



Elementary schools' learning tools development based on Understanding by Design

Desi Eka Pratiwi¹, Leni Yuliana²

^{1,2} Universitas Wijaya Kusuma Surabaya, Surabaya, Indonesia
desipratiwi_fbs@uwks.ac.id¹, leniyuliana@uwks.ac.id²

ABSTRACT

Learning in elementary schools still faces challenges in aligning learning objectives, assessment, and instructional activities, which limits students' conceptual understanding. This study aims to develop Understanding by Design (UbD)-based learning tools for elementary schools that meet the criteria of validity, practicality, and effectiveness. The research employed a research and development (RnD) approach using the ADDIE model. The developed learning tools comprise teaching modules, instructional materials, and authentic assessment instruments grounded in the backward design principle. Data were collected through expert validation, observation of learning implementation, teacher and student response questionnaires, and learning outcome tests, and were analyzed using descriptive, quantitative, and qualitative methods. The results showed that the UbD-based learning tools achieved very high validity. Practicality was indicated by implementation rate and positive responses from teachers and students. The learning tools were also effective, as shown by improved student learning outcomes, with classical mastery. Therefore, UbD-based learning tools are feasible and effective for improving elementary school learning oriented toward conceptual understanding.

ARTICLE INFO

Article History:

Received: 17 Oct 2025
Revised: 25 Jan 2026
Accepted: 4 Feb 2026
Publish online: 17 Feb 2026

Keywords:

elementary school; learning tools; understanding by design

Open access

Curricula: Journal of Curriculum Development is a peer-reviewed open-access journal.

ABSTRAK

Pembelajaran di sekolah dasar masih menghadapi tantangan dalam menyelaraskan tujuan pembelajaran, asesmen, dan aktivitas pembelajaran sehingga pemahaman konseptual peserta didik belum berkembang secara optimal. Penelitian ini bertujuan mengembangkan perangkat pembelajaran berbasis Understanding by Design (UbD) di sekolah dasar yang memenuhi kriteria valid, praktis, dan efektif. Penelitian menggunakan metode research and development (RnD) dengan model ADDIE. Perangkat pembelajaran yang dikembangkan meliputi modul ajar, bahan ajar, dan instrumen asesmen autentik yang dirancang berdasarkan prinsip backward design. Data dikumpulkan melalui validasi ahli, observasi keterlaksanaan pembelajaran, angket respons guru dan peserta didik, serta tes hasil belajar, kemudian dianalisis menggunakan teknik deskriptif kuantitatif dan kualitatif. Hasil penelitian menunjukkan bahwa perangkat pembelajaran berbasis UbD memiliki validitas sangat tinggi. Kepraktisan perangkat ditunjukkan oleh keterlaksanaan pembelajaran dan respons positif guru serta peserta didik. Keefektifan perangkat terlihat dari peningkatan hasil belajar dengan ketuntasan klasikal. Dengan demikian, perangkat pembelajaran berbasis UbD layak dan efektif untuk meningkatkan kualitas pembelajaran yang berorientasi pada pemahaman konseptual peserta didik sekolah dasar.

Kata Kunci: perangkat pembelajaran; sekolah dasar; understanding by design

How to cite (APA 7)

Pratiwi, D. E., & Yuliana, L. (2026). Elementary schools' learning tools development based on Understanding by Design. *Curricula: Journal of Curriculum Development*, 5(1), 321-334.

Peer review

This article has been peer-reviewed through the journal's standard double-blind peer review, where both the reviewers and authors are anonymised during review.

Copyright

2026, Desi Eka Pratiwi, Leni Yuliana. This an open-access is article distributed under the terms of the Creative Commons Attribution-ShareAlike 4.0 International (CC BY-SA 4.0) <https://creativecommons.org/licenses/by-sa/4.0/>, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author, and source are credited.

*Corresponding author: desipratiwi_fbs@uwks.ac.id

INTRODUCTION

Basic education plays a crucial role in shaping students' cognitive, affective, and psychomotor abilities, thereby providing a foundation for lifelong learning. Therefore, learning in elementary schools should not only focus on meeting curricular content targets but also on fostering meaningful and sustainable conceptual understanding. Recent studies emphasize that meaningful learning enables students to interpret, connect, and apply knowledge in real-world contexts rather than merely memorizing information, and is strongly associated with teaching quality dimensions such as cognitive activation, teacher support, and student participation in classroom discourse (Herbert et al., 2022). In this context, instructional quality is reflected in how learning is designed and delivered in a meaningful, contextual, and engaging manner, as the use of appropriate instructional media that stimulate cognitive and emotional engagement has been shown to support students' understanding in elementary education (Damanik et al., 2025).

Furthermore, effective learning requires coherent alignment among curriculum standards, instructional objectives, learning activities, and assessment practices, as such alignment enables teachers to monitor students' learning processes, provide meaningful feedback, and support the achievement of intended learning outcomes (Namus et al., 2024; Zhao et al., 2023). Various studies indicate that learning tools used by elementary school teachers tend to be procedural and administrative in nature, as lesson plans are often designed merely to fulfill curriculum requirements without sufficient attention to essential learning outcomes and evidence of students' understanding (Hadinda et al, 2025; Lo & Hew, 2022). This practice frequently results in misalignment among learning objectives, instructional activities, and assessments, thereby weakening the effectiveness of learning and limiting students' opportunities to develop a deep understanding. From an opportunity-to-learn perspective, poorly aligned assessment practices may also constrain students' access to meaningful learning experiences and reinforce learning inequities (Bennett, 2025).

