



Development of teaching materials to improve understanding of material in computer application courses for PGSD students at Wijaya Kusuma University Surabaya

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ARTICLE INFORMATION

History:
Received 14 December 2024
Revised 24 February 2025
Published 18 May 2025

Keywords:

Teaching Materials, Computer Applications, PGSD Students



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ABSTRACT

This research was conducted because students felt that the existing teaching materials were boring, less interesting, and less able to enable students to easily understand the material, so there was an urgency to create teaching materials that made it easier to understand the material with direct involvement of students and lecturers, not just buying books at the publisher's shop. This research aims to describe the procedures for developing teaching materials, producing appropriate teaching materials, and the effectiveness of developing teaching materials. The type of research is Research & Development (R&D). As a result of the research that has been carried out, it is known that media expert lecturers and learning material experts have validated computer application teaching materials. Based on validation results from media experts, the average was 36.00, which is included in the "Good" criteria with an ideal percentage of 90%. Meanwhile, the validation results from material experts received an average of 47.50, which is included in the "Very Good" criteria with an ideal percentage of 79%. The trial phase was carried out 2 times, namely, limited and extensive trials. From the limited trial, it was discovered that the weaknesses and strengths of the computer application teaching materials were identified, so the researcher did a second revision after conducting the limited trial. In the second trial, namely a broad trial, several results were obtained to determine whether the computer application teaching materials were effective. It is hoped that developing this teaching material can produce quality teaching materials as a learning resource for students receiving lecture material, and provide potential for further research.

How to cite: Desiningrum, N., & Suryandari, S. (2025). Development of teaching materials to improve understanding of material in computer application courses for PGSD students at



INTRODUCTION

This research was conducted because students felt that the existing teaching materials were boring, less interesting, and less able to make students easily understand the material so that it became an urgency to make teaching materials that made it easier to understand the material with direct involvement of students with lecturers, not just buying books at publisher shops. Teaching materials are materials or subject matter arranged systematically by teachers and students in the learning process (Fu, Fan, Ji, & Zhao, 2020). Teaching materials are an important part of implementing education in schools (Hadinugrahaningsih, Rahmawati, & Ridwan, 2017; Sitorus & Masrayati, 2016). Through teaching materials, teachers will find it easier to carry out learning, and students will be more assisted and find it easier to learn.

Teaching materials are a set of learning tools or tools that contain learning materials, methods, boundaries and ways to evaluate which are systematically designed and attractive in order to achieve the expected goals, namely achieving competencies or sub-competencies with all their complexities (Chikiwa & Schäfer, 2018; Firdaus, Kailani, Bakar, & Bakry, 2015). This definition explains that teaching materials must be designed and written with instructional principles because teachers will use them to assist and support the learning process. Learning materials or materials are the "content" of the curriculum, which is in the form of subjects or fields of study with topics/subtopics and details (Guerra & Holgaard, 2016; Yazar Soyadı, 2015).

In addition, "the existence of teaching materials plays a vital role in supporting the success of learning because it can bridge, even combine student experience and knowledge" (E. P.L. Emanuel, Kirana, & Chamidah, 2021; Putut Laksminto Emanuel & Zakiyah, 2021). The subject chosen for teaching materials is computer application courses because these courses are practical courses that require book guides that can make it easier for students to understand the material and practice directly through computer laboratories. According to the National Center for Competency Based Training (Alex Barakabitze, J. Kitindi, Sanga, Kibirige, & Makwinya, 2015; Roussinos & Jimoyiannis, 2019; Zhang & Liu, 2016) materials is any form of material used to assist teachers or instructors in carrying out the learning process. The intended material can be written or unwritten (Kaya & Aydin, 2016; Meyer, 2018; Park, Byun, Sim, Han, & Baek, 2016; Son, Han, Kang, & Kwon, 2016). The views of other experts say that teaching materials are a set of materials that are systematically arranged, both written and unwritten, to create an environment or atmosphere that allows students to learn (Atabaki, Keshtiaray, & Yarmohammadian, 2015; Mumford, Todd, Higgs, & McIntosh, 2017). According to Goodnough, Azam, and Wells (2019) and Roussinos and Jimoyiannis (2019), teaching materials are materials or subject matter arranged systematically, which teachers and students use in the learning process.

