

The Development of Digital Books Based on Contextual Approach to Improve Mathematical Communication Skills at Mawaridussalam Class VII A.Y 2020/2021

Putri Indah Lestari

Mathematics Education, Faculty of Mathematics and Natural Sciences,
Universitas Negeri Medan (20221), North Sumatera, Indonesia
putriindhlestari@gmail.com

Diterima 30 Agustus 2022, disetujui untuk publikasi 30 November 2022

Abstract. *This research aims to obtain a digital book based on a contextual approach that is valid, practical, and effective, so as to improve students' mathematical communication skills on the material of perimeter and area of a rectangle. The research instruments used were questionnaire and instrument validation sheets, lesson plans validation sheets, interactive teaching materials validation sheets, mathematical communication skills tests, and student and teacher response questionnaires to teaching materials. After all instruments, lesson plans, and interactive teaching materials were declared valid by the validator, then readability tests and field trials were carried out. The results of the study show that: (1) The digital book based on the contextual approach developed has met the criteria of validity based on the validator's assessment with an average validity of lesson plans of 87% in the very feasible category and the average validity of digital books is 90% for material and 88% for media with very decent category; (2) the contextual-based digital book developed has met the practicality criteria through: a) the results of the student response questionnaire to interactive teaching materials show the percentage of practicality of 79.9% in the very practical category; b) the results of the teacher's response questionnaire to interactive teaching materials show the percentage of practicality of 89.01% with a very practical category; (3) The developed contextual-based digital book meets the effective criteria with: a) classically 92% mastery of student learning; b) more than 65% of students achieved 75% of the learning objectives for each indicator; c) learning time is the same as ordinary learning in field trials and good student responses to the developed teaching materials. Through the Gain test, it can be seen that the mathematical problem solving ability of students using digital books based on a contextual approach has increased by 0.74, meaning that it is in the high category. . [THE DEVELOPMENT OF DIGITAL BOOKS BASED ON CONTEXTUAL APPROACH TO IMPROVE MATHEMATICAL COMMUNICATION SKILLS AT MAWARIDUSSALAM CLASS VII A.Y 2020/2021] (Jurnal Fibonacci, 03(2): 36 - 4, 2022)*

Keywords: Digital book; contextual approach; mathematical communication skills; rectangle.

Introduction

Mathematics is one of the subjects that must be studied. In studying mathematics there are objectives as states in the regulations of the Minister of National Education number 22 of 2006 which states that one of the goals of studying mathematics is to have the skills to communicate ideas with symbols, tables, or diagrams to study a situation or problem. Setiawan 2014 suggested that communication is very necessary as a means of conveying messages to message recipients. In addition, communication is needed as a medium to help, express opinions or behavior, either directly or indirectly. However, the reality is that the communication skills of students of class VII-C Mawaridussalam is still low. Therefore, to solve this problem, it is necessary to improve the quality of the learning process or to develop of teaching

materials such as technology-based teaching materials.

From the results of the diagnostic test of the VII-C grade students of SMP Mawaridussalam which was conducted on 26 students showing that the students have very low communication skills. The test given is related to the algebraic material, where students' communication skills can be seen from the mathematical communication indicators based on the results of students' answers, such as presenting images and mathematical symbols. The low mathematical communication skills of these students can also be seen from the results of interviews. The teacher said that the students' skills to express ideas, use symbols or mathematical language in writing and form mathematical models was still low. students are also unable to transform mathematical ideas or mathematical

solutions into pictures, diagrams, graphs or tables. This has an impact on the passing rate of the KKM (Minimum Completeness Criteria).

On the other hand, students of class VII-C Mawaridussalam admitted that they prefer learning with the use of technology in the form of digital media than conventional books. This is because learning using digital books can make students easier to understand the material from text, pictures, music, videos and animation. With this book, it is easier for them to understand mathematical concepts, for example to understand the concept of flat shapes. Where, there is only by knowing the concept of rectangles and triangles this can make it easier for students to find the area of other flat shapes without having to memorize the written formulas. In addition, students nowadays belong to the generation who are very accustomed to using and utilizing digital technology media to search for information and make transactions.

