



Reframing mistakes as learning opportunities: Implementing “learning from error” in history classrooms

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Abstract

This study explores the application of the learning from errors (LFE) approach in history education, where student errors are seen as learning opportunities that can enhance understanding and deep reflection. This study aims to identify common types of errors, the factors that cause them, students' perceptions of errors, and the extent to which LFE is applied in history learning. Using a survey method, this study involved 615 students from various districts in West Java with data collection through structured questionnaires and analysis of student responses. The study results show that most students have difficulty remembering historical facts, reflecting a learning system emphasizing memorization rather than critical comprehension. Factors that cause errors include excessive cognitive load, limited access to teaching materials, lack of motivation, and previous negative experiences. Although many students see mistakes as learning opportunities, fear of reprimands and bad grades remains a significant obstacle. However, students who receive constructive teacher feedback are more likely to develop reflective learning strategies. These findings confirm that applying a culture of learning from mistakes in history learning can improve students' critical thinking skills and engagement. Therefore, educators must create a supportive classroom environment, reduce the fear of failure, and encourage students to reflect and correct their mistakes actively.

Keywords: *critical thinking; error analysis; history learning; learning from error; reflection.*

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INTRODUCTION

Errors in education are usually considered undesirable because they are regarded as failures in the learning process. However, recent research shows that mistakes can be a valuable experience that stimulates learning, creativity, and innovation (Bauer & Mulder, 2013). The teaching from errors model utilizes the mistakes or errors that students make in the learning process as a source of information to improve their understanding and skills (Badets et al., 2006). Mistakes are a natural byproduct of challenging learning task attempts and can provide more learning opportunities. Research on learning from error (LFE) has received little attention, so the theoretical framework that addresses the learning process in terms of emotional experience, changes in motivation, self-regulation, metacognitive activity, and cognition is still lacking (Tulis et al., 2016). In summary, there is an increase in research interest in LFE-specific phenomena. However, a theoretical framework that integrates these different perspectives is lacking.

No one wants to make a mistake in a critical situation. The consequences of doing so are that errors can be devastating, and even mistakes can threaten safety (Klamar et al., 2024). Past research, such as that conducted by Bandura (1986) and Skinner (2013) assessed that if students make mistakes, they will make the mistakes themselves stronger, increasing the likelihood of repeating them. Thus, they state that mistakes are bad and should be avoided. Allowing people to make mistakes will encourage them to practice wrong and inefficient approaches that will cause problems because, later, they will find it difficult to change to the right approach (Metcalf, 2017). Bandura (1986) advocates for students to be taught the right things from the beginning, thereby fostering the proper knowledge and skills from the outset, and avoiding the negative aspects of making mistakes. Indeed, in the behavioristic paradigm and cognitive psychology, it is assumed that errors must be avoided because they will interfere with correct information (Elagha & Pellegrino, 2024).

Mistakes can potentially increase knowledge acquisition if students can deal with them adaptively and reflexively (Collin et al., 2010; Khoe et al., 2023; Lohre et al., 2022). From the perspective of neuroscience, an individual's mindset can induce anxiety when perceived as a threat, yet it may also function as a source of motivation (Hajcak, 2012). Experimental research shows that making mistakes while learning, if followed by corrective feedback, is beneficial for learning (Metcalf, 2017). Essentially, it takes the power of motivation to survive a mistake, correct it, and reflect on the underlying misunderstanding (Tulis et al., 2016). Teachers will gain valuable information from errors made by their students, and tolerance for mistakes will encourage active, exploratory, and generative student involvement (Metcalf, 2017).

The *learning from errors* model can be applied in history learning because it helps students correct their mistakes and improve their understanding of complex history material (Heemsoth & Heinze, 2016). History learning is often faced with complex and diverse challenges. Students not only have to memorize a large amount of information, such as dates, names, and important events, but also need to understand the broader context, relate various events, and assess the

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multiple perspectives and interpretations that emerge in the study of History (Fachrurozi, 2016; Hill, 2019; Pratiwi & Aman, 2016). History lessons are often considered memorization lessons, which are considered nothing more than a series of years and the sequence of events that must be remembered and revealed when answering exam questions (Hasan, 2012; Kurniawan, 2023; Saidillah, 2018). The difficulty of learning history is exacerbated by the fact that learning history makes students passive and dull. Based on this fact, students' views on history and learning occupy a less meaningful position in daily life (Sukardi, 2011).

History learning should not be limited to the knowledge of facts. However, it should be held as a joint activity between teachers and students. In this regard, it is not the memorization of facts that is required. However, joint research between teachers and students is the main activity. In this way, students are directly faced with intellectual challenges (Sukardi, 2011). However, if presented with the proper learning method, these historical facts can stimulate students to think critically, namely by encouraging students to interpret historical sources and facts that are then associated with social issues in today's life (Shih et al., 2010). Thus, history learning is an intellectual skill learning activity that involves finding out specific facts, compiling concepts, and continuing by compiling generalizations that apply to history (Jordanova, 2019).

