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Validity of Local Wisdom-Based Insets Learning Model to Improve Critical Thinking Skills of Senior High School Students

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ABSTRACT

Objective: This study aims to produce a valid learning tool for the local wisdom-based insets model to improve the critical thinking skills of high school students. **Method:** This research uses the Instructional Design Model (IDM) 1) needs analysis, 2) design and development of prototypes, 3) validation of socio-scientific issues, and 4) testing of socio-scientific issues prototypes. socio-scientific issues validation, 4) socio-scientific issues prototype testing, 5) socio-scientific issues evaluation, 6) socio-scientific issues revision. Validity was measured based on validation results from three expert lecturers. Data analysis was done descriptively and quantitatively. **Results:** The overall average test results of content validity with a very valid category, the overall average of construct validity with a very valid category, and the overall average validity of learning devices with a very valid category. The results showed that the insets model learning device based on local wisdom is valid for improving the critical thinking skills of high school students. **Novelty:** Students' critical thinking skills can be trained by integrating local wisdom-based insets learning model for 21st-century education.

INTRODUCTION

The 21st century has witnessed a rapid technological evolution, reshaping every facet of human life, including education. Students must be receptive to scientific and technological advancements (Alifah & Sukartono, 2023; Kalyani, 2024). Students must have life and career skills, learning and innovation skills, and information media and technology skills in 21st-century education (Shiyamsyah et al., 2024). To achieve 21st-century education, critical thinking skills are needed (Arini et al., 2023). Students' capacity for critical thought will influence how well they learn (Ramadhani et al., 2023).

The ability to reason logically through analysis is known as critical thinking ability. In general, individuals with critical thinking skills will not just accept or reject information; they will investigate, assess, and weigh all available facts before making a decision (Wulandari, 2024). Critical thinking skills are essential for innovation because they allow individuals to question assumptions, challenge existing ideas, and generate new and creative solutions to problems (Yang, 2024). Critical thinking and science process skills are two variables that can be developed in the learning process, especially science learning (Lieung et al., 2020). Science is a discovery process and a body of knowledge composed of facts, concepts, and principles since it is the methodical discovery of natural occurrences. As a result, natural science is a subject that can help students develop critical thinking abilities to resolve issues that arise in daily life (Adelia & Nasution, 2021). The introduction must relate to the recognized problems or issues and eventually lead to the research questions. The structure of the introduction may vary. This section discusses the results and conclusions of previously published studies to help explain why the current study is of scientific interest.

However, critical thinking is not an ability that is easily acquired and needs to be trained continuously. Weaknesses in learning that do not support the development of critical thinking, such as conventional methods that only emphasize memorization, can hinder this ability (Wahyuni et al., 2020). Amijaya et al. (2018) stated that the problem faced by teachers in the learning process so far is the weakness of teachers to encourage students to provide feedback in classroom learning activities where students are not encouraged to be able to think critically about the material provided by the teacher but teaching and learning activities in the classroom are only directed to memorize material without being directed to understand or know what students understand. So far, students' Critical thinking skills are still relatively low, so students have difficulty providing conclusions and determining solutions to problems or material taught. In teaching and learning activities, teachers must find or use a suitable learning model in order to help students train and improve their critical thinking skills. Students with good critical thinking skills will be seen in narrating their knowledge in sentences well.

The PISA 2022/2023 results show that the average score of Indonesian students was below the OECD average in all three domains tested, namely reading, math, and science. The reading literacy score reached an average score of 371, indicating that many Indonesian students still struggle to achieve a basic level of proficiency in understanding and interpreting text. In math, the average score of Indonesian students was 379, while in science, the average score was 389. This was also seen in North Central Timor District, NTT Province students, who showed low critical thinking skills due to various factors such as conventional teaching methods and lack of learning support facilities (Zulkarnain et al., 2019). This is because (1) Most students always memorize the subject matter given by the teacher during classroom activities. (2) Facilities and infrastructure supporting learning activities are still very lacking (3) The teacher's ability to explain the material and encourage students to understand the subject matter is still very lacking; this causes students to have low critical thinking skills, resulting in mastery of the subject matter is still very low. Thus, the teacher must be good at choosing and using a suitable learning model in order to involve students in critical thinking.

