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DEVELOPMENT OF CANVA-ASSISTED PBL TO IMPROVE STUDENTS' INFORMATION LITERACY AND CRITICAL THINKING SKILLS

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Abstract
The low level of information literacy and critical thinking skills in elementary school students in 21st-century learning is due to teacher-centered learning, resulting in students being less active in analyzing, evaluating, and using information effectively. This study aims to develop and test the effectiveness of a Problem-Based Learning model assisted by the Canva application in improving students' information literacy and critical thinking skills. This study used a Research and Development (R&D) approach adapted from Borg & Gall with 10 systematic stages. The subjects were teachers and fourth-grade elementary school students in Purwakarta Regency. Data collection was conducted through interviews, Likert-scale questionnaires, observations, and pretests and posttests. Data analysis used both qualitative and quantitative methods. The results of the PBL model's effectiveness test using the Canva application showed an increase in the average score from 57.08 to 78.32 with an N-Gain of 0.49 (moderate category) for information literacy skills, and from 47.6 to 72.6 with an N-Gain of 0.48 (moderate category) for critical thinking skills. The effectiveness test results showed a significance value of less than 0.05, indicating that the model had a significant impact on both skills. This study concludes that the Problem-Based Learning model assisted by the Canva application is effective in improving information literacy and critical thinking skills in elementary school students.
***Keywords**: Problem-Based Learning; Information Literacy; Critical Thinking; Canva Application*

Abstrak
Rendahnya kemampuan literasi informasi dan berpikir kritis siswa sekolah dasar dalam pembelajaran abad ke-21 disebabkan karena pembelajaran masih berpusat pada guru, sehingga siswa kurang aktif dalam menganalisis, mengevaluasi, dan menggunakan informasi secara efektif. Penelitian ini bertujuan untuk mengembangkan dan menguji efektivitas model *Problem Based Learning* berbantuan aplikasi canva dalam meningkatkan kemampuan literasi informasi dan berpikir kritis siswa. Penelitian ini menggunakan pendekatan *Research and Development* (*R&D)* yang diadaptasi dari Borg & Gall dengan 10 tahapan sistematis. Subjek penelitian adalah guru dan siswa kelas IV sekolah dasar di Kabupaten Purwakarta. Pengumpulan data dilakukan melalui wawancara, kuesioner dengan skala Likert, observasi, serta *pretest* dan *posttest*. Analisis data yang digunakan adalah kualitatif dan kuantitatif. Hasil uji efektivitas model PBL berbantuan aplikasi canva menunjukkan peningkatan skor rata-rata dari 57,08 menjadi 78,32 dengan nilai N-Gain sebesar 0,49 (kategori sedang) pada kemampuan literasi informasi, dan dari skor 47,6 meningkat menjadi 72,6 dengan nilai N-Gain sebesar 0,48 (kategori sedang) pada kemampuan berpikir kritis. Hasil uji efektivitas menunjukkan nilai signifikansi kurang dari 0,05, yang berarti model memberikan pengaruh yang signifikan terhadap kedua kemampuan tersebut. Penelitian ini menyimpulkan bahwa model *Problem Based Learning* berbantuan aplikasi canva efektif dalam meningkatkan kemampuan literasi informasi dan berpikir kritis siswa sekolah dasar.
Kata Kunci: *Problem Based Learning*; Literasi Informasi; Berpikir Kritis; Aplikasi Canva

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Introduction

The development of 21st-century education requires students to master not only factual knowledge but also higher-order thinking skills. The 21st-century skills framework emphasizes four core competencies known as the 4C: critical thinking, creativity, collaboration, and communication (Partnership for 21st-century learning, 2019). Of these four skills, critical thinking is an important foundation because it relates to the ability to analyze information, evaluate arguments, and make rational decisions (Paratiwi & Ramadhan, 2023).

According to Ennis in Sima et al. (2022), critical thinking is a reasonable and intelligent ideology that focuses on finding out what to acknowledge or do. Ennis said there are six criteria in critical thinking, namely focus, reason, inference, situation, clarity, and overview or commonly called FRISCO. These six criteria are basic components in critical thinking that are interconnected. Focus means students can determine what is known and what is asked. Reason means students can convey reasons based on reality evidence in each step of drawing conclusions. Inference means students choose relevant reasons to support the conclusions that have been made. Situation means students use all available information and use related concepts to answer questions. Clarity means students are able to provide clarity of symbols or meanings that have been written so as not to give rise to other assumptions. Overview means students check the accuracy of answers or double-check their work from start to finish.

Furthermore, information literacy is an essential skill because students live in an era of digital information overload, which demands the ability to sort, evaluate, and use information appropriately (UNESCO, 2021). Without these two skills, students will struggle to adapt to the dynamics of modern learning and ever-changing technological developments (Yusria et al., 2024). The curriculum implemented in elementary schools in Indonesia emphasizes strengthening eight graduate profiles, one of which is through the development of critical reasoning (Kemendikdasmen, 2025). In practice, implementing learning that truly trains these two competencies still faces various challenges.

International data shows that Indonesian students' literacy and critical thinking skills still need improvement. The 2022 PISA results show that Indonesian students' reading literacy scores remain below the OECD average (Widiatina, 2022). National research also found that elementary school students tend to have lower order thinking skills and are not yet optimal in analyzing problems (Edwar et al., 2020). Futhermore, the elementary school students still have difficulty distinguishing between valid and invalid information when using digital sources (Yudiana et al., 2023).