Teaching materials are a component of the completeness of the learning process (Borba et al., 2016). Textbooks are part of teaching materials (Eka Susanti & Wahyudin, 2017; Tirani, 2017). The availability of textbooks is an ideal supporting element in the learning process (Kriyany & Armiami, 2019; Erika Susanti & Wahid, 2018). Its existence means lecturers do not need to explain too much material in class, but provide more guidance to students. Textbooks for students can increase the attractiveness of learning independently or collaboratively and enrich information (Habsyi, 2020; WIJAYA, 2016).

As a printed learning media tool, textbooks are used to facilitate educators and students in improving their competence (Febri, 2021; Yanti et al., 2021). Therefore, in compiling, it must be well planned according to needs. Textbooks are handbooks for a course that are written and compiled by experts in related fields, meet the rules of textbooks, and are officially published and disseminated.

Effective teaching materials in language teaching are shaped by consideration of several factors, including teacher, learner, and contextual variables (Emanuel et al., 2021). Teacher factors include language proficiency, training and experience, cultural background, and preferred teaching style (Haris, 2019). Learner factors include learners' learning style preferences, their language learning needs, interests, and motivation (Kholil & Zulfiani, 2020; Tirani, 2017; Yuliantika, 2017). Contextual factors include school culture, classroom conditions, class size, and the availability of teaching resources in situations where the material will be used (Safitri, 2022; Sari, Ramadhani, 2024; Somawati, 2024). Learning materials are related to the final ability to be achieved.

Some of the benefits of textbooks in the learning process are students in group, individual and classical learning, students can learn the topic of material first, educators can save time in teaching, as a support for lectures lecturers are not too giving lectures, changing the role of educators to facilitators, improving the learning process that is effective, varied and interactive (Qomariyah, 2015). Computer applications are a type of computer program that is made by a programming language and is used for various necessary needs (Alex Barakabitze, et al., 2015; Algilani, Langius-Eklöf, Kihlgren, & Blomberg, 2017). The Introduction to Computer Applications course allows students to use office computer application software, such as creating letters, making financial reports, making presentations, creating/sending/replying/forwarding electronic mail (email), and searching for data sources and information on the internet.

Software or applications have the following functions: 1. Processing data, commands, or special instructions so that users can operate their computers according to the desired information results. 2. Means of interaction to connect users with other tap devices. The benefits of computers that make it very easy for humans include processing data, speeding up work, sending information, printing important documents, and communicating with certain parties who have a relationship with the company.

Student understanding can be interpreted as the level of ability expected of students to understand the meaning or concepts, situations, and facts they know (Sudarsana et al., 2019). 7 ways to measure student understanding of learning, consecutively including interpreting, exemplifying, classifying, summarizing, inferring, comparing, and explaining. The first way to measure student understanding of learning is through interpretation. Interpretation occurs when a student can change one form of information into another. For example, from graphs to sentences or vice versa, from words to numbers or vice versa, or words to words, summarizing or paraphrasing. Assessment format in the form of a test format, short answer (students find answers), and multiple choice (students choose answers). The second way to measure student understanding of learning is through an example. Exemplifying or illustrating can be done when a student can be said to understand when they can provide an example of a general concept or principle. Providing this example can show that a student is familiar with a form that can identify the characteristics of a concept and then use the characteristics of the concept obtained to make an example. Modeling involves identifying the key features of a general concept or principle. Assessment format: Test format, short answer (students search for answers), and multiple choice (students select answers).

The third way to measure students' understanding of learning is through classification. A student is said to understand when they can recognize that something (object or phenomenon) falls into a specific category, including the ability to classify the characteristics of an object or phenomenon. It involves detecting characteristics or patterns corresponding to examples, concepts, or principles. Assessment Format: In a short-answer test, students are given an example and required to create a concept or principle that corresponds to the example. In a multiple-choice test, students are given an example and then required to select a concept or principle from a choice of concepts or principles. Students may also be given several examples and required to determine which belong to a category and which do not, or they may be required to place an example into one of many categories.

