reviewed from its specific scientific characteristics. According to Hinduan (2003) education has great potential to be used as a vehicle to develop various high-level thinking skills, development of scientific attitudes and basic skills. Second, the nature of character learning which refers to products and processes. According to Carin et al. (1990) the nature of learning includes four (4) things: product (content), process, attitude and technology. Thus, the learning process should be directed at providing active experiences that involve cognitive skills (minds on), manual skills (hands on) and social skills (hearts on). This is relevant to the statement of Rustaman et al. (2019) that the learning process will only be experienced meaningfully by students if students are actively involved intellectually, manually, and socially.

The scientific characteristics and nature of learning are expected to bring logical consequences in the implementation of learning in the classroom. Character learning cannot be taught only by transferring knowledge through lecture or question and answer methods, but must be taught through a process based on active experience through a learning approach that is oriented towards the scientific process with the experimental method. As previously explained, scientific skills are oriented towards the process skills approach which contains various skills that include at least eight (8) activities including: observing, classifying, interpreting, predicting, asking questions, hypothesizing, conducting experiments, communicating experimental results (communication) (Rustaman et al., 2019). Observation skills include various activities that involve the use of the five senses through: sight, hearing, smell, taste, and touch. These skills include using relevant and adequate facts from the results of observations. Classification skills carry out activities to classify after recognizing the characteristics

of an object. Grouping skills include skills in finding differences, contrasting characteristics, finding similarities, comparing, or finding the basis for classification. Interpreting skills, namely interpreting observation results by recording each observation result separately between the main results and the side results, connecting observation results, finding patterns or regularities from an observation. Prediction skills, namely submitting estimates about something that has not happened based on an existing tendency or pattern. Questioning skills, can be in the form of a request for explanation about something, why, how, or asking the background of a conclusion. Hypothesis skills, namely stating the relationship between two variables or submitting estimates of the cause of an event. Experimenting skills, namely planning investigations or experiments including determining experimental variables, determining observation objects, measurements, determining work steps, to data processing methods. Communication skills, including communicating experimental data or empirical data in the form of graphs, tables, or diagrams, explaining experimental results, compiling and delivering reports systematically and clearly.

The use of process skills-based learning has several advantages, including: 1) Process skills-based learning allows students to be actively involved intellectually, manually, and socially. The experience of being active intellectually, manually, and socially can lead students to learn meaningfully which can ultimately optimize student learning outcomes. 2) Process skills-based learning allows students to develop scientific attitudes. Scientific attitudes include various attitudes such as: honesty, patience, openness, thoroughness, independence, respect for others, discipline, etc. The scientific attitude that develops after carrying out the process skills above is a basic attitude in building a strong moral character foundation in students.

In the application of process skills-based learning, the role of teachers is again a key factor in achieving learning objectives. According to Harlen et al. (2002), there are at least five aspects that teachers need to pay attention to in developing process skills-based learning, namely: 1) The learning design that is prepared must be able to provide students with opportunities to have process skills through direct experience exploring materials and natural phenomena. Through this direct experience, they can use their senses to make observations, collect information or evidence to then be followed up by asking questions, formulating hypotheses based on their ideas. 2) Learning settings in the form of small groups that allow students to have discussions. Learning tasks are designed in such a way that students can share ideas (brainstorming), listen to the opinions of other friends, explain and defend ideas,

so that reflective thinking is needed. 3) Accommodate process activities based on students' ideas through the use or application of various learning strategies, so that students can connect between previously owned knowledge with new knowledge that they acquire after interacting with their learning environment. 4) Provide opportunities or encourage students to review or critically review the activities they have done. 5) Provide techniques or strategies as provisions to improve students' scientific skills, because to be able to know the techniques for using tools correctly, knowledge is needed about the procedures for using them, such as: measuring techniques, communicating data, using tools.

Several prerequisites that teachers must understand in developing process skills in learning related to character. Developing observation process skills requires support from observation objects, tools, materials, and learning instruments such as worksheets equipped with observation sheets. To develop object classification skills, support from worksheet formats is needed that contain aspects of observation in the form of matrices. Developing skills in communicating data in the form of graphs, charts, schemes, reading results, discussing, and presenting research results. Teachers are required to be able to become learning facilitators so that students have the opportunity to carry out these activities through assignments. To develop data interpretation skills in students, teachers are required to encourage students to find patterns from a number of collected data in the form of: images, tables, graphs, etc. through the skills of explaining and drawing conclusions. The development of prediction skills can be carried out by teachers as a continuation of interpretation skills which are activities that teachers have carried out previously. Hypothesizing skills can be developed by providing students with the opportunity to explain the specific conditions of the results of observations and interpretations that have been carried out previously based on student ideas.

