



Case-Based Learning on Concept Mastery and Students' Thinking Ability in the Field of Nutrition and Health

Desak Made Citrawathi^{1*}, Putu Budi Adnyana² 

^{1,2} Biology Education Study Program, Universitas Pendidikan Ganesha, Singaraja, Indonesia

ARTICLE INFO

Article history:

Received January 12, 2023

Accepted April 12, 2023

Available online April 25, 2023

Kata Kunci:

Pembelajaran berbasis kasus, kemampuan berpikir, hasil belajar, gizi, kesehatan

Keywords:

Case-Based Learning, Thinking Skills, Learning Outcomes, Nutrition, Health



This is an open access article under the [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.

Copyright © 2023 by Author. Published by Universitas Pendidikan Ganesha.

ABSTRAK

Perkuliahan gizi dan kesehatan yang berlangsung selama ini yaitu mahasiswa kurang mampu mengembangkan kemampuan berpikir tingkat tingginya dengan optimal. Proses pembelajaran dengan strategi dan metode yang digunakan belum dapat memaksimalkan proses belajar mahasiswa untuk bisa mengembangkan kemampuan berpikir tingkat tingginya. Tujuan penelitian ini yaitu menganalisis keefektifan pembelajaran berbasis kasus terhadap penguasaan konsep dan kemampuan berpikir mahasiswa dalam bidang gizi dan kesehatan remaja. Jenis penelitian ini yaitu kuantitatif. Subjek penelitian adalah mahasiswa semester 6 yang memprogramkan Mata Kuliah Gizi dan Kesehatan dengan jumlah 24 orang. Desain penelitian adalah one short case study. Metode pengumpulan data menggunakan observasi dan tes. Instrumen penelitian yang digunakan adalah tes dan kuesioner untuk mengetahui respon mahasiswa. Hasil penelitian menunjukkan bahwa rerata nilai penguasaan konsep mahasiswa tentang gizi dan kesehatan adalah 86,13 tergolong kategori sangat baik, kemampuan berpikir mahasiswa diperoleh 86,08 tergolong kategori sangat baik. Respon mahasiswa terhadap pembelajaran berbasis kasus yang digunakan tergolong sangat baik dengan nilai 87,33. Keefektifan pembelajaran berbasis kasus ditentukan berdasarkan indeks efektivitas diperoleh nilai 100%. Disimpulkan bahwa penguasaan konsep, kemampuan berpikir, respon mahasiswa dalam kategori sangat baik, dan keefektifan pembelajaran berbasis kasus pada bidang kajian kesehatan gizi remaja juga dalam kategori sangat baik.

ABSTRACT

The nutrition and health lectures show that students can optimally develop higher-order thinking skills. The learning process with the strategies and methods used has yet to be able to maximize the student learning process to be able to develop high-level thinking skills. This study aimed to analyze the effectiveness of case-based learning on students' mastery of concepts and thinking skills in the field of nutrition and adolescent health. This type of research is quantitative. The research subjects were 6th-semester students who programmed the Nutrition and Health Course with 24 people. The research design is one short case study. Methods of data collection using observation and tests. The research instruments used were tests and questionnaires to determine student responses. The results showed that the mean score of students' mastery of concepts about nutrition and health was 86.13, which was classified as very good, while students' thinking skills were obtained at 86.08, which was classified as very good. The student response to the case-based learning was very good, scoring 87.33. The effectiveness of case-based learning is determined based on the effectiveness index obtained by 100%. It was concluded that concept mastery, thinking skills, and student responses were in the very good category, and the effectiveness of case-based learning in adolescent nutrition health studies was also very good.

1. INTRODUCTION

One that determines the quality of human resources is nutritional health. Nutritional health is largely determined by nutritional status, which is determined by the amount of food intake consumed (Diniyah & Nindya, 2017; Hidayah et al., 2018). In addition to malnutrition, Indonesia is simultaneously facing the problem of overnutrition, which tends to increase from time to time (Husaini et al., 2012; Rany et al., 2018). In other words, Indonesia is currently facing multiple nutritional problems. Slowly malnutrition will impact high maternal, infant and toddler mortality rates and low life expectancy (Abidah & Anggasari, 2019; Nuryani & Paramata, 2018). In addition, the impact of malnutrition can also be seen in low school enrollment, low education, and slow economic growth. One factor affecting a person's nutritional status is a lack of knowledge about nutrition and nutritional health (Naningsih et al., 2022; Novasty et al., 2020). This reduced knowledge will also reduce a person's daily ability to apply nutritional information. One way to increase one's knowledge is by providing nutrition education (Novita et al., 2017; Tumenggung et al., 2016). Through nutrition and health education, a person gains knowledge, can build a

*Corresponding author.

