

Implementation of Deep Learning in History Learning Based on Virtual Museum Tours

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Abstract Deep Learning is an approach that emphasizes in-depth understanding of concepts and competencies. This learning encourages students to actively engage in the learning process. There are three main elements of deep learning: meaningful learning, mindful learning, and joyful learning. Classroom learning is emphasized to be more meaningful and enjoyable for students. Therefore, history learning, known for its monotonous use of texts covering past events, must be implemented into an enjoyable learning experience through various innovations by teachers. One innovation teachers can implement is conducting virtual tours in the classroom by partnering with the National Education Museum. The method used in this research is a case study. The results of this study indicate that learning through virtual tours of museums is highly relevant because it aligns with the historical learning outcomes in schools.

Keywords: History learning, deep learning, virtual tours of museums

Abstrak Pembelajaran Deep Learning ialah suatu pendekatan yang menekankan pemahaman konsep dan kompetensi secara mendalam, pembelajaran ini mendorong siswa secara aktif terlibat pada proses kegiatan belajar. Terdapat 3 (tiga) elemen utama pembelajaran deep learning yakni: Meaningful learning, Mindful learning, dan Joyful learning. Pembelajaran dikelas ditekankan agar dapat lebih bermakna dan menggembirakan siswa. Untuk itu pembelajaran sejarah yang dikenal dengan pembelajaran yang monoton pada teks-teks materi peristiwa masa lampau harus diimplementasikan menjadi suatu pembelajaran yang menggembirakan dengan berbagai inovasi yang dilakukan oleh guru. Salah satu inovasi yang dapat guru lakukan adalah dengan melakukan virtual tour di ruang kelas dengan bermitra belajar dengan museum Pendidikan nasional. Metode yang dipakai pada penelitian ini adalah metode penelitian studi kasus. Hasil dari penelitian ini adalah pembelajaran dengan virtual tour museum ini sangat relevan karena sesuai dengan capaian pembelajaran sejarah di sekolah.

Kata kunci : Pembelajaran sejarah, deep learning, virtual tour museum



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INTRODUCTION

Learning is a process of interaction between students, teachers, and other learning resources within a learning environment so that students can develop attitudes, knowledge, and skills to achieve the planned objectives. History learning is a learning activity that studies the past, the present, and the future chronologically, encompassing place, space, and time. In the history learning process, students study development and change from one period to another. Therefore, history learning should not rely solely on the past; rather, it must also be continuous. Students must understand that, through history learning, they can learn about the causes and effects of events. The most essential aspect of every historical event is that students are expected to be able to take positive values that are worthy of being emulated (Hermanto, R., 2016, p. 02).

However, history learning in the classroom tends to be perceived as boring for students because it is too dependent on texts and an excessive amount of material. Therefore, the solution to be undertaken by teachers is the use of museum virtual tours in history learning. This learning belongs to a digital learning system that uses information technology effectively so that classroom learning becomes more meaningful. The use of digital teaching materials helps students gain new experiences and build new perspectives through discussions with peers when developing a history project. Such digital teaching materials can encourage collaboration and communication in the classroom among students, with other students, and even with teachers, thereby bridging effective communication during the learning process and strengthening socio-emotional aspects. Teachers also use digital technology in history learning to respond to the current tendency of students who cannot be separated from technology such as mobile devices, laptops, and so forth. To develop good learning, digital technology should facilitate students' learning activities at school. Because museum virtual tours provide visual tours or images of historical replicas that can also produce sound accompanied by explanatory text, the diverse characteristics and needs of different students can be well accommodated. Museum virtual tours are expected to help teachers create a more interactive history learning process and serve as a form of teacher adaptation within SMA Negeri 4 Penajam Paser Utara, which is a digital school. In general, a digital school is a school that carries out various activities using informative technological facilities. Based on this background, the research questions in this study are as follows:

1. How is deep learning implemented in history learning at SMA Negeri 4 Penajam Paser Utara?
2. Is a museum virtual tour a relevant form of deep learning implementation for students?

