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Effectiveness of the CTL Model Using *Liveworksheets* to Improve Creative Thinking and Science Process Skills of Grade IV Elementary School Students

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Abstract
Study this aim for analyze effectiveness of the Contextual Teaching and Learning (CTL) learning model liveworksheet for increase think creative and science process skills student Grade IV Elementary School. Background from study This is low activity student in class as well as method conventional teacher - centered research method. is Research and Development (R&D) with the Borg and Gall model, which is limited to seven stages development. Subject in study This is 15 students Class IV of SDN Budi Asih for limited testing, and 36 students Class IV of SDN 4 Ciharashas for area test. Instrument data collection includes interviews, observations, and instrument tests. Validation results experts show the product is worthy used with an average percentage of practicality reached 80%. In the trial field area, class experiments show significant improvement with an N-Gain of 0.62 (medium) for think creative and 0.65 (moderate) for science process skills. The results taller compared with the class control which obtained 0.34 and 0.49 respectively. It can be concluded that effectiveness of the assisted CTL learning model embedded live worksheet method brainstorming can increase think creative and science process skills student grade IV elementary school.

Keywords: Contextual Teaching and Learning Model, Creative Thinking, Liveworksheet, Science Process Skills

INTRODUCTION

Education is not let go from competence 21st century, where there is competencies that must be owned. Learning 21st century using the term 4Cs, including ability think critical thinking, creative, collaboration, and communication (Agustin & Pratama, 2021). One of them the ability that must be owned by students is think creative. Ability think creative can help student in solve something problem with creative way in accordance with life daily they. With existence creativity, ability think participant educate can used in a way maximum for get solution to something the problem he has face it (Majidah et al., 2024). As for the indicators think creative According to Ida (Hartati et al., 2021), namely fluency thinking, flexibility thinking, original thinking, and elaborative thinking. In general think creative considered as a mental process in emphasize reasoning and thinking for produce understanding new (Hambali et al., 2025). Through skills this 21st century especially in thinking creative expected can produce generation that does not only intelligent in a way academic, but also creative, adaptive, and ready face future challenges (Rosidin et al., 2025).

In order for students' creative thinking skills to run smoothly and systematically, mastery of science

process skills is required. Process skills are directed scientific skills that can be used to discover a concept, principle, or theory, in developing a pre-existing concept, or to refute a discovery (Yuniasih et al., 2022). Process skills have two types, one of which is basic process skills. Basic science process skills have six skills, including observation, measuring, classifying, predicting, concluding, and communicating (Darmayanti et al., 2021).

However, based on an interview with one of the teachers at SDN Budi Asih, it was found that students' creative thinking skills and science process skills are still relatively low, this can happen because students are still fixated on the material given by the teacher, causing hesitation to answer, during the learning process that involves students to be active in class only a few people, as well as the lack of involving students to be active in learning. In line with the results of interviews conducted by Permana et al., (2023)a fifth-grade teacher at one elementary school, it was found that student learning outcomes are still said to be low. This can happen because during the learning process in schools it is still dominated by conventional methods that are only centered on the teacher (*teacher-centered*). Although students sometimes learn in groups, the teacher has not implemented a structured learning model according to the syntax and is still fixated on textbooks. In line with research conducted by Dariansyah et al., (2023)from one of the observations conducted on fifth-grade elementary school students, it was found that many students were still passive during the learning process. This can happen because the teacher only uses the lecture method in the learning process. The lack of student involvement to be active in the classroom is a factor that hinders the development of students' creative thinking skills and science process skills.