The concept of LFE offers a new perspective in history education and the learning of other social sciences, where mistakes are seen as opportunities to learn and develop (Tirado-Olivares et al., 2023). In history learning, this approach can help students be more actively involved in the learning process, understand their mistakes, and use those mistakes to improve their understanding and abilities (Bransford & Donovan, 2005). As such, exploring whether and how LFE can be applied in history learning is essential. Students who are allowed to explore errors in history exams with reflection and group discussion are better able to understand the material in-depth than those who only study facts without examining their mistakes (Maggioni, 2010).

This article aims to explore the potential application of LFE in history learning, evaluate the benefits and challenges that may arise, and propose practical strategies that educators can apply to improve the effectiveness of history teaching. The urgency of this research is to explore more interactive and reflective learning approaches, such as LFE, that can be applied in history education. Research on the benefits of mistakes as a learning tool is still minimal. Thus, this study aims to bridge the gap by exploring how mistakes can be used as a practical learning strategy in history.

Several previous studies have highlighted the importance of reflection on mistakes in the learning process. Metcalfe (2017) found that errors corrected with appropriate feedback can strengthen students' understanding, and reflection on mistakes in the learning process can increase long-term retention and improve conceptual understanding. In cognitive psychology, errors analyzed by reflection have improved memory and critical thinking skills (van Peppen et al., 2021). However, in history education, research discussing the application of learning

strategies from mistakes is still limited (Heemsoth & Heinze, 2016). Most of the existing studies focus more on errors in mathematics, medical science, and science learning (Denkenaa et al., 2024; Elagha & Pellegrino, 2024; Fiori & Zuccheri, 2005; Lohre et al., 2022) or errors in the professional work environment (Collin et al., 2010). On the other hand, studies in history education still tend to focus on memorization and understanding basic concepts (Pratiwi & Aman, 2016). Research by Tulis et al. (2016) developed a mistake-based learning model emphasizing education's emotional, self-regulation, and motivational aspects. Heemsoth & Heinze (2016) analyzed the impact of error reflection on students' understanding of science. However, it has not been widely applied in history.

This research aims to fill this gap by exploring how errors in history can be used as a learning tool that improves students' conceptual understanding and analytical skills. This study does not directly analyze the application of LFE. It does not include a comparative analysis between various error-based learning models in other subjects or at different levels of education. In addition, the aspects analyzed are limited to students' perceptions of errors, the factors that cause these errors, and the role of teachers in providing feedback. The benefit of this research is to contribute to the development of a more effective history learning model through the Learning from Error (LFE) approach. Theoretically, this study provides insights into how cognitive and metacognitive processes are influenced by error recognition and correction, supporting the idea that making and analyzing mistakes is a critical part of deep learning. It reinforces educational theories that advocate for constructivist learning, where students actively build knowledge through experience, including failure.

Practically, this research can help teachers create a more inclusive and reflective learning environment in which students are encouraged to view mistakes not as failures, but as valuable learning opportunities. In this way, students do not merely memorize historical facts but are guided to understand historical concepts more deeply and critically. Furthermore, the implementation of the LFE approach has the potential to enhance students' critical and analytical thinking skills through structured reflection and teacher-guided feedback. For the field of education, the findings of this study can serve as a reference for the development of more innovative, relevant, and meaningful learning models that promote active student engagement and long-term conceptual understanding.

METHOD

Research Design

This study employed a survey method to explore the potential application of the Learning from Error (LFE) concept in history learning. The survey aimed to identify the aspects of history learning where students commonly make mistakes, their perceptions of these errors, the reasons behind them, and the extent to which teachers provide guidance or feedback regarding such errors. The survey method was chosen to gather broad and diverse insights from a large

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sample of students, making it possible to analyze trends and relationships in the data systematically.

Participants

The study involved a total of 615 students from various high schools across several districts in West Java, including Bandung City, Bandung Regency, West Bandung Regency, Garut Regency, Tasikmalaya City, Tasikmalaya Regency, Sumedang Regency, Cianjur Regency, and Kuningan Regency. The sample was selected based on the principle of representativeness and diversity in student characteristics. West Java, as one of the most populous provinces with a high number of educational institutions, offers a rich demographic landscape for studying the implementation of the LFE approach.

Characteristics of the participants are 1) 57.7% were female students, and 42.3% were male, 2) Students from Grade X made up the largest portion with 305 students (49.5%), 3) Grade XI students totaled 220 (35.8%), and 4) Grade XII students were the fewest, totaling 90 (14.7%). All 615 responses were considered valid, with no missing or incomplete data, ensuring a 100% representation of the sample population. The large sample size enhances the reliability and validity of the findings and allows for comparative analysis across grade levels and school regions.

