

Problem Analysis of Science Learning Based on Local Wisdom: Causes and Solutions

Hikmawati^{1*}, Ketut Suma², I Wayan Subagia²

¹Department of Physics Education, University of Mataram, Mataram, Indonesia

²Science education study program, Universitas Pendidikan Ganesha, Singaraja, Indonesia.

DOI: [10.29303/jppipa.v7iSpecialIssue.1021](https://doi.org/10.29303/jppipa.v7iSpecialIssue.1021)

Article Info

Received: October 6th, 2021

Revised: November 15th, 2021

Accepted: November 21st, 2021

Abstract: This study aims to analyze the problematic analysis of science learning based on local wisdom and the solution in terms of its solution in terms of several aspects, namely: curriculum, teachers, students, learning strategies, assessments, facilities and infrastructure. This type of research is descriptive qualitative. The research data was obtained through literature review and giving questionnaires to 65 respondents. The respondents came from 201 teachers who are alumni at one of the universities in Mataram City who are members of WAG IKA (WhatsApp Group Alumni Association). The questionnaire contains a list of six open-ended questions. The results of the study provide information that curriculum changes are expected to answer the needs of the times and consider local wisdom according to the characteristics of each region, these changes require mental changes from curriculum implementers. The quantity of teachers is sufficient but the quality of teachers still needs to be improved, especially in designing learning tools based on local wisdom. From the student factor, the role of parents as well as motivation and interest in learning is important to improve so that learning outcomes are as expected, and students also care about local wisdom in their neighborhood. For this reason, teachers need good learning strategies in planning local wisdom-based learning processes in the classroom by considering authentic assessments that are able to measure aspects of students' attitudes, knowledge, and skills in learning science. Facilities and infrastructure that can support science learning activities based on local wisdom include: library facilities, science laboratories, multimedia laboratories, and objects of local wisdom around students.

Keywords: Science learning problems; local wisdom.

Citation: Hikmawati, H., Suma, K., & Subagia, I. W. (2021). Problem Analysis of Science Learning Based on Local Wisdom: Causes and Solutions. *Jurnal Penelitian Pendidikan IPA*, 7(SpecialIssue), 46-55. <https://doi.org/10.29303/jppipa.v7iSpecialIssue.1021>

Introduction

The low quality of education causes Indonesia's young generation to be unprepared to compete in the era of globalization. According to the results of a survey by an international institution, namely the United Nations Development Programme, Indonesia's Human Development Index ranks 107 along with Bolivia and Philippines. This order is still far from several countries in Southeast Asia such as Thailand at number 79, Malaysia at number 62, Brunei Darussalam

at number 47 and Singapore at number 11 (UNDP, 2020).

The low quality of education in Indonesia can also be seen from the results of research by various international institutions, including in the field of science, one of which is from PISA (Program for International Student Assessment). The average science score of Indonesian students in PISA 2018 is 396. This value is still far from the science average value of partner countries of 489. The average score of Indonesian students' science is below the average score

*Email: hikmawati@unram.ac.id

of Thai students' science which is 426, Brunei Darussalam is 431, Malaysia is 438 and Singapore is 551 (OECD, 2019).

Based on the fact of the low quality of education mentioned above, it is necessary to identify learning problems, especially in science learning based on local wisdom, so that we can find solutions to overcome them. The approach used by the teacher in the learning process must consider various factors, namely students' attitudes and perceptions of science learning, task meaning, curiosity, and intrinsic motivation. The variables that affect the science learning process are students' perceptions of science learning, affective, and cognitive (Suprpto & Mursid, 2017).

Research topics related to the problems of learning science based on local wisdom can be obtained by using the Publish or Perish and VOSviewer applications. The keywords used in Publish or Perish are local wisdom, science learning problems, curriculum, teachers, students, learning strategies, assessments, facilities and infrastructure. The number of articles selected through Google Scholar is 200. The results displayed on the VOSviewer are shown in Figure 1.

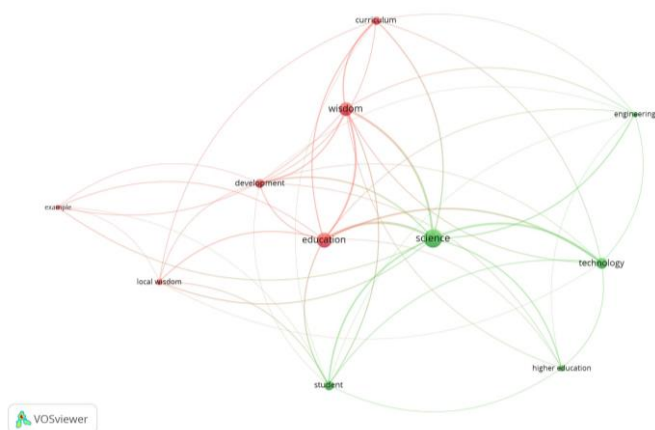


Figure 1. Research topics related to the problems of learning science based on local wisdom