One solution that can be implemented is the use of teaching tools designed based on innovative learning models, such as Problem Based Learning (PBL) (Sabil et al., 2021; Tang, 2023). The PBL model places contextual problems as the starting point of learning, so that students are encouraged to think critically in finding solutions (Suparjan et al., 2024). The steps of PBL include: (1) orientation to the problem, (2) organizing students for learning, (3) independent and group investigations, (4) development and presentation of results, and (5) analysis and evaluation of the problem-solving process (Meiriza & Wulandari, 2024). Through these stages, students not only receive information but also actively construct knowledge. The advantage of PBL lies in its ability to simultaneously train analysis, synthesis, evaluation, and information literacy skills (Chaliha et al., 2024).

Various previous studies have demonstrated the effectiveness of PBL in improving critical thinking skills. PBL can significantly improve analytical and problem-solving skills. In

terms of information literacy (Ismail & Imawan, 2022). Research by Aripin & Mufit (2025) shows that PBL encourages students to be more active in seeking, evaluating, and using information sources independently.

Based on the results of a pre-survey conducted in several fourth-grade public elementary schools in Purwakarta, it was found that most students still have difficulty answering analysis and evaluation-based questions. The average score on the critical thinking skills test was below KKTP, the learning objective achievement criteria. When given the task of searching for information from various sources, students tended to copy information without evaluating its accuracy. This condition indicates the need for innovation in more contextual learning materials that simultaneously targets improving critical thinking and information literacy PBL based that utilize digital applications to simultaneously improve these two competencies.

The novelty of this research lies in the development of a PBL based teaching module with the help of the Canva application, utilizing an R&D approach with the Borg and Gall development procedure. The use of Canva allows for a more visual, and contextual presentation of material tailored to the characteristics of elementary school students. Based on this description, the purpose of this study was to develop and test the feasibility and effectiveness of a PBL-based learning module supported by the Canva application to improve information literacy and critical thinking skills in elementary school students.

Research methods

This research uses a Research and Development (R&D) approach by adapting the development procedure of Borg and Gall (Okpatioka, 2023) with ten research steps presented in Figure 1 below:

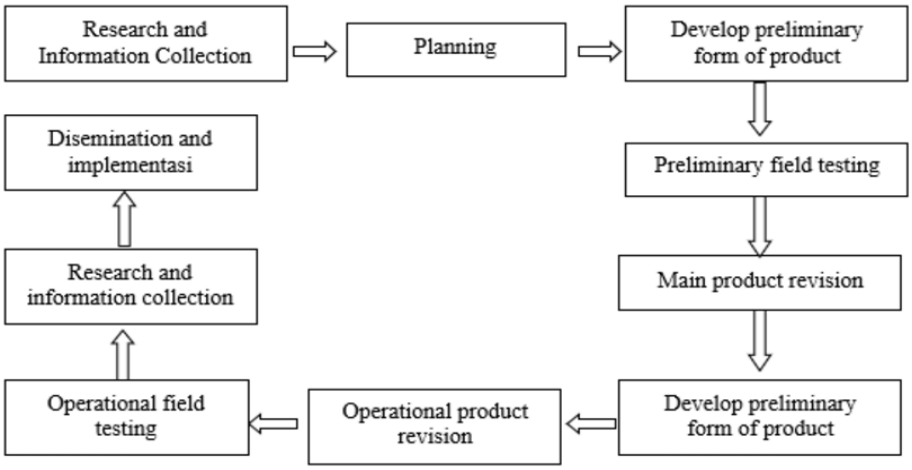


Figure 1. Borg and Gall's R&D Steps

Development research is a systematic study designed in such a way that it produces a product which is then tested (Gustina et al., 2024). Borg and Gall in Okpatrioka (2023) define development research as follows. Educational Research and development (R&D) is a process used to develop and validate educational products. The steps of this process are usually referred to as the R&D cycle, which consists of studying research findings pertinent to the product to be developed, developing the product based on these findings, field testing it in the setting where it will be used eventually, and revising it to correct the deficiencies found in the filed-testing stage. In more rigorous R&D programs, this cycle is repeated until the field-test data indicates that the product meets its behaviorally defined objectives. Educational

Research and Development (R&D) is the process used to develop and validate educational products.

According to Borg and Gall in Okpatrioka (2023) the ten phases of R&D research can be described as follows: First, pre-research (pre-interview) to gather information (literature review, classroom observation), identify and summarize learning problems. Second, planning (identifying and defining skills, formulating objectives, defining the learning cycle, and conducting experiential or small-scale trials or peer-review). Third, developing the type/form of the output product, including preparing teaching materials, compiling the learning cycle, and evaluating guidebooks and tools. Fourth, conducting an initial field test. Information or data is collected through observation, interviews, and questionnaires, followed by data analysis. Fifth, revising the main product based on input and feedback from the results of the first field test. Sixth, conducting a field trial. Student performance tests/assessments are conducted before and after learning. Seventh, revising the functional product based on input and feedback. Feedback from the main field test results. Eighth, conducting a field test with the finished product. Information is collected through interviews, observations, and questionnaires. Ninth, revising the final product based on suggestions made during the field test. Tenth, product dissemination. From this, it can be concluded that the general stages of research and development are product design, development, and evaluation. The final product of this R&D is a PBL model assisted by the Canva application which is included in the teaching modules, teaching materials, media, student worksheets, as well as test and non-test instruments.

The research data was obtained from teachers and 100 fourth-grade elementary school students in Purwakarta during the first semester of the 2025/2026 academic year. In addition, this study also involved two lecturers from the faculty of education as expert validators and one teacher as a practitioner validator. The results of the study will determine whether the developed product is feasible and effective in improving elementary school students' information literacy and critical thinking skills.