This condition is reinforced by national research findings indicating that teachers continue to emphasize content delivery and textbook completion. In contrast, assessment practices predominantly measure lower-order thinking skills (LOTS) rather than higher-order thinking skills (HOTS) (Sariyanti et al., 2024). Other studies also report that assessment instruments used in elementary schools have not optimally facilitated higher-order thinking and conceptual understanding (Kusuma & Nurmawanti, 2023). Similar challenges have also been reported in international contexts, where teachers play a crucial role in HOTS implementation but often face constraints related to limited exposure, insufficient pedagogical knowledge, and heavy instructional workloads, which hinder effective HOTS-based teaching and assessment (Hamzah et al., 2023). Meanwhile, current curriculum policies in Indonesia emphasize the development of competencies, conceptual understanding, and the ability to transfer knowledge to real-life contexts (Nadira et al., 2022).

One contributing factor to this issue is teachers' limited understanding of the principles and substance of the Merdeka Curriculum, particularly in designing learning tools such as Learning Objective Sequences (Alur Tujuan Pembelajaran/ATP), teaching modules, and lesson plans in a systematic and conceptually aligned manner (Saragih et al., 2025). As a result, learning tools used by elementary school teachers remain predominantly procedural

and rote-oriented, with limited consideration of pedagogical strategies that align with the characteristics of learning content and students' learning needs (Purba et al., 2025). Studies published in SINTA-accredited journals report that teachers experience difficulties in aligning learning objectives, instructional strategies, and assessment instruments (Hadinda et al., 2025; Namus et al., 2024). Learning tools that are developed separately tend to reduce instructional coherence and effectiveness in fostering students' conceptual understanding.

Similar findings from international research highlight the importance of curriculum designs that integrate objectives, assessment, and learning activities within a coherent framework (Lo & Hew, 2022; Mendoza et al., 2022). The Understanding by Design (UbD) approach is proposed as an alternative based on the backward design principle, which begins by identifying learning objectives, then determining assessment evidence, and subsequently designing aligned learning activities. Recent studies emphasize that UbD supports meaningful learning by placing conceptual understanding and knowledge transfer at the core of instructional planning (Darling-Hammond, 2020; Uluçınar, 2021). In the context of elementary education, UbD is relevant because it emphasizes structured, contextual learning experiences that align with students' developmental characteristics. Empirical studies at both national and international levels show that UbD implementation improves the clarity of learning objectives, the quality of assessment, student engagement, and instructional consistency (Namus et al., 2024; Uluçınar, 2021).

Nevertheless, UbD implementation in elementary schools remains limited. Teachers face challenges in formulating essential questions and developing authentic assessments aligned with learning objectives, and the availability of contextual UbD-based learning tools for thematic learning is still inadequate (Hadinda et al., 2025; König et al., 2022). This study focuses on developing contextual and applicable UbD-based learning tools for elementary schools. It offers scientific novelty by creating and validating a systematically aligned set of learning tools that integrate objectives, assessment evidence, and instructional activities based on backward design and students' developmental characteristics. Recent research emphasizes that alignment among objectives, assessments, and activities is crucial for instructional quality and deep conceptual understanding in primary education (Andrade & Heritage, 2023).

This study goes beyond examining UbD as an instructional approach by developing validated, practical learning tools that support thematic learning and can be directly applied by teachers in real classroom contexts. Therefore, the objectives of this study are to develop UbD-based learning tools for elementary schools that are valid, practical, and effective, and to evaluate their feasibility in supporting thematic learning oriented toward students' deep conceptual understanding. The expected contributions of this study are both theoretical and practical. Theoretically, this research strengthens the instructional design literature by providing empirical evidence on the development of UbD-based learning tools in elementary education. In practice, the developed learning tools are expected to assist teachers in designing coherent, meaningful, and understanding-oriented learning that aligns objectives, assessments, and instructional activities.

LITERATURE REVIEW

The Truth of Meaningful Learning in Elementary Schools

Ausubel in "*Educational psychology: A cognitive view*" and Bransford in "How people learn: Brain, mind, experience, and school" explained that meaningful learning is a learning process that emphasizes the integration of new knowledge with learners' existing cognitive structures, enabling deep conceptual understanding and long-term retention. Recent empirical studies in elementary education further confirm that meaningful learning strategies significantly improve students' conceptual understanding when new content is explicitly connected to prior knowledge and learning experiences (Nugroho et al., 2025). In elementary education, meaningful learning is particularly important because students are in the concrete-operational stage, which requires contextual, structured, and experience-based learning to support conceptual development in line with the statement Piaget "*Science of education and the psychology of the child*" and Slavin in "*Educational Psychology: Theory and practice (12th ed.)*". In line with this perspective, meaningful learning in upper-primary education involves not only understanding the content but also connecting it to students' daily experiences, future goals, and real-life relevance, which is perceived as supporting learning motivation and conceptual clarity (Polman et al., 2021).