Learning models such as inquiry and SETS (Science, Environment, Technology, and Society) have proven effective in developing students' critical thinking skills. The inquiry model emphasizes critical and analytical thinking processes in solving problems, while the SETS model links learning to real situations involving science and technology. Guided inquiry can be applied to complement the textbook model to practice critical thinking skills. According to Dewi (2020), the inquiry model is used to develop students' critical thinking skills. The inquiry model is a learning model that investigates and identifies problems, formulates hypotheses, designs experiments, collects data, and draws conclusions about problems. The inquiry model emphasizes the process of thinking critically and analytically to seek and find answers to an issue or problem that is questioned.

Local wisdom-based learning has been proven effective in building students' character and improving their understanding of science concepts. Recent studies have shown that this approach can improve students' critical thinking, creativity, and problem-solving skills while instilling important local cultural values. This aligns with research by Yuliati and Mardapi (2020), which showed that using local wisdom in science learning can improve students' critical thinking skills and understanding of science concepts. Local wisdom learning is obtained from life in balance with nature

through local knowledge, local skills, local intelligence, local resources, local social processes, local values or norms, and local customs (Wafiqni & Nuraini, 2018). The main objective of local wisdom-oriented education is by the mandate contained in Law Number 20 of 2003 concerning the National Education System in Article 3, stating that education functions to develop abilities to build the character and civilization of a dignified nation to educate the nation's life.

Based on the results of field observations that have been carried out in four research location schools in North Central Timor Regency (Noemuti High School, Taekas High School, Insana Tengah High School, Kefamenanu High School) obtained information that the learning strategy applied by teachers at school has not facilitated students to train students' critical thinking skills where the learning model used still uses conventional learning models so that students tend to be bored and passive in learning activities. It is also seen that the ability to think critically in mastering the concept of biological material (plants) is very low in this case, as evidenced by the low value of student learning outcomes (Zulkarnain et al., 2019).

Science learning based on local wisdom provides information to students so that they are always close to the actual situation or conditions they face. Local wisdom-based learning must relate to empowering students' lives based on the reality they face (Hidayah & Karimah, 2020). Local-based learning helps students apply their knowledge to practical circumstances. Students' critical thinking skills can be developed through active participation in learning activities (Safitri et al., 2024). Sopi is a long-standing cultural legacy from ancestors (Nabuasa et al., 2024). Sopi-based science learning makes students a part of preserving the existing culture in the surrounding environment and is directly utilized to improve science skills.

Sopi is an alcoholic drink that contains addictive substances that can cause addiction and dependence, so teenagers and the general public favor some drinks. In general, traditional sopi drinks have many things or impacts where if consumed excessively, a person will experience a decrease in consciousness because sopi contains addictive substances, making it difficult for someone to stop. Sopi, for the Dawan people in North Central Timor, has a very high position and value and is sacred as an embracer, unifier, and reconciler. It is also used as a sign of the start of a traditional activity. It is not uncommon for this drink to be served at every ceremony or event. The traditional drink is a symbol of kinship, intimacy, togetherness, and civilization of the Timorese dawan tribe in the reality of social life. Sopi has a very high and sacred value in the life of the Dawan people, so sopi is always the main element in every traditional ceremony of the Dawan tribe in the North Central Timor District.

Sopi, as part of the culture of the Dawan tribe in the North Central Timor District, has high social and ritual values. Learning that integrates local wisdom, such as sopi, can help students understand and appreciate culture and develop critical thinking skills. With the background described, this study aims to test the validity and practicality of the local wisdom-based inquiry learning model in improving the critical thinking skills of high school students. This model is expected to be an effective solution to overcome students' low critical thinking skills in the North Central Timor District and support the national education goals of developing the character and intelligence of the nation through local values.

RESEARCH METHOD

This type of research is development research; this research design applies the Instructional Design Model (IDM). This research was conducted at the Doctoral Degree Study Program in Science Education, Surabaya State University. The implementation of the research consisted of 6 stages, namely: 1) needs analysis, 2) prototype design and development, 3) Socio-scientific issues validation, 4) socio-scientific issues prototype testing, 5) socio-scientific issues evaluation, 6) socio-scientific issues revision (Ampa et al., 2023), This study presents the results of the validation stage. The device validation stage by experts validates the model book, learning devices, and research instruments. The research method steps are interpreted in Figure 1.