## Conclusion

Based on the description above, it can be concluded that there are at least two things that teachers need to understand in teaching, namely: a) The learning process is reviewed from the specific scientific characteristics where the scope of the study material includes character, morals, and ethics so that studying it requires high-level thinking skills, logical, analytical, critical and combinatorial. b) Reviewed from the nature of learning which refers to products and processes, so that the learning process should be directed at providing active experiences that involve intellectual skills (minds on), manual skills (hands on) and social skills (hearts on). The process skills approach includes at least eight activities

including: observing, grouping, interpreting, predicting, asking questions, hypothesizing, conducting experiments, communicating experimental results (communication). Through process skills-based learning, scientific attitudes can be developed which include various attitudes including: honesty, patience, openness, thoroughness, independence, respect for others, discipline, etc. The scientific attitude that develops after carrying out the process skills above is a basic attitude in building a strong moral character foundation in students. In implementing process skill-based learning, the role of the teacher is very important, so that to help students be able to have process skills, certain prerequisites must be carried out by the teacher. Process skill-based learning has advantages, namely that in addition to allowing students to be actively involved intellectually, manually, and socially, which can lead students to learn meaningfully and can optimize learning outcomes, it also allows the development of a scientific attitude which is a basic attitude in building a strong moral character foundation in students.

#### Acknowledgments

Thank you to all parties who have helped in this research so that this article can be published.

#### Author Contributions

The author greatly contributed to the creation of this article, starting from the initial stages of research until the completion of this article.

#### Funding

No external funding.

#### Conflicts of Interest

No conflict interest.

#### References

- Arifudin, I. (2016). Integrasi Sains dan Agama serta Implikasinya terhadap Pendidikan Islam. *Edukasia Islamika*, 1(1), 161–179. Retrieved from <https://media.neliti.com/media/publications/69140-ID-integrasi-sains-dan-agama-serta-implikas.pdf>
- Chrisiana, W. (2005). Upaya Penerapan Pendidikan Karakter Bagi Mahasiswa (Studi Kasus di Jurusan Teknik Industri UK Petra). *Jurnal Teknik Industri*, 7(1), 83–90. <https://doi.org/10.9744/jti.7.1.83-90>
- Dari, S. W., Yuriska, Rachmadani, T., Novinda, Asbari, & Masduki. (2022). Implementation of Pancasila in the Development of Science & Technology. *Journal of Information Systems and Management*, 1(4), 25–31. Retrieved from <https://jisma.org/index.php/jisma/article/view/100>
- de Hoyos Guevara, A. J., & Dib, V. C. (2021). From a Society of Knowledge to a Society of Consciousness a Call for Awareness Is on Its Way. *Sustainability*, 13(5), 2706. <https://doi.org/10.3390/su13052706>
- Hariram, N. P., Mekha, K. B., Suganthan, V., & Sudhakar, K. (2023). Sustainalism: An Integrated Socio-Economic-Environmental Model to Address Sustainable Development and Sustainability. *Sustainability*, 15(13), 10682. <https://doi.org/10.3390/su151310682>
- Hariyanto, S. (2013). *Konsep dan Model Pendidikan Karakter*. Bandung: PR Rinjaya Rosda Karya.
- Harlen, W., & Deakin Crick, R. (2002). A systematic review of the impact of summative assessment and tests on students' motivation for learning. *President, AERA*, 1–151. Retrieved from <https://dspace.stir.ac.uk/handle/1893/19607>
- Hasibuan, S. (2015). Budaya media dan partisipasi anak di era digital. *Proceedings of International Post-Graduate Conference, 01*, 829–850. Retrieved from <https://www.researchgate.net/publication/310596154>
- Hinduan, A. A. (2003). Meningkatkan Kualitas SDM Melalui Pendidikan IPA. In *Makalah disampaikan dalam Seminar Himpunan sarjana pendidikan IPA Indonesia*. Bandung: UPI.
- Kartadinata, S. (2018). *Arah dan Tantangan Bimbingan dan Konseling Profesional: Proposisi Historik-Futuristik*. Bandung: Universitas Pendidikan Indonesia.
- Koesoema, A. D. (2007). *Pendidikan Karakter: Mendidik Anak di Zaman Global*. Jakarta: Grasindo.
- Kurniasih, I., & Sani, B. (2017). *Ragam Pengembangan Model Pembelajaran untuk Peningkatan Profesionalitas Guru*. Bandung: Kata Pena.
- Kurniawan, S. (2017). *Pendidikan Karakter Konsepsi dan Implementasi Secara Terpadu di Lingkungan Keluarga, Sekolah, Sekolah, dan Masyarakat*. Yogyakarta: Ar-Ruzz Media.
- Marzuki. (2013). Revitalisasi Pendidikan Agama Di Sekolah Dalam Pembangunan Karakter Bangsa Di Masa Depan. *Jurnal Pendidikan Karakter*, 4(1), 64–76. <https://doi.org/10.21831/jpk.v0i1.1288>
- Maswardi, A. (2015). *Pendidikan Karakter Anak Bangsa*. Yogyakarta: Calpulis.
- Mensah, J. (2019). Sustainable development: Meaning, history, principles, pillars, and implications for human action: Literature review. *Cogent Social Sciences*, 5(1), 1653531. <https://doi.org/10.1080/23311886.2019.1653531>
- Mentari, A. (2017). Study Thought Ki Hajar Dewantara on The Concept of Character and National Education. *4th International Conference on English Literature and Humanities*, 480–484. <https://doi.org/10.15242/dirpub.ea0417033>
- Roblek, V., Meško, M., Bach, M. P., Thorpe, O., & Šprajc,

