# SEKOLAH TINGGI KEGURUAN DAN ILMU PENDIDIKAN
# STKIP PGRI JOMBANG
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| | | | |
|---|---|---|---|
| PROGRAM STUDI : | PENDIDIKAN EKONOMI | PROGRAM STUDI : | PENDIDIKAN BAHASA DAN SASTRA INDONESIA |
| TERAKREDITASI : | SK BAN-PT No. 192/BAN-PT/Ak-XVI/S1/IX/2013 | TERAKREDITASI : | SK BAN-PT No. 1694/SK/BAN-PT/Akred/S/VIII/2016 |
| PROGRAM STUDI : | PENDIDIKAN PANCASILA DAN KEWARGANEGARAAN | PROGRAM STUDI : | PENDIDIKAN BAHASA INGGRIS |
| TERAKREDITASI : | SK BAN-PT. No. 1133/SK/BAN-PT/Akred/S/X/2015 | TERAKREDITASI : | SK BAN-PT. No. 1162/SK/BAN-PT/Akred/S/XII/2015 |
| PROGRAM STUDI : | PENDIDIKAN MATEMATIKA | PROGRAM STUDI : | PENDIDIKAN JASMANI DAN KESEHATAN |
| TERAKREDITASI : | SK BAN-PT. No. 0259/SK/BAN-PT/Akred/S/IV/2016 | TERAKREDITASI : | SK BAN-PT. No. 1189/SK/BAN-PT/Akred/S/VII/2016 |

## SURAT KETERANGAN

Nomor: 739T/ 7.088/ KL/ 2018

Saya yang bertanda tangan di bawah ini

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NIK                 : 0104770032

Jabatan          : Kepala Bagian IT STKIP PGRI Jombang

Menerangkan bahwa artikel ilmiah dengan judul

**Pupils ' error on the concept of reversibility in solving arithmetic problems**

Karya :

**(1) Syarifatul Maf'ulah**
(2) Dwi Juniati
(3) Tatag Yuli Eko Siswono

Bebas plagiasi sesuai dengan hasil pemeriksaan tingkat keunikan sebesar **88%** yang dapat dilihat pada URL: https://goo.gl/M8riAV .

Demikian keterangan ini kami buat untuk dapat dipergunakan sebagaimana mestinya.

Jombang, 2 Agustus 2018

Mengetahui                                                Menyetujui

Ketua STKIP PGRI Jombang                          Kepala Bagian IT

Dr. Munawaroh, M.Kes.                              Dr. Masruchan, M.Pd.

NIP. 196411251991032001                           NIK. 0104770032

| | | |
|---|---|---|
| <mark>Unique</mark> | Thus, this research is inspired by the theory of Piaget about reversibility | - |
| <mark>Unique</mark> | Lamon requested researchers, especially in education field, to focus and investigate on students" reversibility | - |
| 1 results | He has marbles less than Connie"s | files.eric.ed.gov |
| 172 results | How many marbles does Connie have | math.madison.k12.wi.us elemath.hallco.org math.niu.edu mydigitalchalkboard.org ec.ncpublicschools.gov montgomeryschoolsmd.org cosa.k12.or.us cram.com nctm.org nap.edu |
| <mark>Unique</mark> | Due to Jim has marbles, so the total of Connie"s are marbles | - |
| 1 results | Or pupils can think that Jim has marbles" | files.eric.ed.gov |
| <mark>Unique</mark> | Therefore, in arithmetic equation, it can be said or | - |
| <mark>Unique</mark> | So, the number of Connie"s marbles are | - |
| 1 results | This judgment implicates that one of the topic related to pupils" reversibility is arithmetic | files.eric.ed.gov |
| 1 results | Moreover, reversibility is related to arithmetic | files.eric.ed.gov |
| <mark>Unique</mark> | For instance, two glasses containing milk with comparable volume | - |
| 1 results | This is because the children"s mentality is "centrally" and irreversible | files.eric.ed.gov |
| <mark>Unique</mark> | In this case, starting point means two glasses that contained milk with comparable volume | - |
| <mark>Unique</mark> | Such ideas described the notion of reversibility | - |
| <mark>Unique</mark> | This means that addition negation is subtraction and multiplication is dividing | - |
| <mark>Unique</mark> | While the reciprocity concepts are related to the equivalent relation | - |
| 1 results | She provides the equation to illustrate her interpretation of negation and compensation | files.eric.ed.gov |
| <mark>Unique</mark> | ", „Fifteen divided by what equals five | - |
| <mark>Unique</mark> | ", and „Seven minus what equals three | - |
| <mark>Unique</mark> | This view implied that reversibility had two process within: | - |
| <mark>Unique</mark> | = 10, the pupil complete the task with correct algoritm, | - |
| <mark>Unique</mark> | In this case, the previous data is its problem (that is | - |
| <mark>Unique</mark> | So it is right that the problem-solving is 17 | - |

[One of material which could be used for practicing the reversibility is arithmetic](researchgate.net)     researchgate.net

Unique — [In this study, the researcher has focused on the arithmetic material](#) —

Unique — [The data was descriptive due to its qualitative nature, in the form of essay](#) —

Unique — [In this case, the data was derived from the result of subjects" works](#) —

Unique — [Elementary students were selected with consideration that reversibility began to Maf"ulah et al](#) —

Unique — [evolve in the age-range between 7 to 11 years old, indicating elementary graders](#) —

Unique — [There are 9 items of arithmetic task as shown in Figure](#) —

Unique — [Then the pupils completed arithmetic task individually](#) —

Unique — [Then, they were classified into groups based on their errors](#) —

Unique — [The researchers selected one subject with errors in each group](#) —

Unique — [Analysis was conducted within some procedures which are:](#) —

Unique — [RESULTS The item number 1 is not relating item to the reversibility concept](#) —

Unique — [The item 1 is only to check the subject"s understanding concerning to sum operation](#) —

Unique — [Thus, for number 1 is not paid more attention in error analyzing](#) —

Unique — [Based on pupils" answers, the data was gotten as sshown in Table](#) —

Unique — [For number 4, all pupils answered by changing " " to "](#) —

Unique — [Due to the problem number 7, all pupils 1780 Educ](#) —

Unique — [Data which present the number of pupils who completed wrong operation error](#) —

Unique — [In solving the problem, pupils change the operation given on the task](#) —

