THE EFFECTIVENESS OF *THE CONTEXTUAL TEACHING AND LEARNING* MODEL THROUGH WHATSAPP GROUP IN MATHEMATICS LEARNING

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Abstract: This study aims to determine the effectiveness of the application of *the contextual teaching and learning* model through *whatsaap group* in grade IV mathematics learning by paying attention to the indicators of effectiveness achievement, namely: learning implementation, student learning activities, and student responses. The type in this study is descriptive research. The population of all grade IV students of Madrasah Ibtidaiyah (MI) in Sorong City for the 2021/2022 academic year. The sampling technique uses *cluster random sampling*. Data collection techniques use observation and questionnaires. Observation is used to describe the implementation of learning and learning activities of students, while questionnaires are used to describe student responses. Data analysis is carried out by describing the average achievement of effectiveness indicators consisting of learning implementation, student learning activities, and student responses. The results showed that the indicators of achieving effectiveness, the implementation of learning have been carried out well starting from the beginning, core, and closing activities. Indicators of student learning activities are classified as very active. Student response indicators are very positive. Based on this, the application of *the contextual teaching and learning* model through *whatsaap group* in grade IV mathematics learning is effective to apply.

Key Words: Effectiveness, Contextual Teaching and Learning, Mathematics Learning

THE EFFECTIVENESS OF THE CONTEXTUAL TEACHING AND LEARNING MODEL THROUGH WHATSAPP GROUP IN LEARNING MATHEMATICS

Abstract: *This study aims to determine the effectiveness of the application of the contextual teaching and learning model through whatsaap groups in class IV mathematics learning by taking into account the indicators of achieving effectiveness, namely: learning implementation, student learning activities, and student responses. The type of this research is descriptive research. The population is all fourth grade students of Madrasah Ibtidaiyah (MI) in Sorong City for the 2021/2022 academic year. The sampling technique used cluster random sampling. Data collection techniques using observation and questionnaires. Observations were used to describe the implementation of learning and student learning activities, while questionnaires were used to describe student responses. Data analysis was carried out by describing the average achievement of effectiveness indicators consisting of the implementation of learning, student learning activities, and student responses. The results of the study indicate that the indicators of achievement of effectiveness, implementation of learning have been carried out well starting from the initial, core, and closing activities. Indicators of student learning activities are classified as very active. Indicators of student response are classified as very positive. Based on this, the application of the contextual teaching and learning model through whatsaap groups in fourth grade mathematics learning is effective.*

Keywords: *Effectiveness, Contextual Teaching and Learning, Mathematics Learning*

INTRODUCTION

Education is a conscious and planned effort to create an effective learning atmosphere and learning process (Sudarsana et al., 2018). According to (*Law No 20 of 2003*) Education is a conscious planned effort to create a learning atmosphere and learning process, so that students can actively develop their potential, have religious spiritual strength, grow personality, self-control, intelligence, and noble morals, as well as the abilities needed by themselves, society, and the country.

Education functions to develop the ability and shape the character and civilization of a dignified nation in order to educate the nation's life, aims to develop the potential of students to become human beings who believe and fear God Almighty, have noble character, healthy, knowledgeable, capable, creative, independent and become democratic and responsible citizens. In achieving these educational goals, one way that can be taken is through the implementation of education in schools.

School education in Indonesia is divided into several curriculum structures. The structure of the basic education curriculum contains learning content or subjects designed to develop the competencies of students. The curriculum structure of SD/MI, SDLB, and equivalent consists of several learning contents. One of the learning contents in the curriculum structure of SD/MI, SDLB, and equivalent is Mathematics.

Mathematics is one of the sciences that has been studied starting from elementary school. General objectives of mathematics learning as formulated in (Permendiknas No. 22 of 2006) is to understand mathematical concepts, explain the relationship between concepts and apply concepts or algorithms flexibly, accurately, efficiently and precisely in solving problems; using reasoning on patterns and properties, performing mathematical manipulations in making generalizations, constructing proofs or explaining mathematical ideas and statements; solve problems which include the ability to understand problems, design mathematical models, complete models and interpret solutions obtained; as well as communicating ideas with symbols, tables, diagrams or other means to clarify problems.

