Application Of The Problem-Based Learning Model To Improve Learning Outcomes Of Class X Biology Students At SMA Negeri 2 Tondano

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Abstract. This study aims to determine the use of audio-visual media in Problem-Based Learning to improve student learning outcomes in tenth grade SMA Negeri 2 Tondano using classroom action research as the research methodology. (1) Planning, (2) Action, (3) Observation, and (4) Reflection are the four major phases of a cycle. In data analysis, the percentage of completed student learning outcomes is utilized. The research result was derived from student learning outcomes using two cycles; in cycle I, the percentage of classical completion was 44.44 percent and in cycle II, it was 55.55 percent. It became a reference for the subsequent cycle's follow-up. The classical percentage of completeness for cycle II was then 92.59 percent complete and 7.40 percent incomplete. This demonstrated that it followed the research indicator in a conventional manner. Therefore, it is unnecessary to follow the subsequent cycle. This study concludes that using problem-based learning audio-visual as a learning medium for virus materials is crucial for improving student learning outcomes among students in class X at SMA Negeri 2 Tondano.

Keywords: problem-based learning, virus

Abstrak. Penelitian ini bertujuan untuk mengetahui penggunaan media audio visual dalam Pembelajaran Berbasis Masalah untuk meningkatkan hasil belajar siswa kelas X SMA Negeri 2 Tondano dengan menggunakan penelitian tindakan kelas sebagai metodologi penelitian. (1) Perencanaan, (2) Tindakan, (3) Pengamatan, dan (4) Refleksi adalah empat fase utama dari sebuah siklus. Dalam analisis data digunakan persentase hasil belajar siswa yang tuntas. Hasil penelitian diperoleh dari hasil belajar siswa dengan menggunakan dua siklus; pada siklus I persentase ketuntasan klasikal sebesar 44,44 persen dan pada siklus II sebesar 55,55 persen. Hal tersebut menjadi acuan untuk tindak lanjut siklus berikutnya. Persentase ketuntasan klasikal siklus II adalah 92,59 persen tuntas dan 7,40 persen tak tuntas. Ini menunjukkan bahwa itu mengikuti indikator penelitian dengan cara konvensional. Oleh karena itu, tidak perlu mengikuti siklus berikutnya. Penelitian ini menyimpulkan bahwa penggunaan audio visual pembelajaran berbasis masalah sebagai media pembelajaran materi virus sangat penting untuk meningkatkan hasil belajar siswa pada siswa kelas X di SMA Negeri 2 Tondano.

Kata kunci: problem based learning, virus

INTRODUCTION

Education is an activity and human effort to improve personality by developing personal potential. Education is also a collection of knowledge or concepts that are arranged systematically and have specific scientific methods that investigate and reflect on the symptoms of educational actions or a process of assistance provided by adults to help immature children reach maturity in order to prepare themselves for a meaningful life (Fadli, 2021; Rahman, 2022). Education in Indonesia also continues to experience development towards improvement to improve the quality of education. In the 1945 Constitution, paragraph 4 reads, "Educating the Life of the Nation"; thus, education is the main factor in life (Gesmi et al., 2018; Nurgiansah, 2021).

Education is a necessity for humans. Education can be a medium for someone to acquire and develop their knowledge, causing people to know what was previously unknown and not previously understood (Santoso, 2017; Wardani, 2018). Education can also be used as a benchmark for a nation's progress, as seen from the quality of education (Saputro & Hadi, 2022). A developed nation is a nation that has a high quality of education, where the nation can produce quality human resources (Primayana, 2015). Education is closely related to formal things, which include learning processes involving teachers and students (Maesaroh, 2013). Of course, good quality education will also produce good student achievement (Kusumawati et al., 2017).