Based on Figure 1, there are two clusters with 11 items that have a relationship with each other in the research variables. The first cluster consists of 6 items, namely curriculum, development, education, example, local wisdom, wisdom. The second cluster consists of 5 items, namely engineering, higher education, science, student, technology. The integration of local wisdom in science learning requires curriculum development, including the identification of local wisdom that exists in the environment where students live, so that educational goals can be achieved as mandated by law. The results of the identification of local wisdom that have the potential for ethnosience include the use of non-standard units in the manufacture of traditional

houses for the Sasak people on the island of Lombok, the classification of Nyale (sea worms) in the Bau Nyale tradition derived from the story of Princess Mandalika, the process of dyeing threads in the tradition of making woven fabrics. Sesek typical of Sasak, the use of traditional musical instruments Gendang Beleq related to the concept of sound, and making a traditional snack of the Sasak Sade village community called Poteng Reket using conventional biotechnology (Hikmawati et al., 2021).

Local wisdom in this study can be in the form of local traditions, local culture, and ethnosience used in science learning. Many local wisdom-based learning has been carried out, but those who have conducted research on the problematics of local wisdom-based science learning in terms of many aspects have never been done. Thus, this study aims to analyze the problems of learning science based on local wisdom and how to overcome these problems in terms of several aspects, namely: curriculum, teachers, students, learning strategies, assessments, facilities and infrastructure.

Method

This type of research is descriptive qualitative. The data collected is about the problematics of science learning based on local wisdom in terms of six aspects, consisting of: curriculum, teachers, students, learning strategies, assessments, infrastructure. The research data was collected through literature review and giving questionnaires to teachers via google form.

Data through literature review are obtained from laws, reference books and articles in scientific journals (national and international) that discuss the problems of learning science based on local wisdom. Data through the provision of questionnaires was obtained by distributing questionnaires to alumni of one of the universities in Mataram City who had become teachers, as many as 65 people. Respondents in this study were taken from 201 teachers who are alumni at one of the universities in Mataram City. The respondents are members of the WAG IKA (WhatsApp Group Alumni Association). The questionnaire distributed via google form contains a list of six open-ended questions. The data from the next research were analyzed descriptively.

Result and Discussion

The data from the research on the problematics of science learning based on local wisdom from the curriculum aspect can be shown in Figure 2. The curriculum is a set of learning plans that are used as guidelines in implementing learning, consisting of:

objectives, content, lesson materials, and methods used to achieve the goals that have been set. Curriculum is a factor that influences learning and its problems (Undang-Undang Republik Indonesia Nomor 20 Tahun 2003 Tentang Sistem Pendidikan Nasional, 2003). The curriculum in Indonesia has undergone several changes. The pressure points for the development of the 2013 Curriculum are improving the mindset, strengthening curriculum governance, deepening and expanding the material, strengthening the learning process, and adjusting the learning load in order to ensure conformity between what is desired and what is produced (Kemendikbud, 2013).

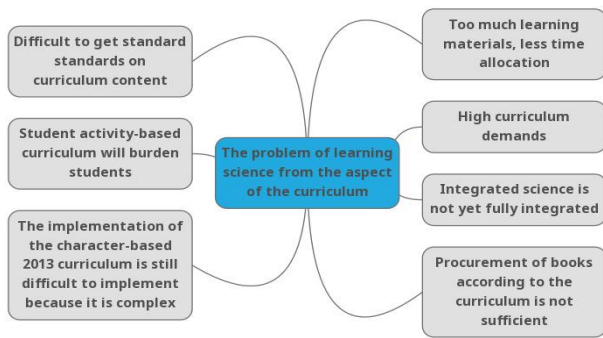


Figure 2. The problem of learning science from the curriculum aspect

The implementation of the 1994 active learning curriculum policy as a substitute for the 1984 curriculum in Indonesia still cannot be said to be successful. This is due to a combination of political, technical, and cultural factors as well as the interaction between the three. The active learning approach in the 2000 Competency-Based Curriculum still cannot be said to be successful. At the time the Competency-Based Curriculum was undergoing an internal review, active learning as a policy was still attached to its successor which was then known as the Education Unit Level Curriculum. The 2013 curriculum which is currently being introduced adopts an integrated and thematic approach. According to a government statement, this new approach reinforces previous commitments to active learning. Thus, Indonesia's policy on curriculum, namely the practice of learning in classrooms, must be made in a way that better understands the technical, cultural, and political realities in Indonesia (Sopantini, 2014).

Some of the problems in implementing the 2013 Curriculum include 1) there are still school policies that are not appropriate for students; 2) limited facilities and infrastructure so that they do not support the process of learning activities; 3) the creativity of educators in managing learning is still lacking and seems monotonous; 4) administrative preparation is

complicated and seems burdensome because it is very detailed and dense. The 2013 curriculum can still be continued because it is in accordance with the development of the technological era so that it does not erode the character education that exists in students (Rahmatullah & Jumadi, 2020). A curriculum that integrates local wisdom in learning will develop student competencies needed in the 21st century such as higher order thinking skills and cultural care attitudes as part of character education promoted by the government (Hikmawati Hikmawati et al., 2020).

The data from the research on the problematics of learning science based on local wisdom from the teacher's aspect can be shown in Figure 3.