E-mail addresses: dskcitra@undiksha.ac.id (Desak Made Citrawathi)

conceptual framework for nutritional principles, and builds a positive attitude towards good nutritional habits so that he can use this nutritional knowledge in determining the best choice to be nutritionally healthy (Rani et al., 2021; Romadona & Rudiyanto, 2022).

The Nutrition and Health course is compulsory for 6th-semester students of the Biology Education Study Program, Faculty of Mathematics and Natural Sciences, Ganesha University of Education. Studying Nutrition and Health, students are expected to have the ability to think and be skilled at solving problems related to nutrition and adolescent health that occur to themselves, as well as those that occur in society. To achieve this ability, the learning process for nutrition and health courses is hoped to facilitate students in developing high-level thinking skills. Good learning activities can improve students' thinking skills (Afriyanti et al., 2021; Sagala & Andriani, 2019; Tyas et al., 2019). Based on experience, it has been shown that in the lectures on nutrition and health going on so far, students are less able to develop high-level thinking skills optimally. The learning process with the strategies and methods used, such as discussions, questions and answers, nutrition and health problem-solving assignments, has not been able to maximize the student learning process to develop high-level thinking skills. Even these varied learning activities should improve students' abilities (Chairudin & Dewi, 2021; Handayani et al., 2017; Magelo et al., 2019; Yuniati & Rohmadheny, 2020).

They are learning facts that can also be observed during lectures. First, low student participation during discussions. Only a few students want to ask questions about the lecture material being discussed. Second, the types of questions asked are still at a low-level cognitive level (dominantly C1 and C2). Third, the ability of students to answer questions or problems raised in discussions still needs to improve. Fourth, students' ability to complete given problem-solving tasks still needs to be improved to understand what is read without a deeper and comprehensive understanding. Fifth is the lack of ability to relate to other concepts or problems or cases of nutrition and health that exist around them or to problems or cases in the "real world". The results of interviews with students stated that they needed help in applying or associating other materials or concepts to solve the nutrition and health problems discussed. Students need help implementing the theoretical studies they have learned to analyze or explain cases of nutrition and health, especially among adolescents, in society.

The learning conditions that occur in nutrition and health lectures can be caused by various internal and external factors (Abihail et al., 2023; Salmia & Yusri, 2021; Widagdo et al., 2020). Internal factors include intelligence, lack of motivation to learn, limited study time, and ineffective student study habits (Kassim & Idris, 2018; Morris, 2019; Yan et al., 2021). The external factors include strategies, models and learning methods, learning media, availability of teaching materials, and the quality of teaching materials used as learning resources (M. Arifin & Abduh, 2021; Pramana et al., 2020; Wulandari et al., 2020). The learning process in nutrition and health lectures has yet to fully implement student-centred Learning (SCL). Student-Centred Learning can be applied effectively by integrating learning methods with appropriate teaching materials so that students can play an active role and learn to find concepts, principles, and procedures for solving cases or problems based on concepts or principles that have been learned (Hamid et al., 2013; Keiler, 2018; Sudarsana et al., 2019).

One of the learning methods that can involve students actively is case-based learning (CBL). Case Based Learning is constructivist-oriented learning with active student participation so that students can form their knowledge (Gade & Chari, 2013; Thistlethwaite et al., 2012). References to the literature or books used as learning resources in Nutrition and Health courses have not been able to hone students' analytical skills, students sensitivity to problems, train students in problem-solving, and evaluate problems related to nutrition and health holistically. Applying case-based learning can train students to use realistic narratives, analyze and consider solutions from a case, and integrate multiple sources of information in an authentic context (Alawiyah & Sopandi, 2016; Nurhusain & Hadi, 2021). Case-based learning will challenge students to analyze problems which are real cases, discuss them in groups, and draw conclusions based on the available information (Anas, 2021; Lubana et al., 2013). In the study of Nutrition and Health, the case discussed is the problem of malnutrition that, affects health that can occur throughout the human life cycle. Studying Nutrition and Health courses using a case-based method is expected to train, develop, and improve students' thinking skills in learning Nutrition and Health. This study aimed to analyze the effectiveness of case-based learning on students' mastery of concepts and thinking skills in the field of nutrition and adolescent health.

2. METHOD

This research is a pre-experimental study with the research design of One Short Case Study. The research subjects were students of the Biology Education study program in Semester 6 who attended lectures on nutrition and health. The number of research subjects was 24 people. Data collection

instruments used interview guides, tests, description questions about adolescent nutrition and health cases, and questionnaires. The interview guide was used to interview research subjects about learning difficulties in nutrition and health. Students' mastery of concepts is obtained from objective test results, and students' thinking skills are obtained from description questions in the form of case analysis and questionnaires to determine student responses to applied case-based learning. The learning tools used in this study include syllabi, semester lecture plans, student assignment plans, teaching materials, and case-based worksheets.

