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The Impact of The Jurisprudential Analytical Inquiry Learning Model Assisted by Augmented Reality (Assemblr Edu) on Critical Thinking Abilities in Biology For 10th Grade High School Students

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Abstract

The study is in the background with learners' low critical thinking ability in learners' activities. In the learning process, instead of using a media learning model, it can also be used as an aid. One of the learning models and the media is Jurisprudential Analytical Inquiry assisted Augmented Reality Assembly Edu. This study intends to identify the learning model Jurisprudential Analytical Inquiry assisted Augmented Reality Assembly Edu to the critical operation of class X Biology subjects at SMA. This research is a quantitative study using the Quasy Experiment Method. The research population was taken using 2 X MIPA classes, and the research sample consisted of X MIPA 6 as the Experiment class and X MIPA 3 as the Control class, with a total of 68 students. The sample technique in this study is the Cluster Random Sampling Technique. The research test instrument used multiple choice questions and tested the hypothesis using an independent t-test. Data was obtained from the results of hypothesis calculations using independent sig value tests. (2-tailed) that is 0.00 less than 0.05. So it can be concluded that the hypothesis in this study is accepted, meaning that there is an influence of the learning model Jurisprudential Analytical Inquiry assisted Augmented Reality Assembly Edu to the critical operating of class X Biology subjects at SMA.

Keywords: Learning Model Jurisprudential Analytical Inquiry; Media Augmented Reality Assembly Edu; Critical Thinking Skills.

Introduction

Education is a conscious and planned effort to create an atmosphere of learning and a learning process to develop students' potential (Sanjaya, 2016). Education is carried out through a learning process in schools using specific methods or methods so that someone obtains knowledge, understanding, and ways of behaving by the provisions (Sihotang *et al*., 2015). As a result of changing times, the education system in Indonesia demands changes in the learning process. The learning process has referred to the 2013 curriculum, an educational program provided by educational institutions for students (Hamalik, 2017). The teaching and learning process in the 2013 curriculum is closely related to scientific and critical attitudes because students are guided to think openly, be curious, honest, and other aspects. Scientific and critical attitudes are huge in achieving learning objectives. One of the successes in learning is caused by a scientific and critical attitude. So, scientific and critical attitudes are critical in achieving the learning objectives (Kemdikbud, 2018). To develop students' thinking skills, things are needed to support them during the learning process, including the learning media. The importance of learning media as one of the elements that support the learning process cannot be ignored (Kemdikbud, 2018). Learning media convey information or material to

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students. It can improve students' understanding and evaluation of the material presented. The role of learning media is vital in the biological learning process (Chairudin *et al*., 2023). Augmented Reality Assembly Edu is one media that can be used in the teaching and learning process. Augmented Reality (AR) - Edu Assembly results from technology combining cyberspace and the natural world that educators can use because it can project something abstract and interactive (Kishino, 2017). Assemblr Edu is one of the applications of AR that has advantages, including having animated videos and audio, not requiring programming knowledge, and being able to be seen from various points of view (3 dimensions). EDU Assemblr has a studio assembly to edit and import 3 -3-dimensional images of other types. FBX and OBJ can help students develop critical thinking skills (Assemblr, 2020).