Based on the problems found and the advantages of digital books based on a contextual approach, it is believed that it can improve students' mathematical communication skills. Therefore, there is a need for efforts to conduct research under the title "THE DEVELOPMENT OF DIGITAL BOOKS BASED ON CONTEXTUAL APPROACH TO IMPROVE MATHEMATICAL COMMUNICATION SKILLS AT SMP MAWARIDUSSALAM CLASS VII-C YEAR 2020-2021"

Theoretical Framework

Learning

Learning is a complex process that occurs in every person throughout his life. The learning process occurs because of the interaction between a person and his environment. One sign that someone has learned is a change in behavior in that person that might be caused by a change in knowledge, skills, or attitudes. Learning mathematics in the sense of resolving mathematical problems is engaging reasoning, attitudes, examples, positive emotions and encouragement to be able to solve problems nationally and policy.

Development Research

Researchers have used a number of terms in the field of education to refer to what is meant by "development research" (development research), including: design studies, design experiments, design research, developmental research, formative research, formative inquiry, formative experiment, formative evaluation, action research, and engineering research. The research and development model chosen in this study is the ADDIE model. ADDIE stands for Analysis,

Design, Development or Production, Implementation or Delivery and Evaluations. This model can be used for various forms of product development such as models, learning strategies, learning methods, media and teaching materials. The ADDIE model was developed by Dick and Carry (1996) to design learning systems.

Development of Teaching Materials

Teaching material is a set of learning tools or tools containing learning material, methods, boundaries, and ways of evaluating systematically and attractively designed in order to achieve the expected goals, namely achieving competence or subcompetence with all its complexity (Widodo and Jasmadi in Sustainable, 2013: 1). It is known that teaching materials are very important for achieving learning objectives, but what and how the materials used to achieve these goals are left entirely to the educators as professionals. In this case the teacher is required to have the ability to develop their own teaching materials.

The quality aspect of teaching material is first seen from the validity level, which consists of content validity and construct validity. The second is practicality, which is seen from the use and ease of teachers and students in using and utilizing teaching materials that are developed. And the third is effectiveness, in terms of the willingness to learn, understand, and improve students' problem solving abilities. Based on the description above, in this study the quality of teaching materials is determined by valid, practical, and effective criteria.

Digital Books

Digital books or e-books (electronic books) are one of the technologies that utilize computers that are used to display information in the form of text, images, audio, video, and other multimedia in a concise and dynamic form that can be read by computers or other electronic devices. The function of digital books is as an alternative learning media. Unlike conventional books, digital books can contain multimedia content in them, enabling the presentation of information in a more interactive and interesting way. As a medium for sharing information, digital books can be distributed more easily than conventional books. One can easily become the author, as well as the publisher of his own book easily (Ruddamayanti 2019: 1197).

Mathematics Communication

Communication is the process of expressing ideas or mathematical understandings using numbers, images and words, in a variety of communities including teachers, peers, groups, or classes. In addition, According to Asikin (2001: 1) mathematical communication can be interpreted

as an event of mutual relations / dialogue that occurs in a classroom environment, where message transfer occurs. The message that is diverted contains mathematical material that is learned in class, communication in the classroom environment is the teacher and students. While the way to transfer the message can be written or verbally delivered by the teacher to students to communicate with each other, so that communication can run smoothly and vice versa if communication between students and teachers does not work well then the ability of mathematical communication is low.

According to NCTM (2000) mathematical communication emphasizes the ability of students in terms of: 1) organizing and consolidating their mathematical thinking through communication, 2) communicating their mathematical thinking coherently (logically arranged) and clearly to their peers, teachers and others, 3) analyze and evaluate mathematical thinking and strategies used by others, 4) use mathematical language to express mathematical ideas correctly. While the indicators used in this study refer to the communication component contained in the National Council of Teachers of Mathematics (NCTM) (1989: 214) include: (1) The ability to express mathematical ideas through oral, written, and demonstrate and visualize them visually ; (2) The ability to understand, interpret, and evaluate Mathematical ideas both verbally and in other visual forms; (3) The ability to use mathematical terms, notations and structures to present ideas, describe relationships and models of situations.

Contextual Teaching Learning

Contextual learning is a concept of learning and teaching that helps teachers link material taught with real-world situations and encourage students to make connections between the knowledge they have and their application in their lives as family members, citizens and workers.

Bern and Erickson (2001) in Komalasari (2014: 23) put forward five strategies in implementing contextual learning, namely problem-based learning, cooperative learning, project-based learning, service learning and work-based learning.

Research Methodology

Place and Time of Research. This research was conducted at Mawaridussalam Islamic Boarding School, which is one of the Islamic schools in the city of Medan. This research was conducted in the even semester of the 2019/2020 school year.