Data Collection

Data were collected using a structured questionnaire distributed via Google Forms. The instrument consisted of both closed-ended and open-ended questions. Closed questions included Likert scale and multiple-choice formats to gather quantifiable data, while open-ended questions provided space for students to elaborate on their personal experiences and perceptions regarding errors in history learning.

The questionnaire focused on 1) Students' perceptions of errors, 2) the reasons behind the mistakes made during history learning, and 3) the role of teachers in providing feedback and correcting these errors. This mixed-format approach allowed for both statistical analysis and qualitative insight, thereby capturing a richer understanding of the LFE concept in educational practice.

Data Analysis

The collected data were analyzed using descriptive statistical techniques. The analysis focused on identifying 1) the frequency and types of mistakes commonly made by students in history learning, 2) the distribution of perceptions and experiences related to these mistakes, and 3) the relationship between students' error perceptions and their inclination to engage in reflective learning strategies. Further analysis examined correlations between teacher feedback and the adoption of the LFE approach. This helped determine the extent to which error-based reflection was already being applied in history classes. The results provide a comprehensive

overview of the practical challenges in history learning and highlight the theoretical and practical potential of the LFE approach to improve student engagement, critical thinking, and deep conceptual understanding.

RESULTS

To explore the application of LFE in history learning, the researcher surveyed by asking several questions to 615 respondents, namely, what mistakes they made most often when learning history, the main factors that caused the mistakes to occur, students' perceptions of mistakes, and teachers' guidance on the mistakes made. This is the first step to applying the LFE model in history learning. The previous study was applauded because research on using mistakes when learning history for learning optimization was almost impossible. Table 1 decrypts what mistakes students often make in learning History.

Table 1. Common mistakes in history learning

No	Type of Mistake	Number of Those Who Did (%)	Number of Those Who Did Not Do (%)
1	Remembering historical facts (name, date, place of an event)	70.7	29.3
2	Understanding concepts/terms when learning historical events	67.1	32.7
3	Remembering historical events chronologically	73.9	26.1
4	Understanding the concept of cause and effect	58.3	41.7
5	Understanding the process of social change	59.6	40.4
6	Difficulty in critical thinking	66.8	33.2
7	Difficulty in explaining values in history	66.8	33.2
8	Difficulty in understanding the problems discussed	54.1	45.9

Table 1 provides information that the majority of students make mistakes in the aspect of "remembering both historical facts in the form of names, dates, and places of an event (70.7%) and errors in remembering historical events chronologically (73.9%). This explains two things at once. The most challenging aspect for students in learning history is memorizing facts. However, it also indicates that this aspect is often asked about in the evaluation of history learning. The data further strengthens previous studies that learning history is only for developing low-level memory skills. The dominance of learning based on remembering historical facts makes it possible for students to have much knowledge about what has happened in the past because they can remember many names of historical events, names of perpetrators, years of events, and the course of events.

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Table 2. Causes of errors in history learning

No	Cause of Error	Number of Those Who Did (%)	Number of Those Who Did Not Do (%)
1	lack of memorization of historical facts	82.1	17.9
2	lack of books, materials, and sources of material for learning	44.5	55.5
3	do not understand the teacher's explanation	39.1	60.9
4	do not like learning history	24.9	75.1
5	Family and environmental conditions	26.5	73.3
6	lazy to learn	35.0	65.0
7	lack of enthusiasm for learning history	38.8	61.2
8	lack of self-confidence in learning history	57.7	42.3
9	disappointed because of lousy history grades	85.2	14.8

Table 2 provides information that strengthens the problem in Figure 1; most students (82.1%) said that the reason for their mistakes when learning history is their lack of memorization of historical facts (82.1%) and their disappointing grades (85.2%). These two things are related because the disappointing value is caused by their lack of memorization of historical facts. Thus, the initial assumption that the questions teachers ask their students are primarily about historical facts is strengthened by the data in Table 2. The fact that students have difficulty memorizing historical facts (82.1%) and understanding the teacher's explanations (39.1%) indicates that they may have cognitive *overload*. This happens when too much information is stored and processed in short-term memory before being transferred to long-term memory.

Other causes whose presentations are quite large that cause students to make mistakes when learning history are a lack of confidence in learning history (57.7%), a lack of books, materials, and sources of materials for learning (44.5%), not understanding the teacher's explanations (39.1%), and lazy learning (35%). A small percentage of students (26.5%) felt that family and environmental conditions contributed to errors in history learning. Although this factor is not dominant, it shows that aspects outside of school can also affect students' history learning outcomes.