Unique — [Figure 2 presents one of the examples of pupil"s error](#) —

Unique — [Thus, the answer which was gotten was wrong](#) —

Unique — [Figure 3 shows the different types of error](#) —

Unique — [The answer presented in Figure 3 should be 39](#) —

Unique — [However, subject LA answered 239 because he committed an error in accounting](#) —

| | | | |
|---|---|---|---|
| Unique | The example of pupil‟s error due to the type of wrong operation | - | |
| Unique | Data which present the number of pupils who completed obvious computation error | - | |
| Unique | The example of pupils‟ error in obvious computation error type | - | |
| Unique | For solving the problem number 2, there are 2.88% pupils who used method | - | |
| Unique | For solving the problem number 3, there are 14.4% pupils who used method | - | |
| Unique | For solving the problem number 5, there are 11.52% pupils who used method | - | |
| Unique | For solving the problem number 6, there are 10.52% pupils who used method | - | |
| Unique | For solving the problem number 8, there are 8.64% pupils who used method | - | |
| Unique | For solving the problem number 9, there are 11.52% pupils who used method | - | |
| Unique | Figure 4 shows an example of this type of error | - | |
| Unique | Figure 5 shows the example of this type of error | - | |
| Unique | The answer of the problem on Figure 5 should be 287 | - | |
| Unique | However, the initial subject ALA answered 136 | - | |
| Unique | Moreover, the solving process was unclear | - | |
| Unique | Thus, the error which was completed by ALA was not detected clearly | - | |
| Unique | So, the solving problem of Figure 5 was categorized into random response | - | |
| Unique | The error due to this type of random response Maf‟ulah et al | - | |
| Unique | The example of pupils‟ error due to the type of random response | - | |
| Unique | If related to the meaning of the equal sign "=" for pupils, Mc | - | |
| Unique | Arithmetic are basic materials for studying algebra and the other materials | - | |
| 2 results | CONCLUSION The research conclusions are: | cyberleninka.ru pt.scribd.com | |
| 4,100 results | Conflict of interests The authors have not declared any conflict of interests | coursehero.com awarenessisfreedom.com sciencedirect.com journals.sagepub.com journals.sagepub.com article.sciencepublishinggroup.com researchgate.net file.scirp.org pdfs.semanticscholar.org scribd.com | |

| | | | |
|---|---|---|---|
| <mark>Unique</mark> | Research on whole number addition and subtraction | | - |
| 136,000 results | ), Handbook of research on mathematics teaching and learning | amazon.com amazon.com worldcat.org books.google.com researchgate.net mathed.net researchgate.net project2061.org newbooksinpolitics.com infoagepub.com | |
| <mark>Unique</mark> | Algebra: It"s Elementary: Boston University | | - |
| <mark>Unique</mark> | Retrieved on August 7 th , 2016 at www | | - |
| <mark>Unique</mark> | enc.org/focus/k5algebra Haciomeroglu ES, Aspinwall L, Presmeg N (2009) | | - |
| <mark>Unique</mark> | The Role of Reversibility in The Learning of The Calculus Derivative and Antiderivative Graphs | | - |
| <mark>Unique</mark> | 5:81-88 Inhelder B, Piaget J (1958) | | - |
| 35,000 results | The Growth of Logical Thinking from Childhood to Adolescence | books.google.com amazon.com goodreads.com questia.com barnesandnoble.com archive.org worldcat.org trove.nla.gov.au onlinelibrary.wiley.com | |
| <mark>Unique</mark> | New York: Basic Books Kang Mee-Kwang, Lee, Byung-Soo (1999) | | - |
| <mark>Unique</mark> | On Fuzzied Representation of Piagetian Reversible Thinking | | - |
| <mark>Unique</mark> | 3(2):99-112 Krutetskii VA (1976) | | - |
| 3 results | The Psychology of Mathematical Abilities in Schoolchildren | amazon.com hindawi.com educationengland.org.uk | |
| 23 results | Chicago: The University of Chicago Press | amazon.com amazon.com searo.who.int iep.utm.edu en.wikipedia.org faculty.rsu.edu asmallgroup.net froebelweb.org en.wikipedia.org getty.edu | |
| <mark>Unique</mark> | Rational numbers and proportional reasoning: Towards a theoretical framework for research | | - |
| 26 results | Charlotte, NC: Information Age Publishing | amazon.com infoagepub.com ted.com educationalstudies.org arnoldbakker.com jamespaulgee.com karlkapp.com apicollege.edu.au westwinded.com en.wikipedia.org | |
| <mark>Unique</mark> | Maf"ulah S, Juniati D, Siswono TYE (2015) | | - |
| <mark>Unique</mark> | Middle-Scool Pupils" Understanding of The Equal Sign: The Books They Read Can"t Help | | - |

| | | |
|---|---|---|
| 21 results | [Lawrence Erlbaum Associates, Inc](#) | cognitivesciencesociety.org playwithlearning.com en.wikipedia.org tau.ac.il readingrockets.org onlinepresent.org ldonline.org sslw.asu.edu en.wikipedia.org iteslj.org |
| Unique | [Reversibility of thought: An instance in multiplicative tasks](#) | - |
| 31,000 results | ["The failure strategies of third grade arithmetic pupils](#) | link.springer.com jstor.org scribd.com onlinelibrary.wiley.com journals.sagepub.com journals.sagepub.com files.eric.ed.gov onlinelibrary.wiley.com files.eric.ed.gov iosrjournals.org |
| Unique | [" Arithmetic Teacher 16:442-446 Slavin Robert E (2006)](#) | - |
| 8 results | [Educational Psychology: Theory and Practice](#) | amazon.com amazon.com wps.ablongman.com de.wikipedia.org testbanksm01.com |
| Unique | [Boston: Allyn &Bacon Wong B (1977)](#) | - |
| Unique | [The relationship between piaget's concept of reversibility and arithmetic performance among second graders](#) | - |
| Unique | [1775-1784, 23 September, 2016 DOI: 10.5897/ERR2016.2895 Article Number: 389262760889 ISSN 1990-3839 Copyright © 2016](#) | - |
| 1 results | [reversibility in solving arithmetic problems Syarifatul Maf'ulah 1 , Dwi Juniati 2 and Tatag Yuli](#) | files.eric.ed.gov |
| 1 results | [Accepted 16 September, 2016 The fact that there is no much study on reversibility](#) | files.eric.ed.gov |
| 4 results | [The objective of this research is to identify errors done by the pupils in](#) | files.eric.ed.gov eric.ed.gov researchgate.net researchgate.net |
| Unique | [The result of this study can inspire teachers to consider the problem-solving in minimizing](#) | - |
| Unique | [The result of this study can be used as a reference in designing further](#) | - |
| Unique | [The subjects of this research are fifth grade pupils of three Elementary Schools in](#) | - |
| 4 results | [The pupils' worksheet was analyzed by calculating a number of pupils who did error](#) | files.eric.ed.gov eric.ed.gov researchgate.net researchgate.net |
| Unique | [Then, it was classified to groups which were based on the error types done](#) | - |
| Unique | [Furthermore, the researcher described error types done by the pupils related to Roberts, namely](#) | - |
| Unique | [This case proved that there are some elementary school pupils who are still having](#) | - |
| Unique | [INTRODUCTION Piaget's theory (Inhelder and Piaget, 1958) explained the levels of individual's cognition growth](#) | - |