Subject and Object of Research. The subjects of this study were students of class VII-C Mawaridussalam which included one class with 26

students. The object of this research is to measure the effectiveness of digital books development products based on contextual approaches as measured by the level of ability to achieve student learning goals, levels of student activity, the level of teacher ability to manage the learning process and student responses to the learning process and to measure the validity of contextual based digital books development products on quadrilateral material.

Research Design. This research is research whose purpose is a product in the form of effective Digital Books. Because of these objectives, this type of research is development research. The development of this research digital book uses the ADDIE model. This model, as the name implies consists of five main phases or stages, namely (A) analysis, (D) design, (D) development, (I) implementation, and (E) evaluation. Using this model, the researcher will develop a teaching material product in the form of a digital book based on contextual approaches to improve students' mathematical communication skills.

Procedure. The procedures for developing research carried out using the ADDIE model to produce Digital Books are described as follows:

- Analysis Steps

This stage aims to establish and define learning requirements. This stage includes needs analysis, curriculum analysis, and student analysis.

- Design Steps

This stage aims to prepare learning tools for designing contextual based teaching materials. At this stage the design of digital books and research instruments was carried out. This stage consists of 3 steps, namely the compilation of a digital book requirement map, the preparation of a digital book framework, and the preparation of a research instrument design.

- Development Steps

In making digital books, researchers do several things, namely:

- a. Typing material and practice questions,
- b. Making animation or video related material,
- c. Audio selection,
- d. Making navigation buttons,
- e. Integration of all components with the main application.

- Implementation Steps

The fourth stage is implementation phase. Implementation is limited to the intended school as a place of research. The implementation was carried out with a limited trial consisting of 5

students and actual classroom testing to determine the practicality and effectiveness of the digital books that had been made. The steps taken at this stage are field trials, practicality trials and effectiveness testing.

- Evaluation Steps

An evaluation is carried out to see whether the teaching material being developed is successful, according to initial expectations or not. In the evaluation phase, an analysis of the quality of digital books is carried out in terms of the validity, practicality, and effectiveness of the developed digital books. The validity of digital books is obtained from assessments by experts at the development stage. While the practicality and effectiveness of each digital book is obtained from the results of filling in the student and teacher response questionnaire and the results of students' mathematical communication skills test at the implementation stage. At each stage through which a digital book will be revised, a revision will be needed at this stage. Revisions made according to the results of the evaluation are used to provide feedback to the user. It is intended that the teaching material developed can be used more widely (Mulyatiningsih, 2014: 201).

Data Analysis

- Validity Analysis

Table 1. Validity Criteria of Digital Books

Score	Validity Criteria
85,01 – 100,00%	Very valid
70,01 – 85,00%	Valid enough
50,01 – 70,00%	Invalid
01,00 – 50,00%	Invalid

Based on these criteria the self-developed worksheets have a good degree of validity and are suitable for use if the average percentage is $\geq 70.01\%$ or the minimum criteria for the level of validity achieved is "good enough".

- Practicality Analysis of Digital Books

The practicality of digital books is obtained from the student response questionnaire, teacher response questionnaire and observation sheet of the implementation of learning.

- Effectiveness Analysis

Analysis of the effectiveness of digital books is done with the aim to find out the effectiveness of digital books developed. The effectiveness data was obtained from the results of students' mathematical communication skills test. The effectiveness analysis aims to make a decision if necessary further testing is done in the digital book development stage.

- Qualitative Data Analysis

The validity of digital book products based on the Contextual Teaching and Learning (CTL) approach developed is in the feasible very high ($90\% \leq \text{TKKM} \leq 100\%$), high ($80\% \leq \text{TKKM} \leq 90\%$), enough ($65\% \leq \text{TKKM} \leq 80\%$), low ($56\% \leq \text{TKKM} \leq 65\%$), very low ($0\% \leq \text{TKKM} \leq 55\%$). 2.

Digital books based on the Contextual Teaching and Learning (CTL) approach are said to be practical if the results of the questionnaire responses of teachers and students are in the practical category (51% - 75%) or very practical (76% - 100%) and learning takes place. Digital book products based on the Contextual Teaching and Learning (CTL) approach are said to be effective if they meet: achievement of students' mastery learning classically that there are 85% of students who take part in the posttest score a minimum of 75 and achievement of learning indicators with completeness indicators of at least 65% of students who are able to achieve a minimum of 75% of the learning objectives formulated.