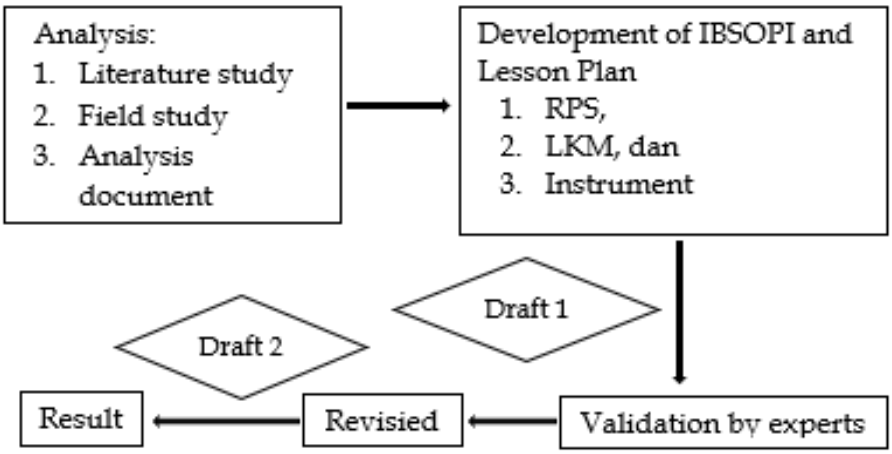

Figure 1. Research method.

The validity data obtained from the experts were then analyzed by calculating the average score of each aspect. Table 1 shows the criteria for evaluating the validity of the lesson model and lesson tools.

Table 1. Validation data interpretation criteria.

Scale Value	Category
3.26 – 4.00	Verry valid
2.51 – 3.25	Valid
1.76 – 2.50	Quite Valid
1.00 – 1.75	Less Valid

(Source: Riduwan, 2013)

The reliability of the results of the assessment of the validity of the model and the validity of the lesson tools was calculated using the percentage of agreement formula presented.

$$R = \left[1 - \frac{A - B}{A + B}\right] X100$$

Description: R = Reliability coefficient A = Assessment of validators who give high scores B = Assessment of validators who give low scores. Observation results when said to be reliable if the reliability value is ≥75.00%.

RESULTS AND DISCUSSION

Results

The validation of the Insets learning model includes three aspects: content validation, construct validation and learning device validation. Figure 2 presents a general description of learning devices.

Figure 2. Learning device display.

Content Validity and Reliability

In general, the data on the content validity of the Insets learning model was obtained through the model content validity assessment instrument presented in Table 2.

Table 2. Results of content validity assessment of insets learning model.

Aspects to be assessed	Validity Results		Reliability	
	Average Score	Criteria	R (%)	Criteria
The need for model development				
1. The Insets Learning Model aims to improve students' critical thinking skills, aligning them with the needs of 21st-century skills and graduate competencies.	3.33	HV	85.70	Reliable
2. The development of the Insets Learning Model bridges the gap between the expectations of the competency needs of 21st-century graduates and the reality of education in Indonesia today, where critical thinking skills are still low.	3.33	HV	85.70	Reliable

Aspects to be assessed	Validity Results		Reliability	
	Average Score	Criteria	R (%)	Criteria
3. The Insets Learning Model fulfills the need for a learning process that prioritizes scientific inquiry activities.	3.33	HV	85.70	Reliable
4. The development of the Insets Learning Model takes into account recommendations for improvement from research on students' critical thinking skills.	3.00	HV	85.70	Reliable
5. The Insets Learning Model uses a transdisciplinary approach to meet the state-of-the-art scientific knowledge, according to the need for model development, and there is mutual consistency between the model components.	3.00	HV	85.70	Reliable
AVERAGE SCORE	**3.19**	**HV**	**85.70**	**Reliable**
Model design meets knowledge novelty				
1. The novelty of the Insets Learning Model is built by considering the advantages and disadvantages based on the recommendations of researchers	3.33	HV	85.70	Reliable
2. Development of Insets model objectives using primary sources from reputable journals	3.33	HV	85.70	Reliable
3. The development of the Insets Learning Model uses the theoretical basis of standard and up-to-date educational psychology figures.	3.33	HV	85.70	Reliable
4. The development of the Insets Learning Model uses an empirical foundation obtained from studies and references from various relevant studies.	3.33	HV	85.70	Reliable
AVERAGE SCORE	**3.33**	**HV**	85.70	**Reliable**
Deskripsi Model Pembelajaran Insets				
1. The Insets Learning Model was developed with the primary objective of facilitating students' critical thinking skills.	3.66	HV	85.70	Reliable
2. The syntax of the Insets Learning Model can be categorized as a new syntax	3.00	V	85.70	Reliable
3. The learning environment of the Insets Learning Model supports optimal learning.	3.33	V	85.70	Reliable
4. Development of assessment and evaluation of the Insets Learning Model using up-to-date reference sources	3.33	V	85.70	Reliable

Aspects to be assessed	Validity Results		Reliability	
	Average Score	Criteria	R (%)	Criteria
5. The Insets Learning Model was developed with the primary objective of facilitating students' critical thinking skills.	3.66	HV	85.70	Reliable
AVERAGE SCORE	**3.39**	**HV**	**85.70**	**Reliable**

Notes: HV: Highly Valid; V: Valid; R: Reliability

A recapitulation of the average content validity and reliability scores is presented in Figure 3.