| | | |
|---|---|---|
| | At sensory-motoric stage, infants learn about their surroundings by using their sensoric and motoric | - |
| | Authors agree that this article remain permanently open access under the terms of the | - |
| 1 results | At this phase, they had no figure on the nature of conservation for they | files.eric.ed.gov |
| | Hence, their ideas were intuitive and not irreversible, they could not turn the ways | - |
| | Reversibility is individual"s mental ability to turn the way of thinking back into the | - |
| | In accordance to Piaget"s theory on cognition growth as earlier discussed, it was suggested | - |
| | If reversibility was involved as the feature of an individual"s cognition growth, it would | - |
| 1 results | The researcher were also motivated by Lamon (2007), that there are few research about | files.eric.ed.gov |
| | Reversibility is defined as someone"s capability to control their mentality in order to be | - |
| | For instance, the problem of conservation according to Piaget (Inhelder and Piaget, 1958), is | - |
| | shorter and wider), then a question was asked, "Which is more, the milk in the | - |
| | When the children"s reversibility has been properly developed, they will respond by saying that | - |
| | Due to the way children think that milk in the bowl poured into | - |
| | It means that children"s capability to control their mentality in order to be able | - |
| | Krutetskii (1976) defines mathematical ability related to pupils" success in solving problems are reversibility | - |
| | Inhelder and Piaget (1958) said that reversibility can be considered a key requirement in | - |
| | While Haciomeroglu and Presmeg (2009) stated that pupils" reversibility is really important in understanding | - |
| | able to solve a number of case related to mathematical problems, one of them is | - |
| | According to Carpenter and Moser (2008), one of the example about arithmetic problems related | - |
| | If the pupils finish that exercise through involving reversibility, they should think "if Jim | - |
| | Or pupils can think that "Jim has marbles less than Connie" so the difference | - |
| 1 results | According to Fuson (1992), reversibility is needed to deal with addition and subtraction problems | files.eric.ed.gov |
| 1 results | According to Wong (1977), reversibility is important for the addition concept as "If | files.eric.ed.gov |

| | | |
|---|---|---|
| 28 results | ” If he is able to answer it, then his reversibility has been developed, because | martinfowler.com psychology4a.com telacommunications.com en.wikipedia.org en.wikipedia.org chem1.com hhs.gov coresubjectsec-6.com informationphilosopher.com iep.utm.edu |
| Unique | The explanation earlier mentioned shows that pupils" reversibility is important and needs to be | - |
| Unique | As the first step in identifying pupils" reversibility, the researcher wants to reveal first | - |
| Unique | the researcher can identify errors done by the pupils in solving arithmetic items related to | - |
| Unique | up to 7 to 11 years old (Piaget and Inhelder, 1958), this means that the | - |
| Unique | Otherwise, arithmetic for the first time was given to the pupils at the Elementary | - |
| Unique | Therefore, the objective of this research is to identify errors done by the pupils | - |
| Unique | by them, the researcher"s expectation is the teachers are able to think the problem-solving in | - |
| Unique | Furthermore, the research result can be as orientation to compose the next learning and | - |
| Unique | of children"s characteristic at the concrete operational level starts at the phase when reversibility is | - |
| Unique | Furthermore, Inhelder and Piaget (1958) said that "reversibility is defined as the permanent possibility | - |
| Unique | shorter and wider), then a question was raised "Which is more, the milk in the | - |
| Unique | Children at the pre-operational will answer that the milk in the glass is comparable | - |
| Unique | Children only focused on one aspect, that is the milk volume, and ignoring the | - |
| Unique | While children at the concrete operational level will answer that „milk in the glass" | - |
| Unique | is poured into the glass, the volume will be as same as that in the | - |
| Unique | It means at that at this level, children"s ability to control their mentality return | - |
| Unique | While, change their mindset to the starting point is when children pour the milk | - |
| Unique | So the milk volume will be as same as the condition before it is | - |
| 1 results | According to Kang and Lee (1999), "reversibility enables the recognition of problems in various | files.eric.ed.gov |
| Unique | For instance, the pupils of Elementary School were given an arithmetic problem, that is | - |
| 1 results | So, through the reversibility, the pupils are able to investigate through some ways, that | files.eric.ed.gov |

Children were considered in conducting a wrong operation when they completed an arithmetical task

the addition operation into the subtraction, which changed the task into , with 13 as

error, the pupil uses the correct algorithm but due to carelessness in recalling number facts,

The result was supposed to be 7, however, the pupil miscalculated the equation into

This errors was classified as obvious computation error Defective algorithm The pupil uses the

Given a task: , the pupil completed the task by subtracting 4 with 3,

This was absolutely false due to the wrong algoritm Random response These are errors

Students" errors were not clearly detected "if 29 plus a particular number was 46,

This was due to the fact that the result of 29 plus the particular

Thus, to fill the blank they need to apply this " ", and the

After getting the result, the next mentality activity done by them is to return

which is related to the reversibility concept The reversibility of pupils could be practiced through

Ramful (2008) stated that, in mathematics, the reversibility is related to the operation of

According to Wong (1977), the educators' assumes that reversible thought is related to children's

Secondly, according to Maf'ulah (2015), he stated that reversibility is having strengthened the relation

The researcher would like to identify the errors which have been done by the

Through this study, hopefully this could be used as previous study of the other

related to the reversibility concept which is describe is based on the classifications of the

RESEARCH METHOD Research design The research design of the study is qualitative design with

This study met the characteristics of qualitatif research, as Bpgdan and Biklen (1998) stated

It was naturalistic because the data sources was real with researchers as the primary

It was inductive, which had no intention to test a hypothesis, but merely describing

