The Validity of Go-Lab Platform-assisted, Character Value-Integrated *Causalitic* Model Learning Tools to Enhance Problem-Solving and Creative Thinking Skills

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Abstract *- This research aims to determine the validity of the causalistic model learning tool integrated with the rocky character values of the Go-Lab platform to improve students' problem-solving and creative thinking abilities. This type of research is research development or Research and Development (RnD). This development research procedure refers to the steps of the 4D development model, which consists of four main stages: define, design, develop, and disseminate. The causalistic model learning tools integrated with the Go-Lab platform's rocky character values were developed in the form of a syllabus, learning implementation plan (RPP), teaching materials, student worksheets, Go-Lab platform media, as well as problem-solving and creative thinking ability test instruments. The results of this research are that the causalistic model learning tool integrated with the rocky character values of the Go-Lab platform is valid for use in science learning to improve students' problem-solving and creative thinking abilities.*

Keywords**:** *Learning Tools; Character Value; Causalitic Model; Go-Lab Platform.*

INTRODUCTION

Natural Science is a subject that primarily focuses on natural phenomena and living organisms (Zuleni et al., 2022). According to Gunawan (2015), natural science (science) is a branch of knowledge related to systematically exploring nature. Science can also be defined as the study of the causes and effects of natural events. Essentially, science encompasses processes, products, and attitudes.

The results of a field study conducted at SMPN 3 Labuapi indicate that (1) the learning tools used do not include steps involving active participation of students in mastering problem-solving skills and creative thinking with the aid of technology, (2) the assessment instruments used are not optimal for testing the problem-solving and creative thinking abilities of students, and (3) the problem-solving and creative thinking abilities of students are still considered low.

The low problem-solving and creative thinking abilities of students require appropriate teaching materials and the use of suitable learning models. This issue can be addressed by changing the learning model to make students interested and motivated to learn. One suitable learning model is the *Causalitic* model. According to Rokhmat (2018), the *Causalitic* (Causality and Analytic) learning model considers that the main activity in the learning process is oriented towards developing the potential of students in causal and analytical thinking. Through causal thinking activities, students are directed to analyze each phenomenon so they can determine the cause-and-effect elements. Then, through analytical thinking activities, students are guided to formulate rationalizations in the form of arguments to explain the conditions of each causal element, thereby collectively producing the effects of each phenomenon.

In line with the *Causalitic* learning model developed by researchers, there are several previous research findings, including the study by Sari et al. (2020), which states that the application of *Causalitic* learning has an impact on improving the problem-solving skills of physics students, as seen in pretest and posttest data as a measure of the achievement of planned learning competencies.

The achievement of learning competencies can be assisted by the use of technology. Technology can help teachers deliver the material to be presented. One form of technological assistance that can be used is the go-lab platform. Go-Lab is a platform that includes applications, virtual laboratories, and Inquiry Learning Spaces (ILS) that can be developed and used freely by teachers. Science learning using go-lab is provided through ILS, designed to integrate material, applications, and virtual laboratories to support inquiry-based learning (Tamami et al., 2021).

The development of the *Causalitic* learning model can also be integrated with character values. The integration of character values in the *Causalitic* model refers to the inherent qualities of an individual in daily life. There are four character values that will be inserted into the developed learning tools, namely care, discipline, honesty, and responsibility. It is supported by Mahmudah et al.'s (2022) research, which states that *Causalitic* learning integrated with character values has a very strong influence on improving creative thinking skills and changing students' character compared to conventional learning. Therefore, using *Causalitic* models integrated with character values assisted by the go-lab platform in learning tools is highly necessary.

Learning tools are a collection of learning resources that allow students and teachers to engage in learning activities (Tanjung et al., 2022). Researchers will develop learning tools based on the *Causalitic* model integrated with character values. The learning tools that will be developed include a syllabus, Lesson Implementation Plan (RPP), teaching materials, Student Worksheets (LKPD), go-lab platform media, and assessment instruments for problem-solving and creative thinking skills.

The developed learning tools need to undergo validation. It is done to ensure that the learning tools are suitable for teaching. It aligns with Putra's (2020) opinion that learning tools must be validated to ensure their quality. It is the basis for researchers' research to determine the validity of the *Causalitic* learning model integrated with character values assisted by the go-lab platform developed to be applied in teaching.

