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Development of Website-Based Interactive Learning Media to Improve Scientific Literacy of Fourth-Grade Elementary School Students

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Abstract

The low scientific literacy of students calls for interactive learning media suited to elementary school students. This study aimed to develop website-based interactive media for the science component of the IPAS (Natural and Social Sciences) subject on the topic "Plants as Sources of Life on Earth", and to examine its feasibility and the change in fourth-grade students' scientific literacy. It used a Research and Development design with the ADDIE model, with a field trial on 25 fourth-grade students in Pulo Gadung District, Jakarta. Data were collected through interviews, expert validation questionnaires, a student response questionnaire, and a 15-item multiple-choice scientific literacy test (pretest–posttest), and were analysed using feasibility percentages and N-Gain. Expert validation fell into the feasible to very feasible categories (75%–100%), and student responses in the one-to-one, small-group, and field tests were 79%, 80%, and 83%, respectively. The mean scientific literacy score rose from 78.12 to 90.28, with a mean N-Gain of 0.47 (moderate). The media are feasible for use and were followed by improved scientific literacy in a one-group design; their effectiveness should be tested further with a control group.

Keyword: interactive learning media; website; scientific literacy; IPAS; elementary school

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INTRODUCTION

Science (IPA) learning in elementary school, which under the Merdeka Curriculum is combined with social studies in the subject Natural and Social Sciences (IPAS), aims to build students' scientific ways of thinking. One of its key outcomes is scientific literacy, that is, the ability to understand scientific concepts and use them in real-life contexts rather than merely master facts (Holbrook & Rannikmae, 2009). A literature review on scientific literacy in elementary schools in the Society 5.0 era emphasises the competencies students need: performing science tasks, understanding concepts, communicating scientific ideas, and using

science to solve everyday problems (Barokah et al., 2024). Scientific literacy is also increasingly linked to digital literacy (Patigu et al., 2024).

Indonesian students' scientific literacy remains a concern. In PISA 2022, Indonesia's science score was 383 points (OECD, 2023). At the elementary level, the reading-writing and science literacy movement has also been reported to be still at a developmental stage (Maryono et al., 2022). A needs analysis of interactive multimedia based on scientific literacy in primary schools showed that low scientific literacy is related to limited use of interactive learning media and the dominance of conventional teaching (Mardiana et al., 2025). Learning media innovation is therefore regarded as one strategy for improving elementary students' scientific literacy (Lorenza, 2025).

Non-digital aids such as ecosystem teaching aids have also been examined for grade V students' scientific literacy (Fadhli et al., 2026), but interactive digital media add visual and audio presentation and immediate feedback. Various forms of digital media have been developed for elementary science/IPAS learning, including flipbooks (Amran et al., 2026; Hartomo & Sukmawati, 2024; Lestari et al., 2024), Canva-based e-modules (Fitri et al., 2024), interactive digital magazines (Muzdalifah & Sutisna, 2026), interactive e-books (Muna & Afandi, 2025), Lectora Inspire (Pentianasari et al., 2023), Articulate Storyline (Cahaya et al., 2025; Habibatuzzahro' & Istianah, 2025; Imran & Arwin, 2026), Wordwall (Salsabilla & Erita, 2025), and digital PowerPoint (Anggraini & Erita, 2025). A systematic review of digital interactive media for science process skills is also available (Sudianto et al., 2026).

Among these forms, website-based media have the advantage of being accessible independently on students' devices. Websites as IPAS media have been reported for an environmental-care topic in grade V, with average expert validation of 95% and an N-Gain of 0.75 (Marlinda et al., 2026), for Google Sites IPAS media in grade IV (Zulemil & Wulandari, 2025; Sintia et al., 2026) and grade V (Sahmura et al., 2026), for web media on cultural literacy (Hidayat, 2024), and for a beach-edutourism science website after which the experimental group's scientific literacy was higher than the control group's (Wulandari et al., 2025). Nevertheless, a review of interactive science media research in elementary schools for 2019–2025 found that most studies focus on learning outcomes, whereas effects on scientific literacy are rarely examined (Intantri et al., 2025).