Research subject This study involved 96 pupils of the fifth graders in jombang with

Besides, the fifith graders were chosen due to the fact that they had already

| | | |
|---|---|---|
| Unique | However, the researchers took one sample in each category of errors for data analysis | - |
| Unique | Research instrument The objective of the study is to identify the errors of arithmetic | - |
| Unique | For reaching up the objective of the study, the researcher made arithmetic task which | - |
| Unique | Data collected procedure The researcher gave instrument of arithmetic task which is related to | - |
| Unique | Data analysis Students" works were analysed by counting the students with errors for each | - |
| Unique | The researchers dercribed the kinds of students" errors for each group based on Roberts" | - |
| Unique | Data reduction that aims at assert, select, focus, abstract, and transform all raw data | - |
| Unique | Data presentation that included classifying and identifying data, which transcripted the organized and categorized | - |
| Unique | As what Wong (1977) stated that, "the form of " was not included in | - |
| Unique | to this type of wrong operation in completing arithmetic problem related to reversibility concept is | - |
| Unique | Based on Table 3, there are 3 items where the pupils have committed error | - |
| Unique | Summary of the number of pupils who committed errors in solving arithmetic problem related | - |
| Unique | 22 36 6 0 3 11 12 26 7 3 39 2 24 68 | - |
| Unique | 0 6 0 0 7 3 2.88 8 0 0 9 2 1.92 - Total | - |
| Unique | It means that the pupils commit wrong operationin solving arithmetic problem related to the | - |
| Unique | Figure 2 shows the example of error at the type of wrong operation which | - |
| Unique | The problem was , however AI changed the sum operation on which became minus | - |
| Unique | type of obvious computation error in completing arithmetic problem related to reversibility concept is presented | - |
| Unique | The information presented in Table 4 shows that for each item there are some | - |
| Unique | But the obvious computation error was committed mostly by the pupils when they solved | - |
| Unique | of defective algorithm in completing arithmetic problem related to reversibility concept is presented in Table | - |
| Unique | The information presented in Table 5 shows that for each item there were some | - |
| Unique | 6 3 2.88 7 39 37.44 8 1 0.96 9 2 1.92 - Total 57 | - |
| Unique | Data which presentthe number of pupils who commit an error due to the defective | - |

| Unique | 6 11 10.52 7 2 1.92 8 9 8.64 9 12 11.52 - Total 120 | - |
| Unique | The example of pupil commited on error due to the defective algorithm type Table | - |
| Unique | Data which presents the number of pupils who commitan error due to random response | - |
| Unique | 6 12 11.52 7 24 23.04 8 16 15.36 9 17 16.32 - Total 141 | - |
| Unique | For solving the problemnumber 4, there are 10.52% pupils who used method, and there | - |
| Unique | The information earlier mentioned explains that there were still many pupils who committed an | - |
| Unique | It means that there were many pupils who committed defective algorithmin solving arithmetic problem | - |
| Unique | of random response in completing arithmetic problem related to reversibility concept is presented in Table | - |
| Unique | Data on the Table 6 shows that for each item there were some pupils | - |
| Unique | DISCUSSION The objective of this research is to identify the Elementary Schoolpupils" error in | - |
| Unique | The research result goes with Roberts (1986) finding which mentioned, the type of error, | - |
| Unique | occured when the pupils did not understand what they should complete in solving the | - |
| Unique | This means that the students did not understand arithmetic concept which is related to | - |
| Unique | According to Krutetskii (1976), "reversibility of the mental process, is the thinking in | - |
| Unique | with the reversibility concept, then better for the pupils check their work which they completed | - |
| Unique | the pupils did not check their work according to the first data, thus they did | - |
| Unique | lack understanding to arithmetic due to the fact that they did not used the reversibility | - |
| Unique | material related to the inverse, while the arithmetic is part of the mathematical material related | - |
| Unique | is very important in under- standing the material relating to the inverse mathematical, and Fuson | - |
| Unique | assignment which contain 20 arithmetic equation, the result indicated significant correlation between reversibility and Arithmetic | - |
| 11 results | + 4 = 7) and were rarely presented in nonstandard operations on both sides contexts | tandfonline.com researchgate.net jstor.org ct4me.net eric.ed.gov |
| Unique | The equal sign "=" is often given meaning by the pupils as the context | - |
| Unique | And rarely interpreted as connecting both sides contexts of the equal sign "=", (that | - |

| Unique | If reversibility pupils are involved in meaning the equal sign "=", then the pupil | - |
|--------|-----------------------------------------------------------------------------------|---|
| Unique | Which imply that the equal sign means "both side are the same or equal | - |
| Unique | According to what was explained by Greenes (2004), algebra is sometimes referred to as | - |
| Unique | Its power lies in the ways it allows us to represent relationships among quantities, | - |
| Unique | Algebra provides rules for manipulating symbols, such as simplifying an expression and then solving | - |
| Unique | Therefore, by detecting the mistakes of the pupils in solving arithmetic problems, is expected | - |
| Unique | to the type of obvious computation error, 3 pupils committed due to the type of | - |
| Unique | obvious computation error, 15 pupils committed error due to the type of defective algorithm and | - |
| Unique | 84 pupils with the following detail: 7 pupils committed error due to the type 1784 | - |
| Unique | error, 56 pupils committed error due to the type of defective algorithm and 18 pupils | - |
| Unique | computation error, 12 pupils committed error due to the type of defective algorithm and as | - |
| Unique | of obvious computation error, as many as 11 pupils committed error due to the type | - |
| Unique | obvious computation error, 2 committed error due to the type of defective algorithm and 24 | - |
| Unique | of obvious computation error, 9 pupils committed error due to the type of defective algorithm | - |
| Unique | 12 pupils committed error due to the type of defective algorithm and 17 pupils committed | - |
| Unique | School pupils who experience such difficulties in solving arithmmetic problem which are related to their | - |
| Unique | and draft up the solution to minimize the errors which are probably committed by the | - |
| 1 results | ), Second handbook of research on mathematics teaching and learning: A project of the National | amazon.com |
| Unique | Analysis on the ability of elementary school pupil who had high mathematics ability in | - |
| Unique | ERIC Journal, Paper presented at the Annual Egetiny of the American Educational Research Association | - |