Data collection techniques were conducted through interviews, questionnaires, observations, and tests. Interviews were conducted with fourth-grade teachers to analyze the need for developing a PBL model assisted by the Canva application. A questionnaire compiled using a Likert scale was used to measure the model's feasibility through expert validation testing (materials, media, and language). This instrument included indicators for aspects of content feasibility, presentation, and product usability (Gustina et al., 2024). Observation sheets were used systematically to monitor student activities during the learning process. These observations measured information literacy skills with indicators were determine information needs, access information effectively, and critically evaluate information and its sources in accordance with information literacy competency standards (Rahayu et al., 2024). Test instruments consisting of a pretest and posttest were used to measure the model's effectiveness before and after the intervention, based on the FRISCO indicators (focus, reason, inference, situation, clarity, and overview) proposed by Ennis (Triwulandari, S., 2022).

The data obtained were then analyzed using qualitative and quantitative methods. Qualitative methods were used to analyze interview data regarding the need for developing a Canva assisted PBL model and its feasibility. Descriptive quantitative analysis was used to determine information literacy skills during learning using the PBL model assisted by the Canva application. Quantitative analysis used inferential statistical tests assisted by the SPSS application. According to Cohen et al. (2007), the paired sample *t*-test is a testing method used to assess the effectiveness of treatment, characterized by a difference in the average before and

after treatment. N-gain to determine the increase in students' critical thinking skills after learning using the PBL learning model assisted by the Canva application.

Results and Discussion

Preliminary Study Results

Based on the research and development that has been carried out in accordance with the Borg and Gall research procedure, the first stage is preliminary study. From the results of interviews with fourth grade elementary school teachers in Purwakarta, data obtained showed that only a few teachers have attempted to relate science material to everyday life, but the teaching tools used have not fully supported the development of higher order thinking skill (HOTS). The results of the analysis of the teachers' answers can be seen in Figure 2 below:

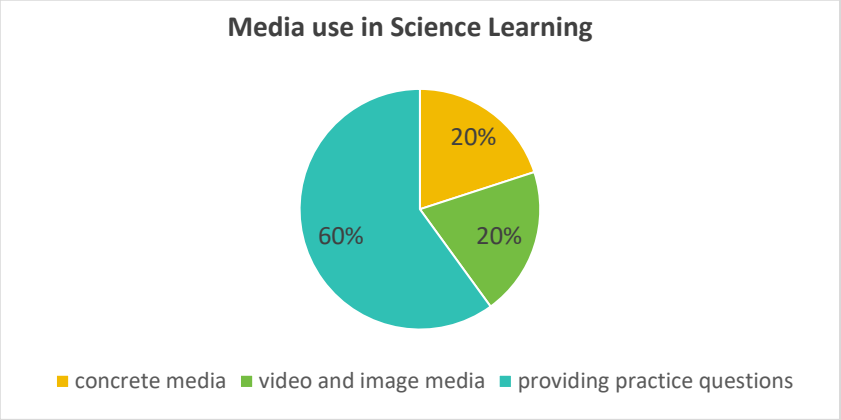


Figure 2. Science Learning Process

Based on the data obtained, the science learning process in grade IV of elementary school is still dominated by the use of concrete media, video and image media, and providing practice questions. Although a variety of media has been used, the learning approach still tends to focus on delivering material and reinforcing basic concepts, so that students' opportunities to analyze problems, seek additional information, and think critically are not fully optimal. This condition indicates the need to develop more structured and integrated learning media to increase student engagement and support the strengthening of information literacy and critical thinking skills optimally.

The next stage is to distribute data through various related sources, as support for the reference sources for this research. The results of several journal references used are as follows:

Table 1. PBL Model References

No	Title	Writer
1	Problem-based learning model based on the local culture of the Bengkulu community to improve the social attitudes of elementary school students.	(Ariffiando et al., 2023)
2	Development of a problem-based learning model on water cycle material assisted by animated video media.	(Erniasari, 2023)
3	Development of a PBL model assisted by Augmented Reality to improve students' understanding and problem solving.	(Olga et al., 2025)
4	PBL learning model in Mathematics lessons to improve investigative skills and affective domains.	(Nurwidyastuti & Wutsqa, 2020)

These findings reinforce the urgency of developing a PBL model integrated with digital media like Canva. According to Oktarizka and Abidin (2024) in their article, the PBL

model has systematic advantages in training students to analyze problems, seek additional information, and critically evaluate sources. By shifting from the use of static, concrete objects to interactive digital media within a PBL framework, students are given ample space to develop solutions rationally and independently. This innovation is an essential solution for increasing student engagement and supporting the optimal strengthening of information literacy and critical thinking skills in elementary schools usability (Pratama, 2024).

Canva-Assisted PBL Model Design to Improve Elementary School Students' Information Literacy and Critical Thinking Skills

The development of the Canva-assisted PBL model was designed by integrating the syntax of PBL with the help of Canva applications such as infographic presentations. The form of development includes the preparation of learning tools (teaching modules, student worksheets, Canva media, and evaluation instruments), which were validated by experts to ensure the appropriateness of the content, language, and learning design.