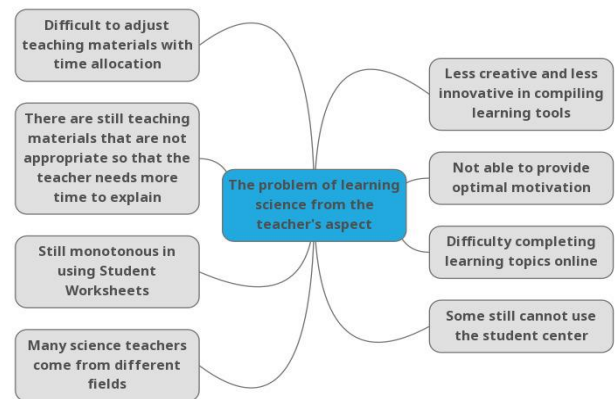


Figure 3. The problem of learning science from the teacher's aspect

The quality of science education is now a national issue in Indonesia. Indonesia has abundant natural resources but lacks human resources to manage or process these natural resources so that the Indonesian people have not received the maximum benefit from these natural resources. Teachers who do not meet the requirements and differences in teacher quality result in the low quality of science education in Indonesia. The quality of Indonesian science education needs to be improved to improve the quality of technological human resources in order to be able to manage/process abundant natural resources for a better life. The Government of Indonesia has paid more attention to teacher quality through upgrading the qualifications and continuing professional development of teachers by placing a high priority on teacher recognition and welfare (Hendayana et al., 2010).

The problem of teacher welfare will give stress to the teacher. This will have a bad impact on students. Stress is related to one's emotions. Socially and emotionally competent teachers have high social awareness and are able to manage their emotions and those of others (Aldrup et al., 2017). Relatedly, teachers' socio-emotional competence, which enables them to

understand and regulate students' emotions as well as their own, appears to be the key to building teacher-student relationships that will positively impact student behavior. A calm and orderly learning environment and supportive relationship with teachers are also valuable resources for student development (Aldrup et al., 2018).

The competence of professional teachers in Indonesia has been regulated by law. There are four teacher competencies, namely pedagogic, personality, social, and professional competencies as follows. Pedagogic competencies include: (1) mastering the characteristics of students; (2) mastering learning theory and teaching principles of learning; (3) curriculum development; (4) educational learning activities; (5) the development of the potential of students; (6) communication with students; and (7) assessment and evaluation. Personality competencies include: (1) acting in accordance with national religious, legal, social and cultural norms; (2) show a mature and exemplary personality; (3) work ethic, high responsibility, pride in being a teacher. Social competence includes: (1) being inclusive, acting objectively, and not discriminating; and (2) communication with fellow teachers, education staff, parents, students, and the community. Professional Competencies include: (1) mastery of materials, structures, concepts, and scientific mindsets that support the subjects taught; and (2) develop professionalism through reflective actions (Undang-Undang Republik Indonesia Nomor 14 Tahun 2005 Tentang Guru Dan Dosen, 2005).

The condition of teachers in Indonesia can still be said that most of them do not have adequate professionalism to carry out their duties. Although the quantity of teachers in Indonesia is quite adequate, in general the quality of teachers is still low. The low welfare of teachers also greatly determines the high and low quality of education in Indonesia. In this case, there is a significant positive interaction effect between teacher qualifications and students' prior knowledge (Ömeroğulları et al., 2020).

The learning problems experienced by teachers, especially in the science field, due to the COVID-19 pandemic also have an impact on the quality of education in Indonesia. The impact felt by teachers in the online learning process is inadequate facilities and infrastructure at home. The next obstacle is that teachers do not yet have a distance education culture because so far the learning system is arranged face-to-face, teachers are used to being in school to interact with students, with the existence of distance learning methods that make teachers need time to adapt and face new changes that indirectly will directly affect the quality of learning outcomes. The COVID-19 outbreak

has forced teachers to use technology, so whether they like it or not, like it or not, they have to learn and be ready to teach remotely using technology. The obstacles faced by teachers are the increasing cost of purchasing internet quotas, online technology requires a network connection to the internet and the quota, therefore the level of internet quota usage will increase. The levy on teacher fees for online learning for several months will of course require more quota and will automatically increase the cost of purchasing internet quota (Purwanto et al., 2020).

Factors that cause low science learning outcomes are teachers who are less varied and efficient in using a learning model or method (usually using conventional learning), learning media to support the learning process and student activity in the classroom. (Safira et al., 2017). To improve the quality of science learning in particular, and Indonesian education in general, the government must pay attention to four basic things, namely: 1) increasing educational attainment and accessibility to resources, 2) improving student achievement, 3) strengthening teacher preparation and professional development, and 4) expand educational research and collaborative efforts (Faisal & Martin, 2019).