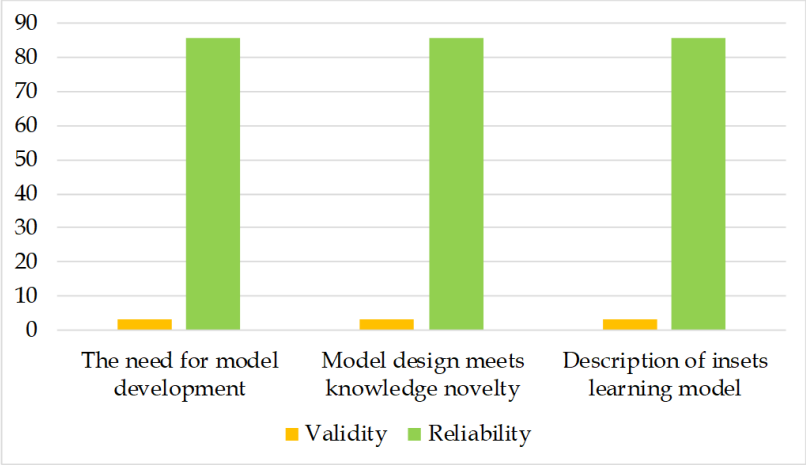

Figure 3. Recapitulation of content validity and reliability results.

Figure 3 shows the recapitulation of the content validation of the insets learning model, which got an average score of 3.19 on the need for module development; 3.33 aspects of module design meet the novelty of knowledge; and 3.39 aspects of the description of the insets learning model. The three aspects are in the very valid category, and they get a reliability score of 85.70% with a reliable category.

The reliability coefficient for all aspects of this model's content validity ranges from 85.70% to 100.00%. The reliability coefficient is within the 75.00% inter-observer agreement, so the results of the content validity assessment using the Insets learning model content validity assessment instrument are reliable.

Construct Validity and Reliability

In general, the data on the content validity of the Insets learning model was obtained through the model content validity assessment instrument presented in Table 3.

Table 3. Results of construct validity and reliability of insets learning model.

Aspects to be assessed	Validity Results		Reliability	
	Average Score	Criteria	R (%)	Criteria
The Rationale for Insets Learning Model				
1. Suitability between the objectives of the Insets Learning Model development and the needs of 21st-century graduate competencies.	3.33	HV	85.70	Reliable

Aspects to be assessed	Validity Results		Reliability	
	Average Score	Criteria	R (%)	Criteria
2. Congruence between the development objectives of the Insets Learning model and the recommendations of the research results	3.33	HV	85.70	Reliable
3. There are no contradictory meanings and/or symbols in the components of the Model Book.	3.33	HV	85.70	Reliable
AVERAGE SCORE	**3.33**	**HV**	**85.70**	**Reliable**
Theoretical and Empirical Support				
Phase 1: Orientation	3.33	HV	85.70	Reliable
Phase 2: Invitation	3.33	HV	85.70	Reliable
Phase 3: Formulate the problem	3.33	HV	85.70	Reliable
Phase 4: Formulate Hypothesis	3.33	HV	85.70	Reliable
Phase 5: Collecting data	3.33	HV	85.70	Reliable
Phase 6: Hypothesis Testing	3.33	HV	85.70	Reliable
Phase 7: Formulate Conclusions	3.33	HV	85.70	Reliable
Phase 8: Feedback	3.33	HV	85.70	Reliable
Phase 9: Application	3.33	HV	85.70	Reliable
AVERAGE SCORE	**3.33**	**HV**	**85.70**	**Reliable**
Sintaks Model				
1. The phases in the syntax show a logical sequence of learning activities and describe the procedure for achieving the learning objectives.	4.00	HV	100.00	Reliable
2. Linkages between phases support each other	4.00	HV	100.00	Reliable
3. Social system stated and described	3.00	V	85.70	Reliable
4. The learning environment stated and described	3.00	V	85.70	Reliable
5. Reaction principle stated and elaborated	3.67	HV	85.70	Reliable
6. Instructional and accompanying effects are clearly and logically stated 6.	3.00	V	85.70	Reliable
AVERAGE SCORE	**3.44**	**HV**	**90.46**	**Reliable**
Model Planning and Implementation				
1. Consistency in determining essential competencies, indicators, and learning objectives with the 2013 curriculum	3.67	HV	100.00	Reliable
2. Consistency of test item design with the assessment developed by PISA	4.00	HV	100.00	Reliable
3. Consistency in organizing resources and logistics to support the learning process 4.	4.00	HV	100.00	Reliable
4. Learning activities reflect the flow of activities oriented towards developing students' abilities.	3.67	HV	100.00	Reliable