In biology learning, students are required to think critically. This ability can begin with basic thinking skills and high-level thinking skills. Critical thinking skills are critical for students to solve problems and make decisions based on scientific truth. Critical thinking is recommended before developing other thinking patterns. Students will understand more about a material concept if their learning process emphasizes the ability to think critically (Wijayanti, 2015). Without thinking critically, humans tend to receive information from various sources without thinking and selecting the information they get. Santrock (2009) also explains that critical thinking skills can be built if the teacher provides learning that asks students to argue by reasoning, evaluating the opinions of others, looking for answers, and finding reasons for a problem. Problems regarding critical thinking skills can be overcome if students are trained to increase the power of analysis, develop observation skills, increase curiosity, ask questions, reflect, and read critically (Siwardani, 2015). The expected thinking skills in achieving optimal learning goals are critical thinking. Students will be able to build meaning and confirm their understanding. The learning process is always accompanied by thinking skills as one of the factors in determining the level of one's success. According to Ennis (1985), critical thinking is an organized process that involves the decision-making process, analyzing, solving problems, and scientific inquiry activities (Wijayanti, 2015). According to the results of an interview with one of the Biology subjects in SMA Negeri 1 Penggala stated that the biology learning process is still dominant using the method of lecture, discussion and question and answer. In the use of educator learning models are still not active in applying other learning models, learning models that are often used by educators are discovery learning learning models. Whereas as researchers have previously described, the current education system prioritizes the critical thinking skills of students during the learning process. This is what is interesting to the author to try to apply the influence of the Jurisprudential Analitical Inquiry Learning Model with Augmented Reality Assemblr Edu on Critical Thinking Ability Class X Biology Subjects in High School.

Literature Review

It is essential to consider the integration of various educational approaches and technologies to establish a theoretical foundation regarding the influence of the jurisprudential analytical inquiry learning model assisted by augmented reality assembly edited Reality (AR) has been recognized as a valuable educational tool, offering benefits in various fields, including learning (Mustaqim, 2017). Ar in Educational Settings has shown promise in enhancing engagement and understanding Among Students (Mustaqim, 2017). Additionally, the Incorporation of Innovative Models such as Jurisprudential Inquiry Can Contribute to Fostering a Democratic Culture within Schools (Japar *et al*., 2018). Models like scientific inquiry and Radec have positively impacted student learning outcomes and critical thinking skills (Marwan, 2023; Pratama *et al*., 2020).

Furthermore, the effectiveness of inquiry learning models, particularly when combined with multimedia tools like Quizizz, has been highlighted in improving students' critical thinking abilities (Islam & Soekamto, 2022). These findings suggest that models emphasizing inquiry-based approaches can be instrumental in developing students' independent learning and critical thinking skills (Islamic & Soekamto, 2022). Moreover, The Development of Learning Media Based on Augmented Reality, such as Assembler Edu, has been explored in Various Subjects Like Biology and Chemistry, showcasing the potential for enhancing learning experiences (Sari, 2023; Octaviani *et al*., 2022). Augmented reality in educational contexts can provide an interactive and immersive learning environment, leading to increased student engagement and comprehension (Sari, 2023; Octaviani *et al*., 2022). By combining the jurisprudential analytical inquiry

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learning model with augmented reality assembly Edu, educators can create a dynamic and engaging learning environment that promotes critical thinking, independent learning, and democratic culture in educational settings. This integration harnesses the benefits of innovative technologies like AR and proven educational models to enhance the overall learning experience for students.

In applying the Jurisprudential Analytical Inquiry learning model with augmented reality assembly Edu to students' critical thinking skills, several theories support the positive influence of integrating the learning and technology model. First, the Think Pair Share (TPS) learning model has been proven to significantly influence students' critical thinking skills (Meilana *et al*., 2020). In addition, the guided inquiry learning model has also been proven to improve the critical thinking skills of students (Amijaya *et al*., 2018). Other studies have shown that formative assessment in the 5E model inquiry learning can improve students' critical thinking skills (Dita *et al*., 2021). Furthermore, the Steam-based Radec learning model has improved students' critical thinking skills (Setyawan *et al*., 2023). Project-based learning learning has also been proven effective in improving the critical thinking skills of students (Yudiana & Sari, 2022). In addition, the learning model of Problem-Based Learning and guided inquiry has also been proven to positively impact students' critical thinking skills (Sitompul, 2021; Sado *et al*., 2020). In addition, the application of blended learning and the make-a-match learning model has also been proven to improve student's critical thinking skills (Nur *et al*., 2022; Novita *et al*., 2021). Problem-based learning models such as MEA and PSF have also been proven to positively influence students' critical thinking skills (Hevitria *et al*., 2021; Angelina *et al*., 2020). Application of the Jurisprudential Analytical Inquiry Learning Model with Augmented Reality Assembly Edu is expected to make a positive contribution to the increasing critical thinking skills of students through the merging of innovative learning models and advanced technology.