Based on this gap, the present study developed website-based interactive learning media on the topic "Plants as Sources of Life on Earth" for fourth-grade students and assessed it in terms of scientific literacy. The objectives were (1) to describe the feasibility of the media according to content, media, and language experts, (2) to describe student responses in the one-to-one, small-group, and field tests, and (3) to describe the change in students' scientific literacy after using the media.

METHODS

This study used the Research and Development method with the ADDIE model, which consists of five stages: analysis, design, development, implementation, and evaluation (Branch, 2009). In the analysis stage, the researcher examined needs through interviews with [fourth-grade teachers: number, school,

and main findings] and analyzed learning outcomes and the topic "Plants as a Source of Life on Earth". In the design stage, the researcher prepared a navigation flow/storyboard and quiz design. In the development stage, media was created using a website platform, combining text, images, learning videos, audio, and interactive quizzes, then validated by 1 content expert, 1 media expert, and [number] linguists and revised. The implementation stage consisted of one-on-one (3 students), small group (10 students), and field testing with 25 fourth-grade students in [school name], Pulo Gadung District, Jakarta, using a single-group pretest–posttest design. The evaluation stage was carried out at each stage by analyzing validation results, student responses, and test results.

The instruments were an interview guide, validation questionnaires for content, media, and language experts, a student response questionnaire, and a scientific literacy test. The test comprised 15 multiple-choice items, with the same form and number of items in the pretest and posttest. Qualitative questionnaire data were converted into quantitative scores using the four-point scale in Table 1 and then expressed as percentages using $P = (\Sigma X/\Sigma Xi) \times 100\%$, where P is the percentage score, ΣX the obtained score, and ΣXi the maximum score. The results were interpreted using the feasibility criteria in Table 1.

Table 1. Questionnaire Rating Scale and Feasibility Criteria

Response	Score	Percentage score	Criterion
Strongly agree	4	< 21%	Very not feasible
Agree	3	21%–40%	Not feasible
Disagree	2	41%–60%	Fairly feasible
Strongly disagree	1	61%–80%	Feasible
		81%–100%	Very feasible

Improvement in scientific literacy was analysed using N-Gain, g = (posttest score − pretest score) / (maximum score − pretest score), with categories high ($g \geq 0.70$), moderate ($0.30 \leq g < 0.70$), and low ($g < 0.30$) (Hake, 1998). Differences between pretest and posttest scores were tested using the Shapiro–Wilk normality test and a paired two-sample test (paired t-test or Wilcoxon).

RESULTS & DISCUSSION

Result

The product is an IPAS learning website on “Plants as Sources of Life on Earth” with text, images, video, audio, and interactive quizzes. Expert validation results are shown in Table 2. All aspects assessed by the media and language experts were in the very feasible category (87.5%–100%). The content expert rated the usability aspect as feasible (75%) and the other aspects as very feasible (84%–96%).

Table 2. Validation Results from Media, Language, and Content Experts

Validator	Aspect	Score	Percentage	Category
Media expert	*Usability*	12	100%	Very feasible
	Navigation system	18	90%	Very feasible
	Graphic design	26	93%	Very feasible
	Compatibility	7	87.5%	Very feasible

Validator	Aspect	Score	Percentage	Category
	Loading time	7	87.5%	Very feasible
	Functionality	12	100%	Very feasible
	Accessibility	4	100%	Very feasible
	Interactivity	8	100%	Very feasible
Language expert	Content	46	95%	Very feasible
Content expert	*Usability*	6	75%	Feasible
	Navigation system	11	92%	Very feasible
	Graphic design	31	96%	Very feasible
	Content	42	91%	Very feasible
	Scientific literacy-based	37	84%	Very feasible

Student responses to the media are presented in Table 3. Mean ratings in the one-to-one and small-group tests were in the feasible category (79% and 80%), whereas the field test was in the very feasible category (83%). Overall, the mean total student response was 81%, in the very feasible category.

