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Project-based learning with interactive video media to improve students' HOTS

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Abstract: *This study aims to improve students' higher order thinking skills (HOTS) through the use of interactive video learning media in project-based learning at SDN Junrejo 2, Batu City. This class action research was conducted in two cycles, the research shows that interactive video facilitates the delivery of information so that in its application it makes it easier for students to understand the material. The importance of the role of educators in providing guidance and support was revealed in helping students in the course of learning and developing higher order thinking skills. The process of improving HOTS requires time, adaptation to the new learning model, and continuous mentoring. With the right strategy, the use of technology in learning can bring positive changes in the quality of education.*

Keywords*: Project Based Learning; Interactive Video; Hots*

Introduction

Higher order thinking skills (HOTS) are very important because of the complexity and dynamics of the modern world that continues to develop in the 21st century (Sunendar, 2020). In the era of information and technology, we are faced with more complicated and multidimensional problems that require analytical, evaluative, and creative abilities to solve (Rohman, 2022). HOTS allows individuals to think critically (Febrianti et al., 2021). In addition, with rapid technological advances, the ability to innovate and adapt to change is the key to success (Alimuddin et al., 2023; Wibowo et al., 2023). Therefore, developing HOTS is not only important for academic success, but also for building survival skills to face global challenges.

HOTS skills play a crucial role in learning mathematics in primary schools, where learners are not only expected to memorize formulas and do routine problems, but also to understand basic concepts and apply them in solving real problems (Astawayasa et al., 2022). In this context, HOTS encourages learners to think critically and analytically as they face various mathematical challenges, which in turn helps them develop strong logic and reasoning skills (Putra et al., 2023). The application of HOTS in mathematics learning in primary schools not only improves learners' conceptual understanding of the material, but also equips them with higher-order thinking skills that will be useful not only in everyday life, but also in further education and more complex life situations in the future.

Based on interviews with educators at SD Junrejo 2, difficulties are still faced in improving HOTS, especially in mathematics learning. The educators revealed that many students are still stuck in the conventional way of thinking, where they tend to memorize formulas without understanding the underlying concepts. In addition, limited time and a tight curriculum make it difficult for educators to implement more interactive and learner-centered teaching methods, which are essential for HOTS development. In line with research conducted by Monawati & Fauzi (2018) said that the teaching done by educators will be

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directly proportional to the learning outcomes of students. Educators have difficulty teaching so that learning outcomes are not as desired (Fauzi et al., 2020). Other barriers faced include the lack of resources and learning materials that support the development of critical and creative thinking skills. Some educators also noted that learners are often afraid to take risks and make mistakes, which inhibits deeper exploration and problem solving. Therefore, efforts are needed to support the development of HOTS in mathematics learning.

The problem at SD Junrejo 2 shows that many students have not reached the expected level of understanding in mathematics, especially in HOTS. This low level of HOTS is largely due to traditional teaching methods that are less able to stimulate learners' critical and creative thinking (Wati et al., 2023). Learners tend to memorize formulas and procedures without really understanding the basic concepts, so they struggle when they have to apply that knowledge in different situations or solve more complex problems. In overcoming this problem, the application of learning models with the help of digital learning media can be an effective solution (Asrizal et al., 2018). The use of technology in the classroom can make math learning more interesting and interactive, so that students are more motivated to learn (Leuwol et al., 2023). With the integration of digital learning media, it is expected that students at SD Junrejo 2 can more easily understand complex mathematical concepts and develop their critical and creative thinking skills. This will not only improve learners' HOTS, but also better prepare them to face the challenges of education and life in the 21st century. The application of technology combined with the right learning model can provide effectiveness in HOTS (Islami & Soekamto, 2022; Puspitasari et al., 2022; Setiawan et al., 2022).

Based on these problems, improvements need to be made in the learning process. Educators need to be primarily in visualizing teaching materials so that students can easily understand the mathematical concepts given. Project-based learning models with the help of learning media can improve HOTS (Amaliah et al., 2023; Ashari et al., 2021; Handayani et al., 2023; Launuru et al., 2023; Suherman et al., 2020). The application of delivery media using interactive media can improve learning outcomes (Ali & Zaini, 2023; Sianturi et al., 2021). One of the learning media that provides interactivity in its delivery is interactive video. Interactive video delivery media makes it easier for students to receive material (Wibowo et al., 2024). The difference in this research with previous research is applying interactive video media as a learning resource in project-based learning in elementary schools. This research was conducted with the aim of increasing students' HOTS.