Methodology

This research uses an experimental research type. Experimental research involves manipulating independent variables, controlling external variables (extraneous), and measurement of the effects of the dependent variable. In more detail, this experimental method is a single case experiment or single subject (Single Subject Experiment) (Sugiyono, 2019). The method used in this study is the quasi-experimental design, which is a design that has a control group but is not fully able to control external variables that affect the implementation of experiments (Hastjarjo, 2019). This research was conducted on students in two classes, namely class X MIPA 6 as an experimental class that uses the Jurisprudential Analytical Inquiry learning model and class X MIPA 3 as a control class that uses discovery learning models. In these two groups, the design control group design is used. The population in this study was all students of class X MIPA in SMA Negeri 1 Penggala, which consisted of six classes. Based on the results of data analysis obtained from data pretest and posttest analyzed using the independent sample t-test to answer the hypothesis. The normality test used the Shapiro-Wilk test to determine whether the data was normally distributed. Furthermore, the homogeneity test was carried out using the homogeneity of variances test to determine whether the data was homogeneous. This study's results indicate an influence of the Jurisprudential Analytical Inquiry learning model with Augmented Reality Assembly Edu on the critical thinking skills of students of class X of SMA Negeri 1 Public High School Biology, which is shown in SIG grades. 0.000 <0.05, meaning that H0 is rejected and H1 is accepted.

Results and Discussion

Overview of Biology Learning in SMA Negeri 1 Penggala

The process of learning activities in SMA Negeri 1 Penggala, in general, is still formal, planned, and carried out with guidance by educators. The media used in learning are mostly still in the form of printed books and images, where students listen to the information conveyed by educators. Although SMA Negeri 1 Penggala has adequate facilities and infrastructure to support biology learning, students cannot utilize these facilities and infrastructure to improve their critical thinking skills. This study used class X MIPA 6 as an experimental class that applied the Jurisprudential Analytical Inquiry learning model with Augmented Reality Assembly Edu. Class X MIPA 3 is a control class that applies the Discovery Learning learning model. Jurisprudential Analytical Inquiry Learning Model with Augmented Reality

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Assembly Edu is designed to improve students' critical thinking skills through systematic and interactive learning steps. The following are the steps of learning in the experimental class.

1) Issue Orientation
   Educators give students initial questions to explore their understanding of environmental pollution. Questions like "Have you ever seen turbid river water?" Moreover, "What causes the murky river water?" was submitted to start the discussion. Students then answer the question based on their knowledge.
2) Identifying problems
   Educators provide further questions to develop students' critical thinking skills, such as "What are the benefits and advantages of learning environmental pollution?" After that, educators convey the benefits obtained from studying environmental pollution material.
3) Determine attitudes
   Educators organize students into small groups consisting of 4-5 people. Then, educators convey problems to students and direct them to use the Augmented Reality Assemblr Edu application to see the tasks of LKPD (Student Worksheet) which contains problems related to environmental pollution.
4) Exploring attitudes
   Students are directed to develop critical thinking and make alleged answers related to environmental pollution and the factors of its causes. Educators facilitate this process by providing guidance and support.
5) Small and qualify for positions
   Educators direct students to conduct the alleged test they made, to determine the truth or error of the allegation. This process involves testing hypotheses that have been developed previously.
6) Evaluation
   Educators direct students to present the results of their answers. Groups that are not advanced presentations give an argument to the answers from the group that advanced presentation. Furthermore, educators guide students to conclude their observations.

Issue Orientation

Identify problems

Determine attitudes

Exploring attitudes

Refine and qualify for positions

Evaluation

Figure 1. Experimental Class Steps
Jurisprudential Analytical Inquiry Learning Model

The implementation of this learning model aims to increase the active participation of students and their critical thinking skills. In this study, a comparison between learning outcomes in the experimental class and the control class to evaluate the effectiveness of the jurisprudential analytical inquiry learning model with augmented reality assemblr Edu.