Efforts that can be made to improve students' creative thinking skills are by using interesting learning models. One learning model that teachers can use in class is *Contextual Teaching and Learning* (CTL). The CTL learning model is a learning concept that can help teachers in linking material with real situations of students and can encourage students to make connections between the knowledge they have with the application of their daily lives (Zaenal et al., 2022). The CTL learning model itself encourages students to know the benefits and meaning of the learning they do. So it can make students more enthusiastic about learning and improve their learning outcomes, because the learning concept comes from students' real experiences (W. P. Lestari et al., 2023). The syntax of the CTL learning model is questioning, constructivism, learning community, inquiry, reflection, modeling, and authentic assessment (Fauziyah et al., 2024)This is in line with research conducted by Akbar & Herni (2022)which obtained results showing that the CTL learning model can improve students' learning outcomes in speaking skills. This is also in line with research conducted by Budiman (2021)stating that after using the CTL model, it showed significant results on science learning outcomes. In order for the CTL model to stimulate students' rational ideas, a brainstorming method was inserted. According to Philips (Angraini & Husna, 2024)the brainstorming method is a technique used to explore as many opinions and ideas as possible in solving a problem. The brainstorming method aims to be able to explore what students think when facing a problem, which is then presented to their friends (Lidiyah & Jani Jani, 2023).

To support the effectiveness of learning in the digital era, this integration is strengthened by the use of liveworksheet media. *Liveworksheet* is an *online platform* that allows you to create interactive worksheets with *drag and drop* feature, videos, and interactive quizzes (Supriyanto et al., 2024). Students can work on worksheets *online* with a variety of interesting shapes and images, thereby fostering a sense of enthusiasm for learning. Liveworksheet based worksheets can directly increase motivation, process skills, activeness, and learning outcomes by making learning more interesting and interactive (Yulismar & Nuzulia, 2023).

Several experts have conducted research related to the CTL model. This is shown by the findings of Nuraeni et al (2021)with the title "Pengembangan Perangkat Pembelajaran Bercirikan CTL Berbantuan GeoGebra Menggunakan Model Flipped Learning" developing teaching devices combined with the CTL model in the GeoGebra learning process. Secondly, by the findings Apriliawati et al (2022)with the title "Pengembangan Buletin IPA Tema Pangan Sebagai Sumber Energi Berbasis Contextual Teaching and Learning (CTL) Yang Berorientasi Pada Kemampuan Berpikir Kritis" developing learning media based on the CTL model in science material. And thirdly, by the findings Wulandari et al (2021) with the title "Pengembangan E-Modul Berbantuan Aplikasi Flip Pdf Builder Berbasis Contextual Teaching and Learning", developing teaching materials in the form of e-modules based on the CTL model in mathematics

material.

Based on the introduction above, the purpose of this study is to determine the process of developing a Contextual Teaching and Learning (CTL) learning model assisted by liveworksheets to improve creative thinking and science process skills of fourth grade elementary school students. The novelty in this study lies in the CTL learning model integrated with the brainstorming method in the liveworksheet platform; to determine the feasibility and practicality of the developed product; to determine the effectiveness of the product on students' creative thinking and science process skills; and the influence of the product on improving students' creative thinking and science process skills.

RESEARCH METHODS

The research method used is Research and Development (R&D). According to Borg and Gall (1989), research and development is a method used to validate and develop a product. The R&D research method was used because it is in accordance with the problem formulation of the effectiveness of the CTL model assisted by live worksheets in improving creative thinking in fourth-grade elementary school students. This development research uses the Borg and Gall model. The reason the researchers used this model is because the Borg and Gall model has the right steps for developing a product.

The Borg and Gall (1989) model has 10 steps research and information collection, planning, developing a preliminary form of the product, preliminary field testing, main product revision, main field testing, operational product revision, operational field testing, final product revision, and dissemination and implementation. The development in this study uses the Borg and Gall development with Sugiyono's modification, which does not have the dissemination and implementation stage (Sa'adah & Wahyu, 2022). The Sugiyono modification is as follows:

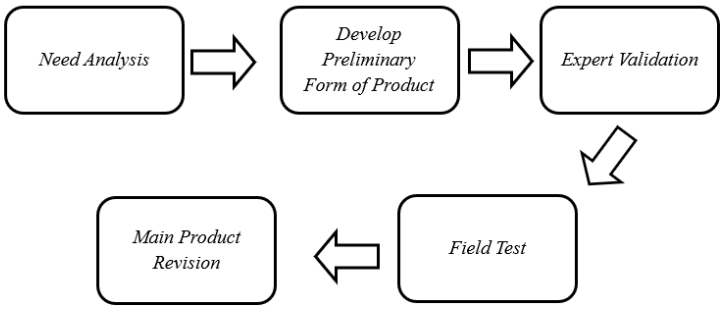


Figure 1Borg and Gall Model

Research Target/Subject

The subjects in this study were fourth-grade elementary school students. For the limited test, the researcher used 15 students at SDN Budi Asih and for the broad test, the researcher used 36 students, including 18 students in the control class and 18 students in the experimental class at SDN 4 Ciharashas.

