www.bircu-journal.com/index.php/birci
Budapest International Research and Critics Institute-Journal (BIRCI-Journal)
Humanities and Social Sciences
ISSN 2615-3076 Online)
ISSN 2615-1715 (Print)
Budapest Institute

Development of Calculus Teaching Materials through Problem-Based Learning Model and Scientific Approach

Sufri[1], Feri Tiona Pasaribu[2]
[1,2]*Faculty of Teacher Training and Education, Universitas Jambi, Indonesia*
sufriary@yahoo.com

Abstract

This research is based on the relatively low literacy or problem solving ability and creative thinking level of students towards the teaching material for the "Calculus" course. In the mathematics education study program, calculus courses are prerequisites for many courses, including advanced calculus, real analysis, mathematical statistics, numerical methods, differential equations, initial values and boundary conditions, and complex number algebra. The purpose of this study is to improve the quality of learning seen from the aspect of the level of problem solving abilities, and students' creative thinking abilities, and to produce teaching materials for Calculus courses in the form of modules that meet the eligibility criteria, namely valid, practical and effective. From the aspect of the learning process the variables observed as indicators or benchmarks of research success are problem solving abilities, and students' creative thinking skills, while from the aspect of learning media the indicators of research success are the validity, practicality and effectiveness of the learning media used. The average value of the problem-solving ability of classically meticulous subjects in solving problems of Calculus learning material reaches 77.2 with a minimum completeness score of 80% (≥75%).

Keywords
problem-based learning; creative thinking; scientific approach; quality of teaching materials

I. Introduction

Calculus is one of the courses in the Mathematics Education Study Program, FKIP Jambi University. This course is a prerequisite for many courses including advanced calculus, real analysis, mathematical statistics, numerical methods, complex analysis, and differential equations. Experience so far has shown that students' ability in solving mathematical problems and creative thinking levels are still relatively low, besides that the existing literature or references are still general in nature, meaning that the reference material is not designed in the same way as the description of the course material as stated in the curriculum and tends to ignoring student characteristics.

Therefore, in this study, calculus course teaching materials were developed in the form of modules designed to be problem-based and scientific approaches and the materials were adapted to the characteristics of students with the order of learning materials in the same order as those listed in the applicable curriculum.

The application of problem-based learning models and scientific approaches in learning can encourage problem-solving skills and show good results, especially those related to creative thinking skills, critical thinking levels, interaction and communication between fellow students. The results of these studies have been carried out, among others, by Cicchino

(2015), and Mariani (2014). The learning process is said to follow the rules of a "scientific approach" if the learning process meets the following criteria, the substance of the learning is fact-based, does not deviate (biased) from the flow of logical thinking, encourages and inspires students to think creatively, critically, analytically, correctly in identifying, able to think hypothetical in seeing the differences, similarities and links to each other from learning materials, inspiring students to understand, apply and develop rational and objective thinking patterns in responding to learning materials, based on concepts, theories and empirical facts.

Based on the description above, this research is focused on developing teaching materials for the "Calculus" course in the form of "modules" which are designed based on problems and a scientific approach.

II. Review of Literature

Teaching materials are a set of learning tools or tools that contain learning materials, methods, limitations, and evaluation methods that are designed specifically, systematically and attractively in order to achieve learning objectives in accordance with the minimum competencies of these subjects. This is in line with what Widodo and Jasmadi said in Lestari (2015). Even Widodo and Jasmadi emphasized the learning objectives to be achieved down to sub-competencies and all their complexities. While Prastowo (2011), said that teaching materials are materials or subject matter that are systematically arranged that are used by teachers and students in the learning process. Sumantri (2015), said that teaching materials are a source of learning in the form of concepts, principles, definitions, content groups (context), data, facts, processes, values, abilities and skills. Formally Komalasari (2011: 28) and Anonymous (2008: 6) say, teaching materials are materials needed for the formation of knowledge, skills, and attitudes that must be mastered by students in an effort to meet the competency standards set and used to help teachers (lecturers)) or instructors in carrying out teaching and learning activities in the classroom. There are at least three principles that must be contained in a teaching material as stated by Amri (2010:162) saying, relevance, consistency, and adequacy are three principles that need to be considered in compiling teaching materials.