RESEARCH METHODS

This research is a type of Research and Development (R&D) study. The development procedure in this research follows the 4D development model design. The 4D model consists of four main stages: defining (define), designing (design), developing (develop), and disseminating (disseminate). The development of learning tools using the 4D model assumes that the learning tools are more sequential and straightforward. In summary, the stages of the 4D model in this research are presented in Figure 1.

The purpose of the define stage is to establish and define the learning requirements, beginning with initial analysis, student analysis, material analysis, and learning objective analysis. The define stage is carried out through observation activities using interview methods, questionnaires, and classroom observations.

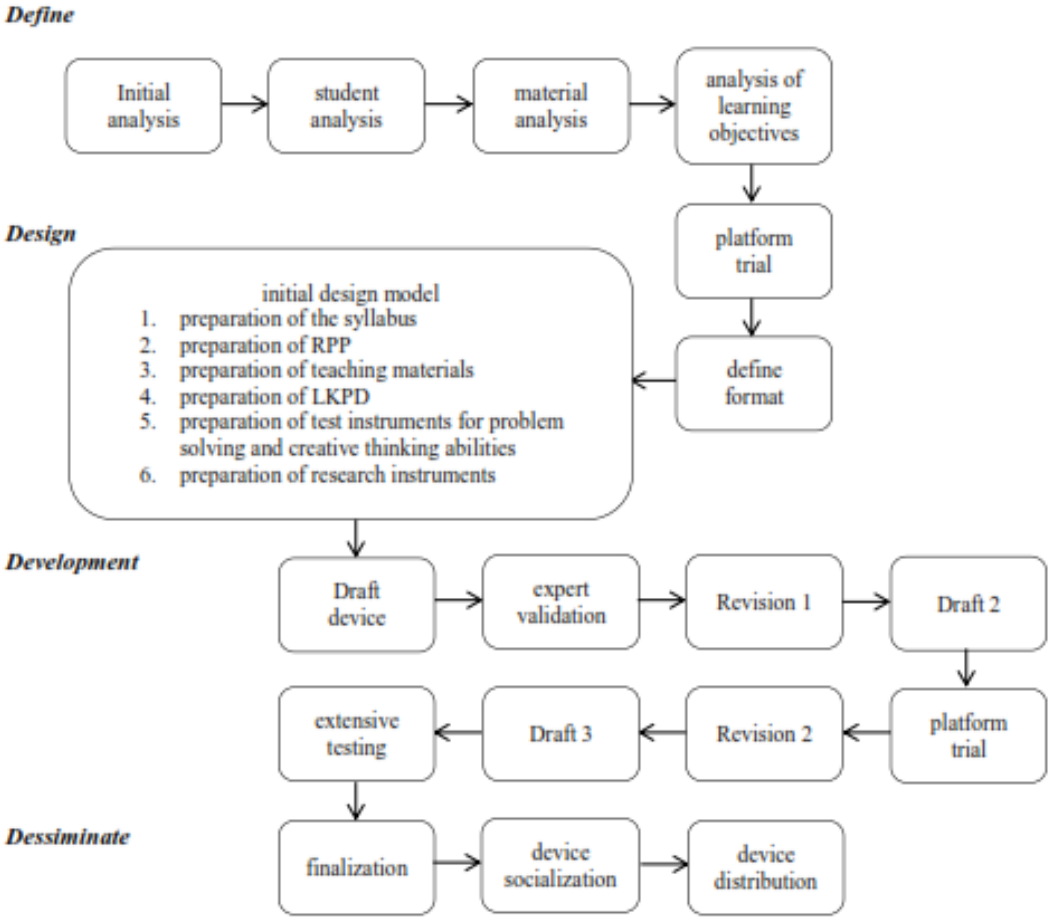

Figure 1. Research Procedure

The design stage aims to create a design or draft of the *Causalitic* learning model integrated with character values, consisting of a syllabus, Lesson Implementation Plan (RPP), teaching materials, Student Worksheets (LKPD), go-lab platform media, as well as instruments for testing problem-solving and creative thinking skills.

The develop stage aims to produce learning tools such as a syllabus, RPP, teaching materials, LKPD, go-lab platform media, and instruments for testing problem-solving and creative thinking skills, which have been revised based on comments, suggestions, and assessments from expert validators.