Research Procedure

Based on the development model in this study, the research procedures are as follows: 1) need analysis, conducting preliminary research and data collection; 2) develop preliminary form of product, developing the initial product type; 3) expert validation, conducting product validation with expert lecturers; 4) field test, including preliminary field testing on 1 school with 15 students as subjects, main field testing, on 1 school with 36 students as subjects using control class and experimental class; 5) main product revision, conducting revisions based on the results of limited trials and extensive trials.

Table 1 Non-Equivalent Control Group Design

Class	Pretest	Treatment	Posttest
E	O_1	X	O_2
K	O_3	-	O_4

(Amaliya & Anas, 2024)

Information:

E : class experiment
K : class control
O_1 : class pretest experiment
O_2 : post-test class experiment
X : treat method experiment
- : treatment method conventional
O_3 : class pretest control
O_4 : post-test class control

Instruments, and Data Collection Techniques

The types of data used in this study are primary data (interviews, observations, and surveys, and test instruments) and secondary data (article).

Data analysis technique

Analysis of the data used in study This is analysis descriptive quantitative. Data in the questionnaire that was initially shaped narrative Then expressed in scale Likert with 4 points assessment, then score from questionnaire the made to in percentage. In general method scale Likert using 5 levels scale, however in study This modified into 4 levels scale Likert, following This is table scale Likert:

Table 2Likert Scale

Information	Score	
	Positive	Negative
Strongly Agree (SS)	4	1
Agree (S)	3	2
Disagree (TS)	2	3
Strongly Disagree (STS)	1	4

(Septiana & Firdonsyah, 2025) modified

As for the criteria in index evaluation as following:

Table 3 Criteria Interpretation Evaluation

Information	Rating Value
Very good	75 - 100
Good	50 - 75
Enough	25 - 50
Very less	0 - 25

(Milala et al., 2021) modified

Table 4 Criteria Practicality

Information	Rating Value
Very Practical	80% < x < 100%
Practical	60% < x < 80%
Enough	40% < x < 60%
Less practical	21% < x < 40%
No Less	0% < x < 20%

(Milala et al., 2021)modified

Then For method calculate data, in study This using Microsoft Excel and IBM SPSS Statistics 26. Microsoft Excel was used for count validity product, practicality products, as well as teacher and student responses. The following is the formula:

$$P = \frac{\sum R}{N} \times 100\%$$

Information:

P : Percentage the score sought.

∑R : Amount the answer given by the validator.

N : Number score maximum or ideal score.

Furthermore, analyzed use Gain for know effectiveness of the assisted CTL learning model liveworksheet between pretest and posttest, the calculation is Gain as following:

$$N - Gain = \frac{skor_{post-test} - skor_{pre-test}}{skor_{maksimum} - skor_{pre-test}}$$

The normalized Ngain score is as follows: This:

Information	N-Gain
Low	G <0.3
Currently	0.3 < G <0.7
Tall	G > 0.7

(Dewi, et al, 2022)

For instrument test besides validation by experts, empirical testing was also carried out on the class One its level, namely to grade V elementary school. With formulas and criteria as following:

$$r_{xy} = \frac{N(\Sigma XY) - (\Sigma X)(\Sigma Y)}{\sqrt{[N\Sigma X^2 - (\Sigma X)^2][N\Sigma Y^2 - (Y)^2]}}$$

Information :

r_{xy}: product moment correlation coefficient

ΣX: the number of scores obtained by students on the question

ΣY: total overall score

N : amount student

X : score student each question

Y : total score of each student

Table 5 Criteria Test Item Validation

Information	Rating Value
Very high	0.81 < x ≤ 1,000
Tall	0.61 < x ≤ 0.80
Enough	0.41 < x ≤ 0.60
Low	0.21 < x ≤ 0.40
Very Low	0.0 < x ≤ 0.20