Some characteristics of teaching materials, including self-instructional, self-contained, stand-alone, adaptive, and user friendly (Lestari, 2015). Self-instructional means that the teaching materials can make students able to teach themselves, therefore the teaching materials must contain learning objectives, and be packaged into more specific units. Self contained means that the teaching material must contain all its parts in one book as a whole to make it easier for readers to learn the teaching material. Stand alone means that the teaching materials developed do not depend on other teaching materials, meaning that these teaching materials can be used in the learning process without having to depend on other teaching materials. Adaptive means that the teaching materials must be in accordance with the development of science and technology. While user friendly means that the teaching materials should make it easier for students to get information as clearly as possible. Teaching materials should pay attention to examples and illustrations, prepare practice questions as feedback, according to course descriptions, and use simple language that is easy to understand. Teaching materials can be in the form of handouts, modules, student activity sheets, brochures, and leaflets (Majid, 2013).

In this study, the teaching materials made were printed teaching materials in the form of modules which were designed based on problem-based learning and a scientific approach. The module was chosen because learning with the help of module teaching materials can make it easier for students to learn independently.

One of the characteristics of the module as a teaching material is that the module is designed in such a way with the aim that students can learn independently by minimizing the role of the teacher in the learning process. This is in accordance with Anonymous (2017) which says, modules are teaching materials that are specially prepared and systematically designed based on a curriculum that is packaged into the smallest learning unit that students can use independently to achieve certain learning objectives that have been set. The following table 1 presents the differences between textbooks and teaching materials (Anonymous, 2011).

Table 1. Differences between Textbooks and Teaching Materials

No	Textbook	Teaching materials
1	Assuming reading interest	Menimbulkan minat dari pembaca
2	Written primarily for teacher use	Ditulis dan dirancang untuk digunakan peserta didik
3	Designed to be marketed widely and commercially.	Tidak dirancang untuk dipasarkan
4	Tidak menjelaskan tujuan Instruksio- nal	Menjelaskan tujuan instruksional
5	Disusun secara linear	Disusun berdasarkan pola belajar (fleksibel)
6	Strukturnya berdasarkan logika bidang ilmu	Strukturnya berdasarkan kebutuhan peserta didik dan kompetensi yang akan dicapai
7	Belum tentu memberikan latihan	Terfokus pada pemberian latihan
8	Tidak mengantisipasi kesulitan belajar	Mengakomodasi kesulitan belajar
9	Belum tentu memberikan rangkuman	Selalu memberikan rangkuman
10	Gaya penulisan bahasa naratif, tetapi ti- dak komunikatif	Gaya penulisan semi formal dan komunikatif
11	Isinya cenderung sangat padat	Kepadatan isi tergantung kebutuhan peserta didik
12	Tidak mempunyai mekanisme untuk mengumpulkan umpan balik	Mempunyai mekanisme untuk mengumpul- kan umpan balik
13	Umumnya tidak memberikan saran un- tuk mempelajari buku tersebut	Menjelaskan cara mempelajari bahan ajar.

Sanjaya (2008) said that learning strategy is a learning activity that must be carried out by teachers and students so that learning objectives can be achieved effectively and efficiently (a plan of operation achieving something). In this context, the learning strategy is still conceptual and to make it happen, various learning methods are needed that are relevant to the characteristics of the material and learning strategies designed. Referring to the opinion above, the learning method can be interpreted as the method used to implement the plans that have been prepared in the form of real and practical activities. The application and selection of learning strategies in the learning process is one of the techniques for teachers/lecturers to accelerate the process of transforming knowledge to students, so it is hoped that educational interactions in the learning process can run in multi-directional ways.