Recent empirical studies confirm that meaningful learning environments significantly enhance conceptual understanding and learning transfer when instruction is designed to be coherent and student-centered. For example, structured learning designs emphasizing conceptual coherence positively affect elementary students' deep understanding (Mendoza et al., 2022). Similarly, Mayer in "*Multimedia learning (3rd ed.)*" emphasized that meaningful learning occurs when learners actively select, organize, and integrate information rather than engage in passive memorization. Furthermore, reported that instructional approaches emphasizing cognitive engagement and relevance to real-life contexts lead to higher retention and application of knowledge among students. In contrast, learning practices that prioritize content coverage over conceptual understanding tend to result in superficial learning outcomes with limited transferability (Herbert et al., 2022). Therefore, elementary school learning should be intentionally designed to foster deep conceptual understanding, connect knowledge with authentic contexts, and support students in applying their learning meaningfully in everyday life, in line with the statement Darling-Hammond in "*The Right to Learn: A blueprint for creating schools that work*".

Learning Tools in Primary Education

Learning tools are a set of instructional components used by teachers to guide the planning and implementation of learning, including learning objectives, instructional materials, learning strategies, and assessment instruments. Recent studies emphasize that effective learning tools should be systematically designed and coherently aligned to ensure consistency between objectives, learning activities, and assessment practices (Bennett, 2025; Lo & Hew, 2022). However, recent national studies indicate that learning tools in elementary schools are still frequently developed primarily for administrative compliance, rather than to support students' deep conceptual understanding (Pratiwi et al., 2024). As a result, learning objectives, instructional activities, and assessments are often poorly aligned,

leading to less effective instructional practices and limited opportunities to develop higher-order thinking skills (Namus et al., 2024; Sariyanti, 2024).

Moreover, the repetitive and unvaried use of similar learning techniques, instructional models, and media tends to reduce students' motivation and engagement (Damayanti & Sukirno, 2025; Yusmita & Hadiyanti, 2025). Empirical studies also show that the development of culturally responsive and contextually relevant digital learning resources can enhance student engagement and support meaningful learning experiences in elementary schools (Purba et al., 2025; Witjaksono & Kasriman, 2025). In the context of the Merdeka Curriculum, critical reasoning, as one of the core values of the Pancasila Student Profile, is widely regarded as the foundation of students' critical thinking skills. Therefore, the success of the Merdeka Curriculum can be partially reflected in the extent to which well-designed learning tools facilitate the development of students' critical thinking skills (Putra & Zulherman, 2025).

Basic Concepts and Principles of Understanding by Design (UbD)

Understanding by Design (UbD) is a curriculum planning framework developed by Wiggins & McTighe in "*Understanding by Design (Expanded 2nd ed.)*" with the primary objective of fostering deep understanding among learners. UbD is grounded in the principle of backward design, which emphasizes instructional planning that begins with the identification of intended learning outcomes, followed by the design of assessments as evidence of learning achievement, and culminates in the development of learning activities aligned with those outcomes. Conceptually, UbD consists of three main stages: 1) Desired Results, which focuses on determining learning objectives that emphasize conceptual understanding and knowledge transfer; 2) Acceptable Evidence, which involves designing authentic and performance-based assessments to measure students' understanding; and 3) Learning Experiences and Instruction, which includes planning learning experiences and instructional activities that systematically support the attainment of learning objectives. Recent studies report that backward design frameworks such as UbD promote instructional coherence and enhance the quality of learning design in primary education settings (Lo & Hew, 2022; Mendoza et al., 2022). The core principle of UbD is the alignment among learning objectives, assessment, and instructional activities. Empirical research indicates that strong instructional alignment significantly improves teaching quality, promotes higher-order thinking skills, and supports meaningful learning and knowledge transfer among students (Bennett, 2025; Herbert et al., 2022).

Application of UbD in Elementary School Learning

In the context of elementary schools, UbD is considered relevant because it helps teachers design structured, contextual, and understanding-oriented instruction. International research reports that the application of UbD can improve the clarity of learning objectives, the quality and alignment of assessment, and student engagement in the learning process (Uluginar, 2021). Recent studies further indicate that UbD supports the development of coherent instructional planning and promotes students' conceptual understanding through well-aligned learning experiences and authentic assessment practices (Bennett, 2025). Use

of UbD in elementary school learning improves the quality of instructional planning and classroom implementation. Research has found that UbD-based learning tools help teachers develop more focused learning objectives and authentic assessment methods (Namus et al., 2024).

Other studies report that applying UbD in thematic learning improves alignment among learning objectives, learning activities, and assessment components. UbD-based planning enhances instructional coherence and supports the development of higher-order thinking skills in elementary classrooms (Aristanti & Fatayan, 2024). However, several studies indicate that teachers continue to struggle to fully understand and consistently implement UbD, particularly in formulating essential questions and determining appropriate evidence of students' understanding (Hadinda et al., 2025). International evidence also suggests that limited professional support and insufficient experience with backward design principles can hinder optimal UbD implementation in primary education settings (Lo & Hew, 2022). These conditions indicate the need to develop systematic UbD-based learning tools aligned with the characteristics and learning needs of elementary school students.

Relevant Research on the Development of UbD-Based Learning Tools

Research on the development of UbD-based learning tools has been widely conducted and has generally shown positive results. Studies in basic education indicate that UbD-based learning tools can enhance student engagement, improve assessment quality, and improve student learning outcomes (Namus et al., 2024; Uluçınar, 2021). Recent international research also confirms that backward design-oriented learning tools support instructional coherence and promote meaningful learning through the alignment of objectives, assessments, and learning activities (Bennett, 2025; Herbert et al., 2022). In addition, action research demonstrates that implementing UbD not only improves students' academic achievement but also significantly contributes to teachers' professional development, indicating UbD's dual impact on both instructional quality and learning outcomes (Yurtseven & Altun, 2020).