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Data analysis

Data collected from pretest and posttest were analyzed using the independent sample t-test to answer the research hypothesis. The normality test was carried out using the Shapiro-Wilk test to find out whether the data is normally distributed. Furthermore, the homogeneity test was carried out using the homogeneity of variances test to find out whether the data is homogeneous. The results of this analysis indicate that there is a significant influence on the application of the Jurisprudential Analytical Inquiry learning model with augmented reality assemblr Edu on the critical thinking skills of students in class X of SMA Negeri 1 Biology. The significance value (GIS.) Obtained from the T test is 0.000, which is smaller than 0.05, so that H0 is rejected and H1 is received. This shows that the application of this learning model significantly improves students' critical thinking skills compared to the discovery learning learning model used in the control class. This critical thinking ability can be seen from the difference in the average score of pretest and posttest in both classes. Students in the experimental class show a higher increase in posttest scores compared to students in the control class. This shows that the Jurisprudential Analytical Inquiry Learning Model with Augmented Reality Assemblr Edu is more effective in increasing the critical thinking skills of students. The use of augmented reality in learning provides a more interactive and interesting learning experience, so that students are more motivated to be actively involved in the learning process. Thus, they can develop critical thinking skills through exploration, discussion, and presentations carried out during the learning process. The results of this study indicate that the application of the Jurisprudential Analytical Inquiry learning model with augmented reality assemblr Edu has a positive impact on increasing the critical thinking skills of students. Therefore, this learning model can be considered to be applied in biology learning and other subjects to improve the quality of education in SMA Negeri 1 Penggala.

Discussion

This research was conducted in three meetings. During the study, students experienced an increase in learning thinking and activities. This is because the model and learning media that allows students to play more active and provide opportunities to improve critical thinking skills. Jurisprudential Analytical Inquiry Learning Model with Augmented Reality Assemblr Edu helps students to be more actively involved in the learning process, which is proven to improve their critical thinking skills. The initial stage of the study involved the validation of instruments such as questions, RPP, Syllabus, and LKPD to Ms. Dwi Asmaning Ayu, S.Pd., as a science teacher at MTs Muhammadiyah Sukarame. This instrument was tested in 32 students of class XI MIPA who had studied the material, using 25 multiple choice questions. After validation, 10 research instruments of multiple choice questions are used during the study. These questions have met the standard of critical thinking ability.

At the first meeting in the X MIPA 6 experimental class that used the Jurisprudential Analytical Inquiry learning model with Augmented Reality Assemblr Edu, a pretest was carried out in the form of multiple choice questions that included indicators of critical thinking skills. This test aims to determine the initial ability of students before studying environmental pollution material. After the pretest, the material about environmental pollution and the causes of the causes are explained. Core activities involve the grouping of students into small groups consisting of 4-5 members. Students then work on LKPD in groups, discuss, present, and provide arguments related to the material presented. At the second meeting, students were again divided into groups. Each group is asked to use the Augmented Reality Assemblr Edu application and work on LKPD assignments relating to waste recycling. At the third meeting, students were given a final test (posttest) in the form of multiple choice questions that included indicators of critical thinking skills. This test functions as a final evaluation of learning and collection of research data.

Increasing the critical thinking skills of students in the experimental class is caused by the use of the Jurisprudential Analytical Inquiry learning model with augmented reality assemblr Edu. This model encourages students to actively think critically in focused discussion groups, through systematic stages. The first stage involves preparation for the framework of thinking by educators, topic explanations, and goals. Educators also help prepare groups and determine the moderator and recorder. The core stage involves discussion and presentation, where students answer case studies in LKPD. With this model, students are more challenged to think critically in giving arguments, so they gain deeper knowledge about the material being studied. Discussions and presentations carried out in this model allows students to work together and respect each other in groups. Students who use the Jurisprudential Analytical Inquiry learning model with Augmented Reality Assemblr Edu show a good response during the learning process. They have

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high curiosity and are active in finding answers to the problems faced, as well as enthusiasm in completing the learning tasks given.