In general, many of us consider maths to be the most difficult subject among others. In this case, mathematics is considered a lesson full of formulas and calculations, so learning mathematics becomes one of the most disliked subjects by learners. This is a challenge for an educator in carrying out effective mathematics learning.

According to Khotimah et al (2018) Learning effectiveness is the result obtained by students after carrying out the teaching and learning process to determine teaching effectiveness can be done by giving tests, because test results can be used to evaluate various aspects of the teaching process. According to Wotruba and Wright (Uno & Mohammad, 2015) Learning is said to be effective, namely: good organization of material, effective communication, mastery and enthusiasm for the subject matter, positive attitude towards students, fair grades, flexibility in learning approaches, and good student learning outcomes.

Effectiveness generally indicates how far a predetermined goal is achieved (Takwin, 2019). According to Hurint (2019) effectiveness is degree Achievable success through one shape or certain efforts in accordance with the intended purpose Reached. Nasution (2016) added that effectiveness refers to the implementation of All tasks Main, achievements purpose, accuracy time and active participation of members. From some Previous definition, It can be concluded that effectiveness is the success rate which is based on the implementation of Main tasks and active participation the Members so that the goals are planned can be achieved. The effectiveness of learning measured are: (1) the implementation of learning; (2) student learning activities during active learning; and (3) learners' responses to learning.

1) Learning implementation

Implementation Learning is an effort to learn students (Uno, 2018). According to Fathurrohman (2017) The implementation of learning can simply be interpreted as an effort to influence a person's emotional, intellectual, and spiritual to want to learn by his own will. Through learning there will be a process of developing religious morals, activities, and creativity of students through various interactions and learning experiences.

According to Ghasya et al. (2021) The implementation of mathematics learning at the elementary school level is not only oriented towards mastering mathematical material, but mathematics material is positioned as a tool and means for students to achieve the expected competencies. Mathematics learning basically has abstract characteristics and tiered concepts and principles. So this often makes it difficult for students to learn materials in mathematics subjects, even though one of the indicators of success in learning mathematics is that students are able to master mathematics

material well.

Implementation Learning mathematics in schools must involve students in activities. Teachers must be able to create a fun and conducive learning process, which is able to equip students with various competencies. The main task of a teacher in the implementation of learning is to plan, implement, and evaluate. In the implementation of learning, teachers must be able to understand the basic concepts of the curriculum and the ability to plan which includes preparing syllabi, lesson plans, carrying out learning and being able to carry out learning assessments.

2) Learning activities

According to Nurmala et al. (2014) activity learn is the participation of learners in the learning process which is in the form of attitudes, thoughts, attention and activities to support the success of the learning process. The learning process in question consists of Ask questions, gather feedback, complete tasks, and respond well question from the teacher. Deep Learning activities, learners must play a role active deep learning process. According to Paul B. Diedrich (In Century, 2018) Student activities are classified as follows: (a) *visual activities*, including reading, paying attention to demonstration images, experiments, other people's work; (b) *oral activities*, such as stating, formulating, asking, advising, expressing opinions, conducting interviews, discussions, and instruments; (c) *listening activities*, such as listening to conversations, discussions, speeches; (d) *motor activities*, e.g. conducting experiments, making constructions, repairing models, playing; (e) *mental activities*, e.g. responding, remembering, solving problems, analyzing, looking at relationships, making decisions; and (f) *emotional activities*, such as taking interest, feeling bored, excited, excited, passionate, courageous, calm, nervous.

So, the classification of these activities shows that the learning activities of students are quite complex and varied. Learning activities can be created by making learning fun and displaying various learning models that further stimulate student activity. This makes students more active in learning activities.

3) Student response

According to Takwin (2019) A response is a reaction that a person makes to the stimuli or behaviors that the stimuli present. The response arises through reactions of acceptance or rejection, as well as indifference or care for what is conveyed by the teacher. In this case, the response of students is in the form of readiness in determining attitudes either in positive or negative forms towards learning.

A positive response is a form reaction actions or attitudes that show or demonstrate, accept, acknowledge, agree and implement Rules What Applies in the person's place. While reaction Negative is a form of reaction actions or attitudes that show or show Disapproval or disapproval of Norm-Norm What Applies Where are people it is located. The indicators of student response according to Lestari &; Yudhanegara (2018) is the satisfaction of responding, the willingness to respond, and the willingness to respond.

