Problem-Based Learning Oriented to Clean and Healthy Living Behavior in Elementary School Science Learning: A Literature Study

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Abstract. Exploring potential solutions is essential to overcoming challenges and issues in elementary school education. Problem-based learning and clean and healthy living behavior education are two strategies that may be able to address these issues. This study outlines the problem-based learning model and the education of clean and healthy living behaviors in elementary science classes. This study reviews a number of research publications as part of its literature review. The results stated that the implementation of problem-based learning can improve science learning outcomes, problem solving skills, critical thinking skill and learning activities. Promoting clean and healthy living behaviors in elementary schools is essential to create a healthier learning environment. Clean and healthy behavior education in elementary schools showed an increase in students' knowledge and enthusiasm to implement good practices through engaging educational materials and activities.

Keywords: clean and healthy behavior, elementary school, problem-based learning, science

1 Introduction

The challenges and problems of education are getting bigger along with the development of the world in the current era of digitalization and globalization. The development of the world in the 21st century brings a shift in the paradigm of education in order to meet the demands and needs [1] [2]. Education is required to synergize the learning process with sustainable development and 21st century abilities that guarantee students' capacity for ongoing learning and problem-solving while preparing them to adjust to a world that is changing quickly [3] [4]. Herlinawati, et.al [5] also argues that 21st century skills which include the 4Cs (communication, collaboration, creativity, and critical thinking) are increasingly recognized as important intellectual competencies.

To face the demands of education, it is necessary to prepare an appropriate learning curriculum from the elementary level. Elementary education plays an important role in preparing graduates

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for future education so that they can adapt to developments and have complete skills and are ready to participate in society [6]. They serve as the foundational stage of formal education, shaping individual character and the collective ethos of a nation [7]. This foundational education is fundamental for helping students acquire the crucial knowledge and abilities they will need to advance in their schooling.

Given the importance of education in facing the development of the era, it is necessary to anticipate and continuously study solutions to overcome all challenges and problems in education, especially at the elementary school level. One form of innovative solutions to educational problems is the implementation of models in the learning process. Hodidjah [8] and Sari, et.al [9] argue that a learning model is a design or conceptual framework that is an important component of supporting the success of the plan that has been prepared and contains guidelines and a detailed description of the learning process from beginning to end. One form of learning model that is relevant to the demands of the 21st century to meet the 4C skills is problem-based learning [9] [10].

Problem-based Learning (PBL) is a student-centered learning model that can stimulate learning potential and emphasize active learning compared to traditional teaching [11]. According to Sururudin et.al the PBL model is a learning process that makes students open-minded, reflective, active, reflective, and critical through real-world context activities. The implementation of PBL in the classroom includes five stages including finding a problem, organizing ideas on the problem, the group works, present findings, and generalizing [13].

The implementation of PBL in elementary schools can be done through science learning. Science learning in elementary schools is not only focused on numbers, formulas or experiments in the laboratory, but also includes various phenomena and problems that often occur in the surrounding environment [14]. Therefore, the characteristics of science PBL are very appropriate to be combined. The finding of a problem in the early stages of PBL can be stimulated by natural phenomena in science.

Science does not only study natural phenomena, but also living things and life processes, including humans and their health. Science education is very important to provide health knowledge [15]. In addition, Aini [16] and Pitriani [17] stated that knowledge and awareness of health can be supported through clean and healthy living behavior education programs in schools.

An effort to enable students, educators, and the school community to understand, desire, and be able to conduct clean and healthy living behavior (CHLB) and actively contribute to the realization of healthy schools [18]. Kundaryanti and Hanny [19] states that CHLB in schools encompasses 8 key indicators: handwashing with soap and running water, using clean toilets, regular exercise, mosquito nests eradication, no smoking, biannual height and weight measurements, proper waste disposal, and maintaining personal hygiene. Maintaining a clean and healthy environment, enhancing the teaching and learning process, and preserving the health of students, faculty, and the school environment are all advantages of CHLB in schools [20].