According to Hendrizal, the advantages of the Jurisprudential Analytical Inquiry learning model include: motivating students to actively debate with logical and rational arguments, facilitate case analysis so as to facilitate the attitudes and conclusions of opinions on a clear basis, developing aspects of knowledge and insight appreciation for differences of opinion. This model is also relevant to the development of modern learning psychology which sees learning as a process of changing the behavior of students thanks to experience. However, this model also has shortcomings, such as requires a long implementation time because of changes from the previous learning model that does not demand the activeness of students. In addition, it is difficult to direct the student's argument at first because not all students have sufficient knowledge, which can cause a coachman debate (debate for unreasonable reasons) (Joyce *et al*., 2009). Ennis (1985) explains that the ability to think critical is a process that aims to make a reasonable decision, so that what is considered the best about a truth can be done correctly. Critical thinking is an important skill that students need to improve the ability to make assessment, explain reasons, and solve unknown problems. Aspects and indicators of critical thinking based on the theory of ennis include: understanding the problems in the questions given, giving reasons based on relevant facts, making conclusions appropriately, choose the right reasons to support conclusions, explain the terms in the problem, provide examples of similar cases, and check back thoroughly from beginning to end.

Interactive learning media that are inserted with video also makes it easy for students to receive material dynamically. The response obtained from the answers uploaded by students can be known quickly. The simulation which is the characteristics of this learning media emphasizes the experiments of various cases to see phenomena and the consequences of various case examples. Previous research shows that simulation -based learning can make students construct material independently, improve creative thinking, representative, and the ability of interpretation of diagrams or graphics and communication simulation results. The Role of the Jurisprudential Analytical Inquiry Learning Model with Augmented Reality Assemblr Edu with the critical thinking skills of students is very positive. Posttest results show a significant increase compared to the previous value. However, educators need to continue to train students so that their critical thinking skills increase, so as to produce new ideas or ideas that are useful.

Conclusion and Recomendations

Based on the results of research and data analysis that has been carried out, it can be concluded that there is a positive influence of the application of the Jurisprudential Analytical Inquiry learning model with augmented reality assemblr Edu on the critical thinking skills of students of class X class of Biology in high school. This is indicated by the difference in an increase in the average critical thinking ability of students, where the acquisition of the average score of N-Gain Critical thinking skills in the experimental class reaches 0.63 with a medium category, while the control class only reaches 0.33 with the category low.

Educators can determine the types of models and learning media that are more innovative and varied in accordance with the material and learning objectives to be able to develop the critical thinking skills of students. Jurisprudential Analytical Inquiry Learning Model and Learning Media Augmented Reality Assemblr Edu can be used as an alternative model and media in learning so that students understand the material in the learning process to improve critical thinking skills. Students are expected to be more active in the process of learning activities so that they can obtain good results and create meaningful biology learning. The school must more often evaluate and make questions that can improve students' critical thinking skills. For further researchers, it is recommended to be able to develop learning models and learning media by using a better test instrument so that it can be applied in other concepts to find out the critical thinking skills of students. In the process of developing critical thinking skills, at least carried out in two cycles, each cycle consists of three meetings. Most effective in developing critical thinking skills is in one semester for maximum results.

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References

Amijaya, L., Ramdani, A., & Merta, I. (2018). Pengaruh model pembelajaran inkuiri terbimbing terhadap hasil belajar dan kemampuan berpikir kritis peserta didik. *Jurnal Pijar Mipa, 13*(2), 94-99. https://doi.org/10.29303/jpm.v13i2.468

Angellena, M., Switoro, E., & Putri, D. (2020). Pengaruh pembelajaran dengan model problem solving fisika (psf) terhadap prestasi belajar dan kemampuan berpikir kritis. *Jurnal Kumparan Fisika, 3*(2), 83-90. https://doi.org/10.33369/jkf.3.2.83-90

Arsisari, A. (2021). Pengaruh model pembelajaran berbasis masalah tipe means ends analysis (mea) terhadap kemampuan berpikir kritis matematis. *Cendekiawan, 3*(2), 116-123. https://doi.org/10.35438/cendekiawan.v3i2.228

Assemblr, T. (2020). *Assemblr*.