Inner hero (According to & Comal, 2021) suggests that student response is one of the factors that play an important role in learning success. Therefore, teachers as education practitioners in carrying out learning must be able to provide stimulus in order to trigger a positive response from students.

Based on the understanding of each of these effectiveness indicators, teachers need to apply learning models that can be used in achieving optimal learning effectiveness. One of the learning models that can be applied in mathematics learning in elementary schools is *the contextual teaching and learning* learning model.

According to Kahfi et al. (2021) type *contextual teaching and learning* be One of the learning models by associating material that Taught with real and encouraging situations learners for Create a connection between Knowledge with its application in life. Marhento (2015) added that the CTL learning model is learning that last in close relationship with experience real. Learning just happens When learners processing information or knowledge new in a way that makes them feel reasonable and in accordance with their attitude (memory, experiences, and responses). Furthermore, Sujana and Sopandi (2020) suggests that the contextual teaching and learning model is a learning model that emphasizes the full participation of students in finding the material to be learned. Then with the application of the contextual teaching and learning model can connect it with real-world situations that encourage students to use it in everyday life.

Learners can gather scientific knowledge from a variety of sources, apply this knowledge in everyday life, participate in planning activities, group discussions, problem solving, and decision-making in

everyday contexts. In this regard, according to Piaget's theory of cognitive development in (Champion, 2019), elementary school students aged 6-12 years still have a concrete way of thinking, so they have to use concrete objects when learning. In other words, when carrying out learning in elementary school, students must be invited into real-life situations that are close to their lives and that often occur in life both in the school environment and in the community.

Research on models *contextual teaching and learning* has also been done by previous researchers. Sukmanah (2017) Finding that the Contextual Teaching and Learning model shows an improvement in the learning process in mathematics learning, this is shown when learners can happily follow the learning process in their groups, and the acquisition of good results in broad material or circumference in mathematics learning in the classroom.

However, the Covid-19 (coronavirus disease) pandemic that has hit all countries in the world, including Indonesia, has become a big challenge for educators, especially in learning. Where learning is recommended remotely or online by utilizing available technology and networks. One of the learning media that can be used during the COVID-19 pandemic is whatsapp group. The use of whatsapp groups as an alternative to learning during a pandemic is a solution at the elementary school level. According to Daheri et al. (2020) Online learning media used at the basic education level is 100% using WhatsApp Group media.

Research related to whatsapp as an online learning medium has also been carried out by previous researchers such as research conducted by Daheri et al. (2020), found that online learning via WhatsApp at the elementary school level tends to be ineffective. This is due to several factors, including the lack of a comprehensive and simple explanation from teachers, low affective and psychomotor aspects of learning, internet signals, busy parents, parental background, and parental economics. Learning through whatsapp still needs to evaluate the role of teachers and parents.

Based on observations at MI Al-Maarif Sorong City, mathematics learning during the pandemic was carried out online using Whatsapp Group, of course, due to various considerations considering that online learning requires sufficient internet quota and signal to access the application. Learning mathematics through Whatsapp Group is an unusual learning system, because educators and students do not interact directly. Learning so far is still dominated by educators, students are less involved so that it seems monotonous and saturation arises in students. This educator-centered learning in addition to seeming monotonous and causing boredom also results in low mathematics learning outcomes of students, which can be seen from the average score of the midterm assessment (PTS) results of grade IV for the 2020/2021 school year is 52.14.

Based on this description, the author is interested in conducting research on the effectiveness of applying the *contextual teaching and learning* (CTL) model through *whatsapp groups* in mathematics learning. The formulation of the problem in this study is: how effective is the application of *the contextual teaching and learning* model through *whatsaap group* in mathematics learning at MI Al-Maarif Sorong City?. The following objectives in this study are to determine the effectiveness of the application of *the contextual teaching and learning* model through *whatsaap group* in mathematics learning at MI Al-Maarif Sorong City by paying attention to indicators of effectiveness achievement, namely: learning implementation, student learning activities, and student responses.