Aspects to be assessed	Validity Results		Reliability	
	Average Score	Criteria	R (%)	Criteria
5. Consistency of assessment and evaluation with model development objectives	3.33	V	100.00	Reliable
6. Consistency of assessment and evaluation with the learning objectives envisioned in the syntax	3.33	V	100.00	Reliable
AVERAGE SCORE	**3.66**	**HV**	**100.00**	**Reliable**

Notes : HV = Highly Valid, V = Valid

A recapitulation of the average construct validity and reliability scores is presented in Figure 4.

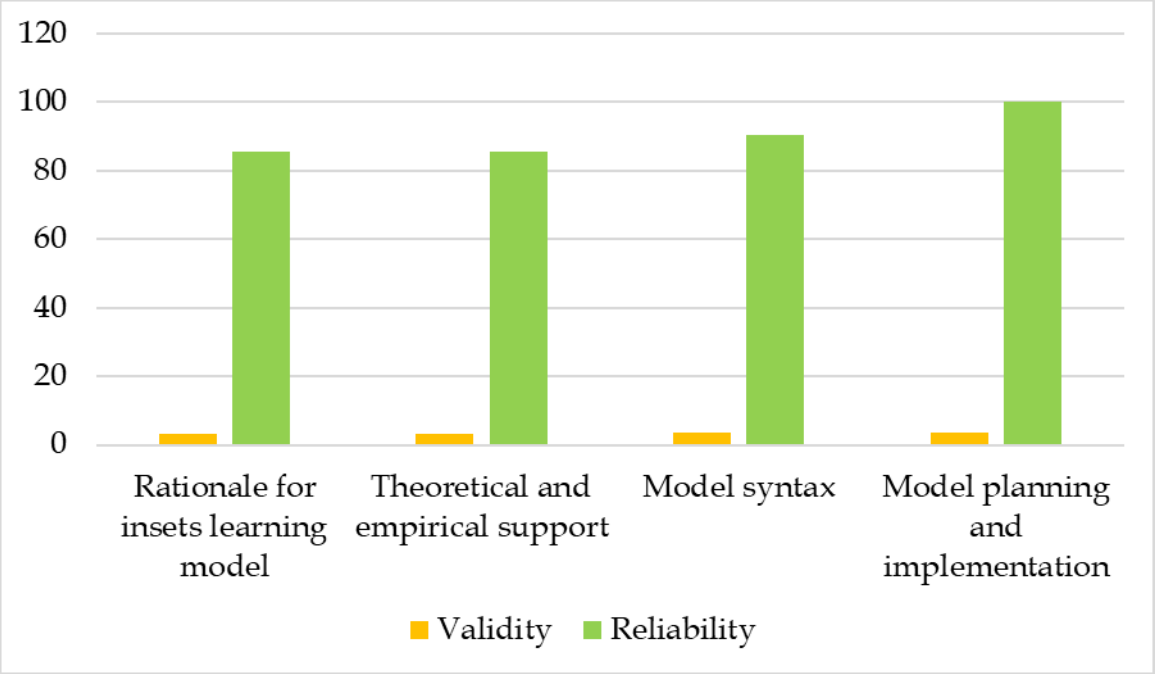

Figure 4. Recapitulation of construct validity and reliability results.

Figure 4 shows the recapitulation of the content validation of the insets learning model, getting an average score of 3.33 on the rational aspects of the insets learning model, 3.33 on aspects of theoretical and empirical support, 3.44 aspects of model syntax, 3.66 on aspects of model planning and implementation, the four aspects are in the very valid category. The four aspects get a percentage of reliability scores of 85.70, 85.70, 90.46, and 100.00 with the reliable category.