Implementing CHLB education programs in schools is crucial and offers numerous advantages, particularly when it comes to integrating PBL models into the science curriculum. Therefore, research was conducted to examine the PBL model and CHLB in elementary school science

learning. The questions in this study are (1) how is the PBL model in science learning in elementary schools?; (2) how is CHLB education in elementary schools?; (3) how is the integration of PBL-CHLB in science learning in elementary schools?

2 Research Method

This study employs a qualitative approach of the literature study type to investigate, analyze, and synthesize previous studies that have been conducted in a particular field of study. The purpose of this study's literature review is to provide an overview of the PBL model and CHLB instruction in science instruction in elementary schools. In a literature study, numerous books, research reports, journal articles, and other sources pertinent to the subject are gathered and assessed [21]. The object of this research is literature related to PBL, CHLB education, and elementary school science learning. Data collection was conducted using Google Scholar with the keywords "problem-based learning"; "clean and healthy living behavior education"; "elementary school science learning". Data filtering was applied to literature from 2019-2024. Literature obtained in the form of proceedings articles, national journal articles and international journal articles. This study is divided into several phases, including data collecting, reduction, presentation, and conclusion drafting.

3 Result And Discussion

3.1 Literature of PBL

The results of the literature review related to PBL in elementary school science learning are presented in table 1 below.

Table 1. Literature Review of PBL in Elementary School Science Learning

No	Author (Year)	Title	Results and Discussion
1	Suswandari, Siswandari, Sunardi, & Gunardi (2019)	The Implementation of Problem-Based Learning on Elementary School Students of Sukoharjo [22].	This study demonstrates that the teacher's role determines PBL's success. For learning to be student-centered, the instructor must act as a motivator and facilitator for the class. If only some students participated, PBL's effectiveness would be limited, leading to a learning gap among the students.
2	Zuryanti, Kenedi, Chandra, Hamimah, & Fitria (2019)	Problem based learning: a way to improve critical thinking ability of elementary school students on science learning [23].	The findings demonstrated that using PBL can help students become more excellent at critical thinking.
3	Saleh, Ahda, & Fitria (2020)	Improving Science Learning Activities and Outcomes by Using	According to the research findings, PBL can enhance students' cognitive, emotional, and psychomotor

No	Author (Year)	Title	Results and Discussion
		Problem Based Learning Model at Elementary School [24].	learning outcomes as well as their activities. Activities involving visual, verbal, written, motor, and emotional learning are all facilitated by PBL in scientific education.
4	Dewa & Purwandari (2021)	Implementation of Problem-Project Based Learning Model in Elementary School [25].	The study's findings suggest that other learning models, such project-based learning, can be integrated with the PBL approach. There are differences in the outcomes of classrooms that use problem-project-based learning and classes that do not because each learning stage helps students develop scientific attitudes and master scientific concepts.
5	Kristiana & Radia (2021)	Meta Analisis Penerapan Model Problem Based Learning Dalam Meningkatkan Hasil Belajar IPA Siswa Sekolah Dasar [26].	According to this study's meta-analysis, PBL significantly affects elementary school science learning results.
6	Rahmani & Mahyana (2021)	The Implementation of Problem Based Learning Model on Science Problem Solving Ability of Elementary School Students [27].	According to quasi-experimental research, PBL can enhance fourth-grade science students' problem-solving abilities.
7	Made, Wibawa, Susanta, Parmithi, Wayan, & Mahendra (2023)	Improving the Scientific Attitude of Elementary School Students Through Problem-Based Learning [28]	The PBL class outperformed the conventional learning class in terms of scientific attitude scores, according to the results.
8	Purwanto (2023)	Increasing Elementary School Students' Science Learning Outcomes Through Problem-Based Learning [29].	According to the findings, PBL can help fifth-grade elementary school students understand science more effectively. PBL encourages students to actively think, research topics, and solve issues. This improves students' comprehension of science concepts and raises their level of participation in the learning process.
9	Safitri & Setiyawati (2023)	The Effect of the Problem-Based Learning Model on Student Activeness in Science Learning [30].	The findings demonstrated that PBL implementation improved students' engagement and activity levels in the scientific learning process. PBL promotes student participation in both group discussions and