National studies further indicate that UbD-based learning tools meet the criteria of validity, practicality, and effectiveness, and support teachers in designing instruction oriented toward students' conceptual understanding. Consistent with these findings, UbD-based instructional tools improve the quality of lesson planning and support the development of higher-order thinking skills in elementary classrooms (Aristanti & Fatayan, 2024). However, most prior studies remain limited to the implementation or evaluation of UbD within specific subjects or learning contexts. Only a few studies have focused on the systematic development of comprehensive UbD-based learning tools that are contextualized to the characteristics and learning needs of elementary school learners (Lo & Hew, 2022). Therefore, further research on the development of UbD-based learning tools remains necessary and holds strong potential to improve the quality of learning planning and implementation in elementary schools. This study addresses this gap by developing UbD-based learning tools to foster students' deep conceptual understanding.

METHODS

This study employed a Research and Development (R&D) approach to develop Understanding by Design (UbD)-based learning tools for elementary schools and to assess the feasibility of the resulting products. The R&D approach was selected because it is well-suited to systematically developing, validating, and evaluating instructional products to ensure their validity, practicality, and effectiveness in real-world learning contexts. The development model used in this study was the ADDIE model, which consists of five stages: Analysis, Design, Development, Implementation, and Evaluation. Recent studies in instructional design indicate that the ADDIE model remains relevant due to its structured yet flexible framework, which supports the iterative improvement of instructional products in elementary education settings (Molenda, 2022).

Data collection techniques included observation, interviews, questionnaires, and learning outcome tests. Research instruments included observation sheets, interview guidelines, expert validation questionnaires, teacher and student response questionnaires, and test instruments to assess achievement of learning objectives. The collected data were analyzed using descriptive quantitative and qualitative techniques. Validity and practicality data were analyzed by calculating percentage scores to assess the feasibility of the learning tools. In contrast, effectiveness data were analyzed using improvements in student learning outcomes and the attainment of learning objectives.

The study was conducted through five stages: analysis, design, development, implementation, and evaluation. During the analysis stage, learning needs and instructional problems in elementary schools were identified through curriculum analysis, analysis of student characteristics, review of teachers' existing learning tools, and identification of teachers' needs for UbD-based learning tools. Data were collected through document analysis, teacher interviews, and preliminary classroom observations to inform the design of the learning tools. The design stage aimed to develop an initial blueprint for UbD-based learning tools by applying backward design principles, including identifying desired learning outcomes, designing assessments as evidence of learning, and planning learning experiences and instructional activities aligned with those outcomes. The designed products included lesson plans, teaching materials, student worksheets, and assessment instruments developed coherently and systematically.

The development stage focused on producing learning tools based on the initial design. The learning tools were validated by subject matter experts, instructional design experts, and language experts to assess content relevance, instructional coherence, clarity of language, and alignment with UbD principles. Validation results were analyzed using descriptive quantitative techniques and served as the basis for revising the learning tools to improve their quality and feasibility. The implementation stage aimed to examine the practicality and effectiveness of the developed learning tools through a limited trial in an elementary school. Practicality data were obtained from teacher and student response questionnaires and classroom implementation observations, while effectiveness data were collected from student learning outcomes and the achievement of learning objectives.

The evaluation stage was conducted to assess the overall quality of the learning tools using both formative and summative assessments. The evaluation results were used for final revisions to ensure that the UbD-based learning tools met the criteria of being valid, practical,

and effective for use in elementary school learning. The research included subject matter experts, instructional experts, and elementary school teachers as validators, and elementary school students as trial participants. The study was conducted at SDN Pakis V Surabaya, which was purposively selected for its school readiness and relevance to the research objectives.

RESULTS AND DISCUSSION

Results

This section presents the study results, organized by the research stages: development, validation, implementation, and evaluation of the UbD-based learning tools.

Results of the Development Stage

This study led to the development of UbD-based learning tools for elementary schools, comprising Lesson Plans (RPP), teaching materials, Student Worksheets (LKPD), and assessment instruments. The learning tools were developed using the UbD backward design framework, which includes identifying desired learning outcomes oriented toward deep understanding, determining acceptable evidence through authentic assessment, and designing learning activities aligned with these objectives. All components were systematically integrated to ensure coherence between objectives, assessment, and instructional activities. Examples of the developed learning tools, including the UbD stages, lesson plans, teaching materials, worksheets, and various assessment instruments, are presented in **Figures 1-9**.