Table 3. Student Responses at Each Trial Stage

Trial stage	Mean rating	Criterion
One to one	79%	Feasible
Small group	80%	Feasible
Field test	83%	Very feasible
Mean total	81%	Very feasible

In the field trial, students took a 15-item multiple-choice pretest, studied IPAS on the topic "Plants as Sources of Life on Earth" using the media through a website link on their own devices, and then took a posttest of the same form and number of items. The results are shown in Table 4 and Figure 2. The mean score rose from 78.12 to 90.28 (a difference of 12.16), with a mean ideal score of 21.88 and a mean N-Gain of 0.47 (moderate). By N-Gain category, six students were high, 13 moderate, and four low; N-Gain could not be computed for two students whose pretest score was already 100 (the maximum). It should be noted that 16 of 25 students (64%) already scored ≥ 80 on the pretest. The score differences were not normally distributed (Shapiro–Wilk $W = 0.87$; $p = 0.004$), so the Wilcoxon test was used, showing a significant difference between pretest and posttest ($p < 0.001$).

Table 4. Pretest, Posttest, and N-Gain Scores of Students (n = 25)

Siswa	Pre	Post	N-Gain	Siswa	Pre	Post	N-Gain
S01	100	100	–	S14	87	93	0.46
S02	100	100	–	S15	80	93	0.65
S03	93	100	1.00	S16	80	87	0.35
S04	93	100	1.00	S17	73	93	0.74
S05	93	93	0.00	S18	73	93	0.74
S06	93	93	0.00	S19	73	87	0.52
S07	93	93	0.00	S20	67	80	0.39
S08	93	93	0.00	S21	60	87	0.68
S09	87	100	1.00	S22	47	73	0.49

Siswa	Pre	Post	N-Gain	Siswa	Pre	Post	N-Gain
S10	87	93	0.46	S23	47	87	0.75
S11	87	93	0.46	S24	40	73	0.55
S12	87	93	0.46	S25	33	67	0.51
S13	87	93	0.46	Rata-rata	78,12	90,28	0,47

Note: "–" = N-Gain cannot be computed because the pretest score was 100. Mean pretest 78.12; posttest 90.28; difference 12.16; ideal score 21.88; N-Gain 0.47 (moderate).

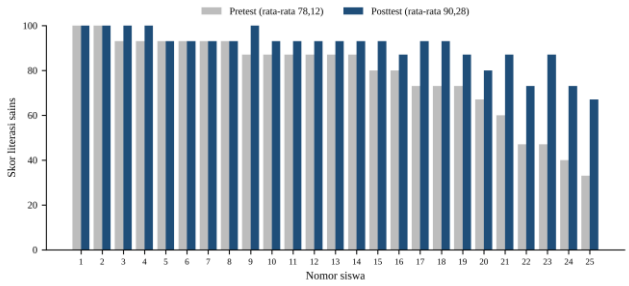


Figure 2. Pretest and posttest scientific literacy scores of each student

DISCUSSION

Feasibility of the media

Validation shows that the media are feasible for use: the media and language experts rated them very feasible, and the content expert rated them feasible to very feasible. This is consistent with other web media for elementary IPAS, for example average validation of 95% for an environmental-care website (Marlinda et al., 2026) and 87% for Google Sites based on Problem Based Learning (Sintia et al., 2026), as well as about 90% for Articulate Storyline media (Cahaya et al., 2025) and 94% (content experts) and 86% (media experts) for a scientific-literacy-based flipbook (Lestari et al., 2024). The content expert's lower usability score (75%) shows room to improve ease of use.

Improvement in scientific literacy

The mean score increased by 12.16 points with an N-Gain of 0.47 (moderate) and a significant difference by the Wilcoxon test. This N-Gain is comparable with Google Sites IPAS media in grade IV (0.51; Zulemil & Wulandari, 2025), a Canva e-module (0.67; Fitri et al., 2024), a Project Based Learning model assisted by interactive media (0.68; Setiani et al., 2026), and PjBL assisted by Assemblr Edu (0.58 in the experimental class and 0.49 in the control class; Maria et al., 2025), but lower than 0.75 for the environmental-care website (Marlinda et al., 2026) and 0.79–0.81 for Google Sites on scientific literacy (Sahmura et al., 2026). The difference is probably related to students' initial scores. In this study 64% of students already scored ≥ 80 on the pretest and two scored 100, so room for improvement (mean ideal score only 21.88) was narrow and the N-Gain is conservative. Items that are too easy may also cause a ceiling effect, which should be checked against the test blueprint.