METHOD

The method used in this study is a case study method. According to Assyakurahim, Dimas, et al. (2023, p. 5), a case study focuses attention on a particular object that is raised as a case to be examined in depth so that it is able to uncover the reality behind a phenomenon. In the

phenomenological paradigm, what appears or is visible is essentially not something real (reality). Everything is merely a reflection of what exists within. The task of a case study researcher is to explore what is not visible so that it becomes visible knowledge. Therefore, a case study can also be interpreted as a process of examining or understanding a case while also seeking its results. The steps of a case study include: determining the topic or theme, reading the literature, formulating the research problem, collecting data, refining data, processing data, analyzing data, theoretical dialogue and data triangulation, drawing conclusions, and reporting the data.

The research sources used in this study are digital literature relevant to the topic under study, including journals, e-books, and other scientific articles, while the research site is SMA Negeri 4 Penajam Paser Utara located at Babulu Darat km. 47, Penajam Paser Utara District, East Kalimantan Province.

RESULT AND DISCUSSION

The rapid development of communication and information technology has given rise to various smartphone-based applications. One of these is virtual tours and virtual reality, which can be utilized as information media as well as relatively attractive promotional media (Jubaedi, A. D., Dwiyatno Saleh, & Sulistiyono, 2020, p. 70). Museum virtual tours are one learning approach that can help teachers deliver material more deeply through the technology and features provided, so that learning is directly centered on students who are free to explore the virtual tour rooms. The use of museum virtual tours is intended to make it easier for students to learn history material. Students can study the material directly from historical sources through their respective devices. This reflects teachers' concern in guiding students to use technology properly as a teaching medium. In addition, monuments, museums, and historical sites are largely located on Java Island, so students outside Java cannot conduct study tours or field trips due to the long distances and cost constraints. The use of museum virtual tours serves as a teacher's solution to provide an engaging learning experience for students. The use of museum virtual tours is also part of the implementation of deep learning (in-depth learning).

Implementation of Deep Learning in History Learning at SMA Negeri 4 Penajam Paser Utara

Deep learning is a learning approach that aims to train students' critical thinking skills. Information received by students is processed critically. Students analyze a problem and find solutions based on data and facts (Fitriyani, A., & Santiani, 2025, p. 53). This approach emphasizes a learning process that is mindful, meaningful, and joyful in the classroom. In-depth learning (deep learning) can occur when students are motivated by various real-world problems by using multiple disciplines and alternative approaches that are student-centered. Deep learning in

education emphasizes a deep and sustained understanding of material. Rather than mere memorization, this approach encourages students to connect the concepts learned with their experiences and real situations around them. This aims to create a stronger and more meaningful understanding.

Deep learning in education differs fundamentally from traditional learning that focuses on memorization and the reproduction of knowledge. The main principles of the Merdeka Curriculum (Independent Curriculum) with a deep learning approach are: (1) deep conceptual understanding; (2) active learning that involves cooperation; (3) learning that encourages students to ask questions and inquire; and (4) group or collaborative learning (Cholifatunisa Aninda et al., 2025, p. 131). SMA Negeri 4 Penajam Paser Utara has implemented in-depth learning (deep learning) in the process of knowledge transfer between teachers and students. One indication is the history learning carried out by a history teacher who uses museum virtual tours, which is considered to encompass the three important elements of deep learning: meaningful learning, mindful learning, and joyful learning. Deep learning in modern education is not limited to artificial intelligence (AI) technology, but also includes deep ways of learning to understand and apply knowledge. In education, deep learning refers to learning that encourages students to explore knowledge more deeply, as opposed to merely memorizing. This approach is oriented toward active, collaborative, and continuous learning. Students are invited to understand context, analyze information critically, and create innovative solutions based on strong conceptual understanding (Fitriyani, A., & Santiani, 2025, pp. 52–53). In this context, deep learning (in-depth learning) trains students to become independent in the learning process by seeking to develop students' self-confidence through collaborative learning with peers such as group discussions, debates, conducting experiments, and even carrying out research. In deep learning, students are also trained to reflect on what they have done in the classroom learning process. Thus, students can recognize their shortcomings in each lesson so that they can improve their competence and achieve the learning outcomes (CP) well. Cholifatunisa Aninda et al. (2025, p. 131) explain that:

Deep learning in learning is not only limited to the use of technology to understand new concepts, but also to curriculum design that enables students to: (1) develop analytical abilities through the utilization of big data; (2) master modern technology skills, such as programming, algorithm design, and the development of artificial intelligence-based applications; and (3) think critically and creatively by interpreting data and producing technology-based solutions.

SMA Negeri 4 Penajam Paser Utara has implemented deep learning (in-depth learning) during the classroom learning process. In history learning in particular, deep learning helps teachers make learning more contextual. In implementing history learning, teachers do not focus

only on studying the past, but also examine current phenomena that are correlated with historical events as cause-and-effect relationships, so that students are expected to view historical events and events occurring today as meaningful learning for themselves. This is because deep learning (in-depth learning) essentially provides opportunities for teachers to develop creativity and involve students actively, thereby fostering learning awareness, motivating intrinsically, and cultivating students' independence in developing learning strategies. This aligns with Triastuti, Ayu, and Sridiyatmiko Gunawan (2023, p. 227), as follows:

History teachers are innovative and creative in utilizing learning media; that is, the development of the times enables history teachers to have broad abilities to be creative with various media. As innovative history teachers, they have the ability to design various learning media with history material as attractively as possible. History teachers face challenges in utilizing technological media. By observing and keeping up with the progress of the times, history teachers continue to prioritize the future of the nation, specifically the Indonesian nation.

History learning is learning that studies events in the past, the present, and the future. This means that history learning not only studies what happened in the past but also examines its correlation with current phenomena and predicts future events, which is referred to as sustainable history. History has three (3) main characteristics: enduring, unique, and important.

Enduring means that history exists only in the memory of the past and cannot be changed. Unique means that history occurs only once and does not recur. It is important because history has a major influence on many people and on the future.

After implementing in-depth learning (deep learning), the teacher realized that deep learning has various advantages, including:

1. Deep learning is learning that can be used to train critical thinking skills, imaginative thinking, interpretive ability, and logical thinking to analyze facts or historical events.
2. Deep learning is learning that can be combined with active learning in which students become the center of learning (student-centered).
3. Deep learning is able to connect classroom learning with students' real lives; in history learning in particular, students not only learn about the past but also correlate it with phenomena or issues around them as a form of sustainable history.
4. Deep learning is able to emphasize students' attitudes, personality, and socio-emotional aspects well, including various reflections carried out by teachers to shape their personality for the better, not merely training cognition.
5. Deep learning is able to train students to communicate well with teachers and peers; this can be demonstrated through various student collaborations in learning as well as students'

efforts to present the results of their research or assignments so that students can develop good public speaking skills.

Museum Virtual Tours as a Relevant Form of Deep Learning Implementation for Students

In implementing museum virtual tours, the teacher divided students into six (6) groups and used six (6) museum virtual tours: the Asia–Africa Conference Museum, the Indonesian Presidential Museum, the National Museum of Indonesia, the Youth Pledge Museum, the Multatuli Museum, and the Sonobudoyo Museum. In this section, the teacher displayed several museum virtual tours provided by the relevant institutions/museums. The following are some of the virtual tours used by the teacher:

1. Asia–Africa Conference Museum: <https://museumkaa.iheritage-virtual.id/>
2. National Museum of Indonesia: <https://museumnasional.iheritage-virtual.id/>
3. Indonesian Presidential Museum: <https://museumkepresidenan.id/virtual-museum/>
4. Youth Pledge Museum: <https://indonesiavirtualltour.com/storage/destination/museum-sumpah-pemuda/src/index.htm>
5. Multatuli Museum: <https://virtual.museummultatuli.id/>
6. Sonobudoyo Museum: <https://kebudayaan.jogjakota.go.id/page/index/virtual-tour-museum-negerisonobudoyo>