Method

This research is a class action research. Action research aims to change several things such as teaching methods, educators' understanding of teaching, and conditions during teaching (Kemmis, 2009). The research was conducted at SDN Junrejo 2, Batu City in the 2023/2024 school year. The subjects in this study were class IV SDN Junrejo 2 totaling 28 students. The research was conducted for 5 lesson hours per cycle, conducted until the criteria for classical completeness were achieved. The procedures in classroom action research according to Kemmis et al. (2014) are Plan, Act and Observe, then Reflect.

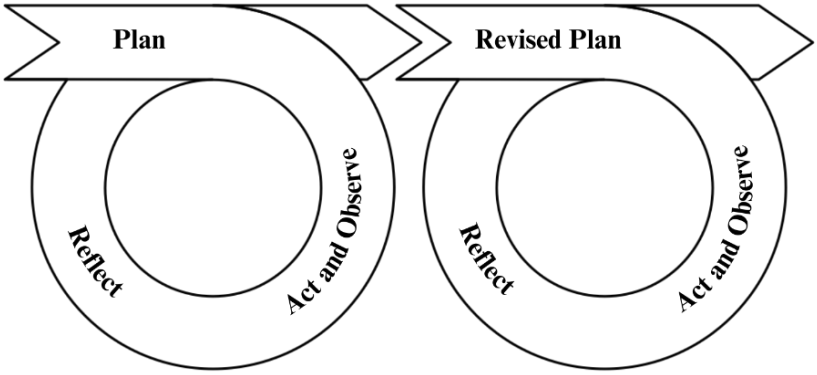

Figure 1. Class action research model by Kemmis, McTaggart, and Nixon.

Data collection used HOTS scores. The assessment was in the form of a written test with 20 multiple choice HOTS questions. The analysis was calculated using simple statistics in calculating learning completeness, as for the criteria for classical learning completeness ≥ 85%, while students were declared complete if they scored ≥ 75 according to the school's minimum completeness criteria. The next cycle is carried out if the learning outcomes reflected in classical completeness have not reached 85%. The analysis in calculating the completeness of learning outcomes according to Arikunto (2021) is as follows.

$$Percentage\ of\ Completion = \frac{Number\ of\ Student\ Completion}{Number\ of\ Student} \times 100\%$$

Results and Discussion

This action research was conducted in 2 cycles with a total of 5 hours 50 minutes. The learning completeness of students in the pre-cycle can be seen in table 1, cycle I can be seen in table 2 and cycle II in table 3.

Table 1. Pre-cycle Recapitulation

Indicators	Pre Cycle Result
Frequency of Student Score ≥ 75	11
Average Student Score	62
Classical Completeness	39%

The results of classical completeness in the pre-cycle obtained 39%, this still did not reach the criteria for classical completeness, so action needed to be taken.

Table 2. Cycle 1 Recapitulation

Indicators	Pre Cycle Result
Frequency of Student Score ≥ 75	18
Average Student Score	74
Classical Completeness	64%

The results of classical completeness in cycle I obtained 64%, the value obtained still did not reach the criteria for classical completeness that must be met, so it was necessary to do the next cycle.

Table 3. Cycle 2 Recapitulation

Indicators	Pre Cycle Result
Frequency of Student Score ≥ 75	24
Average Student Score	78
Classical Completeness	86%

The results of classical completeness in cycle II obtained 86%, the value obtained has reached the criteria for classical completeness, so the research can be completed. The discussion is based on the classroom action research model, first planning, second Act and Observe, third reflect.

1. Plan

Researchers as well as educators plan actions with interactive video learning media in project-based learning. The planning steps in the research are determining learning outcomes, connecting learning outcomes with teaching materials, developing learning designs, developing research instruments, and developing data management plans. The differences in cycles I and II in mathematics learning elements are cycle I on Geometry elements, while cycle II on Data Analysis elements. Project-based learning steps according to Nurohman in (Halimah & Marwati, 2022) are the first to determine basic questions, the second to make project designs, the third to arrange scheduling, the fourth to monitor project progress, the fifth to assess results, and the sixth to evaluate experiences.

2. Act and Observe

Researchers applied interactive video learning media in project-based learning to improve students' HOTS. This application is in accordance with the planning that has been made previously. In the treatment stage, it will be explained based on the syntax of PjBL. In the first syntax, educators provide interactive video media as a learning resource, the application of interactive video media in project-based learning models to help students determine basic questions. Learning media can facilitate the delivery of information (Juhaeni et al., 2020). At the beginning of learning, students form learning groups with members of 4-5 students. In cycle 1 learners are invited to be able to solve problems in geometry to prove that the plane of a space is formed from several flat shapes, while cycle 2 learners are able to solve problems in simple data analysis to make bar and pie charts on the population in several classes at SDN Junrejo 2.