Pupils' error on the concept of reversibility in solving arithmetic problems

Syarifatul Maf'ulah 1 *, Dwi Juniati 2 and Tatag Yuli Eko Siswono 2 1 Mathematics Education, STKIP PGRI Jombang, Indonasia. 2 Mathematics Education, Universitas Negeri Surabaya , Indonasia. The fact that there is no much study on reversibility is one of reason this study was conducted. Others, the importance of reversibility is also being researcher's motivation for focusing pupils' reversibility. On the other hand, the concern on pupils' reversibility is a major concern. The objective of this research is to identify errors done by the pupils in solving arithmetic problems related to reversibility concept. The result of this study can inspire teachers to consider the problem-solving in minimizing errors which must be done by the pupils in solving other arithmetic errors. The result of this study can be used as a reference in designing further learning and tasks for student's reversibility development. This research is qualitative with descriptive approach. The subjects of this research are fifth grade pupils of three Elementary Schools in Jombang, Indonesia. Researcher gave arithmetic task related to reversibility concept to the research subject. The pupils' worksheet was analyzed by calculating a number of pupils who did error for each arithmetic item. Then, it was classified to groups which were based on the error types done by the pupils related to Roberts, namely wrong operation, obvious computation error, defective algorithm, and random response. This case proved that there are some elementary school pupils who are still having difficulty in solving arithmetic problems related to reversibility concept. Furthermore, the researcher described error types done by the pupils.

Key words: Pupil''s error, concept of reversibility, solving, arithmetic problems.