Result and Discussion

Research Result

From the needs analysis data, it is found that several problems occur so that solutions are needed that can minimize them, both on student work and problems during the learning process. The solution that is quite appropriate is to develop a digital book that is contextual to improve students' mathematical communication skills and is considered attractive so that students are more motivated in learning mathematics.

The curriculum analysis stage aims to identify, detail and arrange the main parts that students will learn. The results of this analysis are used as the basis for designing digital books and determining the number of face-to-face plans to be implemented. In this study, the material chosen was a rectangle for grade VII SMP which refers to the 2013 curriculum and is adjusted to a contextual approach.

The next step of this student analysis stage is to analyze learning with the aim of determining the ability of students involved in the learning process to achieve the goals to be achieved in geometry material. Based on the results of observations made at SMP Mawaridussalam, it is known that the student's academic ability is still low, this can be seen from the test results of students not being able to achieve the KKM score (Minimum Completeness Criteria). From the results of the tests carried out during the observation, the class average score was 29.5 out of

26 students. From this case, the researcher concluded that the problem that occurred today was that students were less able to solve problems in geometric material. Based on this analysis, learning using digital books based on a contextual approach to improve mathematical communication skills is expected to be suitable to be applied to grade VII students of SMP Mawaridussalam.

In the design stage, the researcher looks for and collects various references that are used to develop digital books based on the contextual approach. The references used come from various sources such as mathematics books, journals, theses / theses, and others, which are relevant and in accordance with the material perimeter and area of the rectangle.

The development stage is the process of realizing what has been done at the design stage. At this stage of development there are two main activities carried out, the first is to prepare all instruments such as questionnaires, questions, and lesson plans, and media elements which are then put together into a complete digital book. While the second activity is the stage of assessment or validation by experts on the various components that have been completed previously. The results of the expert validation analysis were all in "Sangat Valid" with the average of 90%. The results of the media validation analysis were all in "Sangat Valid" with the average of 88%.

After making improvements (revisions) based on comments and suggestions from experts, and all instruments and digital books based on the contextual approach developed that meet the validity criteria, the next stage is the implementation stage. digital books and test instruments will be tested for legibility first. Then both of them along with the Learning Plan will be used during field trials to see their practicality and effectiveness on learning. The results obtained from the students' readability test of digital books and test instruments showed that the two devices developed were mostly read clearly and could be understood. The results of the student response questionnaire analysis to digital books based on the contextual approach were $\geq 76\%$ of the 26 seventh grade respondents to 26 questionnaires, so that the teaching materials could be categorized as very practical. This means that the interactive teaching materials developed are responded positively by students.

The results of a questionnaire analysis of teacher responses to digital books based on a contextual approach were $\geq 76\%$ by one of the

teachers in the field of mathematics studies at the Mawaridussalam Islamic Boarding School as a respondent to 22 questionnaires, so that the teaching materials could be categorized as very practical. This means that the digital book developed has a positive response from the teacher. it can be concluded that students' mathematical communication from pretest to posttest in the field test has increased through the application of learning tools in the form of digital books based on the contextual approach developed. Thus, it can be said that the use of digital books based on a contextual approach developed in learning the circumference and area of a rectangle has an impact on improving students' mathematical communication skills.

At the evaluation stage, errors and deficiencies that occur during the research process are analyzed and then used as materials in improving the tools being developed, such as: some of the shortcomings and non-conformities of the Learning Implementation Plan (RPP) were developed based on the corrections and suggestions of the validator, the mismatch of pretest and posttest questions developed with a contextual approach and the ability of these questions to measure students' mathematical problem-solving abilities based on corrections and validator suggestions, weaknesses of digital books based on a contextual approach that are developed both in terms of material and media based on corrections and suggestions from validators and correction of writing errors and systematics of all tools and instruments developed based on validator corrections and legibility testing.

Discussion

Based on the description of the research results described in the results of the study, it is obtained a Learning Implementation Plan (RPP), test instruments (pretest and posttest), and digital books based on a contextual approach to improve the mathematical communication skills of junior high school students on the circumference and rectangular area. This digital book was developed with the ADDIE development model with five stages, namely: (1) the analysis stage, (2) the design stage, (3) the development stage, (4) the implementation stage, and (5) the evaluation stage (Evaluation). After all stages of development have been passed, quality interactive teaching materials will be obtained from the aspects of validity, practicality, and effectiveness..