Almost half of the students (44.5%) indicated a lack of learning resources as the cause of errors. This shows that access to adequate teaching materials is still a significant problem, affecting the understanding and accuracy of learning history. Difficulties in obtaining books, materials, and material sources (44.5%) show the importance of diversifying learning resources to help students' cognitive processing. The availability of more sources allows students to gain a deeper understanding of the material in various ways. This enhanced understanding supports the cognitive theory that learning is affected by how students process information.

Some students (39.1%) felt that they did not understand the explanations given by the teacher, which showed that the teacher's method of delivering the material may be less effective or less following the student's learning style. This could indicate that more interactive and discussion-based teaching methods must be implemented. Although not high, almost a quarter of students stated that they did not like history learning. This may be related to how history is

taught, which focuses too much on memorization rather than providing contextual meaning and relevance to students' lives.

Table 3. Positive perceptions of mistakes in history learning

No	Perception of Mistakes	Number of Those Who Do (%)	Number of Those Who Do Not Do (%)
1	Students try to change mistakes as opportunities to learn	99.0	1.0
2	Students motivate themselves to be better in the future when making mistakes	98.7	1.3

Table 3 shows that 99.0% of students try to turn mistakes into learning opportunities, and only 1.0% do not. This indicates that most students (99.0%) are proactive in dealing with errors by seeing them as opportunities to learn and develop. This shows a high level of emotional intelligence and reflective ability among students. Only 1.0% of students do not see mistakes as learning opportunities, which can be caused by factors such as a lack of motivation or previous negative experiences.

Table 3 also shows that 8.7% of students motivate themselves to improve after making mistakes. In comparison, only 1.3% of students do not do so. Almost all students (98.7%) showed initiative to improve themselves after experiencing mistakes. This shows a strong level of resilience and intrinsic motivation among students. As many as 1.3% of students who do not self-motivate may need additional support to develop a positive attitude towards mistakes. The data shows that most students have a positive perception of mistakes in history learning. They see mistakes as an integral part of the learning process and an opportunity for self-improvement. This high percentage of positive perceptions indicates that the learning environment may be supportive enough. It encourages students to be reflective and proactive in dealing with mistakes. Teachers can continue reinforcing teaching strategies that enable students to analyze and learn from their mistakes.

Table 4. Negative perceptions of mistakes in history learning

No	Perception of Mistakes	Number of Those Who Made Them (%)	Number of Those Who Did Not Make Them (%)
1	Students see mistakes in an entirely negative light	55.9	44.1
2	Students consider mistakes made as obstacles to learning	63.7	36.3
3	Students are afraid of making mistakes because the teacher will reprimand them	85.5	14.5
4	Students cannot recognize and correct mistakes made	40.9	59.1

Table 4 provides information that 55.9% of students see errors from an utterly negative point of view. In comparison, 44.1% do not see them as such. This shows that more than half of the students view their mistakes negatively. This negative view can limit them from using mistakes as opportunities to learn. 63.7% of students considered that their mistakes hindered the learning

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process, while 36.3% did not see them as obstacles. This indicates that most students feel that mistakes harm their learning progress.

There, 85.5% of students were afraid of making mistakes because they were worried that they would get a reprimand from the teacher, while 14.5% did not have this fear. A high fear of reprimands indicates a less conducive learning environment. This fear may hinder students from asking questions or admitting mistakes, which could be an opportunity to learn. As many as 40.9% of students could not recognize and correct their mistakes. In comparison, 59.1% could be reidentifying correct errors. Although most students can identify correct errors, nearly half still struggle. This could indicate they need more support or training in reflective skills and self-awareness.

Overall, this data shows that most students have a negative perception of mistakes in history learning. Many students consider mistakes obstacles, fear teacher reprimands, and cannot see mistakes as part of the normal learning process. This challenges practical knowledge, as negative perceptions of mistakes can limit students' courage to explore or take risks in learning. For this reason, teachers can consider a more supportive approach, for example, by encouraging students to see mistakes as learning opportunities and creating a safe environment for them to ask questions or admit mistakes without fear.

Table 5. Analysis, action, and review of errors in history learning

No	Types of Errors	Number of Performers (%)	Number of Non-Performers (%)
1	Students know why errors occur and how they should be corrected	94.3	5.7
2	Students analyze errors honestly and objectively	96.6	3.4
3	Students ask for the teacher's help to prevent repeated errors	66.8	33.2
4	Students ask for the teacher's help to find the root cause of errors	58.1	41.9

Table 5 provides information that as many as 94.3% of students know the reason for the error and how to correct it, while only 5.7% do not know it. This shows a high level of awareness among students to understand the causes of their mistakes and the steps to correct them. This is positive because understanding the cause of errors is the first step in cognitive development and self-improvement. As many as 96.6% of students analyzed mistakes honestly and objectively, and only 3.4% did not do so. This percentage shows that almost all students can reflectively and objectively assess their mistakes. This is essential to support self-regulation in learning.