The fourth way to measure student understanding of learning is through summarizing. Summarizing is making a question that represents all the information or making an abstract of a writing. Summarizing requires students to select the essence of information and summarize it, i.e., be able to specify a condition. The process of summarizing information. Other names for summarizing are generalizing and abstracting. Assessment format: Short-answer or multiple-choice test for determining a theme or summarizing. The fifth way to measure student understanding of learning is through inferring. Inferring occurs when a student can abstract a sample or find a pattern from a series of examples or facts—for example, predicting the development of a population in a community based on data on population development in a community based on data on population development over the past ten years. Also called extrapolating, interpolating, predicting, and inferring. Assessment formats include completion tests, analogy tests, and exclusion tests.

The sixth way to measure student understanding of learning is through comparison. A student can compare when he or she can detect similarities and differences shared by two or more objects. It involves the process of detecting similarities and differences between two or more objects, events, ideas, problems, or situations, such as determining how an event is known. The format of the assessment is mapping. The seventh way to measure student understanding of learning is through explanation. Students can explain when they can provide a model of a theory or construct and use a cause-and-effect model in a system, explaining, creating, and using cause-and-effect models in a system. The explanation assessment format comprises reasoning, problem solving, redesign, and prediction tasks.

METHODS

This type of research is development research or Research and Development (R&D), which aims to develop teaching materials in Computer Application courses that are well qualified by paying attention to validity, practicality, and effectiveness. The research and development method, or *Research and Development*, is a research method used to produce specific products and test the effectiveness of these products (Putut, Emanuel, Nusantara, & Rahardi, 2024; Putut, Emanuel, Nusantara, Rahman, & Rahardi, 2023). The initial step was to form a group of students who participated in this research, namely students of the Elementary School Teacher Education study program in the 6th semester of the 2023/2024 academic year. They then searched and collected references to develop teaching materials for computer application courses.

To be able to produce specific products, research is used, which includes a needs analysis, and to test the effectiveness of these products so that they can function in the

broader community, research is needed. The research stages used appear in Figure 1.

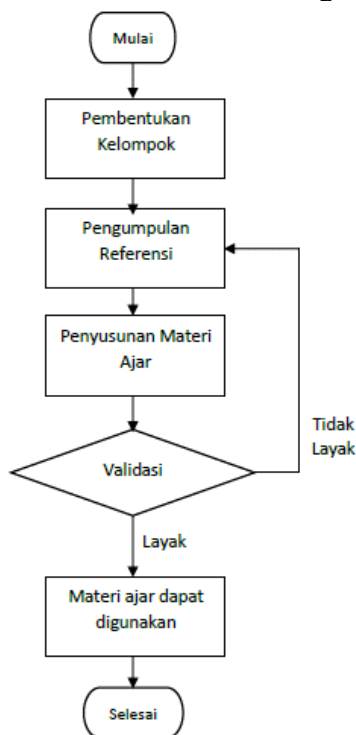


Figure 1: Flowchart of research stages

From Figure 1, it can be said that the teaching materials produced by students are tested for validation. The validation test by material experts and media experts is expected so that the material produced can be used properly. If there are still deficiencies, they must be refined and retested. If it is suitable for use, it is tested using *SPSS software* to measure its effectiveness, as shown in Figures 2 and Figures 3.