Teachers help students by acting as figures, examples, and identifiers. Teachers must uphold personal norms of discipline, accountability, and authority (Yanti, 2014). Teachers can act as facilitators by providing the resources and infrastructure students need to achieve targeted learning outcomes during the learning process (Abdullah, 2018). Teachers must be able to choose learning strategies appropriate to the subject matter covered and attract students' interest in participating in the learning process (Irfangi, 2017). The selection of a learning model is one of the factors that must be considered by an educator, especially when teaching biology (Sholikhah & Wahidah, 2021). Students are less involved in teaching and learning when new learning models are not used, and little learning material is available (Pratiwi, 2022).

In general, learning is a process of providing training or experience to a person or group so that a relatively permanent behavior change occurs in that person. This activity aims to produce positive changes toward maturity and make the right decisions about the problems to be faced and to what extent these changes can be pursued through business through the teaching and learning process (Ahdar & Wardana, 2019).

Problem-based learning uses real-world problems as a context for students to learn critical thinking and problem-solving skills and acquire essential knowledge and concepts from the subject matter. Problem-based learning stimulates higher-order thinking in problem-oriented situations, including Learning (Utomu et al., 2014; Rosy & Pahlevi, 2015; Ardiyanti, 2016; Sucipto, 2017; Maryati, 2018).

Based on the results of interviews with class X biology teachers, more than half of the students had low learning outcomes, or the Minimum Completeness Criteria (KKM) was still low. After the teacher gave material for learning, students did not voice their thoughts or ask many questions, but some still did not pay attention to what the teacher said. Several factors, including the need for variations in the current learning model and media, cause this. This is because students often need help understanding viral material. Students' academic achievement in the learning process can be disrupted if they do not understand the material being taught (Rohmah & Setiani, 2022). Actions must be taken to increase student learning activities and outcomes based on the importance of student learning completion.

Problem-Based learning is a learning approach known as "problem-based learning," which can help develop and hone one's problem-solving skills by focusing on actual situations from everyday life (Putri et al., 2022). The problem-based learning model is a type of instruction that can increase students' capacity to think critically when overcoming challenging challenges (Yoriska & Ristiono, 2022). Curiosity, independence, concern, creativity, and student's ability to think systematically about problems that arise in the context of specific situations and broader problems will increase due to the Problem-Based Learning paradigm. Students can access various sources from their environment thanks to a student-centered learning environment fostered by this Problem-Based Learning model (Wulandari, 2015).

METHOD

The research used is Classroom Action Research. This study only used one class. This research was conducted by designing, implementing, and reflecting. The classroom action research process is designed with several cycle actions, where each cycle consists of 4 stages: the planning stage, the implementation stage, the observation stage, and the reflection stage, which is followed by the next cycle.

The research was conducted at SMA Negeri 2 Tondano from July to August for the 2021–2022 academic year. Time allocation of 2 x 90 minutes is used for 2 meetings. The type

of research used is classroom action research (PTK). The research subject was the learning outcomes of class X-A IPA students at SMA Negeri 2 Tondano for the 2021/2022 academic year. The number of students is 27 people. Questionnaires, test questions, and Student Worksheets (LKPD) are the research instruments used in this study. Observations, field notes, interviews, documentation, and tests were used as data collection methods. Management of learning by using a learning model based on Problem-Based Learning and the learning outcomes of class X-A IPA SMA Negeri 2 Tondano is used as a data analysis methodology in this study. The data collected was examined using descriptive and quantitative methods. Following up on the actions in cycles I and II, quantitative data from test results were examined using learning completeness. Based on performance indicators, the formula used to determine the percentage of students who complete their studies is:

Percentage:

$$P = f/n \times 100\%$$

Information:

P = Percentage Number

f = number of students who complete

n = number of students

RESULT AND DISCUSSION

This research is a classroom action research conducted from August to March for the 2022/2023 Academic Year at SMA Negeri 2 Tondano in class Xa IPA with a total of 27 students, with an allotted time of 2 x 90 minutes. This classroom action research uses a Problem-Based Learning model to improve student learning outcomes. The learning outcomes obtained from students in Cycle I and Cycle II are as follows:

1.   Cycle I

The results of obtaining evaluation calculations in the form of post-tests in cycle I from a total of 27 students obtained only 15 students who met the completeness requirements in learning to determine the level of understanding and improvement of student learning outcomes using the Problem-Based Learning learning model carried out by researchers in class X – A IPA. The results of the recapitulation of the cycle I value can be seen in Table 1 below:

Table 1. Recapitulation of Cycle I Scores of Class X-A IPA SMA Negeri 2 Tondano

Number of Students	Percentage	Information
12	44,44%	Complete
15	55,55%	Incomplete
27	100%	Total

The results of the calculation of cycle 1 have been obtained, and the results can be seen in Table 1 that in cycle 1, there are still many students who still need to reach the standard of classical mastery. It will be continued in the second cycle to get good learning outcomes.