Chairudin, M., Yustianingsih, T., & Aidah, Z. (2023). Sebagai media pembelajaran matematika jenjang SMP/MTS, *4*(2), 1312-1318.

Dita, S., Qadar, R., & Komariyah, L. (2021). Asesmen formatif dalam pembelajaran inkuiri model 5 e (engagement, exploration, explanation, elaboration, evaluation) untuk meningkatkan keterampilan berpikir kritis berbasis web pada siswa sma. *Jurnal Kajian Pendidikan Ipa, 1*(2), 76. https://doi.org/10.52434/jkpi.v1i2.1317

Ennis, R. H. (1985). A Logical Basis for Measuring Critical Thinking Skills. *Educational Leadership, 43*(2), 44-48.

Hamalik, O. (2017). *Proses Belajar Mengajar*. Jakarta: PT Bumi Aksara.

Hastjarjo, T. D. (2019). Rancangan Eksperimen-Kuasi. *Buletin Psikologi, 27*(2), 187. https://doi.org/10.22146/buletinpsikologi.38619

Islami, M., & Soekamto, H. (2022). Efektivitas model pembelajaran inquiry menggunakan quizizz multimedia berbasis gamification terhadap kemampuan berpikir kritis siswa. *Jurnal Ilmiah Pendidikan Profesi Guru, 5*(2), 383-392. https://doi.org/10.23887/jippg.v5i2.48338

Japar, M., Fadhillah, D., Kardiman, Y., Yasnita, Y., & Sarkadi, S. (2018). Building democracy of culture in school through jurisprudential inquiry. *Jurnal Kependidikan Penelitian Inovasi Pembelajaran, 2*(2), 333-347. https://doi.org/10.21831/jk.v2i2.18924

Kemdikbud. (2018). *Pendidikan Sekolah Peserta didik Rumah Belajar Digital*.

Joyce, B., Weil, M., & Calhoun, E. (2009). *Models of Teaching* (8th ed.). Yogyakarta: Pustaka Pelajar.

Kishino, P. M., & F. (2017). Markerless Augmented Reality Pada Perangkat Android. *E-Jurnal Teknik Informatika*.

Marwan, K. (2023). Pengaruh model pembelajaran scientific inquiry dan adversity quotient terhadap hasil belajar siswa di sma. *Jurnal Pendidikan Fisika, 12*(2), 132. https://doi.org/10.24114/jpf.v12i2.32490

Meilana, S., Aulia, N., Zulherman, Z., & Aji, G. (2020). Pengaruh model pembelajaran think pair share (tps) terhadap kemampuan berpikir kritis di sekolah dasar. *Jurnal Basicedu, 5*(1), 218-226. https://doi.org/10.31004/basicedu.v5i1.644

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International Journal Education and Computer Studies (IJECS)

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Mustaqim, I. (2017). Pengembangan media pembelajaran berbasis augmented reality. *Jurnal Edukasi Elektro, 1*(1). https://doi.org/10.21831/jee.v1i1.13267

Natalia, S. B. (2019). Penerapan Model Pembelajaran Jurisprudential Analytical Inquiry Untuk Meningkatkan Hasil Belajar Biologi Kelas X MIPA A SMAN 1. Universitas Islam Riau.