No	Author (Year)	Title	Results and Discussion
			individual assignments, as well as in the entire learning process. PBL creates a classroom atmosphere that encourages students to connect with teachers and peers more comfortably.
10	Deting, Rorimpandey, & Ratunguri (2024)	Implementation of Problem-Based Learning Model to Improve Science Learning Outcomes in Grade V Students of Elementary Schools GMIM Pinaras [31].	Students in the fifth grade improved their scientific learning outcomes as a result of this study's two cycles of class action research. According to the results, learning outcomes were higher than in the prior class that employed traditional teaching methods. Students are inspired to pursue self-directed learning and expand their knowledge using the PBL teaching approach.
11	Yusuf & Khaeruddin., (2024).	Pengaruh model problem-based learning terhadap kemampuan berpikir kritis dan hasil belajar ipa pada siswa sekolah dasar [32].	Comparing PBL learners to those who engaged in traditional learning, the former demonstrated a notable improvement in critical thinking abilities.

The literature related to PBL in elementary school science learning that was reviewed consisted of 3 articles of proceedings and 8 articles of journals, both national and international. The articles covered the years 2019 (2 articles), 2020 (1 article), 2021 (3 articles, 2023 (3 articles), and 2024 (2 articles). The types of research in the articles reviewed included 8 quantitative experimental articles, 2 qualitative articles, and 1 classroom action research article.

Based on the reviewed articles, it is known that the application of PBL in science learning provides many positive impacts on students' skills and involvement in learning. PBL has had an impact on students' intellectual abilities in terms of critical thinking skills [33] PBL facilitates students to exchange information and solve problems so that their critical thinking skills are automatically formed. PBL affects students' problem-solving skills as well. By focusing on real-world problems, classroom conditioning encourages students to think critically and come up with solutions, which trains their problem-solving talents [34]. In addition to influencing higher-order thinking abilities like critical thinking and problem-solving, PBL also improves student learning outcomes in scientific classes [35] [36] [37]. Analysis, assessment, and evidence-based decision-making are some of the deeper cognitive processes that are a part of PBL. In order to comprehend and grasp scientific topics, these critical thinking abilities are crucial[38]. Thus, PBL is effective in improving elementary school students' science learning outcomes.
Not only does it have an impact on the intellectual aspect, the application of PBL in science learning also has an impact on students' scientific attitudes [39] [40]. PBL's primary idea is that it may put students at the center of their education by giving them real-world challenges that are relevant to the course material. PBL enables students to engage with classmates and other learning materials, collaborate in small groups, share academic information, create new

knowledge on their own by solving real-world problems, and have a strong drive to solve problems [41]. These indicators facilitate students' scientific attitude to be better.

PBL has many positive impacts on science learning because it is identical to providing real problems in everyday life. This is in line with the nature of science which studies nature and all phenomena that occur in it. Referring to Samatowa [42], elementary school science curricula cover the concepts of living things and life processes, such as people, animals, plants, and how they interact with their surroundings, as well as health; The earth and the cosmos include the soil, the solar system, and other astronomical bodies; the attributes of things and materials and their functions include liquid, solid, and gas; energy and its transformations include force, sound, heat, magnetism, electricity, light, and rudimentary machines. Therefore, students have the chance to apply scientific ideas to real-world issues through science education.

3.2 Literature of CHLB Education

The results of the literature review on CHLB are presented in table 2 below.