Teachers can take advantage of internet technology, for example in the form of e-modules in learning so as to help students get the right references and make it easier to understand science concepts. There is a significant relationship between students' perceptions of e-modules and students' basic science process skills. Where the relationship is positive, namely a good perception of the guidelines used will help in developing students' basic science process skills. This is because a good supervisor will support practicum as a forum for developing students' science process skills (Darmaji et al., 2020). Teachers can improve the quality of teaching by participating in the Education and Training Program (Diklat). The Education and Training Program provides benefits to teachers, especially in adding insight and experience in acquiring new knowledge to improve the quality of teaching and assisting teachers in solving problems experienced both at school and outside school (Djajadi, 2020). Teachers can be given training in the preparation of science learning tools based on local wisdom, and collaborative research related to local traditions, ethnoscience, and local culture around students so that learning becomes more meaningful. Teachers must pay attention to various things if they want to apply science learning based on local wisdom (local culture) in the classroom (Suastra, 2010).

Problematic data on science learning based on local wisdom in terms of student aspects can be shown in Figure 4. The education level of the students' parents

has an effect on the children's education. The role of parents in providing guidance to students while studying is important in supporting children's achievement. The intensity of guidance given by parents to students is still in the rare category. Students' study habits still tend to be memorizing and still have difficulties in connecting learning with previous knowledge. This is due to the limited cognitive ability of parents in providing guidance. In addition, many parents are busy working so they do not have enough time to provide tutoring for their children. Students' learning habits are still memorizing and students are still unable to connect learning with previous knowledge. Another thing that affects science learning outcomes is the intensity of learning outside school hours which is still low, students only rely on learning at school, and students also do not take lessons outside of school. The low interest and motivation of students to learn science subjects also affect student learning outcomes. This will also be an additional problem that teachers will face in learning science (Jufrida et al., 2020). Thus, students need meaningful learning, for example by utilizing local wisdom around their residence so that they will be more motivated in learning science and easier to understand the concepts in science learning (Suastra et al., 2017).

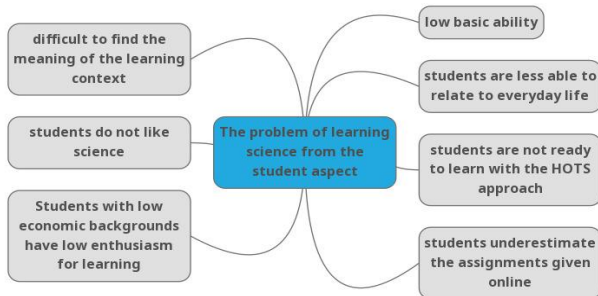


Figure 4. The problem of learning science in terms of student aspects

Student motivation can be increased through the use of real and virtual media such as YouTube. In learning using youtube video media, students are given the opportunity to watch videos about electrical concepts and then are given questions to solve in their groups. Giving questions to solve in groups will build a conducive learning environment, because students will solve problems based on the learning experiences they get from watching the youtube video. Discussions that occur between students in learning cause the learning atmosphere to be more conducive. Showing youtube videos accompanied by learning instructions and animations creates a great curiosity in students to learn more. Curiosity and a pleasant learning atmosphere are aspects of creating high learning motivation. This

causes the senses involved by students are not limited to the visual senses, but also the auditory senses (Iwantara et al., 2014).

Students' interest in learning science is also influenced by misconceptions. Misconceptions are barriers to effective science learning. Early identification of misconceptions among students can help teachers to develop improvement programs and create interest in the subject. Teachers should be very alert and equipped with misunderstanding identification tools, techniques, strategies and skills, so that they will enjoy enjoyable learning (Patil et al., 2019). Apart from students' interest in learning, there is a positive relationship between individual participation and achievement observed in all students regardless of socioeconomic background or gender (Sedova et al., 2019), and there is an influence of parental gender on student achievement (Muntoni & Retelsdorf, 2019).

There is a need for good teacher thinking towards students, namely the idea that students learn best if the teacher's demands are slightly higher than the students' actual skills. This implies that high expectations may benefit all students. Therefore, it seems useful to inform teachers not only about the effect of expectation in general, but also about the positive effect of high expectation in particular. In addition, teachers can be encouraged to form high expectations for all their students. This is very important, because the effect of teacher expectations largely reflects an unconscious process. Teachers who focus on high overall expectations for all students may be a promising way and can support teachers in providing high quality feedback to all their students (Gentrup et al., 2020).

Problematic data on science learning based on local wisdom in terms of aspects of learning strategies is shown in Figure 5.

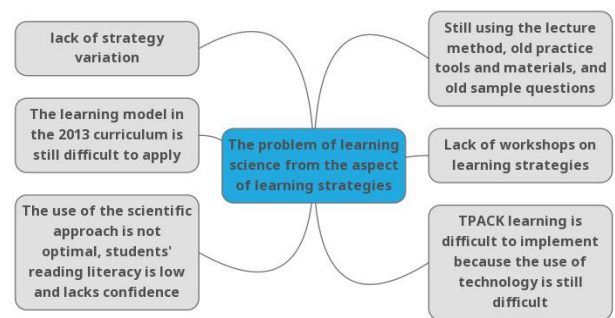


Figure 5. The problem of learning science in terms of aspects of learning strategies

The competencies that must be improved by the teacher related to learning strategies are: the teacher's understanding of the nature of science and the philosophy of constructivism learning, the teacher's

ability to open lessons which include activities in motivating and attracting students' attention, and exploring students' prior knowledge. In core activities, the competencies that need to be improved are the ability of teachers to choose methods that are in accordance with the competencies to be achieved, the creation and use of learning media, and the development of learning evaluations. In closing the lesson, the required competency improvement is how to draw conclusions from the learning that has been carried out. Aspects of teacher's closeness to students and teacher's understanding of students are aspects that must be mastered by teachers well (Rochintaniawati et al., 2009).