- P. (2020). The Interaction between Internet, Sustainable Development, and Emergence of Society 5.0. *Data*, 5(3), 80. <https://doi.org/10.3390/data5030080>
- Rustaman, N. Y., Liliawati, W., Efendi, R., & Rusdiana, D. (2019). Science teacher educator and authentic assessment: Attitude toward NoS and its assessment in science instruction. *Journal of Physics: Conference Series*, 1157, 022057. <https://doi.org/10.1088/1742-6596/1157/2/022057>
- Sari, A., Saleha, M. A. S., Salsabilla, N. K. S., Azaria, N. A., & Agustina, R. A. (2024). The Dynamics And Impact Of Globalization In The Field Of Science And Technology. *Binary Journal of Technology Education*, 1(1), 23–39. Retrieved from <https://journal.cerdasnusantara.org/index.php/binary/article/view/23>
- Setiawati, A. N. (2017). Pendidikan Karakter sebagai Pilar Pembentukan Karakter Bangsa. *Seminar Nasional Tahunan Pendidikan Ilmu-Ilmu Sosial*, 1(1), 348–352 Retrieved from <https://digilib.unimed.ac.id/id/eprint/27544/>
- Sopwan, I. D. (2022). Pendekatan Contextual Teaching and Learning (CTL) Berbasis Lembar Kerja Siswa untuk Meningkatkan Aktivitas dan Hasil Belajar IPA Terapan. *Spizaetus: Jurnal Biologi Dan Pendidikan Biologi*, 3(3), 127. <https://doi.org/10.55241/spibio.v3i3.80>
- Sudarsih, s. (2023). The Role Science and Technology for the Character Development of Young Generation in Indonesia: An Ethical Review. *Proceedings International Conference of Culture and Sustainable Development*. Retrieved from <https://proceedings.undip.ac.id/index.php/icocas/article/view/694>
- Sugiyono. (2019). *Metode Penelitian Kuantitatif*. Bandung: Alfabeta.
- Sukiman. (2016). *Seri Pendidikan Orang Tua: Mendidik Anak di Era Digital*. Jakarta: Kementerian Pendidikan dan Kebudayaan.
- Susanti, R. (2013). Penerapan Pendidikan Karakter Di Kalangan Mahasiswa. *Al-Ta Lim Journal*, 20(3), 480–487. <https://doi.org/10.15548/jt.v20i3.46>
- Suyanto. (2010). *Model Pembinaan Pendidikan Karakter di Lingkungan Sekolah*. Jakarta: Direktorat Pendidikan Dasar dan Menengah Kementrian Pendidikan Nasional.
- Tavares, M. C., Azevedo, G., & Marques, R. P. (2022). The Challenges and Opportunities of Era 5.0 for a More Humanistic and Sustainable Society – A Literature Review. *Societies*, 12(6), 149. <https://doi.org/10.3390/soc12060149>
- Wulandari, Y., & Kristiawan, M. (2017). Strategi Sekolah Dalam Penguatan Pendidikan Karakter Bagi Siswa Dengan Memaksimalkan Peran Orang Tua. *JMKSP (Jurnal Manajemen, Kepemimpinan, Dan Supervisi Pendidikan)*, 2(2). <https://doi.org/10.31851/jmksp.v2i2.1477>