From the results of the evaluation of each stage of digital book development based on the

contextual approach that has been carried out, all aspects such as lesson plans, test instruments, and interactive teaching materials developed have met the criteria of being valid, practical, and effective. Then the ADDIE model development cycle to obtain a quality interactive teaching material (valid, practical, and effective) has ended.

The results of validation by expert validators on questionnaire instruments, lesson plan design est instruments (pretest and posttest), and digital books based on the contextual approach show that all of these tools are classified as valid. The results of the validation of 4 types of questionnaire instruments showed that the criteria were feasible for the material expert validation questionnaire with an average score of 90% of the maximum score of 100%. Very feasible criteria for media expert validation questionnaires, teacher response questionnaires, and student response questionnaires to digital books based on a contextual approach with mean scores respectively 88%, 79.9%, and 89.01% of the maximum score of 100%. The results of the RPP validation with an average score of 87% of the maximum score of 100% fall into the very feasible category. Likewise, the results of the digital book validation based on the contextual approach show that the criteria are very feasible for the results of material validation with an average score of 90%, and also very feasible for the results of media validation with an average score of 88% from a maximum score of 100%. And for the developed test instruments, both the pretest and posttest both obtained valid information from 3 experts.

From the results of the validation for each device developed, a valid questionnaire, lesson plan, test instrument, and digital book based on a contextual approach were obtained that were valid and worthy of being tested in schools. However, the learning tools that have been declared valid still need to be improved in accordance with the validator's comments and suggestions, including the use of language, writing or typing, as well as the appearance of material and media features. So that based on the results of suggestions from experts, digital books and other supporting devices meet the valid criteria provided that they can be used with revisions according to suggestions.

Based on the results of the student response questionnaire analysis, contextual-based digital books obtained practicality validity of 79.9% and 89.01% based on teacher response questionnaires. So that the teaching material can be categorized as very practical, in accordance with the guidelines for the practicality criteria used by researchers, namely the device is declared very

practical if it has a practical validity value in the range of 76% - 100%.

Based on legibility tests and field trials, the digital book based on the contextual approach developed has met the effective criteria in terms of: (1) classical student learning completeness, that is, at least 85% of students taking part in learning are able to achieve a minimum value of 75 (2) achievement of minimum completeness indicators There are 65% of students who are able to achieve at least 75% of the learning objectives formulated, (3) the time used in learning is efficient or does not exceed ordinary learning, as well as student responses to positive learning. In the results of the pretest field trials there were 1 student (4%) who completed or exceeded the value of 75, while 25 students (96%) scored below 75 so that it was declared incomplete. Whereas in the posttest results, there was an increase in the number of students who obtained scores that reached or exceeded the KKM, namely 24 students (92%) and 2 students (8%) declared incomplete. Because the number of students who score ≥ 75 in the class is $\geq 85\%$ of the total students, then class VII is said to have completed their learning.

From the results of the achievement of each indicator that exceeds 65% of the total students, it can be concluded that the achievement of the indicators / completeness of the learning objectives in the field trials has been achieved. From the results obtained in total, it can be concluded that digital books based on a contextual approach to improve the mathematical communication skills of seventh grade students on the circumference and rectangular area have met the criteria of effectiveness based on the achievement of learning completeness..

In terms of improving students' mathematical communication ability, 84.6% of students experienced a high increase, 11.5% experienced an increase in the moderate category, and 3.8% in the low category of their mathematical communication skills after learning with the help of digital books based on a contextual approach . This increase is certainly influenced by the characteristics of digital books that use contextual problems as a starting point for learning, so that students are actively involved in carrying out problem exploration activities.

Conclusion and Suggestion

Conclusion

1. The quality of digital books developed with a contextual approach to the circumference and area of a rectangle is suitable for use from the aspects of validity, practicality, and effectiveness. In terms of the validity aspect, the digital book developed has met the validity

criteria based on the material and media validator's assessment, with an average score of 90% and 88% respectively, both of which obtained the very feasible category. In terms of practicality, the developed digital book is stated to be practical based on the results of a questionnaire on student and teacher responses to teaching materials. From the results of the student response questionnaire, the practicality value of the product was obtained, namely 79.9 % and the results of the teacher response questionnaire obtained a practicality value of 89.01%. Because the results of the questionnaire responses from teachers and students are in the range of 76% - 100%, digital books are categorized as very practical. In terms of effectiveness, contextual-based digital books are declared effective. This can be seen from: a) the achievement of classical learning completeness, namely as many as 92% of students who took part in learning achieved a value of ≥ 75 , b) the achievement of indicators / completeness of learning objectives, where the average individual learning completeness was 83% and c) time attainment time learning using digital books based on a contextual approach is the same as regular learning time and as many as 79.9% of the total students responded positively to the digital books developed.