(Karira et al., 2023)

Then to be continued with calculation reliability with formulas and criteria as following:

$$r_{11} = \left(\frac{n}{n-1}\right)\left(1 - \frac{\Sigma\sigma_{i^2}}{\sigma_{\tau^2}}\right)$$

Information :
r_{11}: reliability
n: number of questions
$\Sigma\sigma_{i^2}$: the sum of the variances of the scores for each item
σ_{τ^2}: total variance

Table 6 Criteria Question Reliability

Information	Rating Value
Very high	0.800 < x ≤ 1.00
Tall	0.600 < x ≤ 0.800
Enough	0.400 < x ≤ 0.600
Low	0.200 < x ≤ 0.400
Very Low	0.0 < x ≤ 0.200

(Karira et al., 2023)

After That to be continued with the level of difficulty, below is formula and criteria:

$$TK = \frac{\Sigma X/_N}{Skor\ Maks}$$

Description :
TK: Difficulty level of the questions
ΣX: total student scores for each question
N : amount student

Table 7 Question Item Difficulty Level Criteria

Information	Rating Value
Difficult	0.00 < x ≤ 0.30
Currently	0.31 < x ≤ 0.70
Easy	0.71 < x ≤ 1.00

(Karira et al., 2023)

Final to be continued with Power differentiator question, the following is formulas and criteria Power differentiator:

$$D = \frac{Ba - Bb}{2Sa \times Mi}$$

Information :
Ba : total correct score group on
Bb : total correct score lower
Sa : amount student group on or lower
Mi : mark maximum

Table 8 Distinguishing Power Criteria

Information	Rating Value
Very ugly	DP ≤ 0.00
Bad	0.00 < DP ≤ 0.20
Enough	0.20 < DP ≤ 0.40
Good	0.40 < DP ≤ 0.70
Very good	0.70 < DP ≤ 1,200

(Karira et al., 2023)

After do series the above calculation, the following This is empirical test results:

Table 9Empirical Test Results

Creative Thinking Indicators	No Question	Validity		Reliability		Level of Scarcity		Power Differentiator	
		Mark	Criteria	Mark	Criteria	Kindergarten	Criteria	DP	Criteria
fluency thinking	1	0.81	Valid	0.70	Tall	0.58	Currently	0.50	Good
	2	0.63	Valid			0.31	Currently	0.42	Good
flexibility thinking	3	0.55	Valid			0.36	Currently	0.33	Enough
	4	0.32	Invalid			0.71	Easy	0.17	Bad
	5	0.73	Valid			0.73	Easy	0.58	Good
original thinking	6	0.66	Valid			0.67	Easy	0.42	Good
	7	0.80	Valid			0.69	Easy	0.42	Good
elaborative thinking	8	0.33	Invalid			0.58	Currently	0.25	Enough
	9	0.53	Valid			0.53	Currently	0.33	Good
	10	-0.09	Invalid			0.62	Currently	0.17	Bad

Then to be continued with calculate IBM SPSS Statistics 26, as follows the table:

Table 10Cronbach's Alpha

Reliability Statistics	
Cronbach's Alpha	N of Items
.696	10

After conducting empirical tests, from 10 questions only 7 were valid with a Cronbach's Alpha of 0.696 with category enough and value reliability of 0.70 which includes very high category. So that instrument worthy used in study This with notes only involving grains valid questions.