Data collection procedures include the preparation and implementation stages of the research. In the first preparatory stage, explaining research subjects related to the research objectives, the stages of the research to be carried out, the learning process, assessment, and the benefits obtained by students. Second, prepare learning tools, which include semester lecture plans, research instruments, student worksheets, and teaching materials. The research was conducted online using the Google Meet and WhatsApp (WA) Group applications. Nutrition and health learning uses case-based learning. The class is divided into eight groups. Each group consists of 3 people. Each group is given a Student Worksheet containing cases related to nutrition and adolescent health to be discussed. Group work results are shared on WAG and collected in the form of Google Drive. Learning is implemented by discussing the results of group work, which begins with a group presentation. At the end of the learning activities, a posttest was carried out to obtain data on students' mastery of nutrition and adolescent health concepts, students' thinking abilities, and student responses to the learning being carried out. Data on concept mastery, thinking skills, and students' responses to implementing case-based learning were analyzed descriptively. The data obtained are grouped, classified, and systematically narrated to obtain a conclusion.

The techniques used in analyzing the data are descriptive qualitative analysis, quantitative, and inferential statistics. The effectiveness of using case-based learning is assessed based on the learning effectiveness index (IEP). Learning is said to be effective if the IEP is $\geq 85\%$ or $\geq 85\%$, and the number of students has achieved $\geq 81\%$ of the learning objectives (mastery of concepts and students' thinking skills as assessed by their ability to solve cases of nutrition and adolescent health). The learning effectiveness index (IEP) category is presented in [Table 1](#).

Table 1. Learning Effectiveness Categories

Category	Presentation
$87.50\% \leq IEP \leq 100\%$	Very effective
$81.25\% \leq IEP < 87.50\%$	Effective
$75.00\% \leq IEP < 81.25\%$	Effective enough
$IEP < 75.00$	Ineffective

3. RESULT AND DISCUSSION

Result

Case-based learning is a method for involving students to discuss specific cases in real life. The stages of case-based learning include: determining cases, analyzing cases studied, determining information, data, and literature, establishing steps for solving cases, formulating conclusions from cases, and presenting the results of the conclusions produced by the group. Student participation in discussion activities led to interactions between students and students and students and lecturers. Students who actively participate in learning have a greater opportunity to understand and remember the subject matter than passive students. Students who participate and interact well in learning will master the subject matter because knowledge formation occurs through interaction. Through interaction, a student can compare the thoughts and knowledge he has formed with the thoughts and knowledge of other students. Students are challenged to develop their thoughts and knowledge further. Group challenges will help students assimilate and accommodate their knowledge schemes. Increased learning outcomes because of the interaction between students and between students and teachers.

Based on the results of data analysis related to the results of learning Nutrition and Health for adolescent students of the Biology Education Study Program, it was shown that the average score of student's mastery of concepts was 86.13 in the very good category. While thinking skills which include the ability to analyze, solve problems and provide solutions to the cases discussed, obtained an average score of 86.08, included in the very good category. Student responses to learning activities are very good, scoring 87.33. Student learning outcomes on the subject matter of adolescent nutrition and health and their problems in case-based learning activities are presented in [Table 2](#).

Table 2. Learning Outcomes and Student Responses with Case-Based Learning

No	Types of Learning Outcomes and Student Responses	The value of learning outcomes	
		Average	Average
1	Concept mastery	86.13	1.94
2	Thinking ability	86.08	1.21
3	Response	87.33	3.88

The process and results of the study of Nutrition and Health for adolescent students of the Biology Education Study Program showed that students' mastery of concepts related to adolescent nutrition and its problems obtained a score of 86.13, including in the very good category. In case-based learning in Nutrition and Health lectures, cases of nutrition and health in adolescents are discussed, such as stunting, iron anaemia, chronic energy deficiency, and obesity. Before being given a case to study, students are given a brief presentation on nutrition and adolescent health and its problems. Case-based learning provides opportunities for students to analyze cases by using the domain of nutrition and health knowledge they already have and encourages students to look for other domains of knowledge that are relevant and supportive in resolving cases. Using cases, students can apply the theory learned in real contexts and develop self-knowledge through small group discussions. Through discussion, students will develop their understanding with other students, and students are increasingly challenged to develop their thoughts through assimilation and accommodation in their knowledge schemes. The acquisition of nutritional and health values is in a very good category because, through case-based learning, there is an increase in learning motivation, communication skills, argumentation, and an increase in students' critical thinking skills so that students' mastery of concepts becomes very good.

Based on the calculation of the effectiveness index for concept mastery and thinking skills, IEF = 100%. It means that all students (24 people) scored mastery of concepts and thinking skills ≥ 81 . Using the IEF score shows the effectiveness of learning Nutrition and Health by using case-based learning is very effective. Case-based learning provides opportunities to train students to apply the theory learned in real contexts, think critically about complex situations, actively integrate multiple sources of information, and find solutions to solving cases based on their knowledge and understanding.