2. The increase in mathematical communication skills of students who were given learning using digital books based on a contextual approach had an average increase of 47, from the previous average of students at the pretest was 36 to 83 in the posttest. And based on the Gain analysis, it was found that an overall increase in mathematical problem solving abilities was 0,74, of which 3,8% experienced an increase in the low category, 11,5% experienced an increase in the moderate category, and 84% experienced an increase in the high category.

Suggestion

1. The resulting contextual approach based learning tools have met the criteria of validity, practicality, and effectiveness so it is recommended that teachers be able to use this tool in developing the mathematical problem solving abilities of grade VII students on the circumference and rectangular area.
2. In the learning process using digital books based on a contextual approach it is

suggested that the media concerned interacts directly with students, not only being displayed in front of the class by the subject teacher.

3. This contextual approach-based learning tool can be used as a reference or reference for developing a new learning tool for other materials, in order to develop students' mathematical problem-solving abilities in general, both at different educational unit levels.
4. In the formation of discussion groups it is recommended not only to pay attention to the heterogeneity of the level of students' cognitive abilities, but the character of each individual and the comfort in the group is also needed.

Daftar Pustaka

- AbdulMajid.(2012). Perencanaan Pembelajaran. Bandung: Rosda Karya.
- Afrilianto, M. (2012), Peningkatan PemahamanKonsep danKompetensi Strategis Matematis siswa SMP dengan Pendekatan Metaphorical Thingking. Jurnal ilmiah program studi matematika STKIP Siliwangi Bandung (2).
- Akbar, Sa'dun.(2013). Instrumen Perangkat Pembelajaran. Bandung: Rsdakarya
- Akker, J. van den (1999) Principles and methods of development research. In J. van den Akker, N. Nieveen, R.M. Branch, K.L.Gustafson & T. Plomp (Eds.), Design methodology and developmental research in education and training (pp. 1-14). The Netherlands: Kluwer Academic Publishers.
- Akker, J. van den, Gravemeijer, K., McKenney, S., & Nieveen, N. (2006). Introducing educational design research. In J. van den Akker, K. Gravemeijer, S. McKenney & N. Nieveen (Eds.), Educational design research (pp. 3-7). London: Routledge.
- Andi Prastowo. 2014. Pengembangan Bahan Ajar Temati. Jakarta: Kencana Pranadamedia Group.
- Anik Yulianti. 2015. Meningkatkan Kemampuan Komunikasi Matematik pada Mahasiswa Melalui Pendekatan Contextual Teaching and Learning (CTL). Jurnal Ilmial Programstudi Matematika Vol.4, No.1 Februari 2015. Bandung: STKIP Siliwangi Bandung.
- Ansari, B.I. 2003. Menumbuhkembangkan Kemampuan Pemahaman dan Komunikasi Matematik Siswa SMU melalui Strategi Think-TalkWrite.Disertasi pada PPS UPI Bandung: tidak diterbitkan.
- Ansari, B.I. 2009. Komunikasi Matematik Konsep dan Aplikasi. Banda Aceh:Yayasan Pena