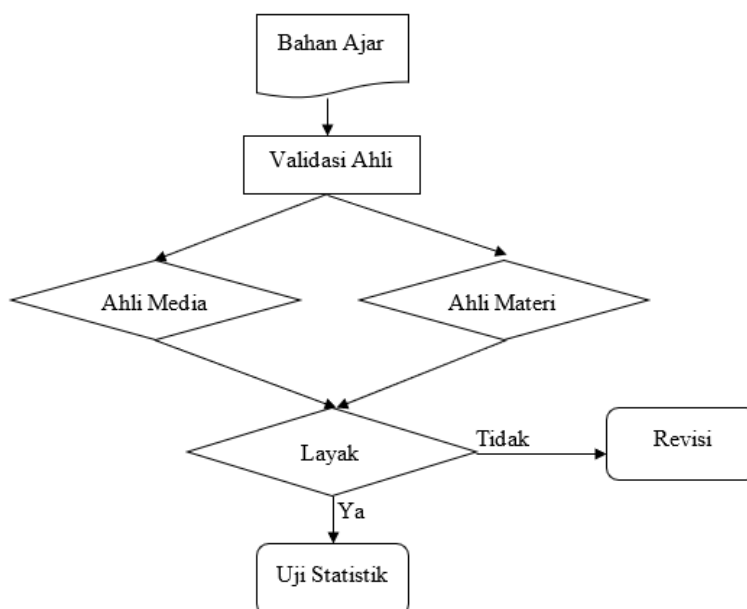


Figure 2: Stages of Expert Validation

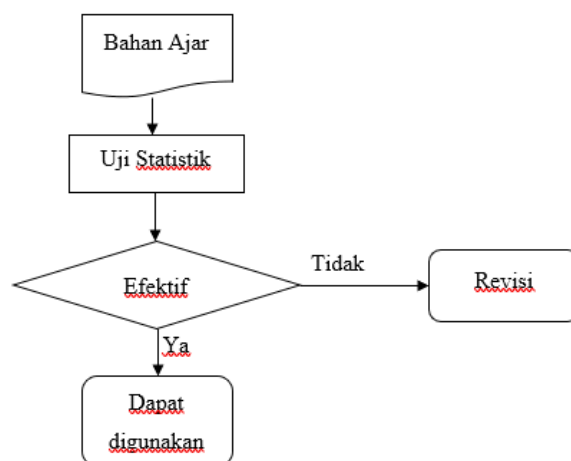


Figure 3: Stages of Statistical Test

After expert validators validate the teaching materials, the next step is a statistical test to measure their effectiveness. The statistical test uses an independent t-test with an α value of 5%. The initial hypothesis is that using computer application teaching materials has a significant effect on old teaching materials. The initial hypothesis is accepted if $t_{(count)} > t_{table}$. The validation stages using statistical tests appear in Figure 3 above. So, in this study, the authors used the *research and development* method. In this study, the product type produced is computer application teaching materials. Thus, this study will measure how effective the computer application teaching materials are in learning to the level of student understanding.

RESULTS AND DISCUSSION

This research was conducted on 6th-semester students in the 2023/2024 academic year, totaling 20 students. The initial stage, by researchers, involved students composing teaching materials for computer applications by forming groups. Each group gets the task of compiling teaching materials according to the subject matter given previously by referring to the latest reference sources. The latest references are intended to facilitate understanding of learning materials and increase their effectiveness. This agrees with Aini, Emanuel, & Chamidah(2021) which states that the use of information technology can improve learning outcomes which are learning outcomes. This opinion is supported by Endrayana Putut Laksminto Emanuel, Meidiana, and Suhartono(2021), which states that using information technology in learning can improve student learning outcomes.

The computer application teaching materials produced must be based on an analysis of community needs, namely, utilizing technological and information advances that are rapidly developing. This aligns with research conducted by Sudarsana et al. (2019) that technology in educational activities can improve student learning outcomes. In this study, the teaching materials developed have utilized advances in information technology, so that they are tailored to the needs of society, especially the world of education today. Based on the references provided by students in the teaching materials produced, it can be said that information technology is beneficial. Computer application teaching materials utilizing technological advances benefit the wider community's needs today, especially in education.

After the computer application teaching materials have been completed and printed, the teaching materials are validated by media expert lecturers and learning material experts, as shown in Figure 2 above, to conclude that the teaching materials are

suitable for use. Decent criteria can be obtained if teaching materials are easy and can help improve student learning outcomes. This opinion is in line with research conducted by Kim (2018), which states that teaching materials suitable for use are based on information technology and can be used anywhere and anytime. Teaching materials produced by students in this study have received criteria worthy of use based on validation from media and learning material expert lecturers, so it is expected to be used in learning activities.

