



ISSN:3026-0442

*Proceedings of the 1st International Conference on Education, Science
Technology And Health (ICONESTH 2023 Universitas Bina Bangsa
Getsempena, Dec 12-14, 2023, Banda Aceh, Indonesia*

PEDGOGICAL CONTENT KNOWLEDGE ANALYSIS OF BASIC SCIENCE BOOKS IN SCIENCE LEARNING CLASS III OF KUTA RENTANG STATE ELEMENTARY SCHOOL

Nurul Zikri Filina¹, Siti Mayang Sari², Zahraini³
^{1,2,3}Universitas Bina Bangsa Getsempena, Banda Aceh, Indonesia

* Corresponding email: nrl:krfln291000@gmail.com

ABSTRACT

Elementary school teachers must understand the content of the material and how to teach it to students or known as Pedagogical Content Knowledge (PCK), and the books used as teacher guides must comply with the PCK principles. This research is descriptive research that aims to obtain information about the scope of Pedagogical Content Knowledge in the Basic Science books for class III SD Negeri Kuta Rentang. The research subject is the sub-chapter of the Basic Science book which is used for third grade students at SD Negeri Kuta Rentang. The book evaluation instrument contains aspects of Pedagogical Content Knowledge content in Basic Science books. Filling out the teacher's book evaluation instrument is done by giving a value of 0 to 5 on each aspect of the assessment. The data that has been obtained is analyzed by calculating the percentage value of Pedagogical Content Knowledge. Based on the results of the analysis of Pedagogical Content Knowledge (PCK) in science learning, Basic Science books are at a percentage of 94% with the very achieved category. However, this book should not be used as the only guide, teachers need to have other companion books as support and complements, especially on aspects of core knowledge and the metacognition framework.

Keywords: *Pedagogical Content Knowledge, Basic Science Books, Science.*

INTRODUCTION

The teacher is one of the keys to the success of education because the teacher has a central role in the learning process. As revealed by Gage and Berliner in (Adnyana & Yudaparmita, 2021) that the main function of the teacher in learning is as a planner, implementer and evaluator. Of course, to carry out its function in learning, the teacher must have competence so that the goals of the education can be achieved optimally (Filina et al., 2022). In Government Regulation No. 74 of 2008 it is stated that teachers must have academic qualifications, competencies, educator certificates, be physically and mentally healthy, and have the ability to realize national education goals. It is further explained that the competencies in question are pedagogic competence, personal competence, social competence, and professional competence.

With the competencies possessed, it is expected that teachers can master content knowledge and pedagogic knowledge which are then integrated into the learning process or PCK (Pedagogical Content Knowledge). According to Margiyono and Mampouw in (Sukadi & Angraeni, 2019) the PCK component indicators include 7 components, namely (1) knowledge about students, including basic knowledge of students, learning difficulties, conception, and development of student abilities; (2) Mastery of curriculum standards, including the foundation of education and curriculum development; (3) Mastery of the learning process, including teaching methods, motivation, learning design, and teaching implementation; (4) Knowledge of evaluation, including aspects of assessment; (5) teaching resources, including multimedia, school facilities and materials; (6) Knowledge of content, including concept maps, difficult material and sequence of material; and (7) Knowledge of learning objectives, including learning objectives and application/orientation.

PCK is a collection of integrated knowledge, concepts, beliefs and values developed by teachers in PCK teaching situations, including aspects that support teachers in carrying out the learning process (Agustina et al., 2022). Many researchers have studied the factors that influence the effectiveness of learning interactions by using two approaches that actually complement each other, namely (1) an approach that views learning interactions from the perspective of teacher behavior, this point of view believes that teacher activity in the classroom determines student success; and (2) an approach that views the cognitive aspect of the teacher, believing that a person's knowledge and mental structure plays a central role in the way of seeing, understanding, thinking, and acting. Likewise in science learning in elementary schools. The teacher is not only required to understand science content, but he must also master effective ways to teach it to students. That way the science material delivered by the teacher can be accepted and understood by students.