In the second syntax, learners are invited to prepare project components, such as determining the topic, determining the objectives, determining the role of each individual in the group, and what is needed in the project. In cycle 1, learners discussed in groups to choose a space building that would be made into a net, choose the paper material to be used and choose the rope used. In addition to discussions with their respective groups, educators conducted several stimuli to make the discussion work. Furthermore, in cycle 2, students discuss in groups to choose which class will be used as an object and choose a suitable diagram for data collection.

In the third syntax, learners are asked to compile a schedule in groups. The educator gives one week to complete the project and provides a project progress sheet as a form of monitoring. The project progress sheet contains several project progress points, such as preparing tools, materials, making prototypes, understanding of the material, and quality of work.

In the fourth syntax, learners do project work for one full week. As for what the educator does, namely checking the project progress sheet and providing feedback to students on what has been done.

In the fifth syntax of assessing results after one week, project work is carried out. Learners in groups are asked to present the results of the work and tell what happened during the project alternately in front of the class. In addition to educators, learners can provide feedback on the results of other groups' projects. The main task in this syntax is that the educator conducts a final assessment of several aspects such as, understanding of the material, quality of project results, presentation, and creativity.

In the sixth syntax, educators reflect on the learning experience. Educators explore the feelings of students when implementing learning using project-based learning models with the help of interactive videos, the aim is to find what still needs to be improved and needs to be maintained. In addition, it is also important for educators to take responsibility for students' understanding that is still wrong regarding the material.

Based on the results of observations on learning in each cycle. Students still need to be guided, this is because students are still not used to the application of learning using a project-based learning model. Seen in the process of presenting the results that are still stuttering, so it is the educator's job to provoke students by using a few questions.

Although the learning model has been considered capable of increasing HOTS, it should also be noted that the pedagogical skills of an educator need to be considered. Educators have a role in guiding students in learning through several ways, one of which is by asking questions (Faridah, 2021). In the findings of this study, mainly educators have the ability to ask questions well, this is important in order to spark students to participate in learning. Educators' questioning skills have a positive effect on students' critical thinking skills (Iqlimah et al., 2023).

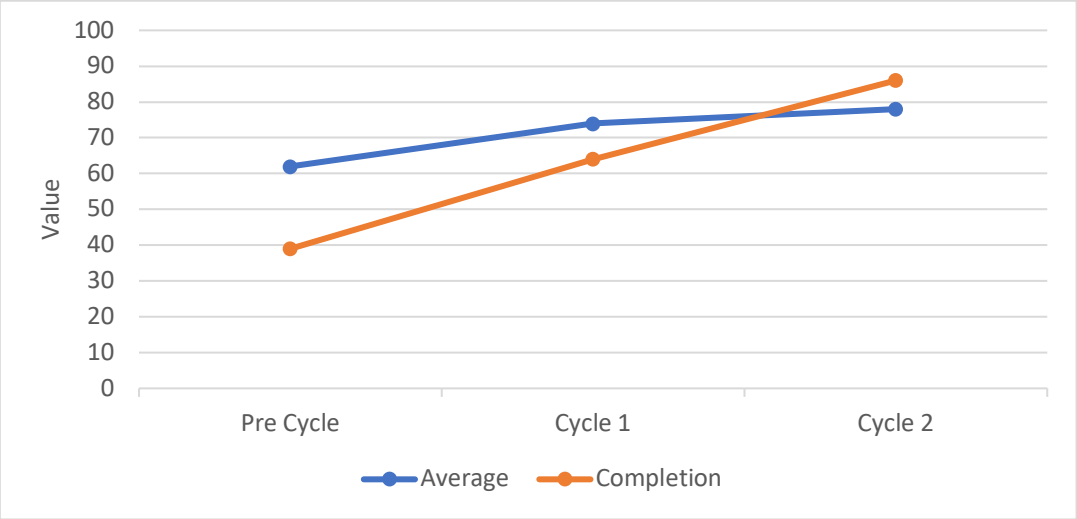

Figure 2. HOTS Improvement in Pre-Cycle, Cycle 1, and Cycle 2.