The disseminate stage aims to disseminate the research product in the form of *a Causalitic* learning model integrated with character values developed learning tools for Natural Science, to be shared with teachers in other classes and schools. The goal is to provide an alternative for teaching activities using the *Causalitic* learning model integrated with character values.

The research subjects are eighth-grade students for the academic year 2023/2024 at SMPN 3 Labuapi. The research began with the title determination on March 30, 2023. The instruments used in this developmental research include learning tools such as a syllabus, RPP, teaching materials, LKPD, go-lab platform media, and instruments for testing problem-solving and creative thinking skills.

The types of data in the developmental research of learning tools, the *Causalitic* model integrated with character values assisted by the go-lab platform, consist of qualitative data obtained from validation questionnaires, including comments and

suggestions for revision from validators, and quantitative data obtained from validation results by experts, in the form of validation questionnaire scores for learning tools on a scale of 1 to 4. The rules for scoring the validity of a product are as shown in Table 1 below.

Table 1. Scoring Guideline

Category	Score
Sangat Baik	4
Baik	3
Kurang Baik	2
Tidak Baik	1

(Setiyorini, 2014).

The data analysis technique is a stage conducted by researchers to process the collected research data. The data analysis technique is used to measure the validity of the developed learning tools. The validity of learning tools is considered valid if the tools are deemed suitable for use, either with or without revisions, by the validators (Rokhmat, 2012). The analysis of the validity of the *Causalitic* learning model integrated with character values assisted by the go-lab platform is as follows.

$$Assessment\ Score = \frac{Validator\ score}{maximum\ score} \times 100\%$$

With the instrument assessment scores converted into several levels of validity, as shown in Table 2.

Table 2. Level of Instrument Validity

Score	Average Score	Clasification
4	3,26 – 4,00	Very Good
3	2,51 – 3,25	Good
2	1,76 – 2,50	Not Good
1	1,01 – 1,75	Bad

(Suyanto, 2009).

Furthermore, to measure the understanding among validators (inter-rater reliability), the analysis is conducted using percentage agreement (Borich, 1994). The results of the validation of the learning tools are considered reliable if the percentage agreement is >75% (Nasrah, 2017). The learning tools are deemed suitable for use in teaching if the analysis results meet the criteria for high validity and reliability (Ibrahim, 2020).

RESULTS AND DISCUSSION

Results

Define Stage

In this stage, initial analysis, student analysis, material analysis, and learning objective analysis are conducted. The initial analysis aims to identify issues faced in science learning. Based on interviews with science teachers and students at SMPN 3 Labuapi, students perceive science as a challenging and dull subject. Consequently, disruptive behaviors, such as sleeping and talking in class, lack of discipline during assignments, and overall disinterest in learning, are observed. Students express dissatisfaction with conventional teaching methods, like discovery learning through lectures and discussions. Science is viewed as a subject filled with mathematical equations without conceptual analysis, leading students to memorize formulas without understanding the underlying concepts. Additionally, students lack motivation, merely playing a passive role without utilizing opportunities for discovery, problem-solving, and creative thinking skill development.

Student analysis focuses on academic abilities, personality, social attitudes, and learning styles. Academic analysis reveals relatively low academic proficiency based on test results. While social attitudes are satisfactory, students still exhibit disruptive behavior. The analysis of learning styles shows considerable diversity, necessitating innovative teaching approaches.

Material analysis is carried out to select content for the development phase. The primary material used is "Effort and Simple Machines," aligned with curriculum standards (KD 3.3 and 4.3).

The analysis contributes to formulating learning objectives based on the syllabus and the chosen material. The objectives aim to enhance problem-solving skills and creative thinking.

Design Stage

The design stage aims to create a blueprint for the *Causalitic* learning model integrated with character values, comprising a syllabus, Lesson Implementation Plan (RPP), teaching materials, Student Worksheets (LKPD), go-lab platform media, and instruments for testing problem-solving and creative thinking skills.