In the museum virtual tours, there are visual tours or images of historical replicas that can also produce sound accompanied by explanatory text. Thus, the diverse characteristics or learning-style needs of different students can be well accommodated. The learning styles of students at SMA Negeri 4 Penajam Paser Utara are divided into three (3) types: first, the visual learning style, which is the way students learn and absorb information visually in the form of maps, pictures, diagrams, or things that can be seen. This means that students can process information when concrete evidence is shown first to be studied. Second, the auditory learning style, namely learning by listening; students can process information easily through emphasis on sounds of words orally or in writing. Third, the kinesthetic learning style, namely students' ability to interact or be directly involved in an event. This learning style tends to prefer bodily movement, such as touching learning media, to remember information in classroom learning. In the context of history learning using museum virtual tours, kinesthetic and visual students can freely explore museum rooms virtually through their devices, while auditory students can listen to the images through the voiced text descriptions that are available. Bagus, D. B., and Pitoyo, I. (2021, p. 194) explain that this feature is very interesting and is an excellent innovation for museums because, with this feature, the assumption that museums are old-fashioned and conventional can be dispelled. The following is a table of student learning styles at SMA Negeri 4 Penajam Paser Utara:

STUDENTS' LEARNING STYLES

Table 1. Students' Learning Styles

STUDENT	CLASS	VISUAL	AUDITORY	KINESTHETIC
FAS	x-1	50%	25%	25%
MA	x-1	55%	25%	20%
MZF	x-1	30%	20%	50%
INR	x-2	55%	15%	30%
MR	x-2	45%	15%	40%
NT	x-2	25%	50%	25%
SR	x-2	35%	35%	30%
AA	x-3	40%	30%	30%
LZ	x-3	45%	35%	20%
PNA	x-3	50%	35%	15%
ZMSP	x-3	35%	45%	20%
AFPP	x-4	40%	30%	30%
RS	x-4	35%	35%	30%

From the table of student learning styles above, it can be concluded that students at SMA Negeri 4 Penajam Paser Utara predominantly have visual and audiovisual learning styles; therefore, the use of museum virtual tours is suitable for history learning. This can increase students' interest in learning history, because students can analyze various historical information in an engaging and accurate manner through the visualizations provided by these museums.

The following is the structure of the lesson plan using museum virtual tours:

After greeting, taking attendance, conducting apperception, and carrying out the introductory activities in class, students had previously been divided into several groups (six groups). Next, the teacher presented an overview of the history material about historical sources. Historical sources are everything, both tangible and intangible, that can be used in historical research, in the form of cultural collections—oral or written, visual or audiovisual. To understand this material, students were directed to use a museum virtual tour. Thus, in understanding historical sources, students directly visited a virtual museum and found original historical sources that had been digitized by the relevant museum.

In this lesson, the teacher provided links to the museum virtual tours so that students could access them independently as learning media. Students were also given an example of how to use the museum virtual tour by the teacher in the classroom via a projector. During the lesson, students could discuss with their group and conduct the virtual tour together with their peers through their respective devices. The assignment from the virtual tour implementation was to create an infographic in the Canva application about the historical sources that students found in the virtual tour. Students could present the results of the virtual tour together with their group in front of the class.

The use of virtual tours in this school is a form of teachers' appreciation for museum virtual tour technology that has been provided by museums in Indonesia. Indonesian society still rarely uses museum virtual tours as an alternative to visiting museums. In fact, with the use of museum virtual tours, historical visits can be more efficient than direct visits. Bagus, D. B., and Pitoyo, I. (2021, pp. 193–194) explain that:

One of the main factors why people, especially millennial students, are still less interested in museums is because museums are considered boring and have not approached the public well, such as using new media to attract their interest in visiting museums. However, the existence of museum virtual tours has indirectly succeeded in approaching the public and providing information about museum collections well.