Table 5 also shows that 66.8% of students asked for help from teachers to prevent mistakes from repeating, while 33.2% did not ask for help. Although most students proactively ask for help to avoid future errors, a third of students still do not ask for help. This may indicate that some students feel confident enough to handle the error independently or hesitate to ask for help. 58.1% of students asked the teacher for help to find the root of the problem, while 41.9%

did not. This suggests that most students know the importance of understanding the root cause of errors. However, almost half do not involve teachers in this process. This may reflect that some students prefer to find solutions on their own or are unaware of the importance of in-depth analysis with the help of teachers.

Table 6. Teachers' roles in LFE

No	Role	Role Number of Those Who Do (%)	Number of Those Who Do Not Do (5)
1	The teacher provides feedback (during exams, discussions, and Q&A) that allows me to know in what areas I still have difficulty understanding the material being taught	85.8	14.2
2	The teacher sorts the location of the error, the cause of the error, and provides correct examples	92.7	7.3
3	The teacher shows recommendations for learning when the results become worse	67.8	32.2
4	The teacher helps to correct and, if possible, eliminate errors	91.7	8.3
5	The teacher's communication with students is one of the most important conditions for learning from errors to occur	92.3	7.7
6	Discussion with the teacher about errors allows students to generate new ideas and insights	92.2	7.8
7	The learning atmosphere encourages students to learn from the mistakes I make	89.6	10.4
8	The learning atmosphere encourages the student to ask the teacher about the mistakes the student makes	77.7	22.3
9	The teacher shares insights that support students in learning from mistakes	93.6	6.4
10	Teachers carry out remedial teaching aimed at overcoming learning difficulties experienced by students	88.9	11.1
11	Teachers use various learning media to improve the quality of the learning process	92.5	7.5

Table 6 shows the role of teachers in helping students learn from mistakes. 85.8% of students stated that teachers provide feedback that helps them know where they still have difficulties, while 14.2% do not feel this way. As many as 92.7% of students admitted that the teacher sorted the location and cause of the error and gave the correct example. Only 7.3% do not feel this role. 91.7% of students stated that teachers helped correct or eliminate mistakes. 8.3% did not experience this role. 67.8% of students said that teachers recommend additional learning methods if the results deteriorate, while 32.2% did not feel that it. Although most teachers give recommendations, almost a third of students think this is untrue.

92.3% of students considered communication with teachers important in learning from mistakes, while 7.7% did not feel it. 92.2% of students felt that discussions with teachers about errors allowed them to generate new ideas and insights. 7.8% do not feel that way. 89.6% of students felt that the learning atmosphere encouraged them to learn from mistakes, while 10.4% did not. Meanwhile, 77.7% of students felt encouraged to ask about their mistakes, but 22.3% did not feel this way. This shows that most students are encouraged to interact, but about a fifth still do not feel supported to ask questions. 93.6% of students felt that teachers shared insights

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that supported them to learn from mistakes, while 6.4% did not feel this. Of the students, 88.9% admitted that teachers were teaching remedial methods to overcome learning difficulties, while 11.1% did not feel it. As many as 92.5% of students stated that teachers use various learning media to improve the quality of the learning process. In comparison, 7.5% do not feel this role.

This study addresses the gap in LFE studies within history learning, an area less explored than science and mathematics subjects. The analysis showed that most students had difficulties remembering historical facts (70.7%) and remembering the chronology of historical events (73.9%). This confirms that a rote-based approach still dominates history learning without providing enough space to explore conceptual understanding and critical analysis. Another gap was the lack of integration of LFE strategies in history learning. Most students (85.5%) are afraid to make mistakes because they are worried about getting a reprimand from the teacher.

In comparison, 63.7% of students see mistakes as obstacles to learning. This shows that the classroom culture does not support enough reflection on mistakes as part of the learning process. In addition, previous studies have focused more on psychological factors such as anxiety and confidence in dealing with mistakes. This study complements this aspect by revealing contextual factors contributing to student errors, such as limited access to teaching materials (44.5%) and conventional teaching methods. Thus, this study provides a more comprehensive perspective on the factors that cause errors in history learning.

This study offers novelty in the study of LFE by exploring how students understand, respond to, and take advantage of their mistakes in history learning. One of the new findings is that although most students perceive mistakes as learning opportunities (99%), there is still a contradiction with the high fear of mistakes. This shows an imbalance between the ideal concept that mistakes can be a learning tool and the reality in the classroom that still considers mistakes failures. Another novelty is identifying the teacher's role in shaping students' perception of mistakes. 92.7% of students stated that the teacher helped them understand the location and cause of the error. However, only 67.8% of students felt they received additional learning recommendations when experiencing difficulties. These findings suggest that while teacher feedback has been good enough, there is still room to improve mentoring strategies for students in managing their mistakes. Additionally, the study highlights that students who receive constructive feedback are more likely to develop reflective learning strategies. 96.6% of students admitted that they analyzed their mistakes honestly and objectively, indicating that if given the proper guidance, they can create a reflective mindset in learning history.