The improvement may be linked to the media's combination of text, images, video, audio, and quizzes with immediate feedback, allowing self-paced learning. Similar findings have been reported: interactive media had a positive effect on science achievement (Hasnawiyah & Maslena, 2024), interactive digital teaching

materials significantly affected grade IV students' scientific literacy (Nashihah & Fanani, 2026), and the group using a digital flipbook performed better on the posttest than the control group (Hartomo & Sukmawati, 2024). A picture-storybook medium reported a high normalised gain in grade IV IPAS concept understanding (Septian & Kurnia, 2025), and interactive multimedia reported improved scientific literacy on plant reproduction (Habibatuzzahro' & Istianah, 2025). Because interaction with each feature was not measured, this link remains a conjecture.

Limitations and implications

This study has several limitations. *First*, a one-group pretest–posttest design without a control group does not allow the score improvement to be fully attributed to the media; the claim that can be supported is therefore that the media are feasible and were followed by improved scientific literacy, not that the media are proven effective. Hartomo and Sukmawati (2024), Wulandari et al. (2025), and Nashihah and Fanani (2026) used control groups. *Second*, the small sample (25 students) from one area and the short duration of use limit generalisation. *Third*, a 15-item multiple-choice test with high initial scores is insensitive to changes in scientific literacy. *Fourth*, content validity could be strengthened with Aiken's V coefficients, as used by Winata et al. (2026). Future research should use a quasi-experimental design, competency-based scientific literacy items, and a larger sample.

CONCLUSION

The website-based interactive learning media on the topic "Plants as Sources of Life on Earth" are declared feasible for use in fourth-grade elementary school: expert validation was in the feasible to very feasible categories (75%–100%) and student response in the field test was 83% (very feasible). After using the media, students' mean scientific literacy score rose from 78.12 to 90.28 with an N-Gain of 0.47 (moderate). Because there was no control group and initial scores were high, effectiveness should be tested further through a quasi-experiment with more challenging instruments.

REFERENCES

Amran, M., Umar, I. I., Lukman, & Sahabuddin, E. S. (2026). Developing a digital flipbook for IPAS learning to enhance students' scientific literacy. *Tadris: Jurnal Keguruan dan Ilmu Tarbiyah, 11*(2). https://doi.org/10.24042/tadris.v11i2.30691

Anggraini, W., & Erita, Y. (2025). Pengembangan media PowerPoint digital berbasis PBL dalam pembelajaran IPAS kelas V sekolah dasar [Development of digital PowerPoint media based on PBL in grade V elementary IPAS learning]. *Pendas: Jurnal Ilmiah Pendidikan Dasar, 10*(3), 348–364. https://doi.org/10.23969/jp.v10i03.32562

Barokah, A., Nurhaliza, N., Kurniati, B., & Kaddafi, T. (2024). Studi literatur: Analisis literasi sains era Society 5.0 di sekolah dasar [Literature review: Analysis of scientific literacy in the Society 5.0 era in elementary schools]. *Pendas: Jurnal Ilmiah Pendidikan Dasar, 9*(2), 257–266. https://doi.org/10.23969/jp.v9i2.15643

Branch, R. M. (2009). *Instructional design: The ADDIE approach*. Springer.

Cahaya, N., Lian, B., & Murniviyanti, L. (2025). Pengembangan media pembelajaran interaktif Articulate Storyline berbasis literasi digital pada pembelajaran IPAS SDN 33 Pagaralam [Development of interactive Articulate Storyline learning media based on digital literacy in IPAS learning at SDN 33 Pagaralam]. *Pendas: Jurnal Ilmiah Pendidikan Dasar, 10*(3), 317–326. https://doi.org/10.23969/jp.v10i03.31550

Fadhli, Y. D., Amsad, L. N., Wabiser, Y. D., Kelana, A. H., & Irawan, S. (2026). Efektivitas penggunaan alat peraga ekosistem untuk meningkatkan literasi sains peserta didik kelas V SD Negeri Inpres Bertingkat Waena [The effectiveness of using ecosystem teaching aids to improve the scientific literacy of grade V students at SD Negeri Inpres Bertingkat Waena]. *Pendas: Jurnal Ilmiah Pendidikan Dasar, 11*(1), 290–302. https://doi.org/10.23969/jp.v11i01.38617