Tujuan Pembelajaran	Asesmen	Kegiatan Pembelajaran
1. Peserta didik dapat menyebutkan nama yang berlaku di lingkungannya sebagai bentuk sikap bermutu dan berakhlak kepada Tuhan Yang Maha Esa.	Asesmen yang digunakan yaitu: • Asesmen Diagnostik Kognitif untuk mengetahui kemampuan awal peserta didik dan untuk menentukan kelompok diskusi.	Kegiatan pembelajaran yang terdapat pada RPP (model 90%) menggunakan: • Pendekatan Pembelajaran: Saintifik dan IPA/CK.
2. Peserta didik dapat menyajikan sikap disiplin dalam menanggapi norma yang berlaku di lingkungannya.	Asesmen Formatif (pelebaran pada saat proses pembelajaran berlangsung) dengan menggunakan LKPD dan soal uraian.	• Metode Pembelajaran: Ceramah, diskusi, demonstrasi, tanya jawab, dan penugasan.
3. Peserta didik dapat masalah macam-macam norma beserta sumber dan sanksinya.		• Model Pembelajaran: <i>Problem Based Learning (PBL)</i> .
4. Peserta didik dapat menyajikan hasil telah tentang macam-macam norma yang berlaku di lingkungannya.		• Media Pembelajaran: <i>Power Point (PPT)</i> , LCD Proyektor, video pembelajaran dan wordwall.

Figure 1. Stages of the UbD Framework
Source: Research 2025

MODUL AJAR PPKa FASE C KELAS 5	
INFORMASI UMUM/MODUL	
Nama Penyusun	: Ahmad Khorayyid
Nama Sekolah	: SD Negeri Pakis V Surabaya
Jenjang/Kelas	: SD Kelas V
Alokasi Waktu	: 2 x 35 Menit (70 Menit)
Tahun Pelajaran	: Tahun 2024/2025
KOMPONEN INTI	
A. Capaian Pembelajaran Fase C	
Pada Fase C peserta didik mampu: Memahami dan menyajikan hasil analisis bentuk-bentuk sederhana norma, aturan, hak, dan kewajiban dalam kehidupannya sebagai anggota keluarga, warga sekolah, dan bagian dari masyarakat menggunakan secara sederhana dan menyajikan hasil analisis pelaksanaan norma, aturan, hak, dan kewajiban sebagai anggota keluarga, dan warga sekolah, melalui analisis kehidupan dan hak sebagai anggota keluarga, warga sekolah, dan bagian dari masyarakat dan menggunakan sumber kepelaksanaan dan aturan bersama serta menafsirkan dalam kehidupan sehari-hari di keluarga dan di sekolah.	
B. Tujuan Pembelajaran	
<ul style="list-style-type: none"> • Peserta didik dapat menyebutkan norma yang berlaku di lingkungannya sebagai bentuk sikap bermutu dan berakhlak kepada Tuhan Yang Maha Esa. • Peserta didik dapat menyajikan sikap disiplin dalam menanggapi norma yang berlaku di lingkungannya. • Peserta didik dapat masalah macam-macam norma beserta sumber dan sanksinya. • Peserta didik dapat menyajikan hasil telah tentang macam-macam norma yang berlaku di lingkungannya. 	
C. Profil Puncak	
<ul style="list-style-type: none"> • Berani Berakhlak kepada Tuhan YME dan Berakhlak Main • Berkehidupan Global • Mandiri • Berakhlak • Kreatif 	

Figure 2. UbD-Based Lesson Plan (RPP)
Source: Research 2025

Asesmen Diagnostik Kognitif

Nama: _____ Kelas: _____

Mengapa kita harus menaati peraturan yang ada?

Bagaimana pendapat anda mengenai anak yang membantah orang tuanya?

Sebutkan peraturan yang ada di sekolah kalian!

Jelaskan pengertian hak, kewajiban dan norma!

Apa yang akan kalian lakukan jika mempunyai teman yang sedang kesulitan?

Figure 3. Diagnostic Assessment Instrument
Source: Research 2025



Figure 4. Student Worksheet (LKPD)
Source: Research 2025

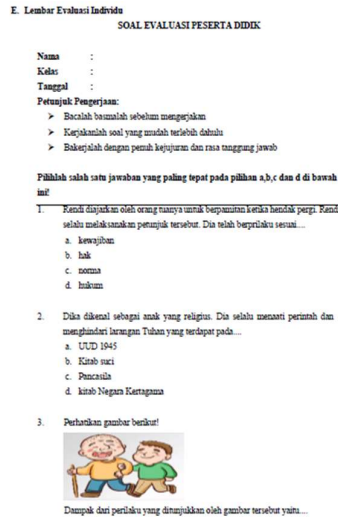


Figure 5. Self-Evaluation Sheet
Source: Research 2025



Figure 6. UbD-Based Teaching Materials
Source: Research 2025

5. Penilaian Pengetahuan

No	Nama Peserta Didik	Aspek Yang Ditilai			Catatan Guru
		Mengikuti norma-macam-norma dalam kehidupan	Harus mengetahui 2 macam norma	Tidak mengetahui macam-macam norma dalam kehidupan sehari-hari	
1	Adelin Putri S.	1	2	1	
2	Adelya Tri Meka				
3	Alia Salabillah				
4	Alika Rafiqi Artant				
5	Akilih Novryanti				
6	Berlana Tasya				

Figure 7. Knowledge Assessment Instrument
Source: Research 2025

4. Penilaian Sikap Percaya Diri

No	Nama Peserta Didik	Aspek Yang Ditilai										Catatan Guru		
		Berani Tampil	Berani Menjawab	Berani Berpendapat	Berani menanggapi	Mengemukakan pendapat	Mengemukakan pendapat	Mengemukakan pendapat	Mengemukakan pendapat	Mengemukakan pendapat	Mengemukakan pendapat			
1	Adelin Putri S.	0	1%	0	0%	0	0%	0	0%	0	0%	0	0%	
2	Adelya Tri Meka													
3	Alia Salabillah													
4	Alika Rafiqi Artant													
5	Akilih Novryanti													
6	Berlana Tasya													
7	Dwi Riska Anggrani D													