Discussion

Students' thinking ability is in the very good category. Students' thinking skills are assessed based on their ability to analyze cases, solve problems in cases, and provide solutions to the cases studied. To be able to achieve this, students must have the ability to understand, analyze, and apply this understanding in solving a problem (Darmaji et al., 2020; Erwiza et al., 2019; Marzuki & Basariah, 2015). These student abilities can be obtained, among others, through case-based learning (Devi et al., 2016; Miri et al., 2017; Sapeni & Said, 2020). In case-based learning (Case Based Learning), students are actively involved, and all students participate actively and form their knowledge. In Nutrition and Health lectures, students are given problems related to nutrition and adolescent nutritional health by examining cases of stunting, iron anaemia, chronic energy deficiency (KEK), and obesity. This case occurs in the lives of adolescents as part of a health problem that tends to develop into a public health problem (Diniyyah & Nindya, 2017; Hartono et al., 2017). These cases were discussed in small groups (groups of 3 students). Through discussion activities, students develop their understanding of nutrition and adolescent health and practice communication and argumentation skills to find agreed solutions in resolving the cases discussed. The cases are closely related to adolescent health problems so students can improve their problem-solving abilities.

Case-based learning trains students to participate actively and communicate. This ability is very important as a provision for them to live in a society in the future (Leen et al., 2014; Taleb & Chadwick, 2016). In order to be able to participate and communicate in the learning process, a model is selected that allows students to participate and practice communication skills (Kardoyo et al., 2020; Noblitt et al., 2010; Sasson et al., 2018). Indicators of participation assessed in case-based learning are giving opinions for solving given cases, giving opinions on the opinions of other students, doing assignments given by lecturers, presenting assignments, tolerance and being willing to accept the opinions of other students, and being responsible as a group member (Gade & Chari, 2013; Thistlethwaite et al., 2012). When discussing in groups, students are simultaneously active participants and observers (Ahmad & Tambak, 2018; Fatmawati, 2019; Manullang et al., 2022). So, case-based learning provides an experience for students to do while students also internalize the thoughts of other students. The case-based learning method encourages students to look for various learning resources to solve or find solutions to the cases

under study. Case-based learning can improve problem-solving communication and argumentation skills (Alawiyah & Sopandi, 2016; Nurhusain & Hadi, 2021).

Lecturers are important in building an effective and enjoyable learning atmosphere (Chick et al., 2021; Hassan & Othman, 2021; Kembara et al., 2018). If the lecturer plans the lesson carefully, accompanied by effective pauses and activities that make students physically active, teaches with high enthusiasm and builds positive relationships with students, students will respond positively to learning (Bock et al., 2018; Kowang et al., 2020). Student response to learning is classified as very good (positive), with a score of 87.33. The student's response is the behaviour that arises from the stimulus given by the lecturer to him or the response to learning something with a feeling of pleasure. Student response is important in determining student success in learning a concept (Arifin, 2022; Fitriah, 2017; Hasby et al., 2021). This positive response is a good start so that students are interested in participating in the learning process to achieve optimal performance. A pleasant atmosphere is one of the most important things in learning (Hayati & Lailatussaadah, 2016; Hidayatulloh, 2014). Students' positive responses to learning can improve learning outcomes

4. CONCLUSION

Based on the research and discussion results, students' mastery of nutrition and adolescent health concepts after case-based learning is classified as very good. Students' ability to think about nutrition and health after being taught case-based is very good. Student response to case-based learning is very good. Using the IEF score shows the effectiveness of case-based learning in the field of nutrition and adolescent health studies, which is very effective.