RESEARCH METHODS

This research will be carried out at MI Al-Ma'arif Sorong City which is located at Jl. Basuki Rahmat KM 9.5 Kladufu Village, East Sorong District, Sorong City, West Papua Province. The type of research used is descriptive research. The independent variable in this study is the *contextual teaching and learning model* through *whatsapp group* which is a research *treatment*, while the dependent variable in this study is effectiveness consisting of: learning implementation, student learning activities, and student responses.

The population in this study is all grade IV students of Madrasah Ibtidaiyah (MI) in Sorong City for the 2021/2022 academic year with a total of 374 students. The sampling technique used is *cluster random sampling*. The sample in this study was class IV A students of MI Al-Ma'arif Sorong City which amounted to 30 students. Data collection techniques in this study used observation techniques and questionnaires (questionnaires). Observational data collection techniques are used to decrypt effectiveness indicators in the form of learning implementation and student learning activities, while questionnaire data collection techniques are used to describe effectiveness indicators in the form of student responses. The data analysis technique used is a descriptive analysis technique.

RESULTS AND DISCUSSION

Result

1. Learning implementation

The learning material used in this study is broad and flat roving. Learning lasts for six meetings. The learning implementation schedule can be seen in table 1.

Table 1. Learning Implementation Schedule

Day	Date	Hit	Activities
Tuesday	January 18, 2022	08.00 WIT	Meeting 1
Wednesday	January 19, 2022	08.00 WIT	Meeting 2
Thursday	January 20, 2022	08.00 WIT	Meeting 3
Friday	January 21, 2022	08.00 WIT	Meeting 4
Saturday	January 22, 2022	08.00 WIT	Meeting 5
Monday	January 24, 2022	08.00 WIT	Meeting 6

The implementation of learning using the *contextual teaching and learning* model can be known by observing the implementation of learning. During the learning process, researchers are accompanied by an observer as homeroom teacher IV who provides an assessment on the observation sheet of learning implementation. The following in determining the achievement of student learning activities in this study uses the criteria in table 2.

Table 2. Learning Implementation Criteria

Interval	Category
0% - 55%	Very Lacking
56% - 65%	Less
66% - 75%	Enough
76% - 85%	Good
86% - 100%	Excellent

Source: Hakimah et al., (2020)

The results of observations on the implementation of learning for grade IV students of MI Al-Ma'arif Sorong City can be seen in table 3.

Table 3. Learning Implementation

Component	Score
Number of Scores	20
Score Maximum	21
Attainment	95,23 %

Source: Observation Sheet Data Collection (2022)

Based on the calculation of the learning implementation score of 20 with a percentage of 95.23% which is classified as very good. The implementation of the learning consisting of introduction, core activities, and closing has been carried out very well.

2. Student learning activities

Data on student learning activities are obtained through observation sheets. The following in determining the achievement of student learning activities in this study using the criteria in table 4.

Table 4. Student Activity Criteria

Interval	Category
81 % – 100 %	Very Active
61 % – 80 %	Active
41 % – 60 %	Simply Active
21 % – 40 %	Less Active
0 % – 20 %	Inactive

Sumber: Nuraini et al. (2018)

The learning activities of grade IV students of MI Al-Ma'arif Sorong City can be seen in table 5.

Table 5. Student Learning Activities

Indicator	Percentage
The presence of learners in the learning process.	81,67 %
Student activities listen to the delivery of motivation, goals, material and perceptions by the teacher.	80 %
Student activities work together with their group mates in making observations and making reports.	90,83 %
The activities of students who appear present the results of their group work and conclude observations.	82,78 %
The activity of students in asking questions and responding related to the material being studied.	78,33 %
Student activities make individual reports sent via whatsapp group.	88,33 %
Average Student Learning Activities	**83,66 %**

Source: Data processing with SPSS version 23 (2022)

Based on the table above, it is known that the presence of students in the learning process is 81.67%, student activities listen to the delivery of motivation, goals, material and perceptions by the teacher by 80%, student activities work together with their group friends in making observations and making reports by 90.83%, student activities that appear to present the results of their group work and conclude observations by 82.78%, Student activity in asking questions and responding related to the material being learned by 78.33%, and student activity in making individual reports sent via

WhatsApp group by 88.38%. Student learning activities in the *contextual teaching and learning* (CTL) model amounted to 83.66% were classified as very active.