INTRODUCTION

Piaget''s theory (Inhelder and Piaget, 1958) explained the levels of individual''s cognition growth from newborn to adult into 4 stages: 1. Sensory-motoric stage (from the newborn to 2 years old) 2. Pre-operational stage (from 2 years old to 7 years old) 3. Concrete-operational stage (from 7 years old to 11 years old), and 4. Formal-operasional stage (from 11 years old to adult). At sensory-motoric stage, infants learn about their surroundings by using their sensoric and motoric skills. They moved with reflexes. At pre-operational stage, their language conception were rapidly developed, but still in primitive manner. In developing their skills, they *Corresponding author. E-mail: dwi_juniati@yahoo.com. At this phase, they had no figure on the nature of conservation for they were centering, they fully focused on one state only. Hence, their ideas were intuitive and not irreversible, they could not turn the ways of their thinking back into the initial state. At the concrete stage, their reversibility evolved. Reversibility is individual''s mental ability to turn the way of thinking back into the original state. At formal-operational stage, they could readily have an abstract and logical construct. In accordance to Piaget''s theory on cognition growth as earlier discussed, it was suggested that the main characteristic of children at concrete stage was the development of reversibility. If reversibility was involved as the feature of an individual''s cognition growth, it would be necessary and should be concerned since it evolved. Thus, this research is inspired by the theory of Piaget about reversibility. The researcher were also motivated by Lamon (2007), that there are few research about reversibility. Lamon requested researchers, especially in education field, to focus and investigate on students'' reversibility. Reversibility is defined as someone''s capability to control their mentality in order to be able to return to the starting point (Slavin, 2006). For instance, the problem of conservation according to Piaget (Inhelder and Piaget, 1958), is given in two glasses which contained milk with comparable volume. When one of the milk is poured into a bowl (A container which is shorter and wider), then a question was asked, "Which is more, the milk in the glass or milk in the bowl?". When the children''s reversibility has been properly developed, they will respond by saying that the milk in the glass is comparable with the milk in the bowl. Due to the way children think that milk in the bowl poured into a glass will have comparable volume, proving that the volume at both container are similar. It means that children''s capability to control their mentality in order to be able to return to the starting point has been developed. Krutetskii (1976) defines mathematical ability related to pupils'' success in solving problems are reversibility and flexibility. Inhelder and Piaget (1958) said that reversibility can be considered a key requirement in a number of problems in mathematics. While Haciomeroglu and Presmeg (2009) stated that pupils'' reversibility is really important in understanding mathematics topic related to the inverse. All those opinion prove that pupils'' reversibility is important. As toward reversibility, pupils are able to solve a number of case related to mathematical problems, one of them is the topic about inverse. According to Carpenter and Moser (2008), one of important arithmetic problems related to reversibility is "Jim has marbles. He has marbles less than Connie''s. How many marbles does Connie have?". If the pupils finish that exercise through involving reversibility, they should think "if Jim has marbles less than Connie, so Connie has marbles more than Jim. Due to Jim has marbles, so the total of Connie''s are marbles. Or pupils can think that Jim has marbles". Or pupils can think that "Jim has marbles less than Connie" so the difference between Jim''s and Connie''s is . Therefore, in arithmetic equation, it can be said or . So, the number of Connie''s marbles are ". According to Fuson (1992), reversibility is needed to deal with addition and subtraction problems that cannot be solved by direct modeling. This judgment implicates that one of the topic related to pupils'' reversibility is arithmetic. According to Wong (1977), reversibility is important for the addition concept as "If a child knows that , Is he able to answer or ?" If he is able to answer it, then his reversibility has been developed, because he understand that similar with ". The explanation earlier mentioned shows that pupils'' reversibility is important and needs to be noticed since the reversibility is being developed. As the first step in identifying pupils'' reversibility, the researcher wants to reveal first condition of pupils'' reversibility at the Elementary Scholl in solving arithmetic problems. Therefore, the researcher gave arithmetic task related to reversibility concept to the pupils, then the researcher can identify errors done by the pupils in solving arithmetic items related to reversibility concept. The pupils of Elementary School was chosen as the research subject with the consideration that reversibility is being developed at the concrete level, that is when a child is up to 7 to 11 years old (Piaget and Inhelder, 1958), this means that the pupils are all in Elementary School. Moreover, reversibility is related to arithmetic. Otherwise, arithmetic for the first time was given to the pupils at the Elementary School. Therefore, the objective of this research is to identify errors done by the pupils at the Elementary School in solving arithmetic problems related to reversibility concept. If the teacher knows the description of pupils'' reversibility based on the errors done by them, the researcher''s expectation is the teachers are able to think the problem-solving in minimizing errors must be done by the pupils for the next. Furthermore, the research result can be as orientation to compose the next learning and duties for the pupils'' reversibility development. REVIEW OF LITERATURE Reversibility Reversibility is a term adopted from Piaget''s theory that one of children''s characteristic at the concrete operational level starts at the phase when reversibility is being developed. Furthermore, Inhelder and Piaget (1958) said that "reversibility is defined as the permanent possibility of returning to the starting point of the operation in question". For instance, two glasses containing milk with comparable volume. When one of the milk is poured into a bowl (A container which is shorter and wider), then a question was raised "Which is more, the milk in the glass or milk in the bowl?". Children at the pre-operational will answer that the milk in the glass is comparable with the milk in the bowl. This is because the children''s mentality is "centrally and irreversible. Children only focused on one aspect, that is the milk volume, and ignoring the other aspect. While children at the concrete operational level will answer that „milk in the glass" is comparable with „milk in the bowl". Because children at this level has the mentality that if milk in the bowl is poured into the glass, the volume will be as same as that in the bowl, which shows that the volume for the both container are comparable. It means at that at this level, child''s ability to control their mentality return to the starting point where it has been developed. In this case, starting point means two glasses that contained milk with comparable volume. While, change their mindset to the starting point is when children pour the milk in the bowl to the glass. So the milk volume will be as same as the condition before it is poured. According to Kang and Lee (1999), "reversibility enables the recognition of problems in various ways". For instance, the pupils of Elementary School were given an arithmetic problem, that is " ", then they were asked to determine the value at the box. So, through the reversibility, the pupils are able to investigate through some ways, that is: 1. - , Since children would think that the two parts of aritmethical equation was added by , the equation would be ( ) - ( ) , hence the result found- . 2. , Since children would think that aritmethical equation implied that 43 minus particular number (symbolized with ) equaled to 24. If 43 minus particular number (symbolized with ) equaled to 24,then, 43 minus 24 should be that particular number (symbolized with ). Indicating that atau . Such ideas described the notion of reversibility. Firstly, children involved with reciprocity, operating the two parts of equation with similar element. At the second manner, they involved reversibility with negation, thinking if 43 minus particular number (symbolized with Maf''ulah et al. 1777 ) equaled to 24, then, 43 minus 24 should be that particual number (symbolized with ). According to Piaget and Inhelder (1998) they stated that there are two reversibilities concept, which are negation and reciprocity. Here, negation includes understanding which is a way one could be delayed by other way. In this case, reversibility shows the idea which is in every operation has invers which is used for canceling the operation. In the example earlier given, subtraction is simply the reversal of addition while multiplication which is canceled by dividing operation. This means that addition negation is subtraction and multiplication is dividing. While the reciprocaly concepts are related to the equivalent relation. The other example of negation and reciprocity in algebra case which is explained by Ardi (2009) are: "In mathematics education, Adi (1978) used the concept of negation and compensation to study the relationship between college students'' developmental level and their performance on equation solving. She provides the equation to illustrate her interpretation of negation and compensation. In solving this algebraic equation, negation is involved when one is asked to make the following inferences: „Fourteen minus what equals nine?", „Fifteen divided by what equals five?", and „Seven minus what equals three?". On the other hand, compensation is involved when one multiply both sides of the equation by to obtain ." Based on these explanation, the researcher conclude that if the reversibility is being developed optimally, so the children are able to solve the arithmetic problems correctly. To acquire it, the children''s reversibility need to be practiced through giving problems related to reversibility concept. Krutetskii (1976) explained that one of the mathematical ability related to pupils'' success in solving problem is reversibility. Reversibility refers to the ability of establishing two-way reversible relations as opposed to one-way relations which function only in one direction. This view implied that reversibility had two process within: 1. A process that started from the initial state moving into the end point as the goal and 2. A process that started from the end point moving back into the initial one, however, it was fine to use another path as its way. Furthermore, he also explained on reversibility of the mental process , thinking in a reverse direction from the result or the product to the initial data. For instance, the pupils of Elementary School are asked to answer arithmetic problem " ", if the pupils involve reversibility in answering the task, so the pupils will think 1778 Educ. Res. Rev. Table 1. Indicators of error classification of the reversibility concept in solving arithmetic problem by Roberts (1968). Error classification of the reversibility concept in solving arithmetic problem Indicators Wrong operation The problems are solved using the operator other than the one specified in the problem. Children were considered in conducting a solution when they completed an arithmetical task by changing the operation presented. Given a task 23 + ... = 10, they completed the task by changing the addition operation into the subtraction, which changed the task into , with 13 as the result. This error was classified as wrong operation Obvious computation error In this form of error, the pupil uses the correct algorithm but due to carelessness in recalling number facts, the wrong answer is given. Given a task 3 + . . . = 10, the pupil complete the task by subtracting 4 with 3, which result was 1. This was absolutely false due to the wrong algoritm Random response These are errors in which no general pattern is detected. Students'' errors were not clearly detected "if 29 plus a particular number was 46, then, 46 minus 29 should be that particular number. This was due to the fact that the result of 29 plus the particular number was 46". Thus, to fill the blank they need to apply this " ", and the result is . After getting the result, the next mentality activity done by them is to return to the result to the previous data. In this case, the previous data is its problem (that is ). Then it can be acquired . So it is right that the problem-solving is 17. The classification of the errors which is done by the pupils for arithmetic solving which is related to the reversibility concept The reversibility of pupils could be practiced through giving the task which is related to the reversibility concept. One of material which could be used for practicing the reversibility is arithmetic. Ramful (2008) stated that in, mathematics, the reversibility is related to the operation of arithmetic, decimal, ratio, algebra, and other cases. According to Wong (1977), the educators'' assumes that reversible thought is related to children''s performance at arithmetic equations. Secondly, according to Maf''ulah (2015), he stated that reversibility is having strengthened the relation with decimal and arithmetic. In this study, the researcher has focused on the arithmetic material. The researcher would like to identify the errors which have been done by the pupils in solving the problem of arithmetic which is related to the reversibility concept. Through this study, hopefully this could be used as previous study of the other arranging the teaching and learning for developing the reversibility of the pupils. In this study, the errors of pupils in solving of arithmetic case which is related to the reversibility concept which is describe based on the classifications of the error according to Roberts (1968) as shown in Table 1. RESEARCH METHOD Research design The research design of the study is qualitative design with descriptive approach. This study met the characteristics of qualitatif research, as Bpgdan and Biklen (1998) stated which are: 1. It was naturalistic because the data sources was real with researchers as the primary instrument 2. The data was descriptive due to its qualitative nature, in the form of essay. In this case, the data was derived from the result of subjects'' works 3. It was inductive, which had no intention to test a hypothesis, but merely describing a phenomena. Research subject This study involved 96 pupils of the fifth graders in jombang with 55 males and 41 females as the research subject. Elementary students were selected with consideration that reversibility began to Maf''ulah et al. 1779 Figure 1. Arithmetic task. evolve in the age-range between 7 to 11 years old, indicating elementary graders. Besides, the fifth graders were chosen due to the fact that they had already learned arithmetic. However, the researchers took one sample in each category of errors for data analysis and research findings. Research instrument The objective of the study is to identify the errors of arithmetic which is related to the reversibility concept. For reaching up the objective of the study, the researcher made arithmetic task which is related to reversibility concept as this instrument has been validated by expert validator. There are 9 items of arithmetic task as shown in Figure 1. Data collected procedure The researcher gave instrument of arithmetic task which is related to reversibility concept to the pupils. Then they completed arithmetic task individually. Data analysis Students'' works were analysed by counting the students with errors for each number of mathematics task given. Then, they were classified into groups based on their errors. The researchers dercribed the kinds of students'' errors for each group based on Roberts'' error classification (1968) including wrong operation, obvious computation error, defective algorithm and dan random response. The researchers selected one subject with errors in each group. Analysis was conducted within some procedures which are: 1. Data reduction that aims at assert, select, focus, abstract, and transform all raw data into meaningful ones. 2. Data presentation that included classifying and identifying data, which transcripted the organized and categorized data that enabled one to make the conclusion; and (3) conclusion making. RESULTS The item number 1 is not relating item to the reversibility concept. As what Wong (1977) stated that, "the form of " was not included in Piaget's abstract concept of reversible thought even though it constitutes on form of arithmetic equations." The item 1 is only to check the subject''s understanding concerning to sum operation. Thus, for number 1 is not paid more attention in error analyzing. Based on pupils'' answers, the data was gotten as sshown in Table 2. Based on Table 2, information concerning the types of errors which were committed by the pupils in solving arithmetic problem related to the reversibility concept is gotten and they are presented below: Wrong operation error Data of the pupils who committed an error due to this type of wrong operation in completing arithmetic problem related to reversibility concept is presented in Table 3. Based on Table 3, there are 3 items where the pupils have committed error due to the type of wrong operation, those are number 4, 7, and 9. For number 4, all pupils answered by changing " " to " ". Due to the problem number 7, all pupils 1780 Educ. Res. Rev.