5. REFERENCES

- Abidah, S. N., & Anggasari, Y. (2019). Analisis Faktor-Faktor Yang Berhubungan Dengan Kejadian Anemia Pada Ibu Hamil Tm Iii Di Bpm Kusmawati Surabaya. *Jurnal Ilmiah Kesehatan*, 12(2). <https://doi.org/10.33086/jhs.v12i02.812>.
- Abihail, C. T., Simanoah, K. H., & Muniroh, L. (2023). Hubungan Asupan Energi dan Zat Gizi Makro serta Durasi Tidur dengan Status Gizi Mahasiswa Baru Fakultas Kesehatan Masyarakat Universitas Airlangga selama Kuliah Online. *Amerta Nutrition*, 7(1). <https://doi.org/10.20473/amnt.v7i1.2023.1-6>.
- Afriyanti, M., Suyatna, A., & Viyanti. (2021). Design of e-modules to stimulate HOTS on static fluid materials with the STEM approach. *Journal of Physics: Conference Series*, 1788(1). <https://doi.org/10.1088/1742-6596/1788/1/012032>.
- Ahmad, M., & Tambak, S. (2018). Penerapan Metode Diskusi Dalam Meningkatkan Hasil Belajar Murid Pada Pelajaran Fiqh. *Al-Hikmah: Jurnal Agama Dan Ilmu Pengetahuan*, 15(1). [https://doi.org/10.25299/jaip.2018.vol15\(1\).1585](https://doi.org/10.25299/jaip.2018.vol15(1).1585).
- Alawiyah, I., & Sopandi, W. (2016). Pembelajaran Berbasis Proyek Untuk Meningkatkan Sikap Ilmiah Siswa Sekolah Dasar Pada Materi Peristiwa Alam. *Jurnal Penelitian Pendidikan*. <https://doi.org/10.17509/jpp.v16i2.4241>.
- Anas, M. (2021). Pengembangan Bahan Ajar Berbasis Kasus: Menuju Inovasi Pembelajaran Mata Kuliah Kajian Makro Ekonomi. *Sosioedukasi : Jurnal Ilmiah Ilmu Pendidikan dan Sosial*, 10(1).
- Arifin, H. (2022). Respon Siswa Terhadap Pembelajaran dalam Jaringan Masa Pandemi COVID-19 di Madrasah Aliyah Al-Amin Tabanan. *Widya Balina: Jurnal Ilmu Pendidikan dan Ekonomi*, 6(2), 262–272. <https://doi.org/10.53958/wb.v5i1.47>.
- Arifin, M., & Abduh, M. (2021). Peningkatan Motivasi Belajar Model Pembelajaran Blended Learning. *Jurnal Basicedu*, 5(4), 2339–2347. <https://doi.org/10.31004/BASICEDU.V5I4.1201>.
- Bock, A., Modabber, A., Kniha, K., Lemos, M., Rafai, N., & Hölzle, F. (2018). Blended learning modules for lectures on oral and maxillofacial surgery. *British Journal of Oral and Maxillofacial Surgery*, 56(10), 956–961. <https://doi.org/10.1016/j.bjoms.2018.10.281>.
- Chairudin, M., & Dewi, R. M. (2021). Pengembangan Bahan Ajar Buku Saku Digital Berbasis Problem Based Learning pada Mata Pelajaran Ekonomi. *Edukatif: Jurnal Ilmu Pendidikan*, 3(3). <https://doi.org/10.31004/edukatif.v3i3.491>.
- Chick, R. C., Adams, A. M., Peace, K. M., Kemp Bohan, P. M., Schwantes, I. R., Clifton, G. T., Vicente, D., Propper, B., Newhook, T., Grubbs, E. G., Bednarski, B. K., & Vreeland, T. J. (2021). Using the Flipped Classroom Model in Surgical Education: Efficacy and Trainee Perception. *Journal of Surgical Education*, 78(6), 1803–1807. <https://doi.org/10.1016/j.jsurg.2021.05.008>.
- Darmaji, Astalini, A., Kurniawan, D. A., Ningsi, A. P., Romadona, D. D., & Dari, R. W. (2020). Regression of