Pada masa pandemic COVID-19, strategi pembelajaran daring menjadi salah satu alternatif yang dapat dilakukan guru sebagai upaya agar siswa dapat memahami konsep IPA sesuai tujuan pembelajaran. Strategi pembelajaran Daring bukan hanya berkatut dengan internet, melainkan aspek penting yaitu "lebih aman (safer)", kemudian pembelajaran Daring dapat memperluas komunitas pembelajaran. With online learning, education users/teachers can more easily find the right science learning rhythm for students. After participating in online-based learning, the students are more enthusiastic about participating in learning, especially in science learning. The students do not feel bored when the learning takes place. Students are also interested in using online-based learning compared to conventional methods (lectures), and students are more active in asking and answering questions with the teacher during learning. The positive impact obtained from the online science learning process is that it can create a learning community. The science learning process can take place together with friends in the online community who have never met before. Then time and cost efficiency in online learning can be done anywhere and anytime. Students do not need to spend hours studying in class. The next priority is that science learning materials can be accessed at any time with technological sophistication, these science learning materials can be downloaded and can be studied at any time without being limited by time (Sobron et al., 2019).

Natural science learning models based on local wisdom, including tradition, culture, and ethnosience can be used in designing learning strategies with the aim that students can have 21st century competencies. These competencies include critical thinking skills and caring attitudes towards local culture. Learning that is related to everyday life or that is often experienced and seen and occurs in students' homes will be meaningful learning. One of the learning models that can be used is the 6E learning cycle model (engagement, exploration, explanation, elaboration, exhibition, and evaluation). This model can develop critical thinking skills and an

attitude of caring for local culture (Hikmawati Hikmawati et al., 2020). Learning models based on local culture can improve students' critical thinking and communication skills (H Hikmawati, Gunawan, et al., 2021). Science learning model that integrates local wisdom can improve student competence (Usmeldi & Amini, 2020), science process skills and students' scientific attitude (Dwianto et al., 2017), character values and conservation behavior (Sudarmin & Sumarni, 2018), environmental literacy ((Ilhami et al., 2019), and support character education in Indonesia (Suastra et al., 2017; Sudarmin, 2014).

Problematic data on science learning based on local wisdom in terms of the assessment aspect is shown in Figure 6. The results of learning physics in students who are given immediate formative test feedback are higher than students who are given delayed formative test feedback. According to Liu and Ginther, field dependent individuals tend to be more independent in developing interpersonal skills but less independent in developing cognitive restructuring skills. They tend to be kind, friendly, and wise, so they are better able to establish interpersonal relationships and are more accepted by others. However, on the other hand, such social orientation makes them less able to withstand social pressures, coupled with their inability to analyze and tend to accept information as it is, so that they have difficulty expressing opinions with their own perceptions. In connection with the feedback function as a provider of corrective information given immediately after correction, it will be very helpful for students/individuals who have a field dependent cognitive style to train and get used to solving problems, especially to be willing and able to do something individuals with a field dependent cognitive style really need Even if he is motivated from outside to analyze he is still very dependent on other people, but at least he will be motivated to want to do it (Sutawan et al., 2014).

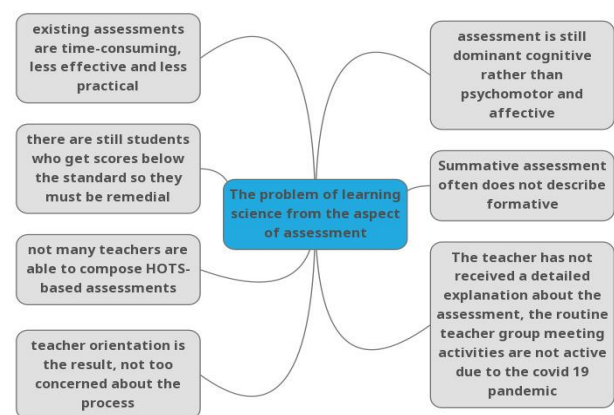


Figure 6. The problem of learning science in terms of the assessment aspect

To determine the quality of teaching, assessments (can be assignments) have the potential to contribute to understanding the extent to which students' intellectual levels are in the classroom as well as in schools. The data can then be used to carry out developments and improvements that lead to improving the quality of teaching and ultimately improving student learning outcomes (Joyce et al., 2018). The concept of authentic assessment is actually an assessment that links science learning topics with topics that are often seen, observed, and even experienced by students in everyday life, including local wisdom that exists in the student's neighborhood (H Hikmawati, Suastra, et al., 2021).