Based on the validation results from media experts, it gets an average of 36.00, which is included in the "Good" criteria with an ideal percentage of 90 %. At the same time, the validation results from material experts averaged 47.50, which was included in the "Very Good" criteria, with an ideal percentage of 79 %. Based on the validation results from media experts and learning materials, the computer application teaching materials are suitable for use, even though minor revisions, comments, and suggestions still need improvement. Improvements and revisions are made in order to get better teaching materials than before. This activity is in line with the thoughts of Roussinos & Jimoyiannis (2019), which states that improvements and revisions are made to achieve learning objectives in the classroom.

After being validated by media and learning material experts, the next stage is to measure the effectiveness of teaching materials by conducting limited trials and extensive trials on students, as in Figure 3 above. Limited trials are used to measure the effectiveness of teaching materials in small groups of users. The broad trial is used to measure the effectiveness of teaching materials when used by large groups of users. Small group trials are conducted so that if revisions are needed, they will be corrected again so that the broad trial can minimize its weaknesses. This aligns with the thinking of Zhang & Liu (2016) that before the teaching materials produced are used in the wider community, it would be nice to be tested first on a small group of students. The weaknesses and advantages of the computer application teaching materials were known from the limited trial, so the researchers made a second revision after conducting a limited trial.

In the second trial, namely the broad trial, several results were obtained to determine whether the computer application teaching materials were effective. In testing the product's effectiveness using the *Independent Sample t-test* calculation, with a confidence level of 95% and $\alpha = 5\%$, the t_{count} was 3.538 while the t_{table} was 2.011. These results show that $t_{count} > t_{(table)}$, meaning that the hypothesis is accepted. So, it can be concluded that there is a significant difference between computer application teaching materials and old teaching materials, where computer application teaching materials are more effectively used as teaching materials for students in computer application courses. The use of teaching materials that integrate newer information technology is effective for improving student learning outcomes. This is supported by research conducted by Putut Laksminto Emanuel & Zakiyah (2021) and Sudarsana et al. (2019), which states that student learning outcomes can increase and learning becomes more effective using information technology in learning activities.

CONCLUSION

Based on the validation results from media experts, it gets an average of 36.00, which is included in the "Good" criteria with an ideal percentage of 90 %. At the same time, the validation results from material experts received an average of 47.50, which is included in the "Very Good" criteria with an ideal percentage of 79 %. The trial phase

was carried out twice: limited and broad trials. The weaknesses and advantages of the computer application teaching materials were known from the limited trial, so the researchers made a second revision after conducting a limited trial. In the second trial, namely the broad trial, several results were obtained to determine whether the computer application teaching materials were effective. Computer application-based teaching materials make it easier for students to understand the material and are effective in learning. The hope is that developing this teaching material can produce quality teaching materials as a source of student learning in receiving lecture material.