RESULTS AND DISCUSSION

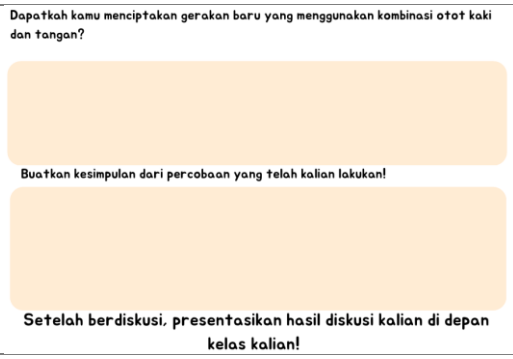
The results of the development in this research at stage 1) research and information, were carried out researchers do data collection through study literature and information through interview to the fourth grade teacher regarding think creative. Based on from study literature and interviews were obtained that think creative student Still in a word low during the learning process only a number of student only active ones in classes and learning still teacher-centered. Too approach prioritize make learning become One direction, thing This No will can hone ability think critical, creative, and ability in solve problem (Simbolon et al., 2025). Based on from results data collection Then a draft was made for the development of a CTL assisted learning model liveworksheet. Before create a researcher, draft gather reference moreover formerly For make product such as CTL learning model steps, creation liveworksheet, and suitable materials. Then, continuing with planning, the researcher created a plan, such as determining the skills required for the research, formulating the research objectives to be achieved, the research design or steps, and the possibility of limited testing. The skills required for this research are creative thinking in fourth-grade elementary school students, as evidenced by the literature review and interviews previously conducted.

Stage 2) Develop a preliminary form of product, the results of data collection on the CTL learning model, which will then be implemented in a liveworksheet. itself has several features, for this research the features used are entering answers, writing text, and entering YouTube links regarding the material to be studied.

Stage 3) Field testing, product validation conducted by expert lecturers and senior teachers. During the validation stage, several revisions were required. The following are the before and after revisions:

Table 11 Revision Product

Before Revision: Questions asked not enough trigger skills think creative	Dari video tersebut, sebutkan kegiatan yang dapat menggunakan gaya otot selain dalam video! (Inquiry) Setelah kamu menuliskan kegiatan tersebut, bagaimana cara kita untuk melakukan kegiatan tersebut? (Brainstorming)
After Revision: Question made can trigger skills think creative student	Dari semua kegiatan yang melibatkan gaya otot kegiatan manakah yang menurutmu menghasilkan gaya dorong otot paling kuat dan gaya tarik otot paling kuat? Catat alasannya! Rancanglah minimal dua gerakan atau aksi unik menggunakan gaya ototmu untuk menggerakkan benda paling jauh atau paling tinggi tanpa bantuan mesin atau listrik!
Before Revision: Activity in test not yet seen clear	Setelah menuliskan kegiatan yang sudah didiskusikan, peragakan kegiatan tersebut dan tuliskan dalam kolom di bawah ini! (Masyarakat Belajar dan Pemodelan) Apa yang terjadi setelah kalian melakukan kegiatan tersebut? Apakah ada perubahan dari sebelum dan sesudah kegiatan tersebut dilakukan?
After Revision: Activity in test made more clear	Lakukan percobaan berikut ini: 1. Lompat dengan menggunakan dua kaki. 2. Dorong meja menggunakan kedua tangan. 3. Amati dan jawablah pertanyaan berikut ini! Ketika kamu melompat, otot di bagian tubuh mana yang bekerja paling keras? Bandingkan dengan otot mana yang paling kamu rasakan bekerja saat kamu mendorong meja! Jelaskan mengapa perbedaan ini terjadi! Aksi manakah ang menghasilkan gaya otot yang lebih cepat habis? Jika kamu disuruh terus melakukan salah satu kegiatan ini selama 1 menit, kegiatan manakah yang akan membuatmu lebih cepat lelah? Mengapa?
Before Revision: n't any conclusion activity in liveworksheet	Dari percobaan yang telah kalian lakukan, apakah ada yang akan kalian perbaiki atau rubah dari percobaan tersebut? Tuliskan alasanmu! (Refleksi) Setelah berdiskusi, presentasikan hasil diskusi kalian di depan kelas kalian! (Penilaian Autentik)

After Revision: Added conclusion in liveworksheet	

After done revision based on input from the validators, then to be continued with validation product back. Next is results from validation and practicality product:

Table 12Validator Results and Practicality Product

Validation	Total Score	Category	Total Score	Category
Media Expert	69	Good	86%	Very Practical
Subject Matter Expert	68	Good	85%	Very Practical
Instrument Expert Test	70	Good	78%	Practical
Design Expert Product	64	Good	85%	Very Practical
Expert Practitioner	71	Good	88%	Very Practical

Result of validation media experts obtained score 69 with category good and 86% with very practical category, validation expert material get score 68 with category good and score 85% with very practical category, validation expert instrument test get score 70 with category good and score 78% with category practical, validation expert design product get score 64 with category good and score 85% with very practical category, and validation expert practitioners get score 71 with category good and 88% with very practical category. From the results of the experts so can concluded that product worthy for used.