Problematic data on science learning based on local wisdom in terms of facilities and infrastructure is shown in Figure 7.

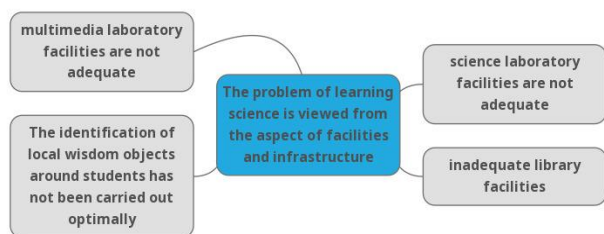


Figure 7. The problem of learning science in terms of facilities and infrastructure

The availability of science learning media in many schools is adequate. However, many media are already in a damaged condition. Damage occurs because it is stored, not because it is used. More media are stored because it turns out that most teachers have not been trained and lack the initiative to solve these problems. Therefore, in terms of utilization, only good media are utilized optimally (Wahyu et al., 2020).

Learning facilities such as laboratories are in accordance with science laboratory standards but have not been optimally utilized in science learning. The school library is available but science textbooks are still incomplete. The multimedia laboratory already exists but is not optimally used to support science learning and the internet network is not yet available (Jufrida et al., 2020). One thing that also needs to be considered in supporting science learning activities is the use of local wisdom objects in the environment around students' residences. This will increase students' learning motivation and science learning will be more meaningful when the topics studied are close to what students see, observe, experience in everyday life (Suastra, 2017).

Conclusion

The problem of learning science based on local wisdom in Indonesia is influenced by various factors, namely the curriculum, teachers, students, learning strategies, assessments, facilities and infrastructure. Indonesia has undergone various curriculum changes which are expected to answer the needs of the times, including character education that contains elements of local wisdom, but there are still various obstacles in its implementation. The quantity of teachers in Indonesia can be said to be quite adequate but efforts still need to be made in terms of improving the quality of these teachers, such as training in the preparation of science learning tools based on local wisdom. The role of parents and students' motivation and interest in learning through science learning based on local wisdom is important to improve so that learning outcomes are as expected. Thus, teachers need appropriate learning strategies in planning the learning process in the classroom, namely by paying attention to local wisdom and having to consider authentic assessments. Supporting facilities and infrastructure also need to be improved such as: library facilities, science laboratories and multimedia laboratories, as well as objects of local wisdom that exist in the environment where students live.

References

- Aldrup, K., Klusmann, U., & Lüdtke, O. (2017). Does basic need satisfaction mediate the link between stress exposure and well-being? A diary study among beginning teachers. *Learning and Instruction*, 50, 21-30. <https://doi.org/10.1016/j.learninstruc.2016.11.005>
- Aldrup, K., Klusmann, U., Lüdtke, O., Göllner, R., & Trautwein, U. (2018). Student misbehavior and teacher well-being: Testing the mediating role of the teacher-student relationship. *Learning and Instruction*, 58, 126-136. <https://doi.org/10.1016/j.learninstruc.2018.05.006>
- Darmaji, D., Kurniawan, D. A., Astalini, A., Winda, F. R., Heldalia, H., & Kartina, L. (2020). The Correlation Between Student Perceptions of the Use of E-Modules with Students' Basic Science Process Skills. *JPI (Jurnal Pendidikan Indonesia)*, 9(4), 719. <https://doi.org/10.23887/jpi-undiksha.v9i4.28310>
- Djajadi, M. (2020). Efektivitas Pendidikan dan Pelatihan Guru: Suatu Upaya Meningkatkan Kualitas Pengajaran Fisika. *Jurnal Sipatokkong BPSDM Sulsel*, 1(1), 30-44.