Fitri, N. C., Roesminingsih, E., & Widiasih. (2024). Pengembangan media pembelajaran e-modul interaktif menggunakan aplikasi Canva untuk meningkatkan literasi sains siswa sekolah dasar [Development of interactive e-module learning media using the Canva application to improve elementary students' scientific literacy]. *JIKAP PGSD: Jurnal Ilmiah Ilmu Kependidikan, 8*(2), 361–367. https://doi.org/10.26858/jkp.v8i2.61843

Habibatuzzahro', L., & Istianah, F. (2025). Pengembangan multimedia interaktif berbasis Articulate Storyline 3 untuk meningkatkan kemampuan literasi sains pada materi perkembangbiakan tumbuhan kelas IV sekolah dasar [Development of interactive multimedia based on Articulate Storyline 3 to improve scientific literacy on plant reproduction in grade IV elementary school]. *Jurnal Penelitian Pendidikan Guru Sekolah Dasar, 13*(2), 453–467. https://ejournal.unesa.ac.id/index.php/jurnal-penelitian-pgsd/article/view/67725

Hake, R. R. (1998). Interactive-engagement versus traditional methods: A six-thousand-student survey of mechanics test data for introductory physics courses. *American Journal of Physics, 66*(1), 64–74. https://doi.org/10.1119/1.18809

Hartomo, R. M., & Sukmawati, W. (2024). The effect of digital flipbook media on improving science literacy on human digestive system materials among elementary school students. *Jurnal Penelitian Pendidikan IPA, 10*(9), 6260–6270. https://doi.org/10.29303/jppipa.v10i9.7994

Hasnawiyah, & Maslena. (2024). Dampak penggunaan media pembelajaran interaktif terhadap prestasi belajar sains siswa [The impact of using interactive learning media on students' science achievement]. *Jurnal Review Pendidikan Dasar: Jurnal Kajian Pendidikan dan Hasil Penelitian, 10*(2), 167–172. https://doi.org/10.26740/jrpd.v10n2.p167-172

Hidayat, N. (2024). Pengembangan media interaktif berbasis WEB untuk meningkatkan literasi budaya pada pembelajaran IPAS siswa kelas IV sekolah dasar [Development of web-based interactive media to improve cultural literacy in IPAS learning for grade IV elementary students]. *JPDI (Jurnal Pendidikan Dasar Indonesia), 9*(2), 72–77. https://doi.org/10.26737/jpdi.v9i2.5824

Holbrook, J., & Rannikmae, M. (2009). The meaning of scientific literacy. *International Journal of Environmental and Science Education, 4*(3), 275–288.

Imran, A. Z., & Arwin. (2026). Pengembangan media pembelajaran interaktif Articulate Storyline 3 dalam pembelajaran IPAS di kelas IV sekolah dasar [Development of interactive Articulate Storyline 3 learning media in IPAS learning in grade IV elementary school]. *Pendas: Jurnal Ilmiah Pendidikan Dasar, 11*(2), 213–223. https://doi.org/10.23969/jp.v11i02.45410

Intantri, C. M., Mulyono, S. E., Subali, B., & Widiarti, N. (2025). Tinjauan pustaka: Pengembangan media pembelajaran interaktif pelajaran IPA jenjang sekolah dasar tahun 2019–2025 [Literature review: Development of interactive science learning media at the elementary level, 2019–2025]. *Didaktika: Jurnal Kependidikan, 14*(3). https://www.jurnaldidaktika.org/contents/article/view/2369

Lestari, V. R., Khotimah, K., & Iksam. (2024). Ekoraya: Biodiversity flipbook based on science literacy. *Jurnal Pendidikan Dasar Nusantara, 10*(1). https://doi.org/10.29407/jpdn.v10i1.22799