However, in the implementation of science learning in elementary schools there are still frequent misconceptions about teachers, prospective teachers, or students. Based on research (Laksana, 2016) shows that the average misconception of prospective teachers is 44.8%. In science learning there is an average misconception of 36% of students (Islami et al., 2018), and misconceptions among teachers occur in research (Dzulfikar & Vitantri, 2017). In addition, (Sari et al., 2021) stated that the ability of Pedagogical Content Knowledge is still low. In line with Sari's opinion, research (Amrina et al., 2022) and (Irfan et al., 2018) show that Pedagogical Content Knowledge is still low.

In this way, to improve PCK in the implementation of student learning, the role is no longer just an object of learning, but a subject of learning (Sari et al., 2021). Therefore the teacher must carefully prepare and plan lessons that can develop students' understanding and process skills. All of that can be realized if the teacher masters the content of the material and how to teach it well. To support this achievement, it is necessary to provide guidance to teachers, in order to form professional teachers. One of the guidelines for teaching used by the teacher is a learning book. Learning books contain material content and learning strategies that serve as a guide in the implementation of learning in educational institutions.

Books as a guide for teachers in planning, conducting, and evaluating learning should comply with pedagogical content knowledge (PCK) principles. Based on the results of an analysis (Resbiantoro, 2016) of the 2013 curriculum book for class V theme 1 and class VI theme 1, the sub-components of core knowledge, the nature of science, assessment, metacognition framework, and differences in student treatment have not been maximally contained in the book. This is in line with the results of the analysis (Anugrah, 2019) showing that overall the appearance of PCK in books published by the Ministry of Education and Culture in 2017 was on.

METHODS

This research uses a descriptive method. The purpose of descriptive research is to make systematic, factual and accurate descriptions, drawings or drawings regarding the facts, characteristics and relationships between the phenomena being investigated (Mulyati, 2021). The subject of this study was the book chapter of Basic Science in Grade III learning at SD Negeri Kuta Rentang. The instrument used to collect data is a book evaluation instrument which contains a combination of PCK indicators developed by Magnusson and Swanepoel developed by (Resbiantoro, 2016). The book evaluation instrument contains aspects of PCK content in the book. Filling in the teacher's book

evaluation instrument is done by giving a value of 0 to 5 on each aspect of the assessment by following the following criteria:

- 1 : Very unloading
- 2 : A little loading
- 3 : Simply loading
- 4 : Loading
- 5 : Very loading

The data that has been obtained is analyzed by calculating the percentage of PCK values with the Sujana formula in (Apriyana et al., 2019) as follows:

$$P = \frac{n}{x} \times 100\%$$

Information:

P = Percentage

n = total score obtained

x = total maximum score

The results of calculating the PCK percentage are then converted into a qualitative form with reference to the score interpretation criteria according to Riduwan and Sunarno in (Pakpahan et al., 2022) which are contained in table 1 below:

Table 1. Interpretation Criteria

Average Score (%)	Category
0%-20%	Not Reached
21%-40%	Underachieved
41%-60%	Enough Achieved
61%-80%	Achieved
81%-80%	Highly Achieved

RESULTS AND DISCUSSION

In this study, the analysis was only carried out on science books for class IV science content, namely CHAPTER 1 to CHAPTER 10. The PCK components were assessed based on their respective indicators which were divided into 2 components, namely the Content Knowledge (CK) component which consisted of learning outcomes, knowledge essence and nature of knowledge. While the second component, namely Pedagogical Knowledge (PK), consists of learning activities, assessment, examples and explanations,

metacognition framework, differences in student treatment, and providing motivation to students. The results of the analysis of science textbooks, i.e. Basic Science books, show that the levels of appearance of the Pedagogical Content Knowledge (PCK) components have quite a variety of percentages. In more detail, the results of the analysis are presented as follows:.