Table 2. Summary of the number of pupils who committed errors in solving arithmetic problem related to the reversibility concept.

| Number Arithmetic problem | The number of pupils who commited error for each type of error | | | |
|---|---|---|---|---|
| | Wrong operation | Obvious computation error | Defective algorithm | Random response |
| 1 | - | - | - | - |
| 2 | 0 | 3 | 3 | 16 |
| 3 | 25 | 3 | 0 | 5 |
| 4 | 15 | 16 | 3 | 4 |
| 5 | 7 | 2 | 56 | 18 |
| 6 | 84 | 5 | 0 | 2 |
| 7 | 12 | 2 | 2 | 6 |
| 8 | 0 | 3 | 11 | 26 |
| 9 | 7 | 3 | 39 | 2 |

Table 3. Data which present the number of pupils who completed wrong operation error.

| Number Arithmetic problems | The number of pupils who committed wrong operation error | Quantity Percentage (%) |
|---|---|---|
| 4 | 24 | 68 |
| 7 | 8 | 0 |
| 9 | 16 | 26 |

In solving the problem, pupils change the operation given on the task. It means that the pupils commit wrong operationin solving arithmetic problem related to the reversibility concept. Figure 2 presents one of the examples of pupil''s error. Figure 2 shows the example of error at the type of wrong operation which was committed by the initial subject AI. The problem was , however AI changed the sum operation on which became minus operation . Thus, the answer which was gotten was wrong. Obvious computation error Data of the pupils who committed an error due to the type of obvious computation in completing arithmetic problem related to reversibility concept is presented in Table 4. The information presented in Table 4 shows that for each item there are some pupils who are definitely committed to such error. But the obvious computation error was committed mostly by the pupils when they solved arithmetic problem number 7, more than 39 (or 37.44%) pupils committed the obvious computation error. Figure 3 shows the different types of error. The answer presented in Figure 3 should be 39. However, subject LA answered 239 because he committed an error in accounting. Defective algorithm error Data of the pupils who commit an error at this type of defective algorithm in completing arithmetic problem related to reversibility concept is presented in Table 5. The information presented in Table 5 shows that for each item there were some pupils who definitely committed errors in solving arithmetic problem related to reversibility concept. Maf''ulah et al. 1781 Figure 2. The example of pupil''s error due to the type of wrong operation. Table 4. Data which present the number of pupils who completed obvious computation error.

| Number Arithmetic problems | The number of pupils who committed "obvious computation error" | Quantity Percentage (%) |
|---|---|---|
| 1 | - | - |
| 2 | 3 | 2.88 |
| 3 | 3 | 5 |
| 4 | 8.4 | 4.12 |
| 5 | 1.92 | 5 |
| 6 | 1.92 | 3 |
| 7 | 2.88 | 7.39 |
| 8 | 37.44 | 8 |
| 9 | 1 | 0.96 |

Figure 3. The example of pupil''' error in obvious computation error type. Table 5. Data which presentthe number of pupils who commit an error due to the defective algorithm type.

| Number Arithmetic problems | The number of pupils who committed"defective algorithm" error | Quantity Percentage (%) |
|---|---|---|
| 1 | - | - |
| 2 | 3 | 2.88 |
| 3 | 15 | 14.4 |
| 4 | 56 | 53.76 |
| 5 | 12 | 11.52 |
| 6 | 11 | 10.52 |
| 7 | 1.92 | 8 |
| 8 | 9.64 | 9 |
| 9 | 12 | 11.52 |

Total 120 - The initial subject AI changed sum operation became minus operation 1782 Educ. Res. Rev. Figure 4. The example of pupil commited on error due to the defective algorithm Table 6. Data which presents the number of pupils who commitan error due to random response type.

| Number Arithmetic problems | The number of pupils who commit "randomresponse" error | Quantity Percentage (%) |
|---|---|---|
| 1 | - | - |
| 2 | 16 | 15.36 |
| 3 | 16 | 15.36 |
| 4 | 18 | 17.28 |
| 5 | 22 | 21.12 |
| 6 | 12 | 11.52 |
| 7 | 24 | 23.04 |
| 8 | 16 | 15.36 |
| 9 | 17 | 16.32 |