The learning model is a form of a planned and illustrated learning process from the beginning to the end of the lesson which is presented specifically by the teacher (lecturer). So it can be said that the learning model is a cover or frame of the application of approaches, strategies and learning methods (Indrawati, 1999). Joyce and Well in Supriawan and Surasega (1990) say there are four groups of learning models, namely, social interaction models, information processing models, humanistic personal models, and behavior modification models. In this study, the application of the group learning model of information processing (cognitive aspects), and behavior modification in the form of the level of creative thinking ability was studied. Information processing means how the learning model that will

be applied can improve academic intelligence (intellectual intelligence), and behavior modification can be interpreted as how students' creative thinking skills in the learning process.

Problem-based learning can be interpreted as a series of learning activities that emphasize the process of solving problems scientifically. (Sumantri, 2015). In the learning process, this model always uses real problems in life as sample content to strengthen creative, critical thinking skills, and increase understanding of the concepts of learning materials. Problem-based learning is the use of various kinds of intelligence that are needed to perform a confrontation against real-world challenges, the ability to deal with everything new and existing complexities (Utomo, 2020). PBL is a learning approach that begins with authentic and meaningful problems for students to find information on the solution and problem solving (Khairani, 2020). The environment provides input to students in the form of assistance and problems, while the brain's nervous system functions to interpret such assistance effectively so that the problems faced can be investigated, assessed, analyzed, and the solutions sought well (Pohan, 2020).

Based on the semester credit system, learning activities in universities are carried out in three activities, namely face-to-face, structured, and independent learning activities. The series of learning activities, called academic activities, are carried out in a programmed, structured and systematic manner which is arranged according to the academic calendar. The main topics and sub-topics are arranged according to the course description and are based on various relevant learning resources. Lecture material content is obtained from various standard references that have been set in the curriculum. The order of lecture material in standard reference books is generally not the same as the order of the material presented in the curriculum, and tends not to take into account the characteristics, environmental conditions, and initial abilities of students, so this condition is one of the factors for students' difficulties in independent learning activities.

In the application of problem-based learning, the conditions that must always be maintained by the teacher (lecturer) include, among others, a conducive, open, negotiable, democratic, and pleasant learning environment, in addition the teacher/lecturer acts as a facilitator, empowering (empowering), enabling and guides on the sides of the students, not as a mentor in the center. This learning model is designed to train, develop and stimulate students' higher-order thinking skills in solving authentic problem-oriented problems. Table 2 below presents the syntax for the implementation of the problem-based learning process.

Table 2. Problem-Based Learning Implementation Syntax

Fase-Fase	Kegiatan Guru (Dosen)
Phase 1: Student orientation (students) to the problem.	Explain the learning objectives, explain the logistics needed, and motivate students to be actively involved in solving the problems set.
Phase 2: Organizing students (students) to focus on the learning process.	Helping students define and organize learning tasks related to the problem to be solved.
Phase 3: Guiding individual and group investigations	Stimulate students to collect relevant information, carry out experiments to get explanations and solve problems.
Phase 4: Develop and present the work.	Helping students in planning and preparing appropriate works such as making reports, making videos, modeling, and sharing assignments among fellow students (students)
Phase 5: Analyze and evaluate the problem-solving process.	Helping students to evaluate or reflect on learning outcomes, investigation results and the processes they use

The scientific (scientific) approach to learning is one of the learning approaches recommended in the 2013 curriculum, because this approach is student-centered, involves science process skills in constructing concepts, laws or principles, involves potential cognitive processes in stimulating intellectual development, especially thinking skills. high-level learners, and can develop the character of learners. Rusman (2015), said that the scientific approach is a learning approach that provides opportunities for students at large to explore and elaborate on the material being studied. Hosnan, (2014), Kahar and Yenice (2012), the scientific approach is a learning process designed so that students can actively construct concepts, laws, or principles through observing, formulating problems, proposing hypotheses, collecting data, analyzing data, draw conclusions and communicate. In its implementation there are 5 steps that must be done, namely, observing (observing), asking (questioning), experimenting (experimenting), associating (associating), communication (communicating). The learning process is directed to train analytical thinking, not mechanistic thinking (Madjid, 2014).