Novita, N., Sakdiah, H., & Asrita, M. (2021). Pengaruh model pembelajaran make a match terhadap kemampuan berpikir kritis siswa di sman 1 lhoksukon. *Relativitas Jurnal Riset Inovasi Pembelajaran Fisika, 4*(1), 30. https://doi.org/10.29103/relativitas.v4i1.3874

Nur, A., Nasrah, N., & Amal, A. (2022). Blended learning: penerapan dan pengaruhnya terhadap kemampuan berpikir kritis mahasiswa program studi pgsd. *Jurnal Basicedu, 6*(1), 1263-1276. https://doi.org/10.31004/basicedu.v6i1.2189

Octaviani, L., Harta, J., & Winarta, G. (2022). Development of assemblr edu-assisted augmented reality learning media on the topic of effect of reactant's concentration and catalyst on reaction rate. *Jcer (Journal of Chemistry Education Research), 6*(1), 58-71. https://doi.org/10.26740/jcer.v6n1.p58-71

Pratama, Y., Sopandi, W., Hidayah, Y., & Trihatusti, M. (2020). Pengaruh model pembelajaran radec terhadap keterampilan berpikir tingkat tinggi siswa sekolah dasar. *Jinop (Jurnal Inovasi Pembelajaran), 6*(2). https://doi.org/10.22219/jinop.v6i2.12653

Sado, R., Dakabesi, D., & Aminatun, T. (2020). Efektivitas model pembelajaran guided-inquiry terhadap kemampuan berpikir kritis dan pemecahan masalah. *Jurnal Pendidikan Teori Penelitian Dan Pengembangan, 5*(6), 844. https://doi.org/10.17977/jptpp.v5i6.13666

Sanjaya, W. (2016). *Strategi Pembelajaran*. Jakarta: Prenadamedia Grup.

Santrock, J. W. (2009). *Educational Psychology*. New York: McGraw-Hill.

Sari, A. (2023). Perancangan media pembelajaran biologi berbasis augmented reality (ar) menggunakan assemblr edu di sma negeri 1 bukittinggi. *Jati (Jurnal Mahasiswa Teknik Informatika), 7*(2), 1387-1394. https://doi.org/10.36040/jati.v7i2.7247

Setyawan, J., Roshayanti, F., & Novita, M. (2023). Model pembelajaran radec berbasis steam pada materi sistem koloid mampu meningkatkan kemampuan berpikir kritis siswa. *Practice of the Science of Teaching Journal Jurnal Praktisi Pendidikan, 2*(1), 18-26. https://doi.org/10.58362/hafecspost.v2i1.29

Siwardani, N. W. (2015). Pengaruh Model Pembelajaran ADDIE Terhadap Pemahaman Konsep Fisika Dan Keterampilan Berfikir Kritis Peserta didik Kelas X SMA Negeri 2 Mengwi Tahun Pelajaran 2014/2015. *E-Journal Program Pascasarjana, Universitas Pendidikan Ganesha, 6*(1), 3.

Sitompul, N. (2021). Pengaruh model pembelajaran problem based learning terhadap peningkatan kemampuan berpikir kritis matematis siswa smp kelas ix. *Gauss Jurnal Pendidikan Matematika, 4*(1), 45-54. https://doi.org/10.30656/gauss.v4i1.3129

Sugiyono, P. D. (2019). *Metode Penelitian Pendidikan: Kuantitatif, Kualitatif, Kombinasi, R&D, dan Pendidikan* (3rd ed., ed. M.T. Apri Nuryanto, S.Pd., S.T.). Bandung: Alfabeta, CV.

Wijayanti, T. F. (2015). Pengembangan Modul Berbasis Berfikir Kritis Disertai Argument Mapping Pada Materi Sistem Pernapasan Untuk Meningkatkan Kemampuan Berfikir Kritis Peserta didik Kelas XI SMA Negeri 5 Sukarta. *Jurnal Inkuiri, 5*(1), 106.

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Yudiana, I., & Sari, N. (2022). Pembelajaran project-based learning berbantuan penilaian teman sebaya dalam pembelajaran daring meningkatkan kemampuan berpikir kritis mahasiswa. *Jurnal Penelitian Dan Pengembangan Pendidikan, 6*(3), 408-414. https://doi.org/10.23887/jppp.v6i3.54342.

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