2.   Cycle II

The results of obtaining evaluation calculations in the form of post-tests in cycle II from a total of 27 students, only 25 students have met the completeness requirements in learning to determine the level of understanding and improvement of student learning outcomes using the Problem-Based Learning learning model carried out by researchers in class X – A IPA. The results of the recapitulation of the cycle I value can be seen in Table 2 below:

Table 2. Recapitulation of Cycle II Grades of Class X-A IPA SMA Negeri 2 Tondano

Number of Students	Percentage	Information
25	92,59%	Complete
2	7,40%	Incomplate
27	100%	Total

The results of Cycle II calculations have been obtained and can be seen in Table 2. From the results obtained that in cycle 2, there has been an increase in student learning outcomes using the Problem-Based Learning learning model. That way, it will not be continued in the next cycle.

According to research, learning cycle I must be continued with cycle II because it has yet to reach an indicator of success. The research cycle ended because success indicators had been obtained. These indicators have been met and proven by the increase in student learning evaluation scores from cycle I to cycle II in Tables 1 and 2 above. In cycle I, 12 students obtained KKM scores of $\Box\Box75$, with a classical percentage of 44.44%; 15 students scored KKM $\Box$ 75, with a classical percentage of 55.55%; and in cycle II, 25 students scored KKM $\Box$ 75, with a classical percentage of 92.59%; and 2 students got KKM $\Box$ 75, with a classical percentage of 7.40%.

According to observations, student learning activity scores increased between cycles I and II. The value of student learning activities increased from 44.44% to 92.59% in cycle II. The biology learning process that uses audio-visual media and the Problem-Based Learning learning model runs smoothly even though several things on the observation sheet need attention for further learning. The increase in the average classical completeness score of student learning activities evidences this. In cycle II, teachers, and students both got satisfactory results. This can be seen in the results that exceed the classical completeness that must be achieved to ensure this research is considered successful.

The research results were conducted to determine whether using audio-visual media in learning biology based on Problem-Based Learning improves student learning outcomes in class X SMA Negeri 2 Tondano. The learning process in cycle I went well. However, there are still deficiencies in the lessons being carried out; this can be seen based on observational data carried out during the learning process and reflections, which found that students lack the motivation to learn, students are less active in group discussions, play and disturb classmates and the influence of class hours makes students do not focus on learning so that it affects the learning process. Paying attention to the results of observations in reflecting on the learning process in cycle I, the researcher felt the need to use audio-visual media in Problem-Based Learning-based biology learning to improve student learning outcomes through continued research in cycle II.

Problem-Based Learning has the advantage of making it easier for students to master the concepts learned in order to solve real-world problems, while the drawbacks of Problem-Based Learning are that when students do not have the intention or do not have the belief that the problem being studied is challenging to solve, then they will feel reluctant to try it.

The learning process in cycle II went well compared to cycle I. In cycle II, the learning process increased because students were actively involved in learning. From the implementation of research using audio-visual media conducted in schools, it can be seen that each student's role in the learning process is perfect, where each student's curiosity about the virus is very high, and cooperation between teachers and students can be trained in the learning process. In research activities, students can understand, comprehend and examine virus material using audio-visual media. The implementation of research in cycle II shows that the difference compared to cycle I is only accompanied by theory and group discussions. So that students find it challenging to understand the learning process that has been given. Mastery of

the material is the level expected to be achieved by students after participating in learning activities that have been carefully prepared to achieve maximum learning outcomes.