Next, in stage 4) field test, it was carried out on 15 students. fourth grade elementary school at Budi Asih State Elementary School. Because of the learning via website link, 5 students requested for bring a cell phone. Live worksheet link Then sent to student through WhatsApp application. At this stage this, students given treat use product. Before learning started student requested for do the pretest moreover formerly for now knowledge beginning student related learning, then to be continued with learning with use product, and at the end with do posttest. From the stage This normality used is Shapiro-Wilk because the sample is less of 50. Following is results from the normality test:

Table 13 Normality Think Creative

Tests of Normality

	Kolmogorov-Smirnov [a]			Shapiro-Wilk		
	Statistics	Df	Sig.	Statistics	df	Sig.
Pretest	.242	15	.019	.857	15	.022
Posttest	.179	15	.200 *	.893	15	.075

The results obtained in the pretest were 0.022 < 0.05, which indicates that the data is not normally distributed. Meanwhile, in *the posttest* get 0.077 > 0.05 which indicates that the data is normally distributed. From the two data can concluded that the data is not normally distributed. Because the data is not normally distributed, continued with non-parametric Wilcoxon. The following is results from non-parametric Wilcoxon:

Table 14Wilcoxon Non- Parametric Test of Creative Thinking

Test Statistics [a]

	Posttest – Pretest
Z	-3.417 [b]
Asymp . Sig. (2-tailed)	.001

The results of the non-parametric Wilcoxon test showed 0.001 < 0.05, so H_0 rejected and H_α is accepted. This is signifying that there is significant difference to think creative students in the pretest and posttest. For now effectiveness from assisted CTL model implementation liveworksheet for increase think creative students, then Ngain test was performed. The following is results from Ngain Test :

Table 15Ngain Test Think Creative

Descriptive Statistics

	N	Minimum	Maximum	Mean	Standard Deviation
Ngain_score	15	.33	.87	.5848	.16957
Gain_percent	15	32.56	86.84	58.4847	16.95747
Valid N (listwise)	15				

From the results above obtained on average from Gain, which is 0.58. For category effectiveness Gain including enough effective and for category Gain score included in progress. Besides thinking creative, science process skills are also measured in study This is the result of science process skills done before and after learning with method do observation. The results from science process skills is as following:

Table 16Normality Test Science Process Skills

Tests of Normality

	Kolmogorov-Smirnov [a]			Shapiro-Wilk		
	Statistics	df	Sig.	Statistics	df	Sig.
pretest	.206	15	.085	.868	15	.032
post-test	.176	15	.200 *	.944	15	.430

The results obtained at the time before learning obtained sig. 0.32 < 0.05 then that indicates that the data is not normally distributed. Then after learning obtained sig.430 > 0.05, then the data is normally distributed. From the two data can concluded that both data No normally distributed. Next non- parametric Wilcoxon test was performed, as follows is the result:

Table 17Wilcoxon Non- Parametric Test for Science Process Skills Test

Test Statistics [a]

	posttest - pretest
Z	-3.425 [b]
Asymp . Sig. (2-tailed)	.001

The results of the non- parametric Wilcoxon test were obtained sig. score 0.001<0.05 then H_0 rejected and H_α is accepted. So that can interpret that there is difference mark between before and after learning. Next to be continued with the Ngain test, as follows is results from Ngain test:

Table 18 Gain Science Process Skills

Descriptive Statistics

	N	Minimum	Maximum	Mean	Standard Deviation
Ngain_score	15	.46	1.00	.6864	.14547
Ngain_persen	15	46.38	100.00	68.6427	14.54700
Valid N (listwise)	15				

Ngain test results above obtained 0.68 with category currently good effectiveness and Ngain score. From the series the results above can it is said implementation of the CTL model with help liveworksheet effective for used in the learning process and products This can increase think creative students. For now response to products developed, students and teachers are given A questionnaire response. For warm response student obtained 75.83% with very good category. And for questionnaire teacher response got 94% with very good category. The results above seen that in the trial field limited get positive response from students and teachers. From the series data processing obtained that in the trial field limited to pretest and posttest experience improvement good think creative and science process skills.