- Science Process Skills On Critical Thinking Skills In Two Junior High Schools In Jambi City. *JIPF (Jurnal Ilmu Pendidikan Fisika)*, 5(3), 177–186. <https://doi.org/10.26737/jipf.v5i3.1788>.
- Devi, A. P., Musthafa, B., & Gustine, G. G. G. (2016). Using Cooperative Learning In Teaching Critical Thinking In Reading. *English Review: Journal of English Education*, 4(1), 1. <https://doi.org/10.25134/erjee.v4i1.310>.
- Diniyyah, S. R., & Nindya, T. S. (2017). Asupan Energi, Protein dan Lemak dengan Kejadian Gizi Kurang pada Balita Usia 24-59 Bulan di Desa Suci, Gresik. *Amerta Nutrition*, 1(4). <https://doi.org/10.20473/amnt.v1i4.2017.341-350>.
- Erwiza, Kartiko, S., & Gimin. (2019). Factors Affecting the Concentration of Learning and Critical Thinking on Student Learning Achievement in Economic Subject. *Journal of Educational Sciences*, 3(2), 205–215. <https://doi.org/10.31258/jes.3.2.p.205-215>.
- Fatmawati, S. (2019). Efektivitas Forum Diskusi Pada E-Learning Berbasis Moodle Untuk Meningkatkan Partisipasi Belajar. *Refleksi Edukatika: Jurnal Ilmiah Kependidikan*, 9(2). <https://doi.org/10.24176/re.v9i2.3379>.
- Fitrah, M. (2017). Pembelajaran Berbasis Masalah Untuk Meningkatkan Pemahaman Konsep Matematika Pada Materi Segiempat Siswa Smp. *KALAMATIKA Jurnal Pendidikan Matematika*, 2(1), 51. <https://doi.org/10.22236/kalamatika.vol2no1.2017pp51-70>.
- Gade, S., & Chari, S. (2013). Case-based learning in endocrine physiology: an approach toward self-directed learning and the development of soft skills in medical students. *Advance in Psikology Education*. <https://doi.org/10.1152/advan.00076.2012>.
- Hamid, R., Baharom, S., Taha, M. R., & Kadaruddin, L. K. (2013). Competition as an Innovative Student-centered Learning Method for Open-ended Laboratory Work. *Procedia - Social and Behavioral Sciences*, 10. <https://doi.org/10.1016/j.sbspro.2013.10.726>.
- Handayani, N. M. D., Ganing, N. N., & Suniasih, N. W. (2017). Model Pembelajaran Picture and Picture Berbantuan Media Audio-Visual Terhadap Pengetahuan IPA. *Journal of Education Technology*, 1(3), 176. <https://doi.org/10.23887/jet.v1i3.12502>.
- Hartono, H., Widjanarko, B., & Setiawati, M. (2017). Hubungan perilaku Keluarga Sadar Gizi (KADARZI) dan Perilaku Hidup Bersih Sehat (PHBS) pada tatanan rumah tangga dengan status gizi balita usia 24-59 bulan. *Jurnal Gizi Indonesia: The Indonesian Journal of Nutrition*, 5(2). <https://doi.org/10.14710/jgi.5.2.88-97>.
- Hasby, E., Noor, T., & Wahyudin, U. R. (2021). Respon Siswa terhadap Pembelajaran Daring PAI pada Masa Pandemic Covid-19 Di SMP. *Edukatif: Jurnal Ilmu Pendidikan*, 3(6), 3984–3992. <https://doi.org/10.31004/edukatif.v3i6.1384>.
- Hassan, M. H. A., & Othman, N. A. (2021). Flipped classroom approach in rigid body dynamics: A case study of five-semester observation. *International Journal of Engineering Pedagogy*, 11(1), 87–94. <https://doi.org/10.3991/IJEP.V11I1.15005>.
- Hayati, S., & Lailatussaadah, L. (2016). Validitas Dan Reliabilitas Instrumen Pengetahuan Pembelajaran Aktif, Kreatif Dan Menyenangkan (Pakem) Menggunakan Model Rasch. *Jurnal Ilmiah Didaktika*, 16(2), 169. <https://doi.org/10.22373/jid.v16i2.593>.
- Hidayah, N., Kasman, K., & Mayasari, M. (2018). Faktor-Faktor Yang Berhubungan Dengan Status Gizi Di Wilayah Kerja Upt.Puskesmas Kertak Hanyar Kabupaten Banjar. *An-Nadaa: Jurnal Kesehatan Masyarakat*, 5(1). <https://doi.org/10.31602/ann.v5i1.1645>.
- Hidayatulloh, M. A. (2014). Lingkungan Menyenangkan dalam Pendidikan Anak Usia Dini: Pemikiran Montessori. *Nadwa: Jurnal Pendidikan Islam*, 8(1), 139–154. <https://doi.org/10.21580/nw.2014.8.1.574>.
- Husaini, Y. K., Sandjaja, S., & Husaini, M. A. (2012). Kms Remaja, Relevansinya Dengan Pemantauan Tumbuh Kembang Dalam Upaya Meningkatkan Gizi Dan Kesehatan. *Penelitian Gizi dan Makanan*, 0(0). <https://doi.org/10.22435/pgm.v0i0.1945>.
- Kardoyo, Nurkhin, A., Muhsin, & Pramusinto, H. (2020). Problem-based learning strategy: Its impact on students' critical and creative thinking skills. *European Journal of Educational Research*, 9(3), 1141–1150. <https://doi.org/10.12973/EU-JER.9.3.1141>.
- Kassim, M., & Idris, A. (2018). Multimedia Project on Website Development Using Dreamweaver and Publish Domain Among Engineering Students. *International E-Journal of Advances in Education*, 14(12), 983–993.
- Keiler, L. S. (2018). Teachers' roles and identities in student-centered classrooms. *International Journal of STEM Education*, 5(1). <https://doi.org/10.1186/s40594-018-0131-6>.
- Kembara, Rozak, & Hadian. (2018). Research-based Lectures to Improve Students' 4C (Communication, Collaboration, Critical Thinking, and Creativity) Skills. *Proceedings of the Second Conference on Language, Literature, Education, and Culture (ICOLLITE)*, 1(1). <https://doi.org/10.2991/icollite>

18.2019.50, . 20019.11.