Table 2. Literature Review of CHLB Education Education

No	Author (Year)	Title	Results and Discussion
1	Kandou & Kandou (2019).	Improving Students Knowledge of Clean and Healthy Living Behavior through Health Education [43].	The findings demonstrated that students' knowledge and comprehension of CHLB before and after receiving health education differed significantly.
2	Fathin, M. (2021).	Science, Technology, Engineering, and Mathematics learning models to establish the clean and healthy living behaviors [44].	The findings of the study's observations demonstrated that CHLB is impacted by environmental norms and knowledge. CHLB is more common among students who understand how bacteria and viruses spread and infect others.
3	Hasyim, Samsuryadi, Purnomo, Adhitya, Fajar, & Cahyono (2021)	Community Empowerment to Improve Clean and Healthy Living Behavior [Chlb]: An Action Research. [45].	Through the integration of educational initiatives in schools, this study highlights the significance of socializing CHLB from a young age. The findings demonstrated that students' attitudes, behaviors, and understanding of CHLB have increased.
4	Naimah & Setyaningsih (2021)	Learning clean and healthy living behavior with pop-up book and poster media on children ages 6-12 years at	This study demonstrates how using media like pop-up books and posters can significantly increase students' knowledge, attitudes, and behavior in an

No	Author (Year)	Title	Results and Discussion
		elementary school, malang [46].	effort to preserve their health through CHLB.
5	Dewi, Fadillah, Kaffah, & Surury, (2023)	The Relationship of Teachers' Role and Students Attitudes toward Clean and Healthy Living Behavior in Islamic Boarding Schools [47]	The success of CHLB education is influenced by the role and attitude of teachers.
6	Lestari (2023)	Edukasi Perilaku Hidup Bersih Dan Sehat Untuk Siswa Sekolah Dasar Di SDN Mayangan 1 [48]	With a specific focus on students, this activity was conducted to foster community and raise awareness of CHLB in schools. This will enable students to actively participate in the creation of healthy schools and practice CHLB. Educating and educating students about CHLB at a young age can help them apply and retain the information, which will then become ingrained in their everyday educational routines.
7	Syaputri, Manalu, Apsari, & Suprawihadi (2023)	The Influence of Clean and Healthy Living Behavior Education on Changes in Student Behavior [48].	The findings demonstrated that students' knowledge, attitudes, and behaviors about CHLB were impacted by therapy. Counseling was done to help students become more adept at applying CHLB in the classroom. It is simpler for students to adopt hygienic and healthy living practices at school when teachers assist them.
8	Ulpa & Djuari (2023)	The Effect of Health Promotion on Clean and Healthy Living Behavior (CHLB) "Handwashing with Soap" To School Children Using Various Methods and Media [49]	The study demonstrated how health promotion affects CHLB's decisions about schoolchildren's soap-washing practices. Using techniques and media makes it easier for students to absorb the information.
9	Nurhanifah, Ihsan & Andani (2024).	Clean and Healthy Living Behavior Education to improve the knowledge of Elementary School Students [50]	Elementary school instruction on CHLB is crucial for enhancing students' understanding and establishing healthy habits at a young age. Numerous strategies are used to educate people about

No	Author (Year)	Title	Results and Discussion
			CHLB, including counseling, campaigns, the creation of educational materials, partnerships with health institutions, training, the active involvement of schools, the use of social media, role models, measurement, and evaluation.
10	Rafika, Fitriani, Hidayat, Rahmadhani, & Maisharoh (2024)	Efforts to Increase Knowledge of Clean and Healthy Living [51]	Based on the N-gain score, the CHLB education program's implementation at school demonstrated an increase in students' understanding and awareness of the significance of clean and healthy living practices.

The literature related to CHLB in schools that was studied included 2 proceedings articles and 8 journal articles. The articles studied were obtained from 2019 (1 article), 2021 (3 articles), 2023 (4 articles), and 2024 (2 articles). The types of research in the articles studied included 5 quantitative experimental articles, 2 qualitative articles, and 3 community service articles.

The literature review's findings indicate that teaching CHLB in schools is crucial for fostering early knowledge and attitudes about health. From a young age, CHLB education can help kids make healthy changes and become accustomed to taking care of their bodies. The cornerstone of preserving personal health and stopping the spread of illness is CHLB [50]. CHLB education affects students' comprehension, knowledge, and awareness of the significance of CHLB [52] [53] [54] [55] [56].