Applying problem-based learning models can increase learning interest and student learning outcomes. Student responses during Learning were very positive, and students quickly understood the material provided by the teacher (Lidi, 2018).

Using audio-visual media can improve learning outcomes by facilitating students' understanding of the material being studied (Mulyono, 2022). Students become more motivated and interested in the immediate learning process due to using audio-visual teaching materials, and they tend not to get bored with the teacher's choice of media because teachers use it in various ways to make students more excited and better able to understand the material.

CONCLUSION

Based on the research results, the conclusions obtained are that learning using the Problem-Based Learning model and audio-visual media can improve learning outcomes with the subject of viruses in class Xa at SMA Negeri 2 Tondano. The suggestions from this study are that it can be used as a basis for further research. In addition, it can be used as a reference for teachers in using audio-visual media with Problem-Based Learning-based learning models to improve learning outcomes.

REFERENCE

Abd Rahman, B. P., Munandar, S. A., Fitriani, A., Karlina, Y., & Yumriani, Y. (2022). Pengertian Pendidikan, Ilmu Pendidikan Dan Unsur-Unsur Pendidikan. *Al-Urwatul Wutsqa: Kajian Pendidikan Islam*, 2(1), 1-8.

Abdullah, M. (2018). Pengaruh Fasilitas Sekolah Dan Motivasi Guru Terhadap Efektivita Proses Mengajar Di Madrasah Aliayah Ddi Bontang. *PROMOSI (Jurnal Pendidikan Ekonomi)*, 6(2).

Ahdar, A., & Wardana, W. (2019). Belajar dan pembelajaran: 4 pilar peningkatan kompetensi pedagogis.

Ardiyanti, Y. (2016). Berpikir kritis siswa dalam pembelajaran berbasis masalah berbantuan kunci determinasi. *JPI (Jurnal Pendidikan Indonesia)*, 5(2), 193-202.

Fadli, M. R. (2021). Hubungan filsafat dengan ilmu pengetahuan dan relevansinya di era revolusi industri 4.0 (Society 5.0). *Jurnal Filsafat*, 31(1), 130-161.

Gesmi, I., Sos, S., & Yun Hendri, S. H. (2018). *Buku Ajar Pendidikan Pancasila*. Uwais Inspirasi Indonesia.

Irfangi, M. (2017). Implementasi Metode Kisah dalam Pembelajaran Akidah Akhlak di Madrasah Aliyah. *Jurnal Kependidikan*, 5(1), 67-80.

Kusumawati, O. D. T., Wahyudin, A., & Subagyo, S. (2017). Pengaruh pola asuh, lingkungan masyarakat dan kedisiplinan belajar terhadap hasil belajar siswa SD Kecamatan Bandungan. *Educational Management*, *6*(2), 87-94.

Lidi, M. W. (2018). Pembelajaran remedial sebagai suatu upaya dalam mengatasi kesulitan belajar. *Foundasia*, *9*(1).

Maesaroh, S. (2013). Peranan metode pembelajaran terhadap minat dan prestasi belajar pendidikan agama Islam. *Jurnal kependidikan*, *1*(1), 150-168.

Maryati, I. (2018). Penerapan model pembelajaran berbasis masalah pada materi pola bilangan di kelas vii sekolah menengah pertama. *Mosharafa: Jurnal Pendidikan Matematika*, *7*(1), 63-74.

Mulyono, M. (2022). PENINGKATAN KETERAMPILAN MENULIS PUISI MELALUI MEDIA AUDIO VISUAL PADA SISWA KELAS IV SDN BONGKOT KECAMATAN PETERONGAN KABUPATEN JOMBANG. *Jurnal Metamorfosa*, *10*(1), 61-75.

Nurgiansah, T. H. (2021). *Pendidikan Pancasila*. CV. Mitra Cendekia Media.

Rohmah, C. N., & Setiani, R. (2022). Pengaruh Model Problem Based Learning (PBL) terhadap Hasil Belajar Materi Sistem Gerak pada Manusia Siswa Kelas VIII SMPN 4 Tulungagung. *Jurnal Pendidikan dan Pembelajaran Sains Indonesia (JPPSI)*, *5*(2), 99-106.