<table>
<tr>
<td> 

Module Cover</td>
<td> 
MODUL AJAR

A. INFORMASI UMUM

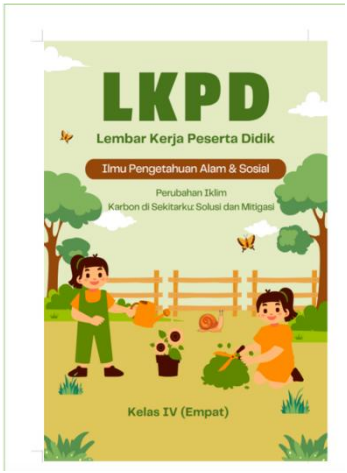
Nama Penyusun	: Ani Nur'aeni
Satuan Pendidikan	: SDN 1 Cilangkap
Tahun Disusun	: 2025
Mata Pelajaran	: IPAS
Jenjang	: SD
Kelas/Semester	: Kelas IV (Empat)/ Semester 1
Alokasi Waktu	: 7 x 35 Menit (3 Pertemuan)
Materi Pokok	: Iklim dan Perubahannya
Sub Materi	: Gas Karbon di Sekitarku: Mitigasi dan Solusi
Fase	: Fase B
Capaian Pembelajaran	: Menghasilkan solusi untuk masalah yang berkaitan dengan pelestarian sumber daya alam sebagai upaya mitigasi perubahan iklim
Dimensi Profil Lulusan	: 1. Penalaran Kritis 2. Kolaborasi 3. Kreatifitas
Sarana dan Prasarana	: 1. Sumber belajar: Buku ajar ILMU PENGETAHUAN ALAM DAN SOSIAL (Edisi Revisi) SD/MI Kelas IV Kemendikbudristek 2. Media Pembelajaran Slide presentasi pada canva 3. Alat / Bahan: Papan tulis, penyiktur dsb
Target Peserta Didik	: 1. Peserta didik regular/tipikal: umum, tidak ada kesulitan dalam mencerna dan memahami materi ajar. 2. Peserta didik dengan pencapaian tinggi: mencerna dan memahami dengan cepat, manipu mencapai kemampuan berpikir tingkat tinggi (HOTS)

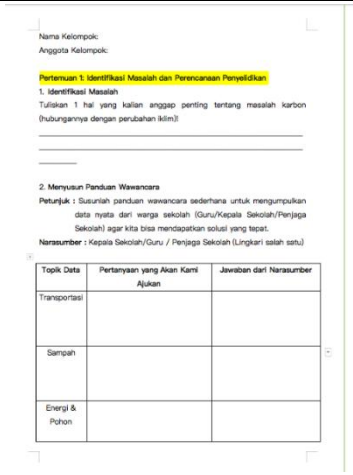
B. CAPAIAN PEMBELAJARAN

Tujuan Pembelajaran	: Peserta didik dapat menghasilkan solusi untuk masalah yang berkaitan dengan pelestarian sumber daya alam sebagai upaya mitigasi perubahan iklim.
Indikator Tujuan Pembelajaran	: • Peserta didik dapat mengidentifikasi jejak karbon di lingkungan sekitar. • Peserta didik dapat menghasilkan solusi untuk masalah yang berkaitan dengan pelestarian sumber daya alam sebagai upaya mitigasi perubahan iklim.
Pemahaman Bermakna	: Meningkatkan kemampuan peserta didik dalam mengidentifikasi masalah yang berkaitan dengan perubahan iklim dan menghasilkan solusi solusinya sebagai upaya mitigasi perubahan iklim
Asesmen	: 1. Asesmen awal: tes kognitif awal 2. Asesmen Proses: observasi diskusi 3. Asesmen Akhir: tes kognitif
Model Pembelajaran	: Problem Based Learning
Metode Pembelajaran	: Ceramah, diskusi, praktik, penugasan

General Information & Achievements of the Module</td>
<td> 
C. KEGIATAN PEMBELAJARAN

Tahapan	Alokasi Waktu	Langkah Model Pembelajaran	Deskripsi Kegiatan Pembelajaran
Pertemuan 1			
Kegiatan Awal ✓ Berkenda ran ✓ Menggamb irakan	10 Menit		1. Peserta didik bersama guru memulai dengan salam, doa, dan tarik napas sadar. 2. Guru mengecek kehadiran peserta didik, memanyakan kabar dan menitakan agar semua anggota keluarga dalam kondisi sehat. 3. Peserta didik bersama guru menyanyikan lagu nasional Indonesia Pusaka. 4. Guru menyampaikan pertanyaan pemantik "Di lingkungan sekitar kita, di mana kamu paling sering melihat asap atau polusi? Apakah asap itu bisa mengilang dengan sendirinya?" Apa gas yang terkandung dalam asap itu? 5. Guru menampilkan cuplikan video dampak lokal peningkatan gas karbon seperti polusi asap kendaraan dan pabrik di lingkungan sekitar (https://youtu.be/TvMPLvgGbRk?si=yIDcOB3J4DkDiCS) 6. Peserta didik menyampaikan tanggapan singkat. 7. Guru menyampaikan tujuan belajar hari ini yaitumengidentifikasi jejak karbon di sekitar kita 8. Peserta didik diberi kesempatan untuk menyampaikan tujuan belajar dan motivasi.
			instrinsik mereka masing-masing dengan dipandu pertanyaan dari guru. Apa yang ingin kalian ketahui lebih dalam tentang dampak iklim bagi kita?" Apa alasan kalian ingin mengetahui hal tersebut? (Berkesadaran) 9. Guru mengajak peserta didik menentukan strategi belajar yang mereka anggap paling efektif. 10. Guru memberikan asesmen awal.

Learning Activities</td>
</tr>
<tr>
<td> 

PBL Student Worksheets Design</td>
<td> 
Nama Kelompok:
Anggota Kelompok:

Pertemuan 1: Identifikasi Masalah dan Perencanaan Penyelidikan

1. Identifikasi Masalah

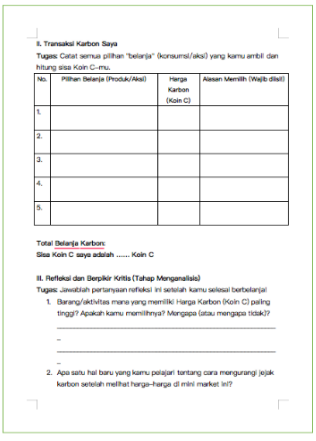
Tuliskan 1 hal yang kalian anggap penting tentang masalah karbon (hubungannya dengan perubahan iklim)!