The findings of this study confirm that LFE's approach to history learning can potentially improve students' critical thinking skills and engagement. However, its implementation still faces challenges, especially in class culture and evaluation methods. More specifically, the analysis showed that students with access to more varied teaching materials were more likely to overcome their mistakes and develop a better understanding. In addition, the finding that some students (40.9%) still have difficulty recognizing and correcting their mistakes emphasizes the teacher's role in providing explicit guidance on learning strategies from errors.

This study confirms that applying LFE in history learning requires a paradigm shift in the evaluation system and teaching approach. By reducing the stigma of error and improving students' reflection, history learning can become more meaningful and oriented towards developing higher-order thinking skills.

DISCUSSION

Mistakes When Learning History and Its Causes

Tables 1 and 2 show that remembering factual information is the main challenge in learning history. This data indicates that the memorization-oriented method of learning history is still dominant. This can be seen from the high error level in remembering facts and chronology, which suggests that learning is often more focused on first-level cognitive mastery (basic knowledge) than higher-order thinking skills. In addition to memorization problems, students have difficulty understanding the concepts conveyed by the teacher, difficulties when invited to think critically, and difficulties in describing and identifying values in history. This suggests that teaching methods may provide fewer opportunities for developing deeper analytical and reflective skills. This challenge can hinder students from connecting historical events with broader concepts or their practical application in contemporary life.

As many as 66.8% of students also experienced difficulties identifying historical values. This approach to history learning may focus more on facts rather than exploring the meanings behind historical events or ethical reflections that can be drawn from that history. Examining error patterns across these types of problems can show whether errors are caused by a single factor or a combination of factors (Elagha & Pellegrino, 2024). Nevertheless, it is still necessary to understand that memorization and the process of remembering are still crucial in history learning, mainly since mistakes made by students are often caused by factors such as lack of knowledge and experience, as well as limited skills (Bazrafshan et al., 2025).

It is indeed strange when reading the data in Table 1, which shows the aspects that students make the fewest mistakes, namely mistakes in understanding the process of social change (59.6%), mistakes in understanding the concept of cause and effect (58.3%), and difficulty understanding the problems discussed (54.1%). These three things lead to high-level thinking skills, understanding change, understanding issues, and the concept of cause and effect, which should be more likely to make mistakes. This data indicates that teachers may rarely assess or test students on aspects that require higher-order thinking skills, such as understanding social change, problems, or the concept of cause and effect. Suppose these aspects rarely appear in exams or assignments. In that case, students' chances of making mistakes in those areas are also reduced. In other words, the low error in these aspects may be due to the rarity of evaluation, not because students have mastered the skill.

A problem-solving-based learning approach and critical discussion can help students develop more profound skills in understanding social change and historical processes (Chang et al., 2025). Teachers should balance fact-based questions with questions that require a deeper

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conceptual understanding (Reich, 2009). Project-based evaluations, case studies, or analysis of historical events can be used more often to engage students in more complex issues and challenge their critical thinking skills (Hernández-Ramos & Paz, 2009). In several other studies, it was revealed about the causes of errors when learning History were revealed. Pramono (2012) found that less interactive learning methods can lead to misconceptions of historical concepts. In addition, research by Palandeng et al. (2023) shows that students' lack of understanding of basic concepts and inability to relate material to a real context contribute to errors in solving story problems. Another influencing factor is the lack of problem-solving and group discussion skills, which can hinder an in-depth understanding of historical material.

The data in Table 1 can harm students because they will judge that learning history will only be a memorization burden and will not train higher cognitive abilities. Higher cognitive skills, such as applying, analyzing, synthesizing, and evaluating, cannot be developed. They are not a concern for history education (Hasan, 2012). Students may know what happened in the past, but their ability to think critically, analyze, and understand the context and values of historical events is lacking. Learning history also trains high cognitive skills, including associating past life with the present by analyzing its influence (Cowan, 2014). The influence of the past on the present is an influence that is in process. Thus, history learning should encourage students to develop certain adjustments from what they learn from the past to their present life, and its impact on the future (Hasan, 2012; Lévesque, 2008).

Data on lack of motivation (24.9% of students disliked history, 38.8% lacked enthusiasm) showed that history learning tended to involve students less in meaningful learning experiences. Suppose students are only expected to memorize facts without relating them to their expertise or relevant context. In that case, they will struggle to build meaningful knowledge. Laziness in learning is recognized by about 35% of students as one of the causes of mistakes. This could be related to students' intrinsic motivation towards history lessons or perhaps because of less attractive teaching methods. This data is reinforced by the fact that almost 40% of students feel less enthusiastic about learning history. This can reflect students' low motivation for these subjects, which can be caused by various factors such as teaching approaches, interest in the material, or the perception that history is irrelevant to their lives. Students may learn more due to external pressures (extrinsic motivations) such as test scores.