Figure 8. Attitude Assessment Instrument
Source: Research 2025

6. Penilaian Keterampilan

No	Nama Peserta Didik	Aspek Yang Ditilai			Catatan Guru
		Dapat melakukan presentasi dengan baik	Dapat melakukan presentasi dengan cukup baik	Tidak dapat melakukan presentasi	
1	Adela Putri S.	3	2	1	
2	Adelya Tri Meka				
3	Alia Salabillah				
4	Alika Rafiqi Artant				
5	Akilih Novryanti				
6	Berlana Tasya				
7	Dwi Riska Anggrani D				
8	Fairol Adhara Cahaf				
9	Kanza Atika				
10	Khanza Shidqia A.				
11	M. Farly Pratama				
12	M. Farza Anshika				
13	M. Rahm Fauzan				

Figure 9. Skills Assessment Instrument
Source: Research 2025

Results of the Validation Stage

The developed learning tools were validated by three experts: a subject-matter expert, a learning-design expert, and a language expert. Validation focused on content feasibility, presentation feasibility, alignment with UbD principles, and language appropriateness. The validation results showed that the UbD-based learning tools achieved an average validity score of 88.6%, which is classified as *highly valid*. The details are as follows:

1. Content expert validation: 90.2% (highly valid);
2. Learning expert validation: 87.5% (highly valid);
3. Language expert validation: 88.1% (highly valid).

The validators also provided suggestions for improvement, including refining the formulation of learning objectives, aligning assessment indicators with essential questions, and improving

grammatical accuracy in several parts of the teaching materials. These suggestions served as the basis for revising the learning tools prior to implementation.

Results of the Implementation Stage (Practicality)

The practicality of the learning tools was evaluated through teacher response questionnaires, student response questionnaires, and classroom observation sheets. The results of the teacher response questionnaire showed a practicality score of 91.3%, categorized as *highly practical*. Teachers stated that the learning tools were easy to use, had a clear instructional flow, and helped align learning objectives, assessments, and learning activities. The student response questionnaire results indicated an average score of 89.7%, which is categorized as *highly practical*. Students perceived the learning process as more engaging, easier to understand, and encouraging active participation through questioning and discussion. In addition, classroom observations indicated an implementation level of 92.0%, suggesting that most learning stages were implemented as specified in the lesson plan. These findings indicate that the UbD-based learning tools are practical for classroom use in elementary schools.

Results of the Evaluation Stage (Effectiveness)

The effectiveness of the learning tools was assessed based on student learning outcomes and achievement of learning objectives. The analysis showed an improvement in student learning outcomes after the implementation of UbD-based learning tools. The average student score increased from 68.4 before implementation to 82.7 after implementation, representing a 14.3-point improvement. Furthermore, the percentage of students achieving mastery learning increased from 62% to 87%, showing that most students met the minimum mastery criteria. Effectiveness was also reflected in students' ability to answer questions that required conceptual understanding and the application of knowledge. Students provided explanations, reasoning, and examples of applying the concept in real-life contexts, indicating a deep understanding.

Summary of Development Results

Overall, the results indicate that the UbD-based learning tools developed in this study meet the criteria of validity, practicality, and effectiveness. The learning tools achieved a validity score of 88.6% (highly valid), a practicality score of 90.8% (highly practical), and demonstrated effectiveness by achieving a 14.3-point increase in learning outcomes and 87% mastery. Therefore, UbD-based learning tools are a feasible alternative instructional resource in elementary schools that supports learning oriented toward deep conceptual understanding.

Discussion

The results of the study indicate that the UbD-based learning tools developed meet the criteria of validity, practicality, and effectiveness. These findings indicate that applying

backward design principles in developing learning tools can significantly improve the quality of learning planning and implementation in elementary schools.

Validity of UbD-Based Learning Tools

The results of the learning tool validation indicated an average score of 88.6%, placing it in the highly valid category. This high level of validity indicates that the learning tools align with curriculum requirements, the characteristics of elementary school students, and the core principles of UbD. Learning objectives are clearly formulated and oriented toward deep understanding; assessments are designed to provide evidence of objective achievement; and learning activities are systematically organized to support the development of that understanding. These findings are in line with UbD theory by Wiggins & McTighe in "*Understanding by Design (Expanded 2nd ed.)*", which emphasizes the importance of alignment between objectives, assessment, and learning activities as the key to meaningful learning. Research published in accredited national journals also indicates that learning tools designed using the UbD framework tend to have a clearer and more consistent structure than conventional learning tools (Namus et al., 2024). Thus, the high validity of the learning tools in this study indicates that the UbD framework is effective as a basis for developing learning tools in elementary schools.