According to Daryanto (2014), there are 5 (five) stages of a scientific approach in the learning process, namely

1. Observing in the sense of prioritizing the meaning of the learning process (meaningfull learning).
2. Questioning is a student activity that is encouraged by the teacher/lecturer to answer the curiosity of students based on observing activities.
3. Gathering information, is a continuation of the activity of asking. This activity is carried out by students by collecting as much information (data) related to the topic being studied from various learning sources as possible.
4. Associating or processing information, is the activity of students to process and analyze all information (data) systematically, and logically to obtain a conclusion.
5. Communicating is an activity for students to disseminate all their findings in the learning process based on the previous 4 steps.

In this study, there are two learning variables that are used as the main indicators to determine whether the learning process has been running optimally, namely, cognitive abilities (problem solving), and students' creative thinking abilities. Susanto (2014:5), Budiningsih (2010:39), and Sudjana (2009:14), say, learning outcomes are changes that occur in students, both concerning cognitive, affective, and psychomotor aspects as a result of learning activities, or the level of success and abilities of students in studying learning materials. Based on the opinions above, from the cognitive aspect, the ability of students to absorb learning materials (learning outcomes) in this study is intended as a description of students' abilities to understand learning materials as a whole and comprehensively according to the description of the calculus course.

Creative thinking skills referred to in this study are the ability of a person (student) to produce or develop something "new" that is something unusual that is different from the ideas produced by many people. Sukmadinata, (2004), Portur and Barkul (2009), and de Bono (2007) say creative thinking is a mental activity to increase purity and sharpness of understanding in developing something or an original cognitive ability and problem-solving process that allows individuals to use their intelligence effectively. a unique way and is directed towards a result that allows the student to obtain many ways or alternative solutions to a problem. The ability to think creatively emphasizes several indicators, including fluency, flexibility, originality, and elaboration. (Siswono and Tatag, 2007). Fluent or fluent in solving mathematical problems, if the student is able to solve problems with various interpretations. Flexibility, if the student is able to solve the problem in one way, then by using another way the student discusses various methods of solving it. Originality, if students are able to determine other unusual strategies in solving problems

(making different solutions). Elaboration means that students are able to take detailed steps to find a deeper meaning for answers or problem solving. Hierarchically, thinking skills can be sorted as follows (Siswono, 2015). Memory, basic thinking, critical thinking, and creative thinking (high-order thinking). The last three are often said to be reasoning.

III. Research Methods

The research subjects were students of the Mathematics Education Study Program of PMIPA FKIP Jambi University, especially mathematics education students who were registered in the even semester of the 2019/2020 academic year and contracted calculus courses totaling 127 people. The research was carried out from April 1, 2020 to October 1, 2020 at the Mathematics Education Study Program of PMIPA FKIP Jambi University.

This research is research and development. Development research is research designed to produce a particular product (Sugiyono, 2012:407). Meanwhile, Sukmadinata (2006:164) said that development research is a process or steps to develop a new product or improve an existing product. This research is designed to produce problem-based printed teaching materials and a scientific approach for calculus courses. The development model applied is a development model that follows the steps, analysis, design, development, implementation, and evaluation, which is abbreviated as ADDIE (Purboningsih, 2015). The steps for developing the ADDIE model are described as in the diagram presented in Figure 1 below.

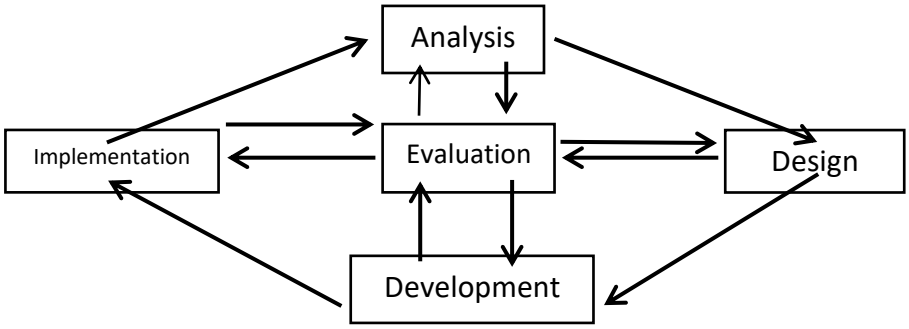

Figure 1. *ADDIE Model Development Procedure (Tegeh, 2014)*

The stages of developing the ADDIE model can be explained as follows.