- <https://ojs.bpsdmsulsel.id/index.php/sipatokko>
ng [Indonesian]
- Dwianto, A., Wilujeng, I., Prasetyo, Z. K., & Suryadarma, I. G. P. (2017). The Development of Science Domain based Learning tool which is Integrated with Local Wisdom to Improve Science Process Skill and Scientific Attitude. *Jurnal Pendidikan IPA Indonesia*, 6(1), 23–31. <https://doi.org/10.15294/jpii.v6i1.7205>
- Faisal, & Martin, S. N. (2019). Science education in Indonesia: past, present, and future. *Asia-Pacific Science Education*, 5(1). <https://doi.org/10.1186/s41029-019-0032-0>
- Gentrup, S., Lorenz, G., Kristen, C., & Kogan, I. (2020). Self-fulfilling prophecies in the classroom: Teacher expectations, teacher feedback and student achievement. *Learning and Instruction*, 66(March 2019), 101296. <https://doi.org/10.1016/j.learninstruc.2019.101296>
- Hendayana, S., Supriatna, A., & Imansyah, H. (2010). Indonesia ' s Issues and Challenges on Quality Improvement of Mathematics and Science Education Sumar Hendayana , Asep Supriatna and Harun Imansyah. *Journal of International Cooperation in Education*, 41–51.
- Hikmawati, H., Gunawan, G., Sahidu, H., & Kosim, K. (2021). Effect of Local Culture Based Learning in Science on Critical Thinking and Student Communication Skills. *Journal of Science and Science Education*, 2(1), 8–16. <https://doi.org/10.29303/jossed.v2i1.713>
- Hikmawati, H., Suastra, I. W., & ... (2021). Assessment in Science Learning Based on Ethnoscience. *Jurnal Penelitian ...*, 7(3). <https://doi.org/10.29303/jppipa.v7i3.736>
- Hikmawati, Hikmawati, Suastra, I. W., & Pujani, N. M. (2020). Ethnoscience-Based Science Learning Model to Develop Critical Thinking Ability and Local Cultural Concern for Junior High School Students in Lombok. *Jurnal Penelitian Pendidikan IPA*, 7(1), 60–66. <https://doi.org/10.29303/jppipa.v7i1.530>
- Hikmawati, Suastra, I. W., & Pujani, N. M. (2021). Local wisdom in Lombok island with the potential of ethnoscience for the development of learning models in junior high school. *Journal of Physics: Conference Series*, 1816(1). <https://doi.org/10.1088/1742-6596/1816/1/012105>
- Ilhami, A., Riandi, R., & Sriyati, S. (2019). Implementation of science learning with local wisdom approach toward environmental literacy Implementation of science learning with local wisdom approach toward environmental literacy. *Journal of Physics: Conference Series*, 1–6. <https://doi.org/10.1088/1742-6596/1157/2/022030>
- Iwantara, I., Sadia, I., & Suma, I. (2014). Pengaruh Penggunaan Media Video Youtube Dalam Pemahaman Konsep Siswa. *Jurnal Pendidikan Dan Pembelajaran IPA Indonesia*, 4(1), 1–13. Retrieved from: https://ejournal-pasca.undiksha.ac.id/index.php/jurnal_ipa/article/view/1081 [Indonesian]
- Joyce, J., Gitomer, D. H., & Iaconangelo, C. J. (2018). Classroom assignments as measures of teaching quality. *Learning and Instruction*, 54, 48–61. <https://doi.org/10.1016/j.learninstruc.2017.08.001>
- Jufrida, J., Basuki, F. R., Rinaldo, F., & Purnamawati, H. (2020). Analisis Permasalahan Pembelajaran Ipa: Studi Kasus Di Smpn 7 Muaro Jambi. *Jurnal Pendidikan Sains (Jps)*, 8(1), 50. <https://doi.org/10.26714/jps.8.1.2020.50-58> [Indonesian]
- Kemendikbud. (2013). *Materi Pelatihan Guru: Implementasi Kurikulum 2013 - SMP/MTs - Ilmu Pengetahuan Alam*. Badan Pengembangan Sumber Daya Manusia Pendidikan dan Kebudayaan dan Penjaminan Mutu Pendidikan Kementerian Pendidikan dan Kebudayaan. [Indonesian]
- Muntoni, F., & Retelsdorf, J. (2019). At their children's expense: How parents' gender stereotypes affect their children's reading outcomes. *Learning and Instruction*, 60, 95–103. <https://doi.org/10.1016/j.learninstruc.2018.12.002>
- OECD. (2019). *PISA 2018 Results (Volume I)*. OECD. <https://doi.org/10.1787/5f07c754-en>
- Ömeroğulları, M., Guill, K., & Köller, O. (2020). Effectiveness of private tutoring during secondary schooling in Germany: Do the duration of private tutoring and tutor qualification affect school achievement? *Learning and Instruction*, 66(April 2019), 101306. <https://doi.org/10.1016/j.learninstruc.2020.101306>
- Patil, S. J., Chavan, R. L., & Khandagale, V. S. (2019). Identification of Misconceptions in Science: Tools , Techniques & Skills for Teachers. *Aarhat Multidisciplinary International Education Research Journal (AMIERJ)*, 8(2), 466–472. Retrieved from: <https://www.researchgate.net/publication...Teachers>
- Purwanto, H., Hamka, D., Ramadhani, W., Mulya, D., Suri, F., & Novaliza, M. (2020). Problematics Study of Natural Sciences (IPA) Online at Junior High School in the Time of the Pandemic Covid-19. *International Journal of Progressive Sciences and*