a. Learning Syllabus with *Causalitic* Integrated Character Value Model
   The syllabus serves as a guide for teachers in preparing other teaching tools. The components of the syllabus include identity, core competencies, basic competencies (3.3 and 4.3), competency achievement indicators, main topics, learning activities referring to the *Causalitic* model stages, assessment, time allocation, and learning resources.
b. Lesson Plan (RPP) with *Causalitic* Integrated Character Value Model Assisted by Go-Lab Platform
   The lesson plan is used as a guide for teachers to implement learning activities with the *Causalitic* integrated character value model on the topic of effort and simple machines. The components of the lesson plan include identity, core competencies, basic competencies, competency achievement indicators, learning objectives, materials, models, methods, media, learning resources, learning steps referring to the *Causalitic* model stages (orientation, exploration, and development of causality concepts, argumentation, and evaluation), time allocation, and assessment of learning outcomes.
c. Teaching Materials
   Teaching materials contain systematically organized content on effort and simple machines for use by teachers and students in learning activities.
d. Student Worksheets (LKPD) with *Causalitic* Integrated Character Value Model Assisted by Go-Lab Platform
   Student Worksheets (LKPD) consist of a series of phenomena related to the use of effort and simple machines to be analyzed by students as evaluation instruments in learning implementation. There are 4 LKPDs developed, adjusted to the number of meetings. Each LKPD consists of 3 questions.
e. Go-Lab Platform Media
   Go-Lab platform media is used as a tool for investigative activities in the form of a virtual lab related to the topic of effort and simple machines to train students' problem-solving and creative thinking skills. The components of the Go-Lab platform media include the homepage, apperception containing examples of phenomena and virtual labs related to the topic, and LKPD.
f. Test Instrument for Problem-Solving and Creative Thinking Skills
   The test instrument for problem-solving and creative thinking skills is used as a measure of the achievement of planned learning competencies. The test instrument consists of 4 essay questions.

Develop Stage

The develop stage aims to generate learning tools in the form of a syllabus, Lesson Implementation Plan (RPP), teaching materials, Student Worksheets (LKPD), go-lab platform media, and instruments for testing problem-solving and creative thinking skills that have been revised based on comments, suggestions, and assessments from expert validators. The develop stage consists of the following:

1. Validation by Expert Validators, consisting of three faculty members from the Master's Program in Science Education, Postgraduate School, Universitas Mataram.

Table 3. The Data of Instrument Validity

No	Perangkat Pembelajaran	Average score	Category	*Percentage Agreement*	Category
1	Syllabus	3.38	Very Good	89.96	Reliable
2	RPP	3.21	Good	84.23	Reliable
3	Teaching Materials	3.26	Very Good	84.23	Reliable
4	Student Worksheet	3.25	Good	89.96	Reliable
5	Go-Lab Platform Media	3.29	Very Good	89.96	Reliable
6	Problem-Solving Skills Test Instrument	3.33	Very Good	84.23	Reliable
7	Creative Thinking Skills Test Instrument	3.44	Very Good	89.96	Reliable

2. Revision I of the Product: In this stage, the learning tools, after being evaluated by expert and practitioner validators, will be improved based on comments and suggestions from the validators.
3. Limited Trial: In this stage, the revised learning tools, following the comments and suggestions from expert validators, undergo a limited trial. The limited trial is conducted with a select number of middle school students who can represent the trial subjects.
4. Revision II of the Product: This stage is completed after the limited trial. Shortcomings and weaknesses found in the learning tools during the limited trial serve as guidelines for revising the product.
5. Extensive Trial: This trial is conducted using the revised learning tools. Data on students' problem-solving and creative thinking abilities will also be collected in this stage.

Dissemination Stage

The dissemination stage aims to distribute the research product, the developed *Causalitic* learning model integrated with character values in the form of science (IPA) teaching materials. This stage involves providing the learning tools to teachers in other classes and schools, intending to serve as an alternative in teaching activities using the *Causalitic* learning model integrated with character values. During this stage, the researcher will distribute the product, which will be tested by science teachers at SMPN 3 Labuapi. Subsequently, it will also be disseminated and tested by other science teachers, such as those at MTsS. Tarbiyatul Mustafid, and science teachers at MTsN 1 West Lombok.

Discussion

This research aims to produce a *Causalitic* learning model integrated with character values supported by the Go-Lab platform, which is valid for improving problem-solving and creative thinking skills among students. The validity of the learning

tools was obtained from the evaluation by three expert validators.