The reliability coefficient for all aspects of this model's construct validity is 85.70% to 100.00%. The reliability coefficient is within the 75.00% inter-observer agreement, so the results of the model construct validity assessment using the Insets learning model construct validity assessment instrument are reliable.

Learning Tools Validity

Learning tools are developed as an operational form of the Insets learning model in the learning process. The components of the developed learning tools include a syllabus (Table 4), lesson plan (Table 5), student textbook (Table 6), student activity sheet (Table

7), student critical thinking skills assessment sheet (Table 8), and observation sheet of science attitude and student character behavior (Table 9).

Table 4. Syllabus validity and reliability results.

Aspects to be assessed	Validity Results		Reliability	
	Average Score	Criteria	R (%)	Criteria
Syllabus Format	3.66	HV	85.70	Reliable
Content	3.00	V	85.70	Reliable
Language	4.00	HV	100.00	Reliable
Average Score	**3.55**	**HV**	**90.46**	**Reliable**

Table 5. Results of Validity and Reliability of Lesson Plans

Lesson Plans	Validity Results		Reliability	
	Average Score	Criteria	R (%)	Criteria
Lontar Plant Tapping Process	3.49	HV	85.67	Reliable
Sopi Fermentation and Distillation Process	3.49	HV	85.67	Reliable
The Position of Sopi for the Dawan Tribe	3.49	HV	85.67	Reliable
Average Score	**3.49**	**HV**	**85.67**	**Reliable**

Table 6. Results of validity and reliability of student teaching materials.

Aspects to be assessed	Validity Results		Reliability	
	Average Score	Criteria	R (%)	Criteria
Book Design	3.67	HV	85.70	Reliable
Format	3.55	HV	85.70	Reliable
Content	3.63	HV	85.70	Reliable
Language	3.86	HV	85.70	Reliable
Presentation Feasibility	3.83	HV	85.70	Reliable
Average Score	**3.70**	**HV**	**85.70**	**Reliable**

Table 7. Student worksheet validity and reliability results.

Lesson Plans	Validity Results		Reliability	
	Average Score	Criteria	R (%)	Criteria
Lontar Plant Tapping Process	3.52	HV	85.70	Reliable
Sopi Fermentation and Distillation Process	3.60	HV	85.70	Reliable
The Position of Sopi for the Dawan Tribe	3.52	HV	85.70	Reliable
Average Score	**3,54**	**HV**	85.70	**Reliable**

Table 8. Results of validity and reliability of student critical thinking ability assessment sheets.

Question Number	Assessment results on aspects							
	Content Validity		Validity Construction		Language		Reliability	
	Average	Criteria	Average	Criteria	Average	Criteria	R (%)	Criteria
1	3.00	V	3.00	V	3.33	V	85.70	Reliable
2	3.00	V	3.00	V	3.33	V	85.70	Reliable
3	3.00	V	3.00	V	3.33	V	85.70	Reliable
4	3.00	V	3.00	V	3.33	V	85.70	Reliable
5	3.00	V	3.00	V	3.33	V	85.70	Reliable
6	3.00	V	3.00	V	3.33	V	85.70	Reliable
7	3.00	V	3.00	V	3.33	V	85.70	Reliable
8	3.00	V	3.00	V	3.33	V	85.70	Reliable
9	3.00	V	3.00	V	3.33	V	85.70	Reliable
10	3.00	V	3.00	V	3.33	V	85.70	Reliable
Overall Score Average	**3.00**	**V**	**3.00**	**V**	**3.33**	**V**	**85.70**	**Reliable**

Table 9. Results of validity and reliability of science attitude assessment sheets and student character behavior.

No.	Aspects to be assessed	Scale Assessment		Reliability	
		Average	Criteria	R (%)	Criteria
1	I am measuring aspects of science attitudes and student character behavior required by Core Competencies and Basic Competencies.	3.67	HV	85.70	Reliable
2	The competencies to be measured	3.67	HV	85.70	Reliable
3	Observable indicators of students' science attitudes and character behaviors can be measured.	3.33	HV	85.70	Reliable
4	Easy to use	3.67	HV	85.70	Reliable
5	Equipped with rubrics for each variable measured	3.67	HV	85.70	Reliable
	Average	**3.60**	**HV**	**85,70**	**Reliable**

The recapitulation of the average score of validity and reliability of learning devices is presented in Figure 5.