- Technologies (IJPSAT)*, Vol. 21 No, 188–195. Retrieved from: <https://ijpsat.ijsht-journals.org/index.php/ijpsat/article/view/1901/1102>
- Rahmatullah, & Jumadi. (2020). Evaluation of the Implementation of Curriculum 2013 At Senior Secondary Schools in Mataram City. *Jurnal Pendidikan Dan Kebudayaan*, 5(2), 210–221. Retrieved from: <https://journal.uny.ac.id/index.php/joe/article/download/5757/4971>
- Rochintaniawati, D., Wulan, A. R., & Sriyati, S. (2009). Kebutuhan guru sekolah dasar di Cimahi dan Kabupaten Bandung dalam melangsungkan pembelajaran IPA. *Jurnal Penelitian*, 10(2), 1–11. Retrieved from: <http://jurnal.upi.edu/105/view....html> [Indonesian]
- Safira, C. A., Setiawan, A., Citrawati, T., & Madura, U. T. (2017). Identifikasi Permasalahan Pembelajaran IPA pada Siswa Kelas III SDN Buluh 3 Socah. *Prosiding Nasional Pendidikan: LPPM IKIP PGRI Bojonegoro*, 388–395. Retrieved from: <https://ejournal.tsb.ac.id/index.php/jpm/article/view/277> [Indonesian]
- Sedova, K., Sedlacek, M., Svaricek, R., Majcik, M., Navratilova, J., Drexlerova, A., Kychler, J., & Salamounova, Z. (2019). Do those who talk more learn more? The relationship between student classroom talk and student achievement. *Learning and Instruction*, 63. <https://doi.org/10.1016/j.learninstruc.2019.101217>
- Sobron, A. N., Bayu, B., Rani, R., & Meidawati, S. (2019). Persepsi Siswa Dalam Studi Pengaruh Daring Learning Terhadap Minat Belajar Ipa. *SCAFFOLDING: Jurnal Pendidikan Islam Dan Multikulturalisme*, 1(2), 30–38. <https://doi.org/10.37680/scaffolding.v1i2.117>
- Sopantini. (2014). Reforming teaching practice in Indonesia : a case study of the implementation of active learning in primary schools in North Maluku. *Reforming Teaching Practice in Indonesia : A Case Study of the Implementation of Active Learning in Primary Schools in North Maluku, September*. Retrieved from: <https://manchester.idm.oclc.org/...ProQ:ProQ%3A>
- Suastra, I. (2010). Model Pembelajaran Sains Berbasis Budaya Lokal Untuk mengembangkan Potensi Dasar Sains dan Nilai Kearifan Lokal di SMP. *Jurnal Pendidikan dan Pengajaran*, 43(1). doi:<http://dx.doi.org/10.23887/jppundiksha.v43i1.1697> [Indonesian]
- Suastra, I. W. (2017). Balinese Local Wisdoms and their Implications in Science Education at School. *International Research Journal of Management, IT & Social Sciences*, 4(2), 48–57. <https://doi.org/10.21744/irjmis.v4i2.389>
- Suastra, I. W., Jatmiko, B., Ristiati, N. P., & Yasmini, L. P. B. (2017). Developing characters based on local wisdom of bali in teaching physics in senior high school. *Jurnal Pendidikan IPA Indonesia*, 6(2), 306–312. <https://doi.org/10.15294/jpii.v6i2.10681>
- Sudarmin. (2014). Pendidikan karakter, etnosains dan kearifan lokal. *Fakultas Matematika Dan Ilmu Pengetahun Alam, UNNES*, 1–139. Retrieved from: <http://lib.unnes.ac.id/27040/1/cover...pdf> [Indonesian]
- Sudarmin, & Sumarni, W. (2018). Increasing character value and conservation behavior through integrated ethnoscience chemistry in chemistry learning: A Case Study in the Department of Science Universitas Negeri Semarang. *IOP Conference Series: Materials Science and Engineering*, 349(1). <https://doi.org/10.1088/1757-899X/349/1/012061>
- Suprpto, N., & Mursid, A. (2017). Pre-service teachers' attitudes toward teaching science and their science learning at Indonesia Open University. *Turkish Online Journal of Distance Education*, 18(4), 66–77. <https://doi.org/10.17718/tojde.340386>
- Sutawan, I. N., Suastra, I. W., & Suma, K. (2014). Pengaruh Pemberian Umpan Balik dalam Penilaian dan Gaya Kognitif Terhadap Hasil Belajar Fisika. *E-Journal Program Pascasarjana Universitas Pendidikan Ganesha Program Studi IPA*, 4(1), 1–10. Retrieved from: https://ejournal-pasca.undiksha.ac.id/index.php/jurnal_ipa/article/view/1059 [Indonesian]
- Undang-Undang Republik Indonesia Nomor 20 Tahun 2003 Tentang Sistem Pendidikan Nasional, Republik Indonesia 1 (2003). Retrieved from: <http://citeseerx.ist.psu.edu/viewdoc/...%0Ahtt>
- Undang-Undang Republik Indonesia Nomor 14 Tahun 2005 Tentang Guru dan Dosen, Republik Indonesia 1 (2005). Retrieved from: <http://dx.doi.org/10.1016/j.cirp.2016.06.001> [Indonesian]
- UNDP. (2020). *HUMAN DEVELOPMENT REPORT 2020: the next frontier -human development and the anthropocene*. United Nations. Retrieved from: www.undp.org
- Usmeldi, & Amini, R. (2020). The effect of integrated science learning based on local wisdom to increase the students competency. *Journal of Physics: Conference Series*, 1470(1). <https://doi.org/10.1088/1742-6596/1470/1/012028>
- Wahyu, Y., Edu, A. L., & Nardi, M. (2020).

Problematika Pemanfaatan Media Pembelajaran
IPA di Sekolah Dasar. *Jurnal Penelitian Pendidikan
IPA*, 6(1), 107.
<https://doi.org/10.29303/jppipa.v6i1.344>
[Indonesian]