a. Analysis

At this stage, competency analysis, student characteristics, and material analysis (learning material content) are carried out.

b. Design

At this stage, product design, media selection, format selection and initial design (prototype) are carried out.

c. Development

At this stage, product development, product editing, product validation, and product revision are carried out.

d. Implementation

At this stage the results of the development are tested on research subjects in the learning process to determine the impact on the quality of the learning process which includes, effectiveness, attractiveness, and efficiency.

e. Evaluation

At this stage, a thorough study is carried out on each development step to see if there are procedural errors that may occur. In this study, the ADDIE stage was only carried out until

the development stage.

In this study, to see the effectiveness of the resulting product, two research instruments were used, namely, learning outcomes test, and creative thinking ability test. According to Munandar (1985) there are four components of creative thinking that are the focus of research observations, namely fluency (fluent thinking), flexibility (flexible thinking), originality (original thinking) and elaboration (detailed thinking). Meanwhile, to see the validity of the resulting product, the research instrument used is a product design questionnaire and a questionnaire on the suitability of learning materials.

IV. Discussion

At the analysis stage, an analysis of competencies, characteristics of students (students), and teaching materials is carried out. Competency analysis is related to the minimum level of achievement of learning outcomes in each meeting or the value of the minimum completeness criteria (KKM) classically before the research is carried out. In general, the average level of achievement of learning outcomes for each meeting before the research was conducted for calculus courses was still low, this was indicated by the average value of learning outcomes that were still below 75%. Analysis of student characteristics (students) is related to the social, cultural, economic background, and the level of cognitive ability of the students. The results of the analysis show that research subjects generally come from various ethnic groups, ethnicities with relatively different cultures, and generally come from lower middle class families economically. The level of cognitive ability of research subjects is very varied, generally can be categorized at medium and low levels. This is understandable because the research subjects came from various high schools (SMA, MAN, and SMK) from all over Indonesia. Meanwhile, the analysis of teaching materials relates to the scope, breadth, and depth according to the description of the calculus course which broadly consists of the real number system, equations, inequalities, absolute values, functions, limits, derivatives, and integrals. Some of these teaching materials have been studied at the high school level. Based on the pretest that has been carried out related to these materials, the cognitive ability (absorption capacity) of the meticulous subject on calculus material is still very low (<50%).

At the design stage, product design, media selection, format selection, and initial product design are carried out. Product design (teaching materials) begins with compiling problem-based learning materials by applying a scientific approach. Furthermore, the teaching materials that are compiled and developed are teaching materials in the form of modules. The format of the modules that are compiled and developed are designed in such a way, so that the modules are attractive for students to study. The initial product design includes cover design, content design, font selection (size and font), and layout. Cover design, font selection, and coloring are determined based on the response of design experts. Meanwhile, the content design, which includes coverage, breadth, and depth, is determined based on course descriptions and responses from material experts. The design of the content of the calculus module consists of instructions, learning outcomes, concept maps, learning materials (a scientific approach consisting of observing, asking questions, gathering information, associating, and communicating), problem solving, and answer keys.

At the development stage, teaching materials for module calculus courses are designed according to established procedures. The designed module contains calculus teaching materials by applying problem-based learning through a scientific approach. The steps in the process of developing teaching materials that are carried out are development, editing, validation and product revision.

Product development and editing are validated by the validator, both from the design aspect and the suitability of the material or content (content). Validation is carried out through research instruments that have been made and carried out by two relevant validators (lecturers). Design validation includes, simplicity, cohesiveness, balance, form, and coloration. While the validation of the suitability of the material (content) includes, coverage, depth, and breadth.