Practicality of UbD-Based Learning Tools

The practicality of the learning tools was reflected in the positive responses from teachers and students, with practicality scores of 91.3% and 89.7%, respectively, and learning implementation reaching 92.0%. These findings indicate that the learning tools are not only theoretically feasible but also easy to use and implement in real classroom settings. Teachers believe that the UbD structure helps them understand the learning process more systematically, particularly in linking learning objectives with assessment and learning activities. This finding aligns with previous studies showing that UbD-based learning tools provide a clear and focused planning framework that supports teachers in designing and implementing instruction more effectively (Hadinda et al., 2025). In the context of teacher professional education, research also indicates that prospective teachers often struggle to formulate clear learning objectives oriented toward deep understanding and to allocate sufficient time for systematic instructional planning, particularly when implementing UbD principles (Hastuti et al., 2025). The positive student response further suggests that UbD-based learning can foster more engaging and meaningful learning experiences through essential questions and contextual learning activities that promote conceptual understanding. International research similarly confirms that instruction emphasizing understanding and meaningful learning experiences enhances student engagement and motivation (Uluçınar, 2021).

Effectiveness of UbD-Based Learning Tools

The effectiveness of the learning tools was demonstrated by an increase in student learning outcomes from an average score of 68.4 to 82.7, as well as an increase in learning

completeness from 62% to 87%. This improvement indicates that UbD-based learning tools can optimally support the achievement of learning objectives. This improvement in learning outcomes can be explained by the characteristics of UbD, which emphasize conceptual understanding and the ability to transfer knowledge. Students are not only guided to remember information, but also to understand the meaning of concepts and apply them in various contexts. This aligns with the view of Wiggins and McTighe in "*Understanding by Design (Expanded 2nd ed.)*" which states that understanding-based learning yields more lasting learning outcomes than memorization-oriented learning. The findings of this study are also consistent with studies reporting that the application of UbD in elementary school learning can improve students' higher-order thinking skills and conceptual understanding (Bennett, 2025; Herbert et al., 2022). Thus, the improvement in learning outcomes in this study strengthens the empirical evidence that UbD is effective when applied in elementary school settings.

Implications of Using UbD in Elementary School Learning

The findings indicate that UbD-based learning tools positively influence the quality of lesson planning and instructional implementation in elementary schools. UbD supports teachers in aligning learning objectives, assessments, and learning activities to foster students' deep understanding (Andrade & Heritage, 2023; Bennett, 2025; Herbert et al., 2022). Practically, these findings suggest that UbD-based learning tools can serve as an effective alternative for elementary school teachers in designing more focused and meaningful instruction. Theoretically, this study reinforces previous research on the effectiveness of UbD and extends its application within the Indonesian elementary education context (Lo & Hew, 2022; Mendoza et al., 2022).

CONCLUSION

This study developed UbD-based learning tools for elementary schools, grounded in the backward design principle, including the formulation of learning objectives oriented toward deep understanding, the development of authentic assessments as evidence of objective achievement, and the preparation of coherent and integrated learning activities. The study results showed that the developed learning tools met the criteria for validity, practicality, and effectiveness for use in elementary school learning. The validity of the learning tools was demonstrated by expert assessments that placed them in the highly valid category, indicating their suitability to the curriculum requirements, the characteristics of elementary school students, and the main principles of UbD. The practicality of the learning tools was reflected in positive responses from teachers and students and in the high level of implementation, indicating that the tools were easy to use and could be applied in real learning contexts. Meanwhile, the effectiveness of the learning tools is demonstrated by improvements in student learning outcomes and learning completion, reflecting the development of conceptual understanding and knowledge-transfer skills. Based on these findings, it can be concluded that the development of UbD-based learning tools contributes positively to improving the quality of learning planning and implementation in elementary schools. Teachers can use these learning tools as an alternative to design more focused, meaningful learning oriented

toward students' deep understanding. This study also strengthens the empirical evidence that the UbD approach is relevant and effective in the context of basic education in Indonesia. Therefore, future studies are recommended to implement these learning tools on a broader scale and in diverse school settings to examine their consistency and generalizability. In addition, further research may explore the integration of UbD-based learning tools with digital learning environments or investigate their impact on specific competencies, such as higher-order thinking skills, literacy, and numeracy, over a longer implementation period.

AUTHOR'S NOTE

The author declares that there is no conflict of interest related to the publication of this article. The author also confirms that the article's data and content are free of plagiarism.