Stage furthermore conducted on 36 students fourth-grade elementary school at SD Negeri 4 Ciharashas with 18 students class control and 18 students class experiment. Class control learning done without existence product, different with class experiments whose learning use product, so that 5 students bring a cell phone. Before learning second class the given a pretest and at the end learning given posttest. Following is results think creative:

Table 19Results of Creative Thinking

Data	**Class Control**		**Class Experiment**		**Category**
	Pretest	**Posttest**	**Pretest**	**Posttest**	
Normality Test	0.001	0.011	0.27	0.59	Abnormal
Mann Whitney	0,000	0,000	0,000	0,000	There is Difference
N-Gain	0.34		0.62		
N-Gain Percent	43%		62%		
Amount Student	18	18	18	18	

Based on the data above pretest obtained in class control obtained sig. 0.001 < 0.05 while class experiment get sig. 0.027 < 0.05. From the results the for pretest of second class the data is not normally distributed. Meanwhile, in the posttest class control get 0.011 < 0.05 and class experiment obtained 0.059 > 0.05. Because of both data the result no normally distributed then to be continued to the non- parametric Mann-Whitney test. The Mann-Whitney results were obtained in the pretest and posttest. from second class the You're welcome get sig. 0.000 < 0.05 then H_0 rejected and H_α is accepted. This is signifying that there is significant difference to think creative students in the pretest and posttest. Same as the trial field limited trials were also conducted Gain score. The result of Gain score in class control obtained Gain score average 0.34 and 43% with category not enough effective as well as Ngain score in category moderate. While in class experiment obtained an average of 0.62 and 62% with effectiveness Enough effective as well as Ngain score in category moderate. Although the Ngain score shows results moderate, but in class experiment far bigger compared to class control. So that there is an improvement in thinking creative in class experiment.

Same as in the trial field limited, besides think creative measured There are also science process skills. As for the results from science process skills as following:

Table 20Science Process Skills Results

Data	Class Control		Class Experiment		Category
	Pretest	Posttest	Pretest	Posttest	
Normality Test	0.017	0.005	0.016	0.224	Abnormal
Mann Whitney	0,000	0,000	0,000	0,000	There is Difference
N-Gain	0.49		0.65		
N-Gain Percent	50%		66%		
Amount Student	18	18	18	18	

Based on the results above obtained in class pretest control obtained Sig. 0.017 < 0.05, and posttest get result 0.005 < 0.05. While in the class the pretest experiment obtained sig.0.016 <0.05 and the posttest get sig. result 0.224 > 0.05. From the results of the normality test then the data is not normally distributed, so that continued with the nonparametric Mann Whitney test. The results of the Mann Whitney test were the same get result 0.000 < 0.05 so there is difference mark from second class then to be continued with Gain score. In class control obtained results of 0.49 and 50% with category currently good Ngain score or effectiveness. Same in class experiment obtained 0.65 and 66% with category currently good Ngain score or effectiveness. Although both of them show Ngain score is moderate, but in class more score experiments big compared to with class control. This is show that There are improvement science process skills in class experiment. Then to be continued with known response from students and teachers from class experiment to products developed. For warm response students on trial field wide obtained 89.67% with very good category. And for questionnaire teacher response got 77% with very good category. Same as the trial field limited, product This get positive response from students and teachers. From the series data processing in trials field area, class experiment experience significant improvement compared to with class control.

The final stage, 5) operational product revision, was conducted after conducting a limited field trial. This revision was made after students identified questions that were unclear. This revision was then carried out to improve the questions. Furthermore, a revision was made during the extensive field trial. Because the liveworksheet was sourced from a website link, if the phone was automatically locked or accidentally exited, the answers already entered would be lost. Therefore, to address this issue, the device was designed to remain on the device without locking or exiting the website.