The validation of the design of teaching materials was carried out by 2 lecturers, and the validation process was based on a design questionnaire and the result was 94.6% (very good). Validation of the suitability of teaching materials (content) was carried out by 2 lecturers, and the validation process was based on a material suitability questionnaire, the results reached 83% (good category).

The response of careful subjects to teaching materials (127 respondents) was 93.3% (very good). The ability of conscientious subjects in absorbing learning material is distributed as follows, the average value of the class for problem solving is 77.2 and there are 48 conscientious subjects (students) who get a value greater than or equal to (≥75) from 60 respondents. This shows that the minimum completeness criteria (KKM) value reaches 80% (good category). Based on the test results, the average value of the creative thinking ability of classically conscientious subjects is 39.9 (good category).

V. Conclusion

Based on the results and objectives of the research above, the study concludes that the quality of the learning process is going well (effective), this can be seen from several indicators of the success of the learning process, namely. The average value of the problem-solving ability of classically meticulous subjects in solving problems of Calculus learning material reached 77.2 with a minimum completeness score of 80% (≥75%). The average value of the creative thinking ability of meticulous subjects in learning Calculus course material is classified as good because it has reached 39.9. The teaching materials for the "Calculus" course produced in this course have met the requirements or eligibility criteria, namely, the validity of the teaching material design is 94.6%, the validity of the suitability of the material is 83%, and this practical response is shown by the meticulous subject's response to the learning content of 93.3%.

References

Amri, S., 2010, Konstruksi Pengembangan Pembelajaran, Jakarta: Prestasi Pustaka

Anonim, 2011, Panduan Pengembangan Bahan Ajar, Direktorat Pembinaan Sekolah Menengah atas, Departemen Pendidikan Nasional

Anonim, 2017, Panduan Praktis Penyusunan E-Modul, Jakarta, Kemendikbud

Budiningsih, A., 2010, Belajar dan Pembelajaran, Jakarta: PT. Rineka Cipta

Cicchino, M., 2015, Using Game Based Learning to Foster Critical thinking in Student Discourse, Interdisciplinary Journal of Problem Besed Learning, Vol 9(2).

Daryanto, 2014, Pendekatan Pembelajaran Saintifik Kurikulum 2013, Yogyakarta, Penerbit Gava Media

de Bono, E., 2007, Revolusi Berpikir, Bandung, Kaifa

Erman, S., dkk. 2002, Strategi Pembelajaran Matematika Kontemporer, Bandung: JICA FPMIPA

Hamalik, O., 2007, Proses Belajar Mengajar, Jakarta: PT. Rineka

Hikmawati dan Wahyudi, 2014, Pengaruh Model Pembelajaran Berbasis Masalah Berbantuan Video Kartun Terhadap Hasil Belajar Fisika, Journal Pijar MIPA, Volume X Nomor 1, Maret 2015

Hosnan, M. 2014, Pendekatan Saintifik dan Kontekstual dalam Pembljaran Abad 21, Bogor, Ghalia Indonesia

Indrawati, 1999, Model-Model Pembelajaran IPA, Bandung: Pusat Pengembangan Penataran Guru IPA

Kahar, E.E. dan Yenice, N., 2012, The Investigation of scientific process skill level of elementary education 8th grade studetns in view of demographic features, Procedia Social and Behavioral Sciences

Khairrani, S., Suyanti, R.D., and Saragi, D. (2020). The Influence of Problem Based Learning (PBL) Model Collaborative and Learning Motivation Based on Students' Critical Thinking Ability Science Subjects in Class V State Elementary School 105390 Island Image. Budapest International Research and Critics in Linguistics and Education (BirLE) Journal Vol 3 (3): 1581-1590.