Teachers' roles are crucial to the implementation of CHLB instruction in the classroom. Dewi [57] states Teachers should provide more assistance and instruction to students, stressing the value of incorporating CHLB into the learning process and promoting cooperative learning activities to keep the classroom environment tidy. The media can also be used to support the success of CHLB education. Because it has a significant impact on raising children's knowledge, attitudes, and behavior in an endeavor to preserve health through CHLB, media like pop-up books and posters can be employed in the learning process [58].

3.3 Integration of PBL and CHLB in Science Learning

Integration of PBL with education on CHLB in science learning is presented in Figure 1.

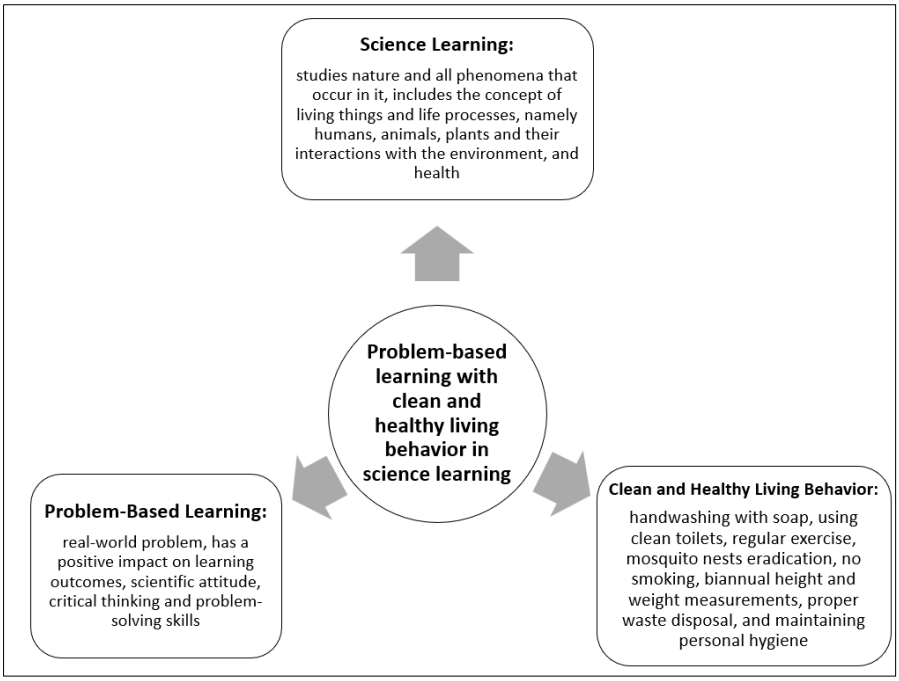

Figure 1. Framework of PBL-CHLB in Science Learning

The application of PBL in science learning can be oriented towards education on CHLB. The implementation of activities aims to increase elementary school students' knowledge about CHLB. The results of the activity program are the formation of habits such as washing hands with soap, consuming healthy food, exercising, and disposing of garbage in its place [59]. These forms are very close to the concept of science learning and are examples of real problems in everyday life. So, it is very possible to have a new formulation in learning, namely PBL that is oriented towards CHLB (PBL-CHLB) on science learning materials such as human organ systems and health, and ecosystems/environments. Through the application of PBL-CHLB, it is hoped that a learning process will be created that produces maximum outcomes not only from the intellectual aspect, but also changes in attitude and awareness to care about health.

4 Conclusion

It has been demonstrated that the use of PBL can overcome the drawbacks of traditional instruction and enhance learning activities, scientific attitudes, problem-solving abilities, and critical thinking skills. To establish a healthier learning environment, elementary schools must encourage students to live clean and healthy lifestyles. Through interesting teaching materials and activities, CHLB education in elementary schools demonstrated an increase in students' knowledge and enthusiasm to put good behaviors into practice. These results demonstrate how PBL-CHLB can be used to enhance scientific instruction in elementary schools. In its implementation, PBL-CHBS can be included in elementary school science learning on human organ systems and health, and ecosystems or environments.

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