REFERENCES

- Aini, F. N., Emanuel, E. P. L., & Chamidah, A. (2021). Efektivitas Penerapan Model Blended Learning Berbasis Google Classroom Ditinjau dari Motivasi Belajar dan Hasil Belajar Siswa Pada Pokok Bahasan Trigonometri Kelas XI IPA-1 SMA Hang Tuah 4 Surabaya. *Briliant: Jurnal Riset Dan Konseptual*, 6(2), 303. <https://doi.org/10.28926/briliant.v6i2.629>
- Alex Barakabitze, A., J. Kitindi, E., Sanga, C., Kibirige, G., & Makwinya, N. (2015). Exploring Students' Skills and Attitudes on Effective Use of ICTs: Case Study of Selected Tanzanian Public Secondary Schools. *Universal Journal of Educational Research*. <https://doi.org/10.13189/ujer.2015.030609>
- Algilani, S., Langius-Eklöf, A., Kihlgren, A., & Blomberg, K. (2017). An interactive ICT platform for early assessment and management of patient-reported concerns among older adults living in ordinary housing – development and feasibility. *Journal of Clinical Nursing*. <https://doi.org/10.1111/jocn.13468>
- Atabaki, A. M. S., Keshtiaray, N., & Yarmohammadian, M. H. (2015). Scrutiny of critical thinking concept. *International Education Studies*. <https://doi.org/10.5539/ies.v8n3p93>
- Borba, M. C., Askar, P., Engelbrecht, J., Gadanidis, G., Llinares, S., & Aguilar, M. S. (2016). Blended learning, e-learning and mobile learning in mathematics education. *ZDM - Mathematics Education*. <https://doi.org/10.1007/s11858-016-0798-4>
- Chikiwa, C., & Schäfer, M. (2018). Promoting critical thinking in multilingual mathematics classes through questioning. *Eurasia Journal of Mathematics, Science and Technology Education*. <https://doi.org/10.29333/ejmste/91832>
- Emanuel, E. P.L., Kirana, A., & Chamidah, A. (2021). Enhancing students' ability to solve word problems in Mathematics. *Journal of Physics: Conference Series*, 1832(1). <https://doi.org/10.1088/1742-6596/1832/1/012056>
- Emanuel, Endrayana Putut Laksminto, Meidiana, Y. G., & Suhartono. (2021). Studi Komparasi Penggunaan Google Meet dan Whatsapp Group Terhadap Hasil Belajar Siswa SMA Hangtuah 4 Surabaya. *Briliant: Jurnal Riset Dan Konseptual*, 6(4), 849–853.
- Febri, A. (2021). Pengaruh kelengkapan fasilitas belajar erhadap hasil belajar matematika siswa kelas V Mi Nurul Ulum Madiun. *Jurnal Paradigma*, 11(1), 187–201.
- Firdaus, F., Kailani, I., Bakar, M. N. Bin, & Bakry, B. (2015). Developing Critical Thinking Skills of Students in Mathematics Learning. *Journal of Education and*

- Learning (EduLearn), 9(3), 226. <https://doi.org/10.11591/edulearn.v9i3.1830>
- Fu, K., Fan, D. P., Ji, G. P., & Zhao, Q. (2020). JL-DCF: Joint learning and densely-cooperative fusion framework for RGB-D salient object detection. Proceedings of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition. <https://doi.org/10.1109/CVPR42600.2020.00312>
- Goodnough, K., Azam, S., & Wells, P. (2019). Adopting Drone Technology in STEM (Science, Technology, Engineering, and Mathematics): An Examination of Elementary Teachers' Pedagogical Content Knowledge. *Canadian Journal of Science, Mathematics and Technology Education*. <https://doi.org/10.1007/s42330-019-00060-y>
- Guerra, A., & Holgaard, J. E. (2016). Enhancing critical thinking in a PBL environment. *International Journal of Engineering Education*.
- Habsyi. (2020). Pengaruh Fasilitas Belajar Terhadap Prestasi Belajar. *Jurnal Pendidikan Dan Ekonomi*, xx(xx), 15.
- Hadinugrahaningsih, T., Rahmawati, Y., & Ridwan, A. (2017). Developing 21st century skills in chemistry classrooms: Opportunities and challenges of STEAM integration. *AIP Conference Proceedings*. <https://doi.org/10.1063/1.4995107>
- Haris, H. dan B. F. (2019). Penerapan Model Pembelajaran Kooperatif Tipe Student Teams Achievement Division (STAD) pada Pelajaran PKn di SMA Negeri 1 Watansoppeng. *Journal of Chemical Information and Modeling*.
- Kaya, D., & Aydin, H. (2016). Elementary mathematics teachers' perceptions and lived experiences on mathematical communication. *Eurasia Journal of Mathematics, Science and Technology Education*. <https://doi.org/10.12973/eurasia.2014.1203a>
- Kholil, M., & Zulfiani, S. (2020). Faktor-Faktor Kesulitan Belajar Matematika Siswa Madrasah Ibtidaiyah Da'watul Falah Kecamatan Tegaldlimo Kabupaten Banyuwangi. *EDUCARE: Journal of Primary Education*, 1(2), 151–168. <https://doi.org/10.35719/educare.v1i2.14>
- Kim, S. (2018). ICT for Children of Immigrants: Indirect and Total Effects via Self-Efficacy on Math Performance. *Journal of Educational Computing Research*. <https://doi.org/10.1177/0735633117699954>
- Kriyany, A. Y., & Armiami, A. (2019). Pengaruh Fasilitas Belajar Dan Disiplin Belajar Terhadap Hasil Belajar Teknologi Perkantoran Kelas X Adp SMK Negeri 1 Lubuk Basung. *Jurnal Ecogen*, Vol. 2, p. 227. <https://doi.org/10.24036/jmpe.v2i3.7329>
- Meyer, M. (2018). Options of discovering and verifying mathematical theorems - Task-design from a philosophic-logical point of view. *Eurasia Journal of Mathematics, Science and Technology Education*. <https://doi.org/10.29333/ejmste/92561>
- Mumford, M. D., Todd, E. M., Higgs, C., & McIntosh, T. (2017). Cognitive skills and leadership performance: The nine critical skills. *Leadership Quarterly*. <https://doi.org/10.1016/j.leaqua.2016.10.012>
- Park, H. J., Byun, S. Y., Sim, J., Han, H., & Baek, Y. S. (2016). Teachers' perceptions and practices of STEAM education in South Korea. *Eurasia Journal of Mathematics, Science and Technology Education*. <https://doi.org/10.12973/eurasia.2016.1531a>