Lorenza, D. M. (2025). Strategi peningkatan literasi sains siswa sekolah dasar melalui inovasi media pembelajaran [Strategies for improving elementary students' scientific literacy through learning media innovation]. *Pendas: Jurnal Ilmiah Pendidikan Dasar, 10*(2), 410–419. https://doi.org/10.23969/jp.v10i2.27877

Mardiana, C., Hamdu, G., & Apriliya, S. (2025). The need analysis for interactive multimedia based on scientific literacy in primary school. *Jurnal Cakrawala Pendas, 11*(3), 568–584. https://doi.org/10.31949/jcp.v11i3.13452

Maria, S., Alindra, A. L., & Mustikaati, W. (2025). Pengaruh model Project Based Learning (PjBL) berbantuan media Assemblr Edu terhadap kemampuan literasi sains siswa sekolah dasar [The effect of the Project Based Learning (PjBL) model assisted by Assemblr Edu media on elementary students' scientific literacy skills]. *Pendas: Jurnal Ilmiah Pendidikan Dasar, 10*(2), 379–389. https://doi.org/10.23969/jp.v10i02.28108

Marlinda, S., Suntari, Y., & Wardhani, P. A. (2026). Pengembangan website sebagai media pembelajaran IPAS untuk meningkatkan pemahaman terkait peduli lingkungan kelas V sekolah dasar [Development of a website as IPAS learning media to improve understanding of environmental care in grade V elementary school]. *Pendas: Jurnal Ilmiah Pendidikan Dasar, 11*(3), 301–314. https://doi.org/10.23969/jp.v11i03.64819

Maryono, M., Pamela, I. S., & Budiono, H. (2022). Implementasi literasi baca tulis dan sains di sekolah dasar [Implementation of reading-writing and science literacy in elementary schools]. *Jurnal Basicedu, 6*(1), 491–498. https://doi.org/10.31004/basicedu.v6i1.1707

Muna, L. F., & Afandi, M. (2025). Pengembangan e-book ekosistem harmonis interaktif untuk meningkatkan kemampuan literasi sains siswa pada materi ekosistem di kelas V sekolah dasar [Development of an interactive "harmonious ecosystem" e-book to improve students' scientific literacy on the ecosystem topic in grade V elementary school]. *Jurnal Pendidikan Sultan Agung, 5*(3), 386–398. https://doi.org/10.30659/jp-sa.5.3.386-398

Muzdalifah, A., & Sutisna, A. (2026). Pengembangan media majalah digital interaktif terhadap kemampuan literasi sains siswa kelas V sekolah dasar [Development of interactive digital magazine media and its effect on grade V elementary students' scientific literacy]. *Didaktika: Jurnal Pemikiran Pendidikan, 32*(1), 20–33. https://doi.org/10.30587/didaktika.v32i1.10373

Nashihah, D., & Fanani, A. (2026). Pengaruh bahan ajar digital interaktif terhadap kemampuan literasi sains siswa kelas IV SDN Dr Soetomo 5 [The effect of interactive digital teaching materials on the scientific literacy of grade IV students at SDN Dr Soetomo 5]. *Pendas: Jurnal Ilmiah Pendidikan Dasar, 11*(2). https://journal.unpas.ac.id/index.php/pendas/article/view/44885

OECD. (2023). *PISA 2022 results (Volume I): The state of learning and equity in education*. OECD Publishing. https://doi.org/10.1787/53f23881-en

Patigu, Y. P. W., Rahmah, N., & Zulnuraini, Z. (2024). Literasi sains dan digital dalam pembelajaran IPA [Science and digital literacy in science learning]. *Journal of Education Research, 5*(3), 3103–3110. https://doi.org/10.37985/jer.v5i3.1404

Pentianasari, S., Putra, D. A., & Martati, B. (2023). Pengembangan media pembelajaran interaktif berbantuan Lectora Inspire pada pembelajaran IPAS di sekolah dasar [Development of interactive learning media assisted by Lectora Inspire in IPAS learning in elementary school]. *JIKAP PGSD: Jurnal Ilmiah Ilmu Kependidikan, 7*(3), 506–515. https://doi.org/10.26858/jkp.v7i3.41537