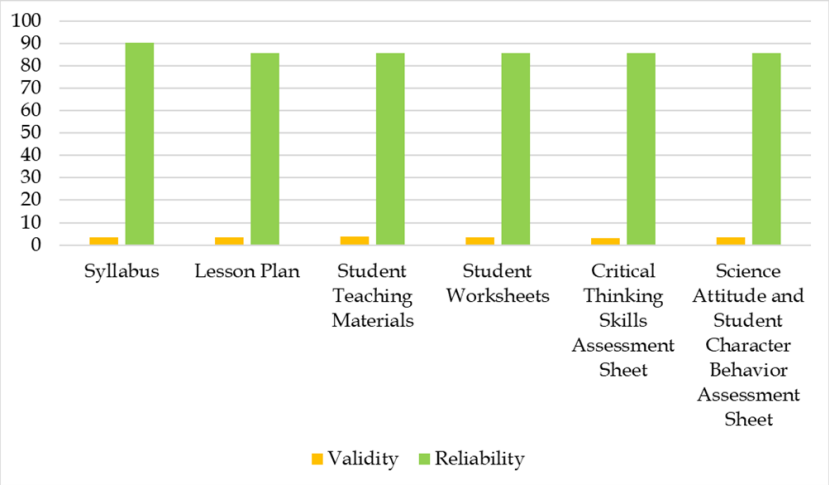

Figure 5. Recapitulation of validity and reliability results of learning devices.

Figure 5 shows a recapitulation of the validity of learning devices. The components of the learning devices developed include: the syllabus gets a score of 3.55; the lesson plan gets a score of 3.49; the student textbook gets a score of 3.70; the student activity sheet gets a score of 3.54; the student critical thinking skills assessment sheet gets a score of 3.11; and the observation sheet of science attitudes and student character behavior gets a score of 3.60. All components of the learning tool get a very valid category.

Reliability coefficients for all component validity of this learning tool range from 85.70% to 90.46%. The reliability coefficient is within the 75.00% inter-observer agreement (Borich, 1994), so the results of the assessment of the model's construct validity using the Insets learning model construct validity assessment instrument are reliable.

Discussion

Content Validity and Reliability

The content validity assessment of the Insets learning model shows that this model is very valid and reliable for use in learning to improve the critical thinking skills of high school students (Figure 2). This validation is based on the model's usefulness in implementing Curriculum 2013, the use of supporting theories, and the benefits of the model to implement the curriculum. The learning model is considered content valid if there is an element of novelty (state-of-the-art) and constructively valid if there is consistency between parts of the model and consistency with the underlying theories.

The novelty of the Insets learning model compared to the Sets and Inquiry learning models lies in its syntax or learning stages. The Insets model has an orientation phase not found in the Sets and Inquiry models. Learning orientation includes learners' willingness to learn, goals, motives, objectives, and concerns about their studies. The advantages of this model are that it can improve students' critical thinking skills in explaining scientific phenomena, designing and evaluating scientific investigations, and interpreting data and facts scientifically. The model also encourages student collaboration through scientific inquiry activities and increases their motivation in formulating goals and problems, identifying variables, and making hypotheses based on existing problems.

Recent research shows that an inquiry-based approach improves students' critical thinking skills, as applied in the Insets learning model. Alam and Ahmad (2019) found that inquiry-based learning can significantly improve students' critical thinking skills.

Darmawan and Nurhayati (2020) also stated that a scientific learning approach can effectively improve high school students' critical thinking skills. In addition, Setiawan and Santosa (2021) showed that problem-based learning, which is also part of the Insets model, can significantly improve students' critical thinking skills. In addition, evaluations of the reliability and validity of learning models in Indonesia also show positive results. Yuliana and Wibowo (2022) found that the instrument used to assess the learning model has a high level of reliability and validity, indicating that the learning model is trustworthy and reliable. Zulkifli and Harahap (2023) developed and validated an inquiry-based science learning module that also showed effectiveness in improving students' critical thinking skills.

Construct Validity and Reliability

The assessment of the construct validity of the Insets learning model shows that it is very valid and reliable for use in learning (Figure 3), so it can improve the critical thinking skills of high school students. The Insets learning model is categorized as very constructively valid based on the consistency between phases in the model syntax (Halim & Hidayat, 2023), consistency between model components, and consistency between models and the underlying theory (Pratama & Nurul, 2024). The construct validity of the Insets learning model can be seen and traced through the model book and the items in the model construct validation sheet (Sari & Putra, 2024). Consistency between phases in the model syntax can be traced from the rational sequence of phases to form a model syntax. Consistency between model components can be traced based on the relationship between model rationale, model syntax, social system, learning environment, and instructional impact.