- Asmin dan Abil, M. (2014). Pengukuran dan penilaian Hasil Belajar dengan Analisis Klasik dan Modern. Medan: Larispa Indonesia.
- Ausubel, D.P. 1968. *The Psychology of Meaningful Verbal Learning*. New York: Grune and Straton.
- Barab, S., & Squire, K. (2004) Design-based research: Putting a stake in the ground. *The Journal of the Learning Sciences*, 13(1), 1-14.
- Bozkurt, A., dan M. Bozkaya. 2015. Evaluation Criteria for Interaktif E-Book fo Open and Distance Learning. *International Review of Research in Open and Distributed Learning*. 16(5):58-83.
- Brown, A.L. (1992) Design experiments: Theoretical and methodological challenges in creating complex interventions in classroom settings, *Journal of the Learning Sciences*, 2, 141-178.
- Bruner, J. 1997. *The Process of Education*. Cambridge: Harvad University Press.
- Collins, A. (1992) Towards a design science of education, In Scanlon, E. and O'Shea, T. (Eds.), *New directions in educational technology* (pp.15-22). Springer, Berlin.
- Daft, R.L., & Lengel, R.H. (1984). Infrmation Richness: a new appoach to managerial behavior and organization design. In: Cumings, L.L. & Staw, B.M. (Eds), *Research in organzational behavior* 6,(191-233). Homewood,IL: JAI Press
- Dick and Carey. (1996) *The sistematic Designof Instruction*. Fourth Edition Harper Collins College Publisher.
- Ditjen Dikdasmen Depdiknas RI. 2003. *Pendekatan Kontekstual (Contextual Teaching and Learning)*. Jakarta: Ditjen Dikdasmen Depdiknas.
- Dwi, Sumpono, dan Aceng. 2018. Pengembangan Media Pembelajaran E-book Berdasarkan Hasil Riset Elektroforesis 2-d untuk Mengukur Kemampuan Berfikir Kreatif Mahasiswa. *PENDIPA Journal of Science Education*, 2018:2(2), 131-134. Bengkulu: FKIP Universitas Bengkulu.
- Ebied, dan A. Rahman. 2015. The Effect of Interactive E-Book on Students Achievement at Najran Univrsity in Computer in Education Course. *Journal of ducation and Practice*, 6(19):2109-2139.
- Eggen, Paul dan Kauchak. 2012. *Menjadi Peneliti PTK yang Profesional*. Jakarta: PT Bumu Aksara
- Endang Mulyatiningsih. (2014). *Metode Peneitian Terapan Bidang Pendidikan*. Bandung: ALFABETA.
- Fatmawati, A. (2016). Pngembangan Perangkat Pembelajaran Koensep Pencmaran Lingkungan Menggunakan Model Pembelajaran Berdasarkan Masalah untuk SMA Kelas X. *Jurnal Education*, Vol. 4 No. 2, 2338-4387
- Gravemeijer, K. (1997). Instruktional dsaign for reform in mathematics education, In M. Beishuizen, K.P.E. Gravemeijer & E.C.D.M. van lieshout (Eds.), *iThe Role of Contexts and Models in Development of Mathematical Strategies and prcedures*, Freudenthal Institute, Itecht
- Hamalik, Oemar 2008. *Prencanaan Pengajaran Berdasarkan Pendekatan Sistem*. Jakarta: Bumi Aksara.
- Harjanto (2008). *Perencanaan Pengajaran*. Jakarta: Rineka Cipta
- Hasratuddin. 2014. Pembelajaran Matematika Sekarang dan yang akan Datang Berbasis Karakter. *Jurnal Didaktik Matematika* Vol.1, No.2 September 2014. Universitas Negeri Medam.
- Hasratuddin. 2018. *Mengapa Harus Belajar Matematika?*. Medan: UNIMED
- Humonggio, I. 2013. Deskripsi Kemampuan Komunikasi Matematika Siswa pada Materi Kubus dan Balok di Kelas VIII SMP Negeri 1 Tibawa. Universitas Negeri Gorontalo.
- Johnson E.B. (2002). *Contextual Teaching & Learning, What it is and why it's here to stay*. California: Corwin Press, Inc.
- Jossey-Bass Teacher (2009). *Mega-Fun Math Games and Puzzles for the Elementary Grades*. USA: John Wiley & Sons, Inc.
- Komalasari, K. 2011. *Pembelajaran kontekstual*. Bandung: PT Refika Aditama.
- Komalasari. 2014. *Pembelajaran Kontekstual (Konsep dan Aplikasi)*. Bandung: Refika Aditama.
- Ika Lestari. 2013. *Pengembangan Bahan Ajar Berbasis Kompetensi*. Padang: Akademia Permata
- Meltzer, D.E (2002). The Relationship Between Mathematics Preparation and Conceptual Larning Grains in Physics: A Posible "Hidden Variabel" in Diagnostice Pretest Scores. *Dalam American Journal Physics*, Vol 70(12)27 halaman.
- Munawarah. 2017. Pengembangan perangkat pembelajaran matematika dengan menggunakan pendekatan kontekstual. *MaPan : Jurnal Matematika dan Pembelajaran*, 5 (2), 168-186
- National Council of Teachers of Mathematics (NCTM). 1989. *Curriculum and Evaluation Standards for School Mathematics*. Reston, VA: NCTM
- National Council of Teachers of Mathematics. (2000). *Prinsiples and Standards for School Mathematics*. Reston: NCTM.
- Naimatil, dkk. 2017. Pengembangan E-book Interaktif Berbasis Fenomena Kehidupan Sehari-hari tentang Pemisahan Campuran. *Jurnal Pendidikan dan Pembelajaran Kimia* Vol.6, No.1 Edisi April 2017. Bandar Lampung: Universitas Lampung.