Sahmura, A. D. S., Laila, A., Ningdiah, E. P. K., & Pebrianti, I. (2026). Pengembangan media pembelajaran interaktif berbasis Google Sites untuk meningkatkan kemampuan literasi sains siswa kelas V sekolah dasar [Development of interactive learning media based on Google Sites to improve grade V elementary students' scientific literacy]. *Pendas: Jurnal Ilmiah Pendidikan Dasar, 11*(2). https://journal.unpas.ac.id/index.php/pendas/article/view/54987

Salsabilla, Z., & Erita, Y. (2025). Pengembangan media interaktif Wordwall berbasis Problem Based Learning (PBL) pada mata pelajaran IPAS di kelas IV sekolah dasar [Development of interactive Wordwall media based on Problem Based Learning (PBL) in IPAS for grade IV elementary school]. *Pendas: Jurnal Ilmiah Pendidikan Dasar, 10*(3), 276–285. https://doi.org/10.23969/jp.v10i03.30358

Septian, R., & Kurnia, I. R. (2025). Pengembangan media pembelajaran berbasis buku cerita bergambar untuk meningkatkan pemahaman konsep IPAS kelas IV SD [Development of picture-storybook-based learning media to improve understanding of IPAS concepts in grade IV elementary school]. *Pendas: Jurnal Ilmiah Pendidikan Dasar, 10*(3), 821–830. https://journal.unpas.ac.id/index.php/pendas/article/view/33405

Setiani, H., Mariyam, I., Hoirunnisa, S., Sulastri, S., & Ghifari, A. (2026). Pengembangan model pembelajaran Project Based Learning (PjBL) berbantuan media interaktif untuk meningkatkan literasi sains peserta didik sekolah dasar [Development of a Project Based Learning (PjBL) model assisted by interactive media to improve elementary students' scientific

literacy]. *Pendas: Jurnal Ilmiah Pendidikan Dasar, 11*(2). https://journal.unpas.ac.id/index.php/pendas/article/view/48426

Sintia, E., Arwin, Hamimah, & Ningsih, Y. (2026). Pengembangan media interaktif Google Sites berbasis Problem Based Learning (PBL) pada pembelajaran IPAS di kelas IV sekolah dasar [Development of interactive Google Sites media based on Problem Based Learning (PBL) in IPAS learning in grade IV elementary school]. *Pendas: Jurnal Ilmiah Pendidikan Dasar, 11*(2). https://journal.unpas.ac.id/index.php/pendas/article/view/50321

Sudianto, A., Susanto, A., Yusuf, B. B., Cahyadi, F., Putra, G. L., & Haryanti, Y. D. (2026). Media interaktif digital untuk keterampilan proses sains siswa sekolah dasar: Tinjauan pustaka sistematis [Digital interactive media for elementary students' science process skills: A systematic literature review]. *Jurnal Basicedu, 10*(1), 275–283. https://doi.org/10.31004/basicedu.v10i1.11517

Winata, W., Izudin, M. I., & Kresnadi, H. (2026). Validitas bahan ajar interaktif materi klasifikasi dan ciri-ciri hewan dalam pembelajaran IPAS kelas III SDN 03 Pontianak Kota [Validity of interactive teaching materials on animal classification and characteristics in IPAS learning in grade III at SDN 03 Pontianak Kota]. *Pendas: Jurnal Ilmiah Pendidikan Dasar, 11*(3), 433–446. https://doi.org/10.23969/jp.v11i03.63962

Wulandari, A. Y. R., Putera, D. B. R. A., & Sutarja, M. C. (2025). Creating an educational science website leveraging beach edutourism to enhance scientific literacy. *Jurnal Inovasi Pendidikan IPA, 11*(1), 308–322. https://journal.uny.ac.id/index.php/jipi/article/view/77539

Zulemil, P. A., & Wulandari, F. T. (2025). Pengembangan media pembelajaran interaktif berbasis web melalui Google Sites pada pembelajaran IPAS di kelas IV sekolah dasar [Development of web-based interactive learning media through Google Sites in IPAS learning in grade IV elementary school]. *Pendas: Jurnal Ilmiah Pendidikan Dasar, 10*(4). https://journal.unpas.ac.id/index.php/pendas/article/view/33971