3. Reflect

The results of the observation action are based on the information collected. The researcher concluded that the application of the use of interactive video learning media in project-based learning can increase students' HOTS. As for this research, there is a gradual increase in its application.

In cycle 1, the use of interactive video learning media was applied to help students understand the concept of geometry through the project of making the nets of building spaces. Although there was an increase in learning completeness, the results had not yet reached the expected criteria. Learners still need to adapt to the new learning model. Learners were less active in group discussions and project presentations. Some learners still have difficulty in using the media so they need guidance.

In cycle 2 improvements were based on the results of the previous cycle's reflection. The project this time focused on simple data analysis by creating bar and pie charts. Some of the changes made included more intensive assistance for learners. Educators prepared many guiding questions to provoke active involvement of learners in discussions and presentations. Learners more easily understand the use of interactive video media.

Based on the results of the observational actions of the two cycles, the researcher concluded that the implementation of the use of interactive video learning media in project-based learning effectively improved students' HOTS. Some important points from this reflection are that the role of educators in providing guidance and support is very important to help learners understand the material and develop higher order thinking skills. HOTS improvement requires a gradual process, and adaptation to new methods requires time and consistent assistance (Isti`adah, 2020). This research confirms that with the right strategy, the use of technology in learning can bring positive changes in the quality of education.

Indirect improvement in learning outcomes is also felt in the activeness of students during the learning process. In the application of the project, students are quite enthusiastic in learning and in the end enthusiastic when understanding the rules that have been explained. Project-based learning models are used to motivate students (Kamaruddin et al.,

2023). In line with research conducted by Hikmah (2020) which suggests that project-based learning can increase student participation. Project-based learning is said to be successful, one of which is that students have been active in learning (Ginanjar et al., 2021).

Learners' activeness is seen at the beginning of learning, they are independently looking for learning resources in the form of interactive video media. In addition to containing material in interactive video media, the media also inserts questions that students must answer while watching, which forces them to think and provide answers correctly. In line with research conducted by Thurner et al. (2022) stated that interactive videos increase learner engagement and provide better learning outcomes.

Conclusion

This class action research successfully showed that the use of interactive video learning media in project-based learning can effectively improve students' HOTS. Through the application of this method, learning becomes more about understanding concepts deeply and applying them in a real context.

The results of this study confirm the importance of innovation in teaching. The use of interactive video, together with a project-based learning model, can create a learning environment conducive to the development of critical, analytical and creative skills. Educators should be encouraged to adopt this approach and provided with adequate training to optimize its implementation.

This study provides strong empirical evidence that the integration of technology in learning can bring positive changes in basic education. The findings can serve as a reference for educators and researchers in their efforts to improve the quality of learning and HOTS development at various levels of education. The next step is to disseminate these best practices and encourage wider adoption in the education system to prepare learners for future challenges.

References

Ali, L. U., & Zaini, M. (2023). Development of Interactive e-modules Based on Local Wisdom Using Android to Improve Students' Higher Order Thinking Skills (HOTS). *Jurnal Penelitian Pendidikan IPA*, *9*(11), 10091-10100. https://doi.org/10.29303/jppipa.v9i11.4515

Alimuddin, A., Juntak, J. N. S., Jusnita, R. A. E., Murniawaty, I., & Wono, H. Y. (2023). Teknologi Dalam Pendidikan: Membantu Siswa Beradaptasi Dengan Revolusi Industri 4.0. *Journal on Education*, *5*(4), 11777-11790. https://jonedu.org/index.php/joe/article/view/2135

Amaliah, I., Rahmatullah, Syam, A., Suharto, R., & Nurjannah. (2023). Pembelajaran Berbasis Proyek (Project Based Learning) Untuk Menumbuhkan High Order Thinking Skill (HOTS). *Indonesian Journal of Learning Education and Counseling*, *5*(2), 138-147. https://doi.org/10.31960/ijolec.v5i2.2024

Arikunto, S. (2021). *Dasar-Dasar Evaluasi Pendidikan* (3rd ed.). Bumi Aksara.