- Putut, E., Emanuel, L., Nusantara, T., & Rahardi, R. (2024). Does Domain of Absolute Value Function Always Positive? Commognitive-Conflict Analysis of Students of First Semester. *Qalamuna: Jurnal Pendidikan, Agama, Dan Sosial*, 16(2), 795–806. <https://doi.org/10.37680/qalamuna.v16i2.5169>
- Putut, E., Emanuel, L., Nusantara, T., Rahman, A., & Rahardi, R. (2023). Why am I confused? Commognitive Conflict in Non-ordinary Question About Number Division. *Journal for ReAttach Therapy and Developmental Diversities*, 6(5s), 891–901. Retrieved from <https://jrtd.com/index.php/journal/article/view/644>
- Putut Laksminto Emanuel, E., & Zakiyah, A. M. (2021). Penggunaan Media ICT dalam Implementasi Problem Based Learning pada Pelajaran IPA Materi Siklus Hidup. *Briliant: Jurnal Riset dan Konseptual*, 6(2), 321. <https://doi.org/10.28926/briliant.v6i2.650>
- Qomariyah, S. N. (2015). Pengaruh Perhatian Orang Tua terhadap Prestasi Belajar Menjahit pada Siswa SMPN 2 Mojogedeng Kabupaten Karangayar. *Jurnal Keluarga*, 1(1), 55–61.
- Roussinos, D., & Jimoyiannis, A. (2019). Examining Primary Education Teachers' Perceptions of TPACK and the Related Educational Context Factors. *Journal of Research on Technology in Education*. <https://doi.org/10.1080/15391523.2019.1666323>
- Safitri, A. N. (2022). Pengaruh Perhatian Orang Tua Dan Fasilitas Belajar Terhadap Hasil Belajar Matematika Peserta Didik Kelas V Sekolah Dasar. *Universitas Lampung*, Vol. 33, pp. 1–12.
- Sari, N., Ramadhani, V., (2024). Pengaruh Motivasi Belajar Dan Disiplin Belajar Terhadap Prestasi Belajar Matematika Siswa Kelas VIII di MTSN 1 Bukit Tinggi. *Jurnal Citra*, 3, 1603–1611. Retrieved from <http://jurnalilmiahcitrabakti.ac.id/jil/index.php/jcp/article/view/3194%0Ahttps://jurnalilmiahcitrabakti.ac.id/jil/index.php/jcp/article/download/3194/878>
- Sitorus, J., & Masrayati. (2016). Students' creative thinking process stages: Implementation of realistic mathematics education. *Thinking Skills and Creativity*. <https://doi.org/10.1016/j.tsc.2016.09.007>
- Somawati, S. (2024). Peran Serta Orang Tua Terhadap Prestasi Belajar Siswa di SMP Negeri 6 Palu Sulawesi Selatan. *Indo-MathEdu Intellectuals Journal*, 5(1), 232–242. Retrieved from <https://ejournal.indo-intellectual.id/index.php/imeij/article/view/597>
- Son, J. W., Han, S. W., Kang, C., & Kwon, O. N. (2016). A comparative analysis of the relationship among quality instruction, teacher self-efficacy, student background, and mathematics achievement in South Korea and the United States. *Eurasia Journal of Mathematics, Science and Technology Education*. <https://doi.org/10.12973/eurasia.2016.1532a>
- Sudarsana, I. K., Nakayanti, A. R., Sapta, A., Haimah, Satria, E., Saddhono, K., Mursalin, M. (2019). Technology Application in Education and Learning Process. *Journal of Physics: Conference Series*, 1363(1). <https://doi.org/10.1088/1742-6596/1363/1/012061>

