The Validity of the CIPro-Lab Learning Model Based on Local Wisdom of Acehnese to Boost Creative Thinking Skills

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Abstract. Students in different parts of Indonesia still need to develop their capacity for creative thought, especially through contextual scientific education grounded in local knowledge. The purpose of this study is to ascertain and evaluate the construct, content, and linguistic validity of the Creative Inquiry Project Laboratory (CIPro-Lab) Learning Model based on local wisdom in Aceh, which serves as a foundation for the model's viability in enhancing students' capacity for creative thought through contextual and meaningful science learning. The research used the research and development (R&D). method with a focus on the model validity test stage involving three expert validators, consisting of science education experts, learning model experts, and education practitioners. The research instruments were model validation sheets and learning tools covering the aspects of construct, content, and language. The results showed that the CIPro-Lab Model obtained an average validity score of 0.94% in the highly valid category, while the average reliability score was 93.83% in the high category. These findings indicate that the CIPro-Lab Model is suitable for use as a contextual learning model based on Acehnese local wisdom and has implications for strengthening learning that can stimulate students' creative thinking skills in a meaningful way.

Keywords: Aceh Local Wisdom, CIPro-Lab, Creative Thinking Skills, Validation

1 Introduction

Learning in the 21st century requires four key skills known as the “4C Skills” of collaborating, critical thinking, creative thinking, and communicating [1]. These four skills are recognized as 21st-century competencies, encompassing critical thinking, creative thinking, communication, and collaboration [2]. The challenges of the 21st century are characterized by the age of science, the knowledge-based society, and future competencies [3]. The 21st century necessitates human resources that are excellent and competitive in mastering various forms of skills [4]. The skill of creative thinking has become one of the essential competencies that students must possess in

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facing the challenges of the era of the industrial revolution 4.0 and society 5.0, where creativity and innovation are highly required to solve complex problems [5]. Creative thinking skills have a positive influence on academic achievement [6].

To assess student learning outcomes, especially creative thinking skills, significant improvements are needed. Indonesia's creative thinking skills are still relatively low, with a score of 0.037, indicating that the country has a low level of creativity. Of the 82 developing countries studied, Indonesia is ranked 81st, and Sweden is in the top position with a score of 0.923 in the Creative Thinking Skills Index [7]. According to previous research, students in various regions of Indonesia have low creative thinking skills [8]. Current learning methods have also not fully optimized these skills [9].

The learning process in schools is still dominated by conventional methods, which do not support creative thinking skills, especially in developing countries. To address this issue, creative learning must be integrated into the learning process so that students can reach their full potential, including the use of local materials and traditional techniques, thus producing innovative products that are sustainable and in accordance with cultural values [10]. The theoretical basis refers to the concept of sustainable development that takes into account social, economic, and environmental aspects [11]. In this paradigm, the development of culture based on local wisdom is considered crucial in achieving sustainable development. In addition to the government being responsible for policies that support the development of culture based on local wisdom, local communities and researchers also have a crucial role in maintaining and developing this local wisdom [12]. This collaborative effort is in line with the results of various studies that show that the application of learning models that involve cultural contexts and creative laboratory activities can foster students' scientific and creative thinking skills [13].

A series of research reports have shown that learning models are effective in developing creative thinking skills. Studies that combine project-based learning with scientific thinking can help students become more creative, increase independence, improve teamwork, and discover new concepts [14]. Project-based learning models that involve experiments and local wisdom have proven effective in enhancing students' creative abilities, especially when they participate directly in projects relevant to community life [15].

In addition, the Ministry of Education and Culture has proposed learning models such as problem-based learning, project-based learning, discovery learning, and inquiry learning. These models emphasize the importance of combining the benefits of various models with local wisdom [16]. In addition, it has been proven that the combination of inquiry-based learning models and project-based learning models is more effective and project-based learning has been shown to increase the efficiency and effectiveness of learning implementation, as shown in the proposed Project-Based Inquiry Science model [17]. The project-based science learning model is based on students' ability to think scientifically, solve creative problems, create projects, and work together in groups [18]. To support the effectiveness of this model, innovations or tools are needed that can improve students' learning experiences through practical activities, so that students can build their own knowledge and utilize their experiences to understand material concepts more deeply [19].