The learning tools were assessed by three expert validators (physics education lecturers) using a validation sheet with a scale from 1 to 4. Based on the calculations, the syllabus assessment yielded an average score of 3.38, categorized as excellent. Amir et al. (2015) stated that valid and appropriate learning tools are a set of learning equipment that meets the criteria for content validity obtained from expert assessments. The developed syllabus clearly includes core competencies, essential competencies, competence achievement indicators, the selection of teaching materials, and learning sources/media that align with the elaboration of competency standards and the required time allocation. Additionally, the developed syllabus uses language following the standard language guidelines (EYD) and simple sentence structures, making it clear and valid for use as a guide in preparing lesson plans (RPP). According to Sahidu (2016), there are eight aspects in developing a syllabus, including mapping competency standards (SK) and essential competencies (KD), identifying core materials, sequencing the presentation of learning material descriptions, developing learning activities, determining assessment types, setting time allocations, and selecting learning resources.

Furthermore, the developed lesson plans (RPP) were structured based on the syntax of the *Causalitic* integrated character value model. Based on calculations, the RPP assessment by expert validators was 3.21, which was categorized as good. The developed RPP includes the RPP identity and core competencies and the accurate elaboration of KD into indicators and learning objectives, in line with Suyanto's (2009) statement. Additionally, the good category in RPP was achieved due to the alignment in selecting the *Causalitic* integrated character value learning model, learning tools or media, and the clarity of the stages of learning activities. The developed RPP also uses language following EYD, simple sentence structures, alignment in time allocation, detailed time allocation for each learning activity, and the completeness of learning objectives tailored to ABCD (audience, behavior, condition, and degree). Sahidu (2016) explains that learning objectives greatly determine the success of a learning process because they contain the mastery of competencies that are operationally targeted in the learning implementation plan. It indicates that the lesson plan (RPP) is valid for use but still needs improvement based on comments and suggestions from all validators. One of the improvements made is in using sentences to make them simpler and easier to understand.

The developed teaching materials cover the topic of effort and simple machines. Based on calculations, the average score obtained was 3.26, which was categorized as excellent. It is because the developed teaching material includes the suitability of the material with learning objectives, connects it with everyday phenomena, and provides illustrations. The developed teaching material also uses language following EYD and simple sentence structures. It indicates that the teaching material is valid for use with improvements provided by validators in the form of suggestions or comments.

Next, the developed Student Worksheets (LKPD) follow the *Causalitic* learning model. Based on calculations, the LKPD assessment obtained from expert validators was 3.25, which was categorized as good. It is because the developed LKPD clearly includes the LKPD identity, the presented issues align with the students' development, and the LKPD trains students to solve problems and think creatively.

Additionally, the language used in the LKPD aligns with EYD, has simple sentence structures, and provides clear instructions. It is in line with Andriyatin et al. (2016), stating that LKPD must be designed using an approach within the learning cycle, from apperception activities to evaluation, to be used for one complete learning process of the material. The information in the LKPD is designed to make students more active in their learning activities. It indicates that the LKPD is valid for use with improvements provided by validators in the form of suggestions or comments. One of the improvements made is the sentence structure to make it simpler and easier to understand.

The assessment of the Go-Lab platform media obtained from expert validators was 3.29, which was categorized as excellent. It is because the media is presented with an attractive display and can help train problem-solving and creative thinking skills among students. Additionally, the language used in the media aligns with EYD, has simple sentence structures, and provides clear and easy-to-understand instructions on using the media. It indicates that the Go-Lab platform media is valid for use with improvements provided by validators in the form of suggestions or comments.

The test instrument developed by the researcher measures the improvement of problem-solving and creative thinking skills before and after applying learning using the *Causalitic* integrated character value model. Pretest and posttest questions were designed as essay questions, with four questions covering indicators of problem-solving and creative thinking skills. Based on calculations, the assessment of the test instrument obtained from expert validators was 3.33 and 3.44, categorized as excellent. According to Fatmawati (2016), learning tools are considered feasible for use if their validation results fall into the criteria of good or valid. The excellent category was obtained because the test instrument for problem-solving and developing creative thinking skills includes the identity of the questions and student identity columns. The questions align with learning indicators and indicators of problem-solving and creative thinking skills. Additionally, the purpose of the questions and illustrations are presented, the language used aligns with EYD, the questions do not contain double interpretations, and the questions are presented using simple and easily understandable language. It indicates that the test instrument for problem-solving and creative thinking skills is valid for use with improvements provided by validators in the form of suggestions or comments.

CONCLUSION

The Go-Lab Platform-assisted, Character Value-Integrated *Causalitic* Model Learning Tools, which has been developed, demonstrate high validity and reliability. It indicates that these learning tools are suitable for use in the educational process.

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