Ashari, R. M. R., Suwono, H., & Fachrunnisa, R. (2021). Students HOTS in PjBL based STEM learning in biology classroom: An experimental analysis. *AIP Conference Proceedings*, *2330*(1), 030013. https://doi.org/10.1063/5.0043256

Asrizal, A., Hendri, A., Hidayati, H., & Festiyed, F. (2018). Penerapan Model Pembelajaran Penemuan Mengintegrasikan Laboratorium Virtual dan Hots untuk Meningkatkan Hasil Pembelajaran

Siswa SMA Kelas XI. *JURNAL PDS UNP*, *1*(1), 49-57. http://pdsunp.ppj.unp.ac.id/index.php/PDSUNP/article/view/9

Astawayasa, K. G., Widana, I. W., & Adi, I. N. R. (2022). Pengembangan Asesment Hots Mata Pelajaran Matematika Sekolah Dasar. *Jurnal Ilmiah Pendidikan Citra Bakti*, *9*(1), 129-140. https://doi.org/10.38048/jipcb.v9i1.659

Faridah, F. (2021). Pentingnya Kemampuan Bertanya Guru Terhadap Motivasi Siswa dalam Belajar Matematika. *Journal of Education and Teaching*, *3*(1), 95-102. https://doi.org/10.24014/jete.v3i1.15132

Fauzi, A., Sawitri, D., & Syahrir, S. (2020). Kesulitan Guru Pada Pembelajaran Matematika Di Sekolah Dasar. *Jurnal Ilmiah Mandala Education*, *6*(1), 142-148. https://doi.org/10.58258/jime.v6i1.1119

Febrianti, W., Zulyusri, Z., & Lufri, L. (2021). Meta Analisis: Pengembangan Soal Hots Untuk Meningkatkan Kemampuan Berpikir Kritis Peserta Didik. *Bioilmi: Jurnal Pendidikan*, *7*(1), 39-45. https://doi.org/10.19109/bioilmi.v7i1.9506

Ginanjar, H., Septiana, T., Ginanjar, D., & Agustin, S. (2021). Keberhasilan Implementasi Pembelajaran Berbasis Proyek: Faktor-faktor Kunci dalam Proses Pembelajaran. *Jurnal Pendidikan Tambusai*, *5*(2), 5542–5548. https://doi.org/10.31004/jptam.v5i2.9703

Halimah, L., & Marwati, I. (2022). *PROJECT BASED LEARNING untuk Pembelajaran Abad 21*. PT Refika Aditama.

Handayani, Y., Asia, E., & Hidayat, S. (2023). Peningkatan Kemampuan High Order Thinking Skills (HOTS) melalui Project-Based Learning (PjBL) dalam Implementasi Kurikulum Merdeka. *PTK: Jurnal Tindakan Kelas*, *4*(1), 48-60. https://doi.org/10.53624/ptk.v4i1.236

Hikmah, M. (2020). Penerapan Project Based Learning untuk Meningkatkan Partisipasi dan Hasil Belajar Pemograman Dasar Siswa. *Jurnal Teknodik*, *24*(1), 27–38. https://doi.org/10.32550/teknodik.v0i2.376

Iqlimah, I., Kartono, K., & Pranata, R. (2023). Deskripsi Keterampilan Bertanya Guru Pada Pembelajaran Tematik Kelas III SD Negeri 13 Pontianak Barat. *Journal on Education*, *6*(1), 5706-5713. https://doi.org/10.31004/joe.v6i1.3762

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

Isti`adah, F. N. (2020). *Teori-teori Belajar dalam Pendidikan*. EDU PUBLISHER.

Juhaeni, Safaruddin, Nurhayati, R., & Tanzila, A. N. (2020). Konsep Dasar Media Pembelajaran. *JIEES : Journal of Islamic Education at Elementary School*, *1*(1), 38–46.

Kamaruddin, I., Suarni, E., Rambe, S., Sakti, B. P. S., Rachman, R. S., & Kurniadi, P. (2023). Penerapan Model Pembelajaran Berbasis Proyek Dalam Pendidik: Tinjauan Literatur. *Jurnal Review Pendidikan Dan Pengajaran (JRPP)*, *6*(4), 2742–2747. https://doi.org/10.31004/jrpp.v6i4.22138

Kemmis, S. (2009). Action research as a practice-based practice. *Educational Action Research*, *17*(3), 463–474. https://doi.org/10.1080/09650790903093284

Kemmis, S., McTaggart, R., & Nixon, R. (2014). *The Action Research Planner: Doing Critical Participatory Action Research*. Springer Singapore. https://doi.org/10.1007/978-981-4560-67-2

Launuru, A., Rumahlatu, D., & Matdoan, M. N. (2023). PjBL-HOTS learning model: Its application and effect on cognitive learning outcomes, critical thinking, and social attitudes. *BIOEDUPAT: Pattimura Journal of Biology and Learning*, *1*(1), 1–10. https://ojs3.unpatti.ac.id/index.php/bioedupat/article/view/3190