Although SMA Negeri 4 Penajam Paser Utara is located in East Kalimantan Province while most museums and national sites are far away on Java Island, students at SMA Negeri 4 Penajam Paser Utara can still take museum tours without being constrained by distance and cost. The use of this virtual tour is very practical and free of charge because it can be accessed publicly on the relevant museum websites. The existence of museum virtual tours greatly helps teachers provide a more meaningful history learning experience. The use of museum virtual tours is a contextual source for history learning; contextual history learning implements various aspects around students by using information technology well so that students can learn history holistically (comprehensively). During learning, students can carefully observe 360° virtual rooms with various features that present information in the form of text about historical relics in the museum so that students can understand the origins, functions, and benefits of various collections. The use of museum virtual tours is also beneficial for students in developing cognitive, psychomotor, and emotional aspects. The use of virtual museums can be applied at every level of education (Erlangga, G., et al., 2022, p. 455). Educational technology and educational innovation are an inseparable unity; the existence of technology should be understood as an effort to increase effectiveness and efficiency that can help humans solve problems. At present, public and private schools are beginning to reorganize their education systems. Many school programs are offered to the public, including majors and school statuses such as superior, model, international, acceleration, and their infrastructure (Salsabila, U. H., & Agustian, N., 2021, p. 130).

The utilization of this virtual tour was implemented well by the teacher. This is because the learning facilities at SMA Negeri 4 Penajam Paser Utara are complete, including a projector in every classroom and active audio speakers that can be used in the learning process. The school's Wi-Fi is also available with a fairly good network. The classroom situation is conducive and comfortable, supported by good desks and chairs for use during learning. The challenge for teachers in implementing museum virtual tours is that using museum virtual tours relies on students' mobile data, whereas not all students have mobile data or sufficient quota; thus, the

solution is that students can access Wi-Fi via their peers, the teacher, or the school Wi-Fi. The impact of using museum virtual tours is that students can learn history material in an enjoyable way and can be taught to use devices for positive purposes, such as using devices for learning needs in history class through museum virtual tours; in addition, it introduces museums in Indonesia directly in the classroom as educational tourism. Furthermore, the use of museum virtual tours is expected to train students to think more critically and historically and to keep up with technological developments in learning, so that history learning using virtual tours is highly relevant for students. This is because the utilization of technology in accordance with its development is one medium that supports improving the quality of history learning (Wiganingrum, Anditya, et al., 2025, p. 129).

In addition, virtual tour-based history learning can help students think critically and historically. Critical thinking is students' ability to analyze, evaluate, interpret, and think logically about information or data obtained so that they can understand the information or data deeply and make appropriate decisions or final conclusions. Meanwhile, historical thinking is students' ability to analyze historical events through various historical concepts such as chronological, diachronic, and synchronic thinking. These concepts help students think deeply about historical information, from the ability to sequence historical periodization to understanding certain factors related to a historical event.

CONCLUSION

SMA Negeri 4 Penajam Paser Utara applies deep learning in its instruction, particularly in history learning, and deep learning is very useful for teachers. Deep learning has three elements: mindful, meaningful, and joyful. This aligns with history learning, in which students are expected to have awareness of themselves as Indonesian citizens; students can interpret various historical events and connect them with the present; and students can learn in an enjoyable way that is not monotonous and text-based. One example is the use of museum virtual tours in the learning process. In the current modern era, technology is developing massively. Therefore, teachers are expected to use technological developments properly; the use of virtual tours is part of the utilization of technology in the learning process. History learning using museum virtual tours is very effective to implement in the classroom. This can help students think critically and historically. The use of museum virtual tours is part of the implementation of digital technology in learning so that history learning for students becomes mindful, meaningful, and joyful. Museum virtual tours help teachers present history contextually through various visuals and audiovisuals that can attract students' interest in learning. The use of museum virtual tours is highly relevant for students because it can help students develop critical thinking and historical thinking.

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