From the explanation above, it is clear that there is no learning model that optimally instills creative thinking skills in an integrated manner, especially one that utilizes local wisdom in the context of the CIPro-Lab learning model, especially in the context of its application in the school

environment. Therefore, research and investigation are needed to integrate the CIPro-Lab learning model based on Acehnese local wisdom. This model must meet three criteria: validity, practicality, and effectiveness [20]. In order to evaluate the importance and coherence of the final model, this study aims to create a CIPro-Lab model based on Acehnese local wisdom and validate its validity.

2 Method

Educational design research is the research methodology used. The purpose of development research is to create specific educational materials and assess their effectiveness. Wademan's Generic Design Research Model (GDRM) is one of many research models that have been developed for educational design [21]. The GDRM development research process includes problem identification; identification of provisional products and design principles; identification of provisional products and theory; prototype validation and evaluation of the initial product; and evaluation of the initial product. Problems are identified and a literature review is conducted in the first and second stages. In the third step, the researcher creates a prototype of the CIPro-Lab learning model based on Acehnese local wisdom, along with the necessary learning tools. In the fourth step, the prototype results are validated.

Developed by two experienced academics from leading universities, the CIPro-Lab learning models and materials were verified by three specialists in scientific education. Content and construct validity were assessed prior to validation. Several key elements that constitute content validity are as follows: (1) the need to develop a CIPro-Lab model based on Acehnese local wisdom; (2) up-to-date knowledge (contemporary knowledge); (3) the chronology of the development of the CIPro-Lab model based on Acehnese local wisdom; and (4) a description of the CIPro-Lab model based on Acehnese local wisdom [22]. Meanwhile, construct validity encompasses the following five elements: a consistent learning model; consistent theoretical and empirical support for the learning syntax's progressive implementation; model design and execution; learning environment management; and assessment and evaluation [23].

Data from construct validation (consistency) and content validation (relevance) were analyzed using qualitative techniques. This analysis's goal was to make judgments on the created model and the caliber of its evaluation. Each component of the assessment indicators was rated using four scales, and the average score from three validators was used for the evaluation. Subsequently, the scores were converted into the four criteria scales as shown in Table 1 [24].

Table 1. Interpretation criteria for Aiken's V values

Aiken's V Value	Validity Criteria	Description
0.8-1.0	Very High	Can be used without revision
0.6-0.79	High	Can be used with minor revisions
0.4-0.59	Moderate	Items require minor revisions and should be re-evaluated
0.2-0.39	Low	Items require major revisions or should be considered for removal
0.00-0.19	Very Low	Items must be removed or thoroughly revised

An analysis of inter-rater agreement was conducted to determine the reliability of the validation instrument and supporting materials for the CIPro-Lab learning model based on Acehnese local wisdom. The reliability test was performed using the percentage of agreement (R2) method proposed by [25]. A validation instrument is considered reliable when the percentage of inter-rater agreement reaches or exceeds 75%. This value indicates a high level of consistency among evaluators regarding the validated criteria [25].

3 Results and Discussion

3.1 Results Research

The expected learning results and model syntax can be used to categorize learning models, and learning environment settings. Learning objectives represent the planned final achievements in an instructional process. The syntax of a learning model includes the systematic stages or steps that must be followed during the implementation of learning, while the learning environment includes the context in which the learning process takes place, including strategies for strengthening motivation and conditioning students [26]. Five key elements make up a successful learning model: (1) syntax; (2) social system; (3) reaction principle; (4) support system; and (5) instructional impact and accompanying impact. These five components interact with each other to form a conceptual framework that serves as a reference in the design, implementation, and evaluation of a learning process [27]. The CIPro-Lab Hypothetical Model used to improve creative thinking consists of 5 phases, namely: (1) Identification inquiry project, (2) Creative and innovation project, (3) Laboratory Experiment Project, (4) Evaluation and reflection project, (5) Presentation and publication product.