Based on trial results field limited and trial field wide, can see the results of the Ngain test is in the "medium" category for gain score, and effectiveness with "sufficient" category "effective". Although in the trial field wide second class show improvement in category moderate, but in class experiment show far-reaching results bigger. At the time learning done observations in both trials this, students become seen more active and enthusiastic at the moment learning and not There is students who are passive during the learning process. So, it can conclude that, in class experiment give far- reaching results more optimal than class control. So that implementation of the assisted CTL learning model can increase skills think creative student grade IV elementary school in class experiment. In line with Sinaga et al., (2023) obtained after applying the CTL model there is improvement motivation Study student both in cycle I and cycle II. In addition, in line with (Mudaim et al., 2024) through CTL models and liveworksheets can help improve strategy in learning and effective in increase interest as well as results Study students. In the learning model the tucked away A method, namely brainstorming. With brainstorming itself can help student for put forward the ideas they have have (Modjo, 2024). Then during the learning process student become more active in class, start from do observation, classifying, communicating, predicting, and concluding. So that besides got increase think creative can also increase science process skills students. In line with research conducted by(Zulaikhah & Rasidi, 2022) based on results his research the influence of the CTL model can science process skills student with pretest and posttest results 0.001<0.05.

Research result This show use sheet Work interactive bring influence significant. In the learning process student become more active in class Because customized with CTL learning model syntax. Application of the CTL model in sheet work student become involved active in learning, observing phenomenon in the environment them, plan and execute experiments, as well as analyze and conclude results

so that can push student for increase social skills and skills think about it (Rohman et al., 2023). Then existence activity cognitive with tuck in brainstorming method can stimulate ability think creative and problem-solving something problem. With tuck in brainstorming method can help student for active have an opinion with creative ideas they so that can help they for determine need based on his interests (Oktavia & Anwar, 2024). With use liveworksheet mark transformation digital pedagogical learning in schools basic. The existence of digital transformation can make activity learning So more flexible in implementation (Ainun et al., 2022).

Therefore that use of appropriate learning models and media in the learning process in the classroom is very necessary. With the learning model can become element external that can influence sustainability and success of the learning process (Ima et al., 2023). Apart from that, interactive media also has role important in sustainability and success during the learning process. With learning media interactive used can optimally make things easier student for understand material taught by the (Fitra et al., 2025) teacher.

In research This in line with theory Study Cognitivism and Constructivism. According to Piaget, the average age of elementary school students are 7-12 years old where range in age This a child be at the stage Operational Concrete. In stages they already can use his mind for reasoning in a way logical to something the event that its nature real, but they Not yet capable use his reasoning on something that is abstract (Hamidah et al., 2024). Therefore, that they need experience direct and utilization object real for understand in a way deep, and can support exploration and creativity student optimally through design appropriate learning (Abdillah & Panggayuh, 2025). Learning in study this use object concrete or object real through activity experiments that are in the liveworksheet. In the activity test student will do in a way in groups based on experience and knowledge beginning they. According to Vygotsky learning no can happen in vacum, but learning can happen through interaction between individual with environment social children (Lestari et al., 2024). So that importance involving student for can play a role active during learning (Dewi et al., 2025).

CONCLUSION

The implementation of the Contextual Teaching and Learning (CTL) learning model, assisted by liveworksheets interspersed with brainstorming methods, can improve the creative thinking skills and science process skills of fourth-grade elementary school students. Based on the results of expert validation in the "very good" category, this product is declared feasible. The effectiveness of this product development is seen from the results of limited field trials and extensive field trials. In the limited field trial, the Ngain test score was 58% with the effectiveness category "quite effective" and the Ngain category score "moderate". In the extensive field trial, it was conducted in two classes, namely the control class and the experimental class. In the control class, the Ngain score was 34% with the effectiveness category "less effective" and the Ngain category score "moderate", while the experimental class obtained a Ngain score of 62% with the effectiveness category "quite effective" and the Ngain category score "moderate". Although both classes have a "moderate" category, the experimental class is superior to the control class, which still uses conventional methods. The difference between the two classes is 28.8%. So it can be said that this product can improve the creative thinking skills of fourth-grade elementary school students. In addition, this product also received a positive response from students and teachers.

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