Pratiwi, I. (2022). Penerapan Model Problem Based Learning Berbantuan Audio Visual Untuk Meningkatkan Kemampuan Berpikir Kritis dan Hasil Belajar Siswa. *Journal of Education Action Research*, *6*(3).

Primayana, K. H. (2015). Manajemen Sumber Daya Manusia Dalam Peningkatan Mutu Pendidikan Di Perguruan Tinggi. *Jurnal Penjaminan Mutu*, *1*(02), 7-15.

Putri, H. T., Said, M., & Wahyuningsih, W. (2022). Penerapan Model Pembelajaran Problem Based Learning Dengan Media Audio Visual pada Mata Pelajaran IPS untuk Meningkatkan Kemampuan Berfikir Kritis Siswa Kelas VIII SMP Negeri 2 Tambang Kab. Kampar Riau. *JURNAL PEMIKIRAN DAN PENGEMBANGAN PEMBELAJARAN*, *4*(2), 369-377.

Rosy, B., & Pahlevi, T. (2015). Penerapan problem-based learning untuk meningkatkan kemampuan berpikir kritis dan keterampilan memecahkan masalah. In *Prosiding Seminar Nasional* (Vol. 160, pp. 160-175).

Santoso, E. (2017). Penggunaan model pembelajaran kontekstual untuk meningkatkan kemampuan pemahaman matematika siswa sekolah dasar. *Jurnal Cakrawala Pendas*, *3*(1).

Saputro, M. N. A., & Hadi, B. (2022). Pengembangan System Penjaminan Mutu Pendidik untuk Menciptakan Seorang Pendidik yang Professional. *Jurnal Inovasi Penelitian*, *2*(11), 3745-3764.

Sholikhah, F. N., & Wahidah, Z. (2021). Penggunaan Metode Pembelajaran Guru Biologi Di Pasuruan: Analisis Persepsi Siswa. *Alveoli: Jurnal Pendidikan Biologi*, *2*(1), 16-29.

Sucipto, S. (2017). Pengembangan ketrampilan berpikir tingkat tinggi dengan menggunakan strategi metakognitif model pembelajaran problem-based learning. *JP (Jurnal Pendidikan): Teori dan Praktik*, *2*(1), 77-85.

Utomo, T., Wahyuni, D., & Hariyadi, S. (2014). Pengaruh model pembelajaran berbasis masalah (problem-based learning) terhadap pemahaman konsep dan kemampuan berpikir kreatif siswa (siswa kelas VIII Semester Gasal SMPN 1 Sumbermalang Kabupaten Situbondo Tahun Ajaran 2012/2013). *Jurnal Edukasi*, *1*(1), 5-9.

Wardani, W. F. (2018). *Penerapan Model Problem Based Learning (PBL) untuk Meningkatkan Hasil Belajar Siswa pada Mata Pelajaran IPS Kelas IV MI Islamiyah Sumberrejo Batanghari Tahun Pelajaran 2017/2018* (Doctoral dissertation, IAIN Metro).

Wulandari, S. S. (2015). Penerapan Model Pembelajaran Problem Based Learning dalam Meningkatkan Kemampuan Berpikir Kritis Mahasiswa. In *Prosiding Seminar Nasional* (pp. 187-204).

Yanti, R. A. (2014). *Pengaruh Motivasi Dan Disiplin Kerja Terhadap Kinerja Pegawai Pada Dinas Perhubungan Kabupaten Gresik* (Doctoral dissertation, Universitas Muhammadiyah Gresik.

Yoriska, V., & Ristiono, R. (2022). Pengembangan Media Pembelajaran Biologi Menggunakan Google Sites Tentang Materi Sistem Sirkulasi Darah Pada Manusia Untuk Peserta Didik Kelas Xi MIPA SMA. *Biodidaktika: Jurnal Biologi dan Pembelajarannya*, *17*(2).