The syntax of the CIPro-Lab model based on Acehnese local wisdom is outlined through a series of learning activities at each phase, systematically designed to meet the desired learning objectives. Learning achievement markers designed to gauge pupils' capacity for original thought are included in each phase. The learning activity design is structured based on the integration of objectives, activities, and achievement indicators at each stage of the model. The detailed stages of learning activities and indicators for achieving creative thinking skills in the CIPro-Lab model based on Acehnese local wisdom are presented in Table 2 [24].

Table 2. Relationship between Syntax, Learning Activities, and Learning Outcomes

Syntax	Learning Activities	Learning Achievement Indicators
Stage 1 Identification inquiry project	Conducting investigations in the creation of project products	Fluency thinking
Stage 2 Creative and innovation projects	Forming heterogeneous groups in creating innovative product projects based on Acehnese local wisdom	Flexibility, originality
Stage 3 Laboratory Experiment Project	Train students to design innovative project products	Original thinking (originality)
Stage 4 Evaluation and reflection project	carry out an evaluation of the project products that have been created and provide reflection to students if there are revisions to the project products that have been created	Elaboration

Syntax	Learning Activities	Learning Achievement Indicators
Stage 5 Presentation and publication of products	Train students by giving students a percentage of the discussion results from the project products they have created.	Elaboration

Two key requirements must be met for a learning model created through development research to be considered valid: consistency and relevance. Analyzing the learning model prototype's construct validity and content validity is part of validity testing. Content validity assesses the extent to which the developed learning model is relevant to educational intervention needs and is based on the latest theoretical developments and scientific findings. Construct validity, meanwhile, assesses the extent to which the model design possesses conceptual coherence and systematic development logic [24], as shown in the Table 3.

Table 3. Findings from Construct Validation, Content Validation, and Reliability

No.	Component	Validation Average	Category	Average Reliability	Category
A.	**Validation of the CIPro-Lab Model Content Based on Aceh Local Wisdom**				
1.	The need to develop a CIPro-Lab model based on Aceh's local wisdom	0.94	Very Valid	93.40	Reliable
2.	State of the art knowledge	0.89	Very Valid	84.75	Reliable
3.	Chronology of the formation of the CIPro-Lab model based on Acehnese local wisdom	0.91	Very Valid	91.00	Reliable
4.	Implementation of the CIPro-Lab model based on Aceh's local wisdom	1.00	Very Valid	100	Reliable
5.	Description of the CIPro-Lab Model Based on Aceh Local Wisdom	1.00	Very Valid	100	Reliable
B.	**Validation of the CIPro-Lab Model Content Based on Aceh Local Wisdom**				
1.	Consistency of learning models	0.94	Very Valid	91.66	Reliable
2.	The application of learning syntax in the phase is consistently supported by theory and actual data.	1.00	Very Valid	100	Reliable
3.	Planning and implementation of the model	0.98	Very Valid	97.80	Reliable
4.	Control of the educational setting	1.00	Very Valid	100	Reliable
5.	Assessment and evaluation	0.91	Very Valid	94.50	Reliable

In order to facilitate the use of the Acehnese local wisdom-based CIPro-Lab paradigm, which is focused on fostering creative thinking abilities, educational resources were created. Construct validity and content validity tests of the learning tools were conducted to assess the level of internal consistency and logic of the supporting components of the CIPro-Lab model based on

Acehnese local wisdom that had been developed. The validated tools included Teaching Modules, Student Worksheets (LKPD), Textbooks, and Creative Thinking Skills Tests. Three experts (validators) conducted the validation process utilizing learning tool validation instruments that the researchers had designed. Table 4 displays the findings of the validity evaluation of the auxiliary learning resources for the Acehnese local wisdom-based CIPro-Lab model [24], as shown in the Table 4.