2. Menyusun Panduan Wawancara

Petunjuk : Susunlah panduan wawancara sederhana untuk mengumpulkan data nyata dari warga sekolah (Guru/Kepala Sekolah/Penjaga Sekolah) agar kita bisa mendapatkan solusi yang tepat.

Narasumber : Kepala Sekolah/Guru / Penjaga Sekolah (Lingkari salah satu)

Topik Data	Pertanyaan yang Akan Kami Ajukan	Jawaban dari Narasumber
Transportasi		
Sampah		
Energi & Pohon		

PBL Student Worksheets Activities</td>
<td> 
II. Transaksi Karbon Saya

Tugas: Catat semua pilihan "belanja" (konsumsi/aksi) yang kamu ambil dan hitung sisa Koin C-mu.

No.	Pilihan Belanja (Produk/Aksi)	Harga Karbon (Koin C)	Alasan Memilih (Wajib diisi!)
1.			
2.			
3.			
4.			
5.			

Total Belanja Karbon:
Sisa Koin C saya adalah ..... Koin C

III. Refleksi dan Berpikir Kritis (Tahap Menganalisis)

Tugas: Jawablah pertanyaan refleksi ini setelah kamu selesai berbelanja!

1. Barang/aktivitas mana yang memiliki Harga Karbon (Koin C) paling tinggi? Apakah kamu memilihnya? Mengapa (atau mengapa tidak)?
2. Apa satu hal baru yang kamu pelajari tentang cara mengurangi jejak karbon setelah melihat harga-harga di mini market ini?

Reflection</td>
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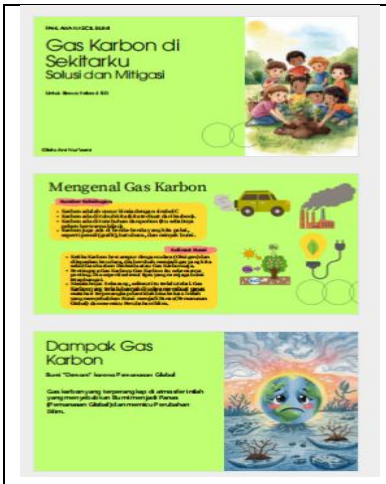
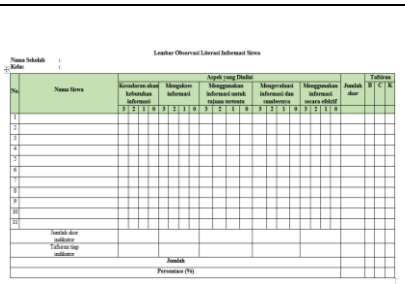
</table>



Teaching Media



Observation Sheet

Test Questions

Figure 3. The Preparation of Learning Tools

The teaching module in this development is designed as a primary guide that integrates PBL syntax with the "Climate and Its Change" science subject through a contextual approach, focusing on real-life experiences, such as issues of waste, transportation, and the presence of trees in schools. This aligns with the findings of Rahmawati et al. (2024), who emphasized that connecting problems to everyday realities can significantly increase students' active engagement in the inquiry process. LKPD were developed with structured instructions to guide discussions and a simulation to develop their information literacy and critical thinking skills. The Canva based learning media in this design structure acts as a cognitive scaffold, helping students organize complex information into more organized schemes (Wahyuningsih et al., 2024). This media presents videos and visual materials that enable students to better categorize information before developing creative solutions.

Observation sheets are designed to monitor student activities throughout the learning process, particularly during simulations and group discussions. Observing the integration of technology into active learning will provide a more in-depth and sustainable understanding of the learning experience, ensuring that students' investigative processes are aligned with the goal of improving information literacy. The test instrument was developed as an evaluation tool to measure students' critical reasoning skills after completing a series of lessons.

The Feasibility of Canva-Assisted PBL Model to Improve Elementary School Students' Information Literacy and Critical Thinking Skills

The feasibility validation test was conducted to ensure the developed model has a high level of credibility and produces effective results. The expert assessment of the material was analyzed based on three aspects: module, media, student worksheet, critical thinking test instruments, and information literacy observation sheets. The results of the expert test are presented in Graph 1 below:

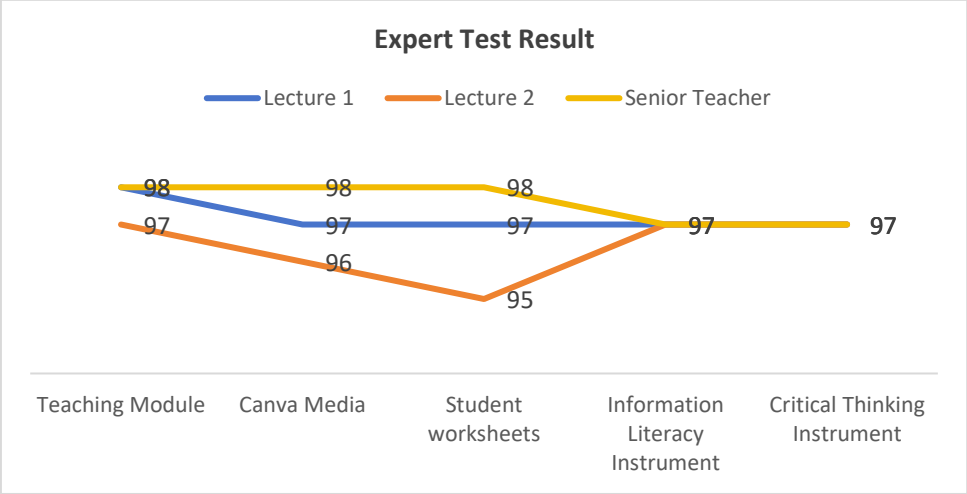


Figure 4. Expert Validation Test

Based on validation results by two expert lecturers and one senior expert teacher, the Canva-assisted PBL learning tool was declared highly suitable for use. The module aspect received very high scores, namely 98% from Expert Lecturer 1, 97% from Expert Lecturer 2, and 98% from senior teachers. The learning media also showed a very good level of suitability with percentages of 97%, 96%, and 98%. In the student worksheets component, scores of 97%, 95%, and 98% were obtained, indicating the suitability of the content, language, and presentation to the characteristics of fourth-grade students. The information literacy instrument and the critical thinking instrument received a consistent score of 97% from the three validators.

Overall, these results indicate that all developed tools are in the very good category and suitable for implementation in elementary school learning. This is because the integration of PBL syntax into Canva modules and media has been systematically designed to meet the pedagogical needs of fourth-grade students. Scores for the modules and learning media indicate high content and design quality. These learning tools meet eligibility standards because the student worksheet has adjusted language difficulty and visual readability to the characteristics of elementary school students' cognitive development. This aligns with the findings of Oktarizka & Abdidin (2024) who stated that readability and visual appeal in learning tools significantly determine students' success in understanding problem-based learning flows. Information literacy and critical thinking instruments showed that these items objectively measure the expected indicators..

Limited Test Results of the Problem-Based Learning Model Assisted by the Canva Application to Improve Students' Information Literacy and Critical Thinking Skills

After conducting the validity test, the researcher then conducted a limited test. The results of the limited test for information literacy skills are described in Table 2:

Table 2. Limited Test Results on Information Literacy Skills

Data	Pre-test	Post-test
N	25	25
Average value	55.44	75.8
Maximum value	67	95
Minimum value	40	53

Standard deviation	7,964	13,925
Normality	0.122	0.222
Paired *t*-test	0,000	
N-Gain	0.46 (effective)	

Source: Processed data (2025)

The results of a limited test indicate that the implementation of the Canva-assisted PBL model had a positive impact on improving students' information literacy. The increase in the maximum indicated that this model is highly effective for students with high learning speeds. The use of Canva as a presentation medium helps students organize information visually effectively. The minimum score indicates that some students still struggle to achieve the completion standard, during the limited testing phase, scaffolding for the information literacy process was not fully distributed to all students.

The following are the results of limited test for students' thinking skills, described in Table 3:

Table 3. Limited Test Results on Critical Thinking Skills

Data	**Pre-test**	**Post-test**
N	25	25
Average value	45.2	70.2
Maximum value	60	85
Minimum value	35	50
Standard deviation	7,427	9,946
Normality	0.115	0.069
Paired *t*-test	0.001	
N-Gain	0.50 (effective)	

Source: Processed data (2025)

The results of the limited test on students' critical thinking skills showed an increase in the average pretest and posttest score with 25 students. The soaring maximum score indicates that this model is highly effective in facilitating students with high cognitive skills to achieve HOTS. The use of Canva in the presentation stage helps students organize their arguments logically and structured. Interactive visual media can help students clarify and provide strong reasons in solving problems (Oktarizka and Abidin, 2024). The persistently low minimum score indicates that some students still experience difficulties adapting to the PBL model. This condition aligns with the findings of Sari and Arifin (2022) that successful critical thinking in the PBL model is highly dependent on students' independent readiness, without intensive scaffolding, students with low initial skills tend to struggle with complex investigative syntax. The results of this limited test demonstrate that the Canva-assisted PBL model is significantly effective, but requires strengthening in terms of instructional differentiation. These findings provide an important basis for revising the tool before moving on to extensive test.

Extensive Test Results of the Problem-Based Learning Model Assisted by the Canva Application to Improve Information Literacy and Critical Thinking Skills

During the limited test, researchers received input to make instructional adjustments to the learning tools. The following are the results of the descriptive statistical analysis of the pretest and posttest values in the broad group, described in Table 4:

Table 4. Results of the Extensive Test on Information Literacy Skills

Data	Pre-test	Post-test
N	50	50
Average value	65.68	75.88
Maximum value	93	100
Minimum value	33	33
Standard deviation	13,573	16,442
Normality	0.200	0.200
Paired *t*-test	0.004	
N-Gain	0.30 (medium)	

Source: Processed data (2025)

The results of the extensive test on students' information literacy skills showed an average pre-test score of 65.68 increasing to 75.88 in the post-test with a sample of 50 students. The maximum score increased from 93 to 100, while the minimum score remained at 33. The data were normally distributed because the significance value of the pre-test and post-test was 0.200 (>0.05). The results of the paired t-test showed a significance value of 0.004 (<0.05), which means there was a significant difference between the pre-test and post-test. The N-Gain value of 0.30 is included in the medium category (lower limit).

The achievement of a maximum score reaching a perfect 100 demonstrates this model's excellence in facilitating independent learning. In the extensive test, the availability of Canva's infographic feature served as a cognitive aid, enabling students to process data precisely and achieve the advanced level of information literacy competency. The minimum score was indicated the presence of more complex learning resistance factors in the large sample. Students in the lower groups tend to become dependent on direct instruction and struggle to conduct independent investigations without intensive personal support.