Komalasari, K., 2011, Pembelajaran Kontekstual Konsep dan Aplikasinya, Bandung: Refika Aditama

Lestari, K.E., 2015, Penelitian Pendidikan Matematika, Bandung, Refika Aditama

Madjid, A., 2014, Pembelajaran Tematik Terpadu, Bandung, Remaja Rosdakarya

Mariani, S., 2014, The effectiveness of Learning by PBL Assisted Mathematics Pop Up Books Againts the Spatial Ability in Grad VII on Geometry Subject Matter. International Journal of Education Research, Vol. 2(8), 531-548

Mudlofir, A., 2011, Aplikasi Pengembangan Kurikulum Tingkat Satuan Pendidikan dan Bahan ajar Dalam Pendidikan, Surabaya: Rajawali Pers

Munandar (1999), Mengembangkan bakat dan kreativitas anak sekolah, Jakarta: Gramedia

Nitko, A.j. dan Brookhart, S.M. 2011, Educational Assesment of Student (6th), Boston: Pearson Education

Pohan, A.M., Asmin, and Menanti, A. (2020). The Effect of Problem Based Learning and Learning Motivation of Mathematical Problem Solving Skills of Class 5 Students at SDN 0407 Mondang. Budapest International Research and Critics in Linguistics and Education (BirLE) Journal Vol 3 (1): 531-539.

Purboningsih, D., 2015, Panduan Keatif Membuat Bahan Ajar Inovatif, Yogyakarta: Diva Press

Purnawati, C., Pengembangan Lembar Kerja Siswa Berasis Pendekatan Saintifik dengan Model Probing Promting pada Materi Relasi dan Fungsi, Jurnal Agrisains, 5(1):43-64, ISSN: 2086-7719

Rusman, 2015, Pembelajaran Tematik Terpadu, Jakarta: Raja Grafindo

Sanjaya, W., 2008, Strategi Pembelajaran Berorientasi Standar Proses Pendidikan, Jakarta: Kencana Prenada

Siswono, dan Tatang, Y.E., 2015, Kontruksi Teoritik Tentang Tingkat Berpkir Kreatif Siswa dalam Matematika, Jurnal Pgriyogya

Siswono dan Tatang, Y.E, 2007, Desain Tugas untuk Mengidentifikasi Kemampuan Berpikir kreatif Siswa dalam Matematika" Jurnal (online), http://tatagyes.file.wordpress. Com/2007/10/tatag.jurnalunej.pdf.

Sudjana, N., 2009, Metode Statistika, Bandung: Tarsito

Sukmadinata, N.S., 2004, Kurikulum dan Pembelajran Kompetensi, Bandung: Yayasan Kesuma Karya

Sugiyono, 2012, Metode Penelitian Pendidikan, Bandung: Alfabeta

Sukmadinata, N.S., 2006, Metode Penelitian, Bandung: Remaja Rosdakarya

Sumantri, 2015, Strategi Pembelajaran Teori dan Praktik di Tingkat Pendidikan Dasar, Jakarta: PT. Cipta Raja Grafindo

Supriawan, D., dan Surasega, A.B., 1990, Strategi Belajar Mengajar, Bandung: FPTK-IKIP Bandung

Supriadi, E., 1996, Kreativitas Kebudayaan dan Perkembangan IPTEK, Bandung: Alfabeta

Susanto, A., 2014, Teori Belajar dan Pembelajaran di Sekolah Dasar, Jakarta: Prenadamedia Group

Tegeh, I.M., 2014, Model Penelitian Pengembangan, Yogyakarta, Graha Ilmu

Treffinger, D.J., Young, G.C., Selby, E.C., and Shepardson, C., 2002, Assessing Creativity A guide for Educators. The National research Center on the Gifted and Talented. Center for crative Learning, Saratosa, Florida.

Utomo, M.R., Hasruddin, and Murad, A. (2020). Influence of Problem Based Learning Models (PBL) and Learning Motivation to Learn Outcomes and Student's Critical Thinking Skills Themes of Caring for Life in Class IV Primary School No 026609 Pujidadi Binjai. Budapest International Research and Critics in Linguistics and Education (BirLE) Journal Vol 3 (4): 1634-1643.