3. Student response

Student response data is obtained through questionnaires. The following in determining the achievement of student responses in this study uses the criteria in table 6.

Table 6. Student Response Criteria

Interval	Category
85% - 100%	Very Positive
70% - 84%	Positive
50% - 69%	Less Positive
0% - 49%	Not Positive

Sumber: Dampolli et al. (2019)

The response of grade IV students of MI Al-MA'arif Sorong City to learning by applying *the contextual teaching and learning* (CTL) learning model can be seen in table 7.

Table 7. Student Response

Indicator	Percentage	Criterion
Satisfaction	91,66 %	Very Positive
Desire	93,35 %	Very Positive
Willingness	98,32 %	Very Positive
Average	**94,44 %**	**Very Positive**

Source: Data processing with SPSS version 23 (2022)

Based on the table above, it is known that the positive response of students on the satisfaction indicator was 91.66%, the willingness indicator was 93.35%, and the willingness indicator was 98.32%. The response of students to the *contextual teaching and learning* (CTL) model of 94.44% was very positive.

Discussion

The application of *the contextual teaching and learning* (CTL) model through *whatsapp groups* in mathematics learning is carried out to see the effectiveness consisting of the implementation of learning, learning activities, and student responses. The discussion on the effectiveness of applying the contextual teaching and learning *(CTL)* model through *whatsapp groups* in mathematics learning is presented in each discussion of effectiveness as follows:

1. Learning implementation

Implementation of learning by applying models *contextual teaching and learning* (CTL) via *whatsapp group* has been carried out well starting from the beginning, core, and closing activities, this is based on the percentage of learning implementation of 95,23%. The results in this study are in line with the results of research conducted by Yuliana et al. (2019), that the implementation of learning by applying the model *contextual teaching and learning* (CTL) has been well done. According to Suardi (2018), learning is carried out to help students to learn well. Therefore, teachers In carrying out learning must be appropriate to plan, implement, and evaluate so that students can learn well.

Implementation Learning is an effort to learn students (Uno, 2018). According to Fathurrohman (2017) The implementation of learning can simply be interpreted as an effort to influence a person's emotional, intellectual, and spiritual to want to learn by his own will. Through learning there will be a process of developing religious morals, activities, and creativity of students through various interactions and learning experiences.

According to Ghasya et al. (2021) The implementation of mathematics learning at the elementary school level is not only oriented towards mastering mathematical material, but mathematics material is positioned as a tool and means for students to achieve the expected competencies. Mathematics learning basically has abstract characteristics and tiered concepts and principles. So this often makes it difficult for students to learn materials in mathematics subjects, even though one of the indicators of success in learning mathematics is that students are able to master mathematics material well.

Implementation Learning mathematics in schools must involve students in activities. Teachers must be able to create a fun and conducive learning process, which is able to equip students with various competencies. The main task of a teacher in the implementation of learning is to plan, implement, and evaluate. In the implementation of learning, teachers must be able to understand the basic concepts of the curriculum and the ability to plan which includes preparing syllabi, lesson plans, carrying out learning and being able to carry out learning assessments.

Teachers in carrying out learning according to Suyono and Hariyanto (Setiawan, 2017), should create a pleasant learning situation for learners to be interested in learning and teachers should facilitate a conducive learning environment. The implementation of learning can affect behavior change in students, according to (Lifeudin, 2017), behavior change with the implementation of

learning includes changes in cognitive, affective, conative, and psychomotor aspects. So, with the implementation of learning well can have a positive impact on students.

2. Student learning activities

Student learning activities by applying models *contextual teaching and learning* (CTL) via *whatsapp group* Tegolong is very active. The results in this study are in line with research conducted by (Nurdalilah, 2020), that student learning activities are classified as very active by applying the model *contextual teaching and learning* (CTL) in learning activities. According to (Aziza, 2017) Learning activities without good student activities, learning activities will not run optimally.