Leuwol, F. S., Basiran, B., Solehuddin, M., Vanchapo, A. R., Sartipa, D., & Munisah, E. (2023). Efektivitas Metode Pembelajaran Berbasis Teknologi Terhadap Peningkatan Motivasi Belajar Siswa di Sekolah. *EDUSAINTEK: Jurnal Pendidikan, Sains Dan Teknologi*, *10*(3), 988-999. https://doi.org/10.47668/edusaintek.v10i3.899

Monawati, M., & Fauzi, F. (2018). Hubungan Kreativitas Mengajar Guru dengan Prestasi Belajar Siswa. *Pesona Dasar : Jurnal Pendidikan Dasar Dan Humaniora*, *6*(2), 33-43. https://doi.org/10.24815/pear.v6i2.12195

Puspitasari, S., Hayati, K. N., & Purwaningsih, A. (2022). Efektivitas Penggunaan Model Blended Learning terhadap Motivasi Belajar dan Hasil Belajar IPS. *Jurnal Basicedu*, *6*(1), 1252–1262. https://doi.org/10.31004/basicedu.v6i1.2186

Putra, W. P., Gunamantha, I. M., & Sudiana, I. N. (2023). Pengembangan E-LKPD Hots Dalam Meningkatkan Berpikir Kritis Pada Pembelajaran IPA SD. *PENDASI Jurnal Pendidikan Dasar Indonesia*, *7*(1), 169-180. https://doi.org/10.23887/jurnal_pendas.v7i1.2177

Rohman, A. (2022). Literasi dalam Meningkatkan Kemampuan Berpikir Kritis di Era Disrupsi. *EUNOIA (Jurnal Pendidikan Bahasa Indonesia)*, *2*(1), 40-47. https://doi.org/10.30821/eunoia.v2i1.1318

Setiawan, T., Sumilat, J. M., Paruntu, N. M., & Monigir, N. N. (2022). Analisis Penerapan Model Pembelajaran Project Based Learning dan Problem Based Learning pada Peserta Didik Sekolah Dasar. *Jurnal Basicedu*, *6*(6), 9736-9744. https://doi.org/10.31004/basicedu.v6i6.4161

Sianturi, A. S. R., Retnoningsih, A., & Ridlo, S. (2021). Development of Interactive E-Book of Ferns Materials Through a Scientific Approach With HOTS Problems to Improve Student Learning Outcomes. *Journal of Innovative Science Education*, *10*(3), 230-236. https://doi.org/10.15294/jise.v10i1.43091

Suherman, Prananda, M. R., Proboningrum, D. I., Pratama, E. R., Laksono, P., & Amiruddin. (2020). Improving Higher Order Thinking Skills (HOTS) with Project Based Learning (PjBL) Model Assisted by Geogebra. *Journal of Physics: Conference Series*, *1467*(1), 1–9. https://doi.org/10.1088/1742-6596/1467/1/012027

Sunendar, D. (2020). Pendidikan Literasi, Hots, dan Keterampilan Abad Ke-21. *The 4th International Conference Of Multiliteracy And Higher Order Thinking Skills*, *1*(1), 1-6. https://prosiding.icomhots4st.rcipublisher.org/index.php/icomhots4st/article/view/3

Thurner, S., Schön, S., Schirmbrand, L., Tatschl, M., Teschl, T., Leitner, P., & Ebner, M. (2022). An Exploratory Mixed Method Study on H5P Videos and Video-Related Activities in a MOOC Environment: *International Journal of Technology-Enhanced Education*, *1*(1), 1–18. https://doi.org/10.4018/IJTEE.304388

Wati, D. K., Saragih, S., Suanto, E., & Roza, Y. (2023). Analisis Kemampuan Pemahaman Matematis Siswa Ditinjau Dari Gaya Belajar Pada Materi Bangun Ruang Sisi Lengkung. *PRISMA*, *12*(2), 425-435. https://doi.org/10.35194/jp.v12i2.3154

Wibowo, S. A., Agustiningsih, & Wardoy, A. A. (2023). Development of website-based virtual tour learning media for learning during the COVID-19 pandemic. *AIP Conference Proceedings*, *2679*(1), 060003. https://doi.org/10.1063/5.0111409

Wibowo, S. A., Degeng, M. D. K., & Praherdhiono, H. (2024). Interactive video for learning Mathematics element of measurement in elementary school. *Inovasi Kurikulum*, *21*(2), 723-736. https://doi.org/10.17509/jik.v21i2.67125