- Susanti, Eka, & Wahyudin, A. (2017). Pengaruh kemampuan ekonomi orang tua terhadap hasil belajar melalui fasilitas belajar di rumah dan motivasi belajar sebagai intervening. *Economic Education Analysis Journal*, Vol. 6, pp. 475–488.
- Susanti, Erika, & Wahid, S. (2018). Gambaran Penyediaan Fasilitas Belajar oleh Orangtua di Taman Pendidikan Alquran (TPA) Jorong Bonjo, Kenagarian Panampuang, Kecamatan IV Angkek, Kabupaten Agam. *SPEKTRUM: Jurnal Pendidikan Luar Sekolah (PLS)*, 6(3), 296. <https://doi.org/10.24036/spektrumpls.v1i3.100560>
- Tirani, A. A. (2017). Hubungan Antara Kebiasaan Belajar, Fasilitas Belajar Dan Perhatian Orang Tua Dengan Prestasi Belajar Matematika Siswa Kelas Vii Smp Negeri Se-Kecamatan Pajangan. *UNION: Jurnal Ilmiah Pendidikan Matematika*, Vol. 5, pp. 59–66. <https://doi.org/10.30738/.v5i1.928>
- Wijaya, A. T. (2016). Hubungan Antara Fasilitas Belajar Di Rumah Dan Motivasi Belajar Dengan Prestasi Belajar Pekerjaan Dasar Teknik Otomotif Siswa TKR SMK Muhammadiyah Bantullipuro Tugas. pp. 31–48.
- Yanti, O. L., Harahap, F., Harahap, T., Pendidikan, I., Selatan, T., Studi, P., & Ekonomi, P. (2021). Pengaruh Fasilitas Belajar Di Rumah Terhadap Motivasi Belajar Siswa Kelas Xi Sma Negeri 5 Padangsidempuan. *Jurnal Misi Institut Pendidikan Tapanuli Selatan (IPTS)* Hal, 4(2), 189.
- Yazar Soyadı, B. B. (2015). Creative and Critical Thinking Skills in Problem-based Learning Environments. *Journal of Gifted Education and Creativity*. <https://doi.org/10.18200/jgedc.2015214253>
- Yuliantika, S. (2017). Analisis Faktor-Faktor Yang Mempengaruhi Disiplin Belajar Siswa Kelas X, XI, dan XII di SMA Bhakti Yasa Singaraja Tahun Pelajaran 2016/2017. *Jurnal Pendidikan Ekonomi Undiksha*, Vol. 9, p. 35. <https://doi.org/10.23887/jjpe.v9i1.19987>
- Zhang, D., & Liu, L. (2016). How does ICT use influence students' achievements in math and science over time? Evidence from PISA 2000 to 2012. *Eurasia Journal of Mathematics, Science and Technology Education*. <https://doi.org/10.12973/eurasia.2016.1297a>