Total 141 - 1. For solving the problem number 2, there are 2.88% pupils who used method. 2. For solving the problem number 3, there are 14.4% pupils who used method. 3. For solving the problemnumber 4, there are 10.52% pupils who used method, and there are 43.24% pupils solving the problem who used method. 4. For solving the problem number 5, there are 11.52% pupils who used method 5. For solving the problem number 6, there are 10.52% pupils who used method 6. For solving the problem number 8, there are 8.64% pupils who used method. 7. For solving the problem number 9, there are 11.52% pupils who used method. The information earlier mentioned explains that there were still many pupils who committed an error when applying method or strategy in solving arithmetic problem. It means that there were many pupils who committed defective algorithmin solving arithmetic problem related to the reversibility concept thus consist an error. Figure 4 shows an example of this type of error. Random response error Data of the pupils who committed an error at this type of random response in completing arithmetic problem related to reversibility concept is presented in Table 6. Data on the Table 6 shows that for each item there were some pupils definitely committed to the type of random response error. Figure 5 shows the example of this type of error. The answer of the problem on Figure 5 should be 287. However, the initial subject ALA answered 136. ALA''s anwer was wrong. Moreover, the solving process was unclear. Thus, the error which was completed by ALA was not detected clearly. So, the solving problem of Figure 5 was categorized into random response. DISCUSSION The objective of this research is to identify the Elementary Schoolpupils'' error in solving arithmetic problem which is related to the reversibility concept. The research result goes with Roberts (1986) thinking which mentioned, the type of error, namely wrong operation, obvious computation error, defective algorithm, and random response. The error due to this type of random response Maf''ulah et al. 1783 Figure 5. The example of pupils'' error due to the type of random response. occured when the pupils did not understand what they should complete in solving the item thus, they carried out an unclear completion. This means that the students did not understand arithmetic concept which is related to the reversibility. According to Krutetskii (1976), "reversibility of the mental process, is the thinking in a reverse direction from the result or the product to the initial data". If it is related to the solving process of arithmetic problem which is concerned with the reversibility concept, then better for the pupils check their work which they completed back to the first data. With this, in solving arithmetic problem which is given by the researcher, most of the pupils did not check their work according to the first data, thus they did not understand that their obtained work was wrong. The number of errors which was completed by the pupils also shows pupils who lack understanding to arithmetic due to the fact that they did not used the reversibility properly. Due to the fact that the reversibility has a role in understanding the mathematical material related to the inverse, while the arithmetic is part of the mathematical material related to invers. According to the study of Haciomeroglu and Presmeg (2009), the reversibility of the pupils is very important in under- standing the material relating to the inverse mathematical, and Fuson (1992) who said that reversibility is needed to deal with addition and subtraction problems. In addition, the research finding by Wong (1977) explained that when he gave reversibility assignment which contain 20 arithmetic equation, the result indicated significant correlation between reversibility and Arithmetic Performance which was found on female subject. If related to the meaning of the equal sign "=" for pupils, Mc. Neil et al. (2006) said, "equal signs were often presented in standard operations-equals-answer contexts (for example, 3 + 4 = 7) and were rarely presented in nonstandard operations on both sides contexts (for example, 3 + 4 = 5 + 2)". The equal sign "=" is often given meaning by the pupils as the context of the answer. And rarely interpreted as connecting both contexts of the equal sign "=", (that is, the right side is the same as the left side). If reversibility pupils are involved in meaning the equal sign "=", then the pupil should think if x = y = x, nor vice versa. Which imply that the equal sign means "both side are the same or equal right side to the left side". Arithmetic are basic materials for studying algebra and the other materials. According to what was explained by Greenes (2004), algebra is sometimes referred to as generalized arithmetic because it formalizes arithmetic relationships. Its power lies in the ways it allows us to represent relationships among quantities, to describe properties of operations (such as commutative and distributive), and to describe patterns. Algebra provides rules for manipulating symbols, such as simplifying an expression and then solving for an unknown. Therefore, by detecting the mistakes of the pupils in solving arithmetic problems, is expected to minimize the error. CONCLUSION The research sconclusions are: 1. There were many pupils who committed errors in solving the second problem, as many as 23% pupils with the following detail: there are 3 pupils who committed error due to the type of obvious computation error, 3 pupils committed due to the type of defective algorithm error, and 16 committed error due to the type of random response. 2. There were many pupils committed errors in solving the third problem, as many as 36 pupils with the following detail: 16 pupils committed error due to the type of obvious computation error, 15 pupils committed due to the type of defective algorithm and 16 pupils committed error due to the type of random response. 3. There were many pupils committed errors in solving the fourth problem, as many as 84 pupils with the following detail: 7 pupils committed error due to the type 1784 Educ. Res. Rev. of wrong operation, 2 pupils committed error due to the type of obvious computation error, 56 pupils committed error due to the type of defective algorithm and 18 pupils committed error due to the type of random response. 4. There were many pupils who committed errors in solving the second problem, as many as 36 pupils with the following detail: 2 pupils committed errordue tothe type of obvious computation error, 12 pupils committed error due to the type of defective algorithm and as many as 22 pupils committed error due to the type of random response. 5. There were many pupils who committed errors in solving the second problem, as many as 26 pupils with the following detail: 3 pupils committed error due to the type of obvious computation error, as many as 11 pupils committed error due to the type of defective algorithm and 12 pupils committed error due to the type of random response. 6. There were many pupils who committed errors in solving the second problem, as many as 68 pupils with the following detail: 3 pupils committed error due to the type of wrong operation, as many as 39 pupils committed error due to the type of obvious computation error, 2 committed error due to the type of defective algorithm and 24 pupils committed error due to the type of random response. 7. There were many pupils who committed errors in solving the second problem, as many as 26 pupils with the following detail: 1 pupil committed error due to the type of obvious computation error, 9 pupils committed error due to the type of defective algorithm and 16 pupils committed error due to the type of random response. 8. There were many pupils who committed errors in solving the second problem, as many as 33 pupils with the following detail: 2 pupils committed error due to the type of wrong operation, 2 pupils committed error due to the type of obvious computation error, 12 pupils committed error due to the type of defective algorithm and 17 pupils committed error due to the type of random response. The explanations earlier given put up the fact that there are still many Elementary School pupils who experience such difficulties in solving arithmmetic problem which are related to their reversibility. The researcher expects that this reseach result can inspire the teachers especially who teach at Elementary School grade in order to pay attention more to their pupils'' reversibility earlier, and draft up the solution to minimize the errors which are probably committed by the pupils in solving the certain arithmetic problems later. 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