- Piaget, J. 1951. *The Child's Conception of the World*. Savage, Maryland: Littlefield Publishers.
- Ramellan, P., Musdi, E., & Armiami. (2012). Kemampuan komunikasi matematis dan pembelajaran interaktif, *Jurnal Pendidikan Matematika*, 1(1) Part 2, 77-82,
- Reeves, T.C., Herrington, J., & Oliver, R. (2005) Design research: A socially responsible approach to instructional technology research in higher education. *Journal of Computing in Higher Education*, 16(2), 97-116
- Reeves, T.C. (2006) Design research from a technology perspective. In J. van den Akker, K. Gravemeijer, S. McKenney & N.Nieveen (Eds.), *Educational design research* (pp. 52-66). London: Routledge.
- Ruddamayanti. 2019. Pemanfaatan Buku Digital Dalam Meningkatkan Minat Baca. *Prosiding Seminar Nasional Pendidikan Program Pascasarjana Universitas PGRI Palembang*, 12 Januari 2019
- Ruhimat, Toto. Dkk. 2011. *Kurikulum dan Pembelajaran*. Jakarta: PT Raja Grafindo Persada.
- Rusman. 2010. *Model-model Pembelajaran: Mengembangkan Profesionalisme Guru* (2nd ed.). Jakarta: Rajawali Pers.
- Sanjaya, H.W. 2006. *Strategi Pembelajaran Berorientasi Standar Proses Pendidikan*. Kencana: Jakarta.
- Sanjaya, Wina. 2012. *Strategi Pembelajaran Berorientasi Standar Proses Pendidikan*. Jakarta: Kencana
- Schunk, Dale. H. 2012. *Learning Theories: An Educational Perspective*, 6th Edition. New York: Person Education Inc.
- Seamolec. (2013). *Simulasi Digital Jilid 2: Buku Siswa SMK/MAK Kelas X*. Jakarta: Kementerian Pendidikan dan Kebudayaan RI
- Setiawan, W. 2014. Penerapan Pendekatan Kontekstual Untuk Meningkatkan Kemampuan Komunikasi dan Pemecahan Masalah Matematik. *Prosiding seminar Nasional Pendidikan*, 2,2(3), 44-56.
- Siti, dan Abdul. 2018. Efektifitas Pendekatan Contextual Teaching and Learning(CTL) Ditinjau dari Kemampuan Komunikasi Matematika Siswa. *MaPan : Jurnal Matematika dan Pembelajaran* Vol.6, No.1 Juni 2018. Yogyakarta: Universitas PGRI Yogyakarta.
- Smaldino, Sharon E., Lowther, Deborah L., Russel, James D. 2008. *Instructional Technology and Media for Learning* (Ninth Edition). NJ: Pearson Education Inc.
- Sudjana, Nana. 2004. *Dasar-dasar Proses Belajar Mengajar*. Bandung: Sinar Baru Algensindo Offset.
- Sugiyono. (2017). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Bandung: ALFABETA,CV.
- Syahbana,Ali. (2012).Peningkatan Kemampuan Berfikir Kritis Mathematis Siswa SMP melalui Pendekatan Contextual Teaching and Learning. *Journal Education/Vol.2,No.2*. hal. 116-123
- Vygotsky, L.S. 1978. *Mind in Society*. Cambridge: Harvad University.
- Tim Puslitjaknov. (2008). *Metode Penelitian Pengembangan*. Jakarta: Departmen Pendidikan Nasional.
- Walker, D.F. (1992) *Methodological issues in curriculum research*, In Jackson, P. (Ed.), *Handbook of research on curriculum* (pp. 98-118), Macmillan, New York.
- Walker, D. & Bresler, L. (1993). *Development research: Definitions, methods, and criteria*, Paper presented at AERA meeting, April 12 16, Atlanta.