- Kowang, T. O., Bakry, M. F., Hee, O. C., Fei, G. C., Yew, L. K., Saadon, M. S. I., & Long, C. S. (2020). Industry 4.0 competencies among lecturers of higher learning institution in Malaysia. *International Journal of Evaluation and Research in Education (IJERE)*, 9(2), 303. <https://doi.org/10.11591/ijere.v9i2.20520>.
- Leen, C. C., Hong, H., Kwan, F. N. H., & Ying, T. W. (2014). Creative and Critical Thinking in Singapore Schools. In *An Institute of Nanyang Technological University* (Vol 2, Number 2).
- Lubana, L., Prasetyo, A. P. B., & Cahyono, E. (2013). Pengembangan Perangkat Pembelajaran Biologi Berbasis Kasus Dan Berorientasi Pendidikan Karakter. *Journal of Innovative Science Education*, 2(1).
- Magelo, C., Hulukati, E., & Djakaria, I. (2019). Pengaruh Model Pembelajaran Open-Ended terhadap Kemampuan Berpikir Kreatif Matematik Ditinjau dari Motivasi Belajar. *Jambura Journal of Mathematics*, 2(1), 15–21. <https://doi.org/10.34312/jjom.v2i1.2593>.
- Manullang, J., Sidabutar, H., & Manullang, A. (2022). Efektifitas Metode Diskusi dalam Pembelajaran Pendidikan Agama Kristen pada Masa Pandemi Covid-19. *Jurnal Ilmiah Pendidikan dan Pembelajaran*, 5(3), 502–509. <https://doi.org/10.23887/jipp.v5i3.39268>.
- Marzuki, M., & Basariah, B. (2015). The influence of problem-based learning and project citizen model in the civic education learning on student's critical thinking ability and self discipline. *Jurnal Cakrawala Pendidikan*, 3(3). <https://doi.org/10.21831/cp.v3i3.14675>.
- Miri, B., David, B. C., & Uri, Z. (2017). Purposely teaching for the promotion of higher-order thinking skills: A case of critical thinking. *Research in science education*, 37(4). <https://doi.org/10.1007/s11165-006-9029-2>.
- Morris, T. H. (2019). Self-directed learning: A fundamental competence in a rapidly changing world. *International Review of Education*, 65(4). <https://doi.org/10.1007/s11159-019-09793-2>.
- Naningsih, H., Anwar, K. K., & Aswita, A. (2022). Pembinaan Kader Posyandu dalam Pencegahan Stunting. *Ahmar Metakarya: Jurnal Pengabdian Masyarakat*, 1(2). <https://doi.org/10.53770/amjpm.v1i2.75>.
- Noblitt, L., Vance, D. E., & Smith, M. D. (2010). A Comparison of Case Study and Traditional Teaching Methods for Improvement of Oral Communication and Critical-Thinking Skills. *The journal of college science teaching*, 39, 26–32.
- Noviasty, R., Indriani, M., Rahayu, F., & Firdaus, F. (2020). Eduwhap Remaja Siap Cegah Stunting Dalam Wadah Kumpul Sharing Remaja. *Logista: Jurnal Ilmiah Pengabdian Kepada Masyarakat*, 4(2). <https://doi.org/10.25077/logista.4.2.494-501.2020>.
- Novita, E., Ismah, Z., & Pariyana, P. (2017). Pengaruh edukasi gizi terhadap peningkatan berat badan pasien tuberkulosis. *Jurnal Kedokteran dan Kesehatan*, 4(2).
- Nurhusain, M., & Hadi, A. (2021). Desain Pembelajaran Statistika Terapan Berbasis Kasus Berkualitas Baik (Valid, Praktis, dan Efektif) untuk Mahasiswa Pendidikan Matematika. *Indonesian Journal of Educational Science (IJES)*, 3(2). <https://doi.org/10.31605/ijes.v3i2.951>.
- Nuryani, N., & Paramata, Y. (2018). Intervensi Pendidik Sebaya Meningkatkan Pengetahuan, Sikap, dan Perilaku Gizi Seimbang pada Remaja di MTsN Model Limboto. *Indonesian Journal Of Human Nutrition*, 5(2). <https://doi.org/https://doi.org/10.21776/ub.ijhn.2018.005.02.4>.
- Pramana, M. W. A., Jampel, I. N., & Pudjawan, K. (2020). Meningkatkan Hasil Belajar Biologi Melalui E-Modul Berbasis Problem Based Learning. *Jurnal Edutech Undiksha*, 8(2), 17. <https://doi.org/10.23887/jeu.v8i2.28921>.
- Rani, K. C., Jayani, N. I. E., & Darmasetiawan, N. K. (2021). Pelatihan pembuatan produk makanan berbasis daun kelor untuk pemenuhan gizi balita di Desa Bogo Bojonegoro. *Aksiologi: Jurnal Pengabdian Kepada Masyarakat*, 5(3). <https://doi.org/10.30651/aks.v5i3.4501>.
- Rany, N., Putri, S. Y., & Nurlisis, N. (2018). Hubungan Asupan Energi, Pengetahuan Gizi dan Aktivitas Fisik dengan Kejadian Overweight pada Anggota Polisi di Polsek Tampar Pekanbaru Tahun 2017. *Jurnal Kesehatan Komunitas (Journal of Community Health)*, 4(2). <https://doi.org/10.25311/keskom.Vol4.Iss2.234>.
- Romadona, N. F., & Rudiyanto, R. (2022). Pembelajaran Kesehatan dan Gizi bagi Guru Taman Kanak-Kanak: Sebuah Penelitian Gabungan. *Jurnal Obsesi*, 6(6). <https://doi.org/10.31004/obsesi.v6i6.3314>.
- Sagala, P. N., & Andriani, A. (2019). Development of Higher-Order Thinking Skills (HOTS) Questions of Probability Theory Subject Based on Bloom's Taxonomy. *Journal of Physics: Conference Series*, 1188(1). <https://doi.org/10.1088/1742-6596/1188/1/012025>.
- Salmia, & Yusri, M. (2021). Peran Guru dalam Pembelajaran Abad 21 di Masa Pandemi Covid-19. *Indonesian Journal of Primary Education*, 5(1), 82–92. <https://doi.org/10.17509/ijpe.v5i1.31955>.