Table 4. Validation Results of the Cipro-Lab Model Learning Aid Tool Based on Acehnese Local Wisdom

No.	Component	Validation Average	Category	Average Reliability	Category
1.	Teaching Module	0.94	Very Valid	94.50	Reliable
2.	LKPD	0.97	Very Valid	93.66	Reliable
3.	Textbook	0.91	Very Valid	92.66	Reliable
4.	Creative Thinking Skills Test	0.94	Very Valid	94,50	Reliable

3.2 Discussion

The study's findings show that all components of the developed learning tools have very high validity and good reliability. The average validity score for the instructional module was 0.94, categorized as very valid, and a reliability score of 94.50, categorized as reliable. This indicates that the developed teaching module meets the aspects of content suitability, language, presentation, and graphics, making it suitable for usage during the educational process. Similarly, the LKPD showed a higher validity score of 0.97, categorized as very valid, and a reliability score of 93.66, which is also categorized as reliable. This finding suggests that the LKPD is capable of supporting interactive learning activities and encouraging optimal student engagement. The textbook obtained a validity score of 0.91, categorized as very valid, and a reliability score of 92.66, indicating consistency in measuring the quality of the teaching materials. Meanwhile, the creative thinking skills test obtained a validity score of 0.94 and a reliability score of 94.50, indicating that the instrument is able to measure aspects of creative thinking accurately and consistently. Overall, these results indicate that the developed learning tools have met high feasibility criteria and can be applied to the process of teaching kids how to think more creatively.

These findings are consistent with expert opinions stating that an Aiken's V value above 0.8-1,0 indicates a very high level of content validity [28]. In addition, high reliability reflects good consistency of measurement results, as explained by A [29], that reliable instruments produce stable and trustworthy data. Furthermore, the development of valid and reliable learning tools is a key prerequisite for achieving effective and meaningful learning [30]. As a result, the educational resources created in this study are not only theoretically viable but also have the potential to significantly improve learning quality, especially in terms of developing students' capacity for creative thought.

The feasibility is further strengthened by the alignment of the acquired knowledge tools with the structure of the CIPro-Lab learning model, which consists of important elements, such as instructional and nurturing impacts, learning syntax, social systems, reaction principles, and support systems [31]. The integration of these components indicates that the learning tools not only fulfill technical aspects of validity and reliability, but are also conceptually aligned with a

systematic instructional model framework, thereby supporting the implementation of innovative, interactive learning oriented toward the development of students' creative thinking skills.

The CIPro-Lab model based on Acehnese local wisdom has four stages of syntax, namely: (1) Identification inquiry project, (2) Creative and innovation project, (3) Laboratory Experiment Project, (4) Evaluation and reflection, (5) Presentation and publication product. The syntax is designed to integrate the creative inquiry process with laboratory project activities that highlight the context of food biotechnology products and Acehnese local wisdom. The cooperative contacts between professors and students during the execution of inquiry-project activities in an actual laboratory demonstrate the elements of the social system and the principle of reaction. Meanwhile, the support system involves the availability of digital devices, local materials, and learning guides that support scientific exploration based on local culture.

The effectiveness of the CIPro-Lab model can be observed through learning indicators oriented towards the development of creative thinking skills. This model has a logical and rational conceptual structure, fulfilling the consistency criteria of an innovative and contextual learning model for Acehnese culture. The findings of the validity test results indicate that all components of the CIPro-Lab model based on Acehnese local wisdom have high quality, strong integration, and suitability with the characteristics of modern science learning. Overall, this model represents strong theoretical coherence and empirical rationality, covering aspects of instructional behavior, hybrid learning environments (real-virtual), authentic assessment, and formative evaluation.

4 Conclusion

The CIPro-Lab learning model based on creative thinking skills has very good relevance and consistency with a very valid and reliable category (percentage of agreement level ≥ 75%), according to research and data analysis findings. The CIPro-Lab learning model was developed through four main stages, namely: (1) Identification inquiry project, (2) Creative and Innovation Project, (3) Laboratory Experiment Project, (4) Evaluation and reflection, (5) Presentation and publication product. The validation results of learning support devices, which include Teaching Modules, Student Worksheets (LKPD), Textbooks, Creative Thinking Skills Tests show that all of these devices are in the valid and reliable category.

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