REFERENCES

- Andrade, H. L., & Heritage, M. (2023). Using formative assessment to enhance learning, achievement, and academic self-regulation. *Theory Into Practice*, 62(1), 45-54.
- Aristanti, A. P., & Fatayan, A. (2024). The effect of the UbD-based problem-based learning model on the critical thinking skills of grade IV students in IPAS subject at elementary school. *Elementary School Forum (Mimbar Sekolah Dasar)*, 11(2), 268-280.
- Bennett, R. E. (2025). Rethinking equity and assessment through opportunity to learn. *Assessment in Education: Principles, Policy & Practice*, 32(1), 5-32.
- Damanik, M. H., Perangin-angin, R. B. B., Ndong, Y., & Yunita, S. (2025). Development of storytelling media to increase civic education interest in elementary students. *Inovasi Kurikulum*, 22(3), 1503-1518.
- Damayanti, I., & Sukirno, S. (2025). PowerPoint learning media to improve activeness and learning outcomes in the Economics subject. *Curricula: Journal of Curriculum Development*, 4(1), 356-368.
- Darling-Hammond, L. (2020). Preparing educators for the time of COVID and beyond. *European Journal of Teacher Education*, 43(4), 457-465.
- Hadinda, S. T., Rohana, & Sayidiman. (2025). Analisis efektivitas modul ajar menggunakan pendekatan Understanding by Design (UbD) pada ketercapaian tujuan pembelajaran di sekolah dasar. *Pendas: Primary Education Journal*, 10(1), 20-32.
- Hamzah, H., Hamzah, M. I., & Zulkifli, H. (2022). Systematic literature review on the elements of metacognition-based Higher Order Thinking Skills (HOTS) teaching and learning modules. *Sustainability*, 14(2), 1-15.
- Hastuti, W. S., Widyaningtyas, F. S., Wati, U. A., & Kusumah, S. A. (2025). Understanding by Design (UbD): an effective way to design elementary school science learning for the competencies of teacher professional education students. *Al-Ishlah: Jurnal Pendidikan*, 17(3), 3952-3965.
- Herbert, B., Fischer, J., & Klieme, E. (2022). How valid are student perceptions of teaching quality across education systems?. *Learning and Instruction*, 82(2), 1-12.
- König, J., Jäger-Biela, D. J., & Glutsch, N. (2022). Adapting to online teaching during COVID-19: Teacher education and instructional coherence. *Teaching and Teacher Education*, 43(3), 1-15.
- Kusuma, A. S., & Nurawanti, I. (2023). Pengembangan soal-soal literasi dan numerasi berbasis Higher Order Thinking Skills (HOTS) untuk siswa SD. *Jurnal Ilmiah Profesi Pendidikan*, 8(1), 516-523.

- Lo, C. K., & Hew, K. F. (2022). A critical review of flipped classroom challenges in K-12 education: possible solutions and recommendations. *Research and Practice in Technology Enhanced Learning, 12*(1), 1-22.
- Mendoza, W., Ramírez, G. M., González, C., & Moreira, F. (2022). Assessment of curriculum design by Learning Outcomes (LO). *Education Sciences, 12*(8), 1-16.
- Molenda, M. (2022). In search of the elusive ADDIE model. *Performance Improvement, 61*(5), 34-39.
- Nadira, S., Ihtisani, A. F., & Mufidah, I., Z. (2022). The future of education: "Freedom" as the foundation of the curriculum. *Curricula: Journal of Curriculum Development, 2*(4), 173-186.
- Namus, A. O., Choirunnisa, A. S., & Hidayati, A. N. (2024). Membangun pemahaman yang mendalam dalam pembelajaran dengan prinsip Understanding by Design (UbD). *Pendas: Primary Education Journal, 5*(2), 83-92.
- Nugroho, B. S., Prayitno, H. J., Utami, R. D., Purnomo, E., & Jamali, A. (2025). Development of learning materials based on meaningful learning as an effort to foster green behavior in elementary schools. *Journal of Deep Learning, 2*(1), 12-18.
- Polman, J., Hornstra, L., & Volman, M. (2021). The meaning of meaningful learning in Mathematics in upper-primary education. *Learning Environments Research, 24*(3), 469-486.
- Pratiwi, D. E., Yuliana, L., Partika, N. T., & Noorwinanda, M. N. R. D. (2024). Development of e-book-based teaching materials through culturally responsive teaching approach in elementary school. *ELSE (Elementary School Education Journal), 8*(3), 145-159.
- Purba, F. P. Y., Sinaga, B., & Harahap, F. (2025). Development of Mathematics learning tools through Realistic Mathematics Education (RME) to enhance spatial ability. *Inovasi Kurikulum, 22*(4), 2301-2314.
- Putra, A. R., & Zulherman. (2025). Educandy assisted as learning media to improve critical thinking skills on light material in elementary school. *Inovasi Kurikulum, 22*(3), 1903-1918
- Saragih, R., Restu, & Mulyono, M. (2025). Analysis of elementary teachers' challenges in implementing kurikulum merdeka in social studies. *Inovasi Kurikulum, 22*(4), 2211-2222.
- Sariyanti, S., Indarwati, D., & Darmawan, I. (2024). Pendekatan understanding by design sebagai strategi pengembangan kualitas pembelajaran di sekolah dasar. *Primary Education Journal, 5*(2), 57-63.
- Uluçinar, U. (2021). Findings of qualitative studies on understanding by design: a meta-synthesis. *International Journal of Curriculum and Instructional Studies, 11*(2), 167-194.
- Uluçinar, U. (2021). The effects of technology-supported UbD-based instructional design training on student teachers' technological pedagogical content knowledge and learning-teaching conceptions. *International Online Journal of Education and Teaching, 8*(4), 2636-2664.
- Witjaksono, S., & Kasriman, K. (2025). The impact of diorama media on learning outcomes in water cycle education. *Curricula: Journal of Curriculum Development, 4*(2), 1723-1738.
- Yurtseven, N., & Altun, S. (2017). Understanding by Design (UbD) in EFL teaching: teachers' professional development and students' achievement. *Educational Sciences: Theory and Practice, 17*(2), 437-461.
- Yusmita, A. R., & Hadiyanti, P. O. (2025). The influence of Wordwall educational game on students' learning interest in elementary school. *Inovasi Kurikulum, 22*(4), 2597-2610.
- Zhao, L., Zhao, B., & Li, C. (2023). Alignment analysis of teaching-learning-assessment within the classroom: how teachers implement project-based learning under the curriculum standards. *Disciplinary and Interdisciplinary Science Education Research, 5*(1), 1-12.