- Sapeni, M. A.-A. R., & Said, S. (2020). The effectiveness of case-based learning in increasing critical thinking of nursing students: A literature review. *Enfermería Clínica*, 30(2). <https://doi.org/10.1016/j.enfcli.2019.07.073>.
- Sasson, I., Yehuda, I., & Malkinson, N. (2018). Fostering the skills of critical thinking and question-posing in a project-based learning environment. *Thinking Skills and Creativity*, 29, 203–212. <https://doi.org/10.1016/j.tsc.2018.08.001>.
- Sudarsana, I. K., Mulyaningsih, I., Kurniasih, N., Haimah, Wulandari, Y. O., Ramon, H., Satria, E., Saddhono, K., Nasution, F., & Abdullah, D. (2019). Integrating Technology and Media in Learning Process. *Journal of Physics: Conference Series*, 1363(1). <https://doi.org/10.1088/1742-6596/1363/1/012060>.
- Taleb, H., & Chadwick, C. (2016). Enhancing Student Critical and Analytical Thinking Skills At a Higher Education Level in Developing Countries : Case Study of the British University in Dubai. *Journal of Educational and Instructional Studies in the World*, 6(February), 67–77.
- Thistlethwaite, J. E., Davies, D., Ekeocha, S., & Kidd, J. M. (2012). The effectiveness of case-based learning in health professional education. A BEME systematic review: BEME Guide No. 23. *Medical Teacher*, 34(6). <https://doi.org/10.3109/0142159X.2012.680939>.
- Tumenggung, Imran, Herawati, L., & Talibo, S. (2016). Housewives' Compliance in Reading Food Labels in Gorontalo City. *Kesmas: Jurnal Kesehatan Masyarakat Nasional*, 10(4). <https://doi.org/10.21109/kesmas.v10i4.639>.
- Tyas, M. A., Nurkamto, J., Marmanto, S., & Laksani, H. (2019). Developing higher order thinking skills (HOTS)-Based questions: Indonesian EFL teachers' challenges. *Proceeding of the 2nd International Conference on Future of Education*, 2(1), 52–63. <https://doi.org/10.17501/26307413.2019.2106>.
- Widagdo, B. W., Handayani, M., & Suharto, D. A. (2020). Dampak Pandemi Covid-19 terhadap Perilaku Peserta Didik pada Proses Pembelajaran Daring Menggunakan Metode Pengukuran Skala Likert (Studi Kasus di Kabupaten Tangerang Selatan). *Jurnal Teknologi Informasi ESIT*, 63(2), 63–70. <https://doi.org/10.31599/jki.v1i1.265>.
- Wulandari, Sudatha, & Simamora. (2020). Pengembangan Pembelajaran Blended Pada Mata Kuliah Ahara Yoga Semester II di IHDN Denpasar. *Jurnal Edutech Undiksha*, 8(1), 1–15. <https://doi.org/10.23887/jeu.v8i1.26459>.
- Yan, L., Whitelock-Wainwright, A., Guan, Q., Wen, G., Gašević, D., & Chen, G. (2021). Students' experience of online learning during the COVID-19 pandemic: A province-wide survey study. *British Journal of Educational Technology: Journal of the Council for Educational Technology*, 10.1111/bjet.13102. <https://doi.org/10.1111/bjet.13102>.
- Yuniati, S., & Rohmadheny, P. S. (2020). Bermain Peran: Sebuah Metode untuk Meningkatkan Kemampuan Bahasa Ekspresif Anak. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 5(1), 60. <https://doi.org/10.31004/obsesi.v5i1.509>.