More than half of the students (57.7%) feel less confident learning history. This can result from previous bad experiences, such as low grades or difficulty understanding the material, which then reduces their confidence in facing these subjects. This is also reinforced by the data that the highest percentage in Table 2 (85.2%) is students who feel disappointed because they get lousy history scores. This can create a vicious circle, where students who get low grades are increasingly unmotivated to learn better, leading to declining outcomes. One of the significant challenges in applying LFE in history classes is the stigma of error. Many students feel embarrassed or anxious when they make mistakes, which can hinder the effective reflection process (Storch, 2005). Therefore, creating a safe and supportive learning

environment is essential to encourage students to be open to their mistakes because psychological safety refers to students' beliefs about whether it is safe for them to take interpersonal risks, such as asking questions, sharing ideas for improvement, or speaking (Hardie et al., 2022).

Perception of Errors

If the data is compared with positive perceptions, minimal contradictions will be found. Although there is a significant negative perception of mistakes, this data also shows that almost all students can overcome these negative perceptions by maintaining a positive attitude. A high level of positive perception can contribute to reducing the impact of negative perceptions, such as fear of teacher reprimands or the view that mistakes hinder learning. Teachers must continue to create a supportive environment where mistakes are perceived as part of the learning process rather than failures, and integrate activities encouraging students to reflect on their mistakes and plan corrective steps (Hardie et al., 2022). In addition, teachers focus on constructive feedback to help students understand and correct their mistakes without creating fear or shame, because if that happens, research shows that an emotionally unsafe environment can lead to stress, lower attendance at school, and less involvement in learning (Shean & Mander, 2020).

Although the data show a high level of positive perception, more research needs to be done to understand the factors that support these attitudes and how they can be more effectively integrated into teaching strategies. Even though most students have positive perceptions, some individuals still need a specific approach to overcome their negative perceptions. Thus, this data emphasizes the importance of teachers' role in forming a positive attitude towards mistakes in history learning and supporting the cognitive and regulatory development of students.

Table 3 shows students seeing mistakes as learning opportunities, showing a proactive attitude and high emotional intelligence. On the other hand, the data also showed that 55.9% of students had a negative view of mistakes. This difference can indicate a discrepancy between the expected ideal attitude and a deeper perception of mistakes. Although most students have reflective abilities, there are still visible challenges, especially with a negative view of mistakes (55.9%) and the perception that mistakes hinder learning (63.7%). While the first data shows the proactive attitude of most students towards mistakes, the second data highlights significant challenges, such as fear of reprimands, a negative view of mistakes, and a lack of reflective skills in some students. Therefore, a holistic educational strategy is needed to overcome these obstacles, such as strengthening reflective skills, applying a learning approach that respects mistakes, and creating an environment that supports students' courage to learn from their experiences.

Data shows that 85.5% of students are afraid to make mistakes because they are worried about getting a reprimand from the teacher. This fear can create an uncondusive learning environment, limiting students' potential to take advantage of mistakes as learning opportunities. This contradicts the first data, which indicates that most students want to learn

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from mistakes. Fear of reprimands may be one of the reasons why 40.9% of students cannot recognize and correct their mistakes. This unsupportive environment can affect the development of reflective skills and students' courage to innovate (Horvath et al., 2021). The second data shows the need to help students develop a positive view of mistakes. Although 59.1% of students can recognize and correct mistakes, nearly half need support in reflective skills. A more inclusive and supportive teaching approach can help overcome the fear of reprimands and increase student motivation. Teachers can play a role in creating an environment where mistakes are seen as a natural part of the learning process.

Analysis and Review

Suppose we relate students' positive and negative perceptions of their mistakes in history learning with the analysis and review process that students do. In that case, we can see how students' attitudes towards mistakes relate to how they handle them through analysis, action, and reflection or review. Based on the data, almost all students positively perceive mistakes, such as taking advantage of them as learning opportunities (99%) and motivating themselves to improve (98.7%). This attitude strongly supports the process of analysis, action, and review of errors because students with a positive perception tend to be more open to self-evaluation and correction. In the analysis process, students must reflect on why mistakes occur. Students with positive perceptions are more likely to analyze their mistakes honestly and objectively, as the data shows that 96.6% of students analyze mistakes honestly. This concerns the positive perception that mistakes are part of learning, encouraging them to reflect deeply.