Construct validity ensures that the test or instrument measures the intended concept, while reliability measures the consistency of the results obtained from the instrument. In the context of learning models, construct validity ensures that all components and phases of the model are interrelated and support the theory underlying the model. In addition, research by Hake (2019) emphasizes the importance of validity and reliability in inquiry-based learning. Hake found that highly valid and reliable inquiry-based learning models can significantly improve student learning outcomes. This aligns with the results obtained from the Insets learning model, where phases such as orientation, invitation, formulating problems, formulating hypotheses, data collection, hypothesis testing, formulating conclusions, feedback, and application have been designed consistently and interrelated, thus supporting an optimal learning process.

Further empirical support comes from research by Wulandari and Arifin (2020), who found that well-designed learning models can improve student engagement and learning outcomes. They showed that learning models with a solid theoretical foundation and consistency in implementation can provide better learning outcomes than conventional learning models. Thus, the high validity and reliability of the Insets learning model construct assure that this model is effective in achieving optimal learning objectives, especially in improving students' critical thinking skills. This is in line with recent research findings that show the importance of validity and reliability in designing and implementing learning models.

Validity and Reliability of Learning Tools

This research develops learning tools to support the implementation of the Insets learning model in science learning. The tools developed include syllabus, lesson plans,

student textbooks, student worksheets, student critical thinking skills assessment sheets, science attitude and student character behavior observation sheets, and student response questionnaires to the Insets learning model. Developing this device follows learning objectives to evaluation, guided by the 2013 Curriculum.

The syllabus was developed to facilitate teachers in preparing lesson plans professionally and systematically. Validation was conducted through focus group discussions with validators, who provided input related to the steps of Core Competencies and Basic Competencies so that they could be translated into indicators and learning objectives. The validation showed that the syllabus was very valid, with a reliability assessment of 85.70% to 90.46% (Dewi & Pratama, 2022; Andriana & Rahayu, 2021). The lesson plans were designed based on the syllabus. They adapted to the learning syntax of the Insets model and the scientific approach—FGDs with validators generated inputs to improve the lesson plans, which were then revised and validated. The validation results showed that the lesson plans were highly valid and reliable. Implementing this lesson plan is expected to improve students' critical thinking skills and make learning more effective (Rahmawati, 2019; Fajri & Sari, 2022).

The Student Teaching Book was developed by considering student characteristics, task analysis, and learning problems. Validators provided input to improve typing, add transparent image sources, and include additional science information. Validation showed that the student teaching book was highly valid and reliable, supporting increased student reading interest and the development of critical thinking skills (Putri & Hidayat, 2020; Suryani, 2021). The student worksheets were designed to facilitate scientific inquiry activities. Validation through focus group discussions identified the need for inclusion of activities to evaluate the design of scientific inquiry. Revision and validation resulted in highly valid and reliable student worksheets, making it easier for teachers to interact with students and support the improvement of critical thinking skills (Aminah et al., 2019; Wulandari & Nugraha, 2022).

The Assessment Sheet was developed to measure students' critical thinking ability, science attitude, and character behavior. Focus group validation led to the revision of questions to measure various critical thinking indicators. The validation results show that the Assessment Sheet is very valid and reliable, making it easier for teachers to assess student achievement (Puspitasari & Kurniawan, 2019; Mulyani & Harahap, 2021).

This questionnaire was developed to determine students' responses to the Insets learning model and its components. Validation shows that the questionnaire is very valid and reliable, helping researchers find out student responses to learning with the Insets model (Santoso, 2020; Dewi, 2020). The development of this learning tool supports the implementation of the Insets learning model, which is activity-oriented, according to the demands of the 2013 curriculum. This device is considered very valid and reliable, so it can improve the quality of science learning in schools (Kurniawati et al., 2020).

CONCLUSION

Fundamental Finding: Based on the study results, the learning device of a local wisdom-based insets learning model to improve the critical thinking skills of high school students is valid for use in learning. This is supported by the research results, which show the overall average content validity with a very valid category, the overall average construct validity with a very valid category, and the overall average validity

of learning devices with a very valid category. **Implication:** Teachers can use learning tools to practice students' critical thinking skills through science learning by integrating local wisdom. **Limitation:** This research is only limited to validity. **Future Research:** It is necessary to apply the learning tools of the insets learning model based on local wisdom in learning to determine the effectiveness of training students' critical thinking skills.

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