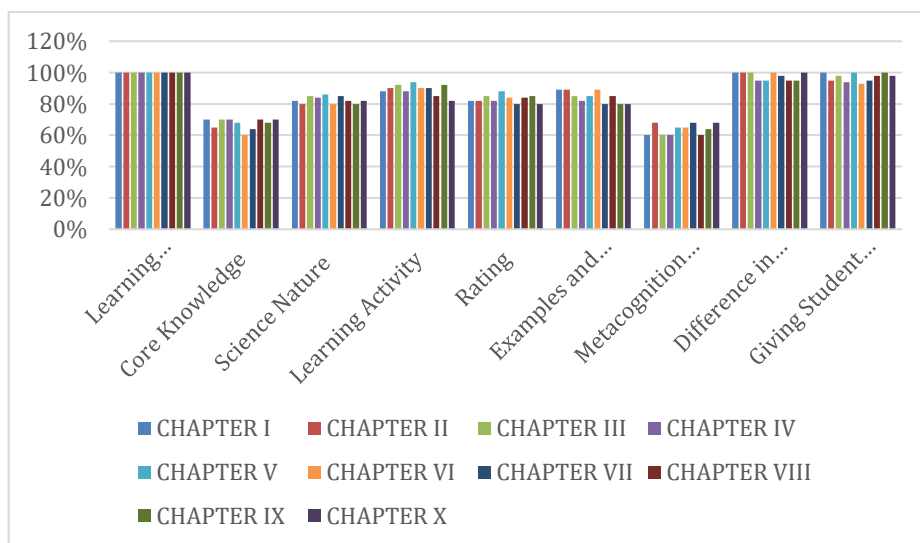


Figure 1. Percentage of PCK Appearance in Each Chapter of Basic Science Books.

Table 2. Results of Pedagogical Content Knowledge (PCK) Analysis in Basic Science Books

PCK Indicator	Sub-Indicator	Percentage	Category
Pedagogical Knowledge	Learning Activity	89%	Very Achieved
	Rating	83%	Very Achieved
	Examples and Explanations	84%	Very Achieved
	Metacognition Framework	64%	Achieved
	Difference in Student Treatment	98%	Very Achieved
	Giving Student Motivation	97%	Very Achieved
Content Knowledge	Learning Achievement	100%	Very Achieved
	Core Knowledge	68%	Achieved
	Science Nature	82%	Very Achieved
Total		94%	Very Achieved

Based on table 2, it shows that the average result of each Pedagogical Content Knowledge (PCK) sub-component that appears in the Natural Sciences learning book is 94% with the very achieved category. With several aspects that are still lacking, this book cannot be used as the only guide, teachers need to have other companion books as support and complements, especially on aspects of core knowledge and the metacognition framework.

Based on these findings, it can be seen that the Pedagogical Knowledge (PK) component that appears in Science learning Basic Science books is more optimal than the appearance of Content Knowledge (CK) that appears in Science learning Basic Science books which are still in the low category. Both PK and CK must be used in the implementation of learning (Hariati et al., 2022). With the emergence of PCK in science learning Basic Science books that are in the highly achieved category allow maximum learning success, because a good PCK is synonymous with a professional teacher. The difficulty experienced by teachers when implementing PCK and the 2013 curriculum was that it was difficult to detail teaching materials because KD was too broad and biased (Agustina et al., 2022), whereas in Basic Science books it was presented clearly and more focused so that the material was easier to sort.

CONCLUSION

Pedagogical Content Knowledge (PCK) in science learning books for Basic Science teachers are in the very attainable category, however this book should not be used as the only guide, teachers need to have other companion books as support and complements, especially on aspects of core knowledge and metacognition framework.

ACKNOWLEDGEMENT

We would like to thank the Kuta Rentang State Elementary School for supporting this research.

REFERENCES

- Adnyana, K. S., & Yudaparmita, G. N. A. (2021). Peran Guru Dan Orang Tua Di Sd Dalam Pembelajaran Ips Dimasa Covid-19. *Edukasi: Jurnal Pendidikan Dasar*, 2(1), 21–30.
- Agustina, N. S., Robandi, B., Rosmiati, I., & Maulana, Y. (2022). Analisis Pedagogical Content Knowledge Terhadap Buku Guru Ipa Pada Muatan Ipa Sekolah Dasar Kurikulum Merdeka. *Jurnal Basicedu*, 6(5), 9180–9187. <https://doi.org/10.31004/basicedu.v6i5.3662>
- Amrina, Z., Anwar, V. N., Alvino, J., & Sari, S. G. (2022). Analisis