According to Nurmala et al. (2014) activity learn is the participation of learners in the learning process which is in the form of attitudes, thoughts, attention and activities to support the success of the learning process. The learning process in question consists of Ask questions, gather feedback, complete tasks, and respond well question from the teacher. Deep Learning activities, learners must play a role active deep learning process. According to Paul B. Diedrich (In Century, 2018) Student activities are classified as follows: (1) *visual activities*, including reading, paying attention to demonstration images, experiments, other people's work; (2) *oral activities*, such as stating, formulating, asking, advising, expressing opinions, conducting interviews, discussions, and instruments; (3) *listening activities*, such as listening to conversations, discussions, speeches; (4) *motor activities*, e.g. conducting experiments, making constructions, repairing models, playing; (5) *mental activities*, e.g. responding, remembering, solving problems, analyzing, looking at relationships, making decisions; and (6) *motional activities*, such as taking interest, feeling bored, excited, excited, passionate, courageous, calm, nervous.

So, the classification of these activities shows that the learning activities of students are quite complex and varied. Learning activities can be created by making learning fun and displaying various learning models that further stimulate student activity. This makes students more active in learning activities.

According to Gage and Berlie in (Masni, 2017), the learner has a high learning activity if he is intrinsically motivated. Therefore, teachers must be able to make learning activities as interesting as possible, so that students can be motivated to learn so that they can make student learning activities very active. Based on the results in this study, learning by applying a model *contextual teaching and learning* (CTL) makes students' learning activities very active, therefore the model *contextual teaching and learning* (CTL) is one of the learning models that teachers can use in making students active in learning activities.

3. Student response

Learner response to the model *contextual teaching and learning* (CTL) via *whatsapp group* Tegolong is very positive. The results in this study are in line with research conducted by (Malmia et al., 2020), that the response of students is classified as very positive by applying the model *contextual teaching and learning* (CTL) in learning activities. According to Takwin (2019) A response is a reaction that a person makes to the stimuli or behaviors that the stimuli present. The response arises through reactions of acceptance or rejection, as well as indifference or care for what is conveyed by the teacher. In this case, the response of students is in the form of readiness in determining attitudes either in positive or negative forms towards learning.

A positive response is a form reaction actions or attitudes that show or demonstrate, accept, acknowledge, agree and implement Rules What Applies in the person's place. While reaction Negative is a form of reaction actions or attitudes that show or show Disapproval or disapproval of Norm-Norm What Applies Where are people it is located. The indicators of student response according to Lestari &; Yudhanegara (2018) is the satisfaction of responding, the willingness to respond, and the willingness to respond.

Inner hero (According to & Comal, 2021) suggests that student response is one of the factors that play an important role in learning success. Therefore, teachers as education practitioners in carrying out learning must be able to provide stimulus in order to trigger a positive response from students. Based on the results in this study, learning by applying a model *contextual teaching and learning* (CTL) makes learner responses positive, therefore models *contextual teaching and learning* (CTL) is one of the learning models that can make students respond positively in order to achieve learning success.

Based on the discussion in this study, the application of *the contextual teaching and learning* (CTL) model through *whatsapp groups* in mathematics learning, can be said to be effective for

use in learning activities, especially in mathematics learning. The effectiveness of the application of *the contextual teaching and learning* (CTL) model through *whatsapp groups* in mathematics learning in this study consists of the implementation of learning, learning activities, and student responses.

COVER

Conclusion

Based on the results of research obtained in data analysis and discussion, the conclusion in this study is: the application of *the contextual teaching and learning* (CTL) model through *the whatsaap group*, effective to be applied in mathematics learning. This is based on the achievement of effectiveness indicators which include the following:

1. The implementation of learning by applying the *contextual teaching and learning* (CTL) model through *whatsaap group* has been carried out well starting from the beginning, core, and closing activities.
2. Student learning activities by applying *the contextual teaching and learning* (CTL) model through *whatsaap group* are very active.
3. The response of students to the *contextual teaching and learning* (CTL) model through *whatsaap group* tegolong was very positive.

Suggestion

Some suggestions that can be given from the results of this study are as follows:

1. For teachers, learning activities by applying *the contextual teaching and learning* (CTL) model through *whatsaap group* can be a reference for teachers in teaching. The application of *the contextual teaching and learning* (CTL) model through *whatsaap group* is effective in the scope of good learning implementation, active learning activities, and positive student response, so that the application of *the contextual teaching and learning* (CTL) model through *whatsaap group* is good to use.
2. For future researchers, it is expected to carry out research with other materials and in a much wider scope. In addition, it is expected that in future research to carry out research by adding several other online learning media.

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