Table 5. Results of Extensive Test on Critical Thinking Skills

Data	Pre-test	Post-test
N	50	50
Average value	51.7	73.8
Maximum value	75	95
Minimum value	40	25
Standard deviation	8,608	13,871
Normality	0.200	0.200
Paired t-test	0.004	
N-Gain	0.46 (effective)	

Source: Processed data (2025)

The results of the extensive test showed an increase in students' critical thinking skills with an N-Gain value of 0.46 (moderate category). Data analysis of the extensive test revealed a contradictory phenomenon: a significant increase in the maximum score followed by a decrease in the minimum score in the post-test. The increase in the maximum score proves that the development of the Canva-assisted PBL model has an effective cognitive boost for high-achiever students. This aligns with Jean Piaget's Theory of Cognitive Development, where students in the concrete operational stage (grade 4 of elementary school) begin to be able to reason abstractly if given the right stimulus. The use of Canva as a visual

representation helps students assimilate complex information into their cognitive schema more efficiently.

However, the increase in sample size in this extensive test has statistical consequences in the form of the emergence of extreme values previously not captured in the small sample. According to the findings of Cohen et al. (2007), the addition of research subjects automatically widens the data range, which explains why the minimum score in the post-test can be lower than the pre-test. The decrease in the minimum score in the post-test indicates cognitive overload in some students. Based on the findings of Bloom's Taxonomy (Anderson, 1999), students with lower skills may be stuck at the remembering and understanding levels, distracted by media, thus failing to reach the applying or analyzing levels, which are the core of PBL.

Based on these findings, researchers suggest several strategic points: teachers need to provide more intensive scaffolding for lower-level students. Referring to Vygotsky's Zone of Proximal Development (ZPD) concept, technical assistance should be provided to minimize extraneous cognitive load so students can reach their maximum potential.

The Effectiveness of the Canva Application-Assisted PBL Model to Improve Elementary School Students' Information Literacy

The results of the product revision are based on evaluations from extensive trials, researchers conducted effectiveness tests of the model on 25 students at different schools.

Table 6. Results of the Effectiveness Test of the PBL Model Assisted by the Canva Application in Improving Elementary School Students' Information Literacy Skills

Information literacy	N	Average value	Standard deviation	N-Gain	Sig-2 Tailed
Pre-test	25	57.08	8,067	0.49	0,000
Post-test	25	78.32	15,453		

Source: Processed data (2025)

The effectiveness test results of the Canva-assisted PBL model showed an average pre-test score of 57.08, increasing to 78.32 in the post-test with a sample of 25 students. The N-Gain value of 0.49 is included in the moderate category, indicating a fairly effective increase in ability. The results of the significance test *(Sig. 2-tailed)* of 0.000 (<0.05) also showed a significant difference between the pre-test and post-test. Thus, the Canva-assisted PBL model is effective in improving the information literacy skills of elementary school students.

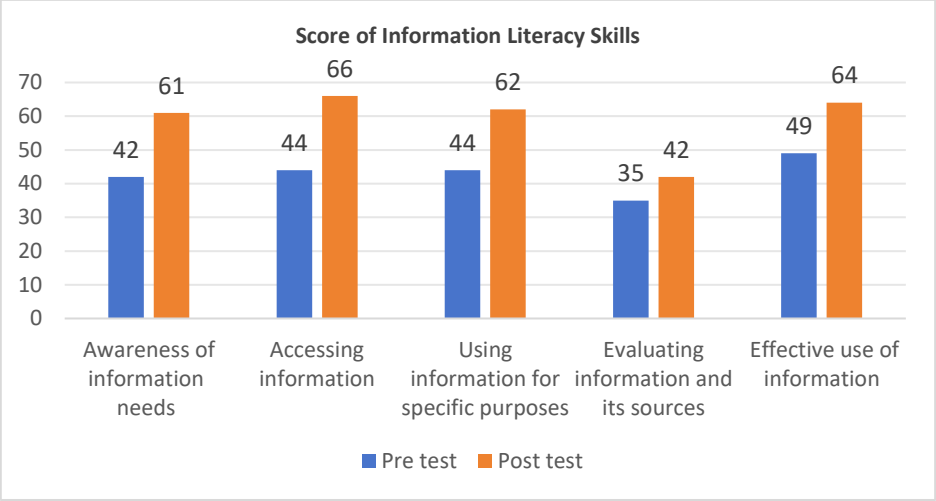


Figure 5. Graph Score of Information Literacy Skills

Based on information literacy indicator data, all aspects improved from the pre-test to the post-test. The awareness of information needs indicator increased from 42 to 61, accessing information from 44 to 66, and using information for specific purposes from 44 to 62. The indicator evaluating information and its sources increased from 35 to 42, although it remains the aspect with the lowest score. Meanwhile, effective use of information increased from 49 to 64. Overall, these results indicate an increase in information literacy skills across all indicators after the treatment was administered.

The ability to access information was significant increase occurred because fourth-grade elementary school students empirically already had a high level of familiarity with the use of search engines, in their daily lives. During the learning process, students did not show any significant technical difficulties when instructed to search for data online. This is in line with the research results of Rahayu et al. (2024). Information access skills are the most prominent indicator, influenced by the ease of accessing technology, which allows students to search for information instantly.

The evaluating information actually showed the lowest increase in this study. This occurs because students assume that what appears on the screen is always true. Students tend to be unable to analyze the validity of the content of the information they obtain. Elementary school students tend to have a low critical attitude towards the validity of internet sources (Rusdiyanti et al., 2023).