- Technological Pedagogical Content Knowledge Terhadap Kemampuan Menyusun Perangkat Pembelajaran Matematika Daring Calon Guru Sd. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, 6(1), 1069–1079. <https://doi.org/10.31004/Cendekia.V6i1.1313>
- Anugrah, M. (2019). *Relevansi Buku Guru Sd Kelas V Tema 2 Udara Bersih Bagi Kesehatan Terhadap Tuntutan Pedagogical*.
- Apriyana, N., Herlina, K., & Abdurrahman. (2019). Pengembangan Lembar Kerja Siswa Berbasis Inkuiri Terbimbing Untuk Meningkatkan Kemampuan Berpikir Kritis. *Jurnal Pendidikan Fisika*, 7(2), 92–96.
- Dzulfikar, A., & Vitantri, C. A. (2017). Miskonsepsi Matematika Pada Guru Sekolah Dasar. *Suska Journal Of Mathematics Education*, 3(1), 41. <https://doi.org/10.24014/Sjme.V3i1.3409>
- Filina, N. Z., Muadi, F., Sari, S. M., Dasar, P., Bina, U., & Getsempera, B. (2022). *The Analysis Of Problem Based Learning With Field Trip Method In Improving Students ' Learning Outcomes In Paya Dua*.
- Hariati, H., M. Ilyas, M. I., & Mohammad Siddik. (2022). Analisis Pembelajaran Daring Di Masa Pandemi Covid-19 Pada Kemampuan Technological Pedagogical And Content Knowledge (Tpack) Guru Sekolah Dasar. *Journal Of Instructional And Development Researches*, 2(1), 32–47. <https://doi.org/10.53621/Jider.V2i1.119>
- Irfan, A., Tuti Marjan Fuadi, Dan, Blang Bintang Lama Km, J., Keudee, L., & Besar, A. (2018). *Mosharafa: Jurnal Pendidikan Matematika Analisis Pedagogical Content Knowledge Mahasiswa Calon Guru Pendidikan Matematika*. 7(2), 239–250. <http://journal.institutpendidikan.ac.id/index.php/mosharafa>
- Islami, D., Munawaroh, F., Hadi, W. P., & Wulandari, A. Y. R. (2018). Analisis Miskonsepsi Siswa Pada Mata Pelajaran Ipa Materi Listrik Statis Menggunakan Four Tier Test. *Natural Science Education Research*, 1(2), 71–77. <https://doi.org/10.21107/Nser.V1i2.4794>
- Laksana, D. N. L. (2016). Miskonsepsi Dalam Materi Ipa Sekolah Dasar. *Jpi (Jurnal Pendidikan Indonesia)*, 5(2), 166. <https://doi.org/10.23887/Jpi-Undiksha.V5i2.8588>
- Mulyati, N. (2021). Analisis Kebijakan Pendidikan Terkait Implementasi Pembelajaran Jarak Jauh Pada Masa Darurat Covid-19. *Jurnal Sosial Teknologi*, 1(9), 89–95. <https://doi.org/10.36418/Jurnalsostech.V1i9.191>
- Pakpahan, M. C., Yuliani, Y., & Dewi, S. K. (2022). Pengembangan Lembar Kerja Peserta Didik (E-Lkpd) Berbasis Guided Inquiry Pada Materi Enzim Untuk Melatih Keterampilan Berfikir Kritis.

- Berkala Ilmiah Pendidikan Biologi (Bioedu)*, 11(3), 567–578.
<https://doi.org/10.26740/bioedu.v11n3.p567-578>
- Resbiantoro, G. (2016). Analisis Pedagogical Content Knowledge (Pck) Terhadap Buku Guru Sd Kurikulum 2013. *Scholaria : Jurnal Pendidikan Dan Kebudayaan*, 6(3), 153.
<https://doi.org/10.24246/j.scholaria.2016.v6.i3.p153-162>
- Sari, S. M., Sinaga, B., & Suyanti, R. D. (2021). Personal Learning Environment Bersinergi Dengan Teknologi Pedagogic Content Knowledge Terhadap Keterampilan Proses Sains. *Educate: Jurnal ...*, 6(1), 72–81. <https://doi.org/10.32832/educate.v6i1.4228>
- Sukadi, E., & Angraeni, L. (2019). Penerapan Pedagogical Content Knowledge Pada Materi Kinematika Untuk Meningkatkan Hasil Belajar Mahasiswa. ... *Pendidikan Mipa Dan Teknologi Ii, September*, 202–214.
<http://journal.ikipgripta.ac.id/index.php/snpmt2/article/view/1376>