The Effectiveness of the Canva Application-Assisted PBL Model to Improve Elementary School Students' Critical Thinking Skills

The following are the results for critical thinking skills after receiving the treatment shown in Table 7 below:

Table 7. Results of the Effectiveness Test of the PBL Model Assisted by the Canva Application to Improve Elementary School Students' Critical Thinking Skills

Critical thinking	N	Average value	Standard deviation	N- Gain	Sig-2 Tailed
Pre-test	25	47.6	11.284	0.48	0,000
Post-test	25	72.6	11.192		

The N-Gain value of 0.48 (moderate category) indicated a fairly effective increase in ability. The classification of the results of critical thinking skills before and after the action based on critical thinking indicators is depicted in Graph 3 below:

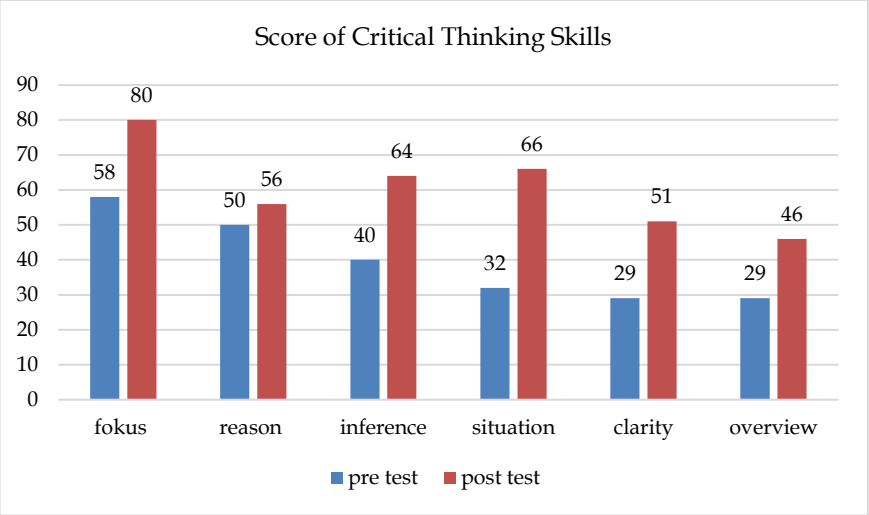


Figure 5. Graph Score of Critical Thinking Skills

Based on the critical thinking skill graph, all indicators increased from the pre-test to the post-test. The focus indicator increased from 58 to 80, reason from 50 to 56, inference from 40 to 64, situation from 32 to 66, clarity from 29 to 51, and overview from 29 to 46. This indicates that the applied learning is effective in improving various aspects of students' critical thinking abilities.

The indicator with the lowest increase is reasoning. The reasoning indicator is the ability to support conclusions with relevant evidence (Triwulandari, 2022). The low achievement of this indicator is because students more often answer with implicit data from information sources and the presence of cognitive laziness, where students prefer instant conclusions rather than having to take the trouble to dissect arguments logically, so that the answers given tend to be short without explaining the arguments.

The most significant improvement was seen in the situation indicator, namely a person's ability to understand the context, conditions, and environment in which a problem occurs. This improvement is because in the digital era, students are easily exposed to a very rapid flow of information, so the ability to scan general information in a story or event is very honed. They are adept at determining "who, where, and when" an event occurred, especially if the event is contextual and close to the student's experience. This is in accordance with the explanation of Ennis (Triwulandari, 2022), that humans are more easily able to think critically if the problem presented is similar to their daily life experiences. In learning, students seek contextual information about the environment, and internet media allows students to understand the context, conditions, and environment in which a problem occurs.

The implementation of the PBL model follows five main syntaxes according to Yusita (2021). In the problem orientation stage, students are introduced to authentic problems in the context of science, such as global warming or environmental change. This stage effectively encourages students to make initial interpretations of the problem, sparking their engagement from the beginning of the learning process. This authentic situation strengthens their ability to identify issues, compare information, and determine the focus of the problem to be analyzed. The guided inquiry stage is the core of students' critical thinking process. In this stage, students are asked to collect data from various sources such as observations, group discussions, or

literature reviews. Students also simulate a green minimarket by selecting activities with a low carbon footprint, finding solutions to the problems they face, and presenting them on Canva. This process allows students to practice selecting relevant information and validating it. This activity significantly supports the development of critical thinking skills, as students not only receive information but also must evaluate the relevance and accuracy of the collected data. This stage also fosters students' habit of questioning and verifying information.

In the developing and presenting results stage, students are asked to organize their findings and communicate solutions to the problems being studied. This activity trains students' ability to explain, argue, and draw logical conclusions. Group presentations enrich students' perspectives, as they must defend their opinions and receive criticism from other groups. This provides reflective thinking experiences, where students re-evaluate their investigations.

The advantage of the PBL model lies in presenting authentic problems that require the application of knowledge, not simply memorizing facts. According to Ismail (2022), learning that places students in real-world situations is more effective in encouraging the processes of analysis, synthesis, and evaluation. This is evident in the significant improvement in posttest scores. Students are better able to draw connections between concepts, assess evidence, and draw relevant conclusions based on the data found.

Overall, this learning implementation is effective in improving various aspects of students' critical thinking skills. This aligns with research by Kurniasih (2025), which confirms that PBL positions students as active learners, encouraging independent learning, collaboration, and critical thinking skills through contextual problems. Students are also required to analyze information, evaluate alternatives, and generate solutions, thus making learning more meaningful.

Conclusion

This study concludes that the development of a Canva assisted PBL model is highly feasible and effective in enhancing information literacy and critical thinking skills among fourth-grade elementary school students. The integration of PBL syntax with the visual advantages of the Canva application has proven to bridge abstract climate change material into meaningful contextual learning experience through active student engagement. Tes results demonstrated a significant and consistent increase in average scores, although additional support strategies are still needed to optimize student achievement in the lower ability group. Overall, this model successfully created a learning environment that empowers students to investigate, evaluate, and communicate solutions to real world problems in their environment.

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