Students who see mistakes as learning opportunities are more likely to take proactive corrective action, such as asking teachers for help or finding solutions independently. Based on the data, 66.8% of students asked teachers for help to prevent repeated mistakes, indicating that positive perceptions motivated them to correct mistakes actively. Students who motivate themselves to improve after making mistakes tend to conduct adequate reviews of their mistakes. This review can be a reflective act of what they could have done differently in the future. A positive attitude towards mistakes reinforces these efforts, encouraging students to learn from their mistakes in depth and continuously.

Students with a negative view of mistakes can hinder handling mistakes because they may be reluctant to conduct honest analyses, ask for help, or conduct reviews. This may limit their efforts to understand the root cause of the error, potentially hindering the development of practical analytical skills. Students may tend to cover up or avoid mistakes instead of evaluating them. When students feel afraid or worried about making mistakes, they may prevent the review process because they are concerned about facing their mistakes. Students' negative view of mistakes can also be understood because they are still teenagers and their emotions are still emotional. The study by Hoffman & Elmi (2021) shows a close relationship between emotional intelligence and the ability to learn from mistakes, and research by Yamashita et al. (2025)

shows that older individuals can learn how to manage mistakes through the process of correcting their own mistakes.

Based on the above analysis, the role of teachers is crucial in reducing negative perceptions, encouraging positive perceptions in analysis and error review, and building the ability for self-reflection and cognitive development. Teachers can reduce negative perceptions of mistakes by creating a supportive environment where students feel safe to make mistakes without fear. This can increase student involvement in the analysis process and corrective actions. Teachers can encourage students to see mistakes as learning opportunities through positive feedback. This way, students will be more likely to engage in reviewing their mistakes and take the necessary actions to correct them. By emphasizing self-reflection and cognitive regulation, teachers can help students develop better analytical and improvement skills for history lessons and other learning. Students' perception of errors dramatically influences the analysis, corrective actions, and review of errors in history learning. Positive perceptions encourage students to handle mistakes, while negative perceptions can be obstacles to proactively. With the right approach, teachers can guide students to take advantage of mistakes in a constructive learning process.

Overall, this data shows that the role of teachers in LFE is very positive, with the majority of students feeling supported by teachers in various aspects such as feedback, communication, improvement assistance, and learning atmosphere. However, there are some areas to look out for, such as additional learning recommendations (where 32.2% of students do not feel them) and the urge to ask teachers (with 22.3% of students feeling unsupported). Using various learning media, remedial teaching, and correct examples are the most effective areas, with more than 90% of students benefiting. Teachers can focus more on improving additional learning recommendations and encouraging more open interactions to ensure all students feel supported in their learning.

This study found that most students still rely on memorization in history learning, as shown by difficulties in remembering historical facts and chronology (70.7% and 73.9%). This finding is in line with the research of Hasan (2012) and Setiawan et al. (2021) which stated that history learning in Indonesia still tends to be based on facts and memorization, not conceptual understanding. In this context, the goal of the *Learning from Error* (LFE) approach, which encourages students to reflect on their mistakes and develop critical thinking skills, is difficult to realize if the evaluation process is based solely on memorization. The difficulty of realizing the ideal goals of LFE is further strengthened by the data that 99% of students see mistakes as learning opportunities, and 63.7% still consider them as obstacles. This indicates that there is an imbalance between the ideal perception of error and reality in the classroom.

These findings support the research of Tulis et al. (2016), which states that although students can learn from mistakes, without effective guidance and feedback from teachers, they may still see mistakes as failures, rather than as opportunities for development. Although 92.7% of students stated that teachers helped them understand the location and cause of errors, only

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67.8% felt that they received additional study recommendations when experiencing difficulties. This shows that the role of teachers in providing follow-up still needs to be strengthened. In addition, about 40.9% of students admitted that they had difficulty recognizing and correcting their own mistakes, which indicates a lack of reflective skills. These findings corroborate Heemsoth & Heinze's (2016) research that reflection on mistakes requires systematic pedagogical support so that students can develop more effective learning strategies. Therefore, this study emphasizes the need to change the evaluation and pedagogical approach to history learning.

In addition, this study found that the main factors causing errors in history learning were a lack of learning resources (44.5%) and fear of mistakes due to an evaluation system that emphasizes punishment (85.5%). These results reinforce the findings of Elagha & Pellegrino (2024), which shows that limited access to educational resources can affect students' academic success, as well as Metcalfe (2017) and Wiyanarti et al. (2023) who highlight the importance of the learning environment that supports fearless reflection on mistakes.

CONCLUSION

This study explores the LFE approach in history education, emphasizing mistakes as learning opportunities rather than failures. Based on a survey of 615 students in West Java, findings reveal that memorization dominates history learning, leading to difficulties in recalling facts and chronology. Factors contributing to errors include cognitive overload, limited resources, and fear of reprimand. Despite challenges, students with constructive feedback develop reflective learning strategies. The study highlights the need for a supportive classroom environment that fosters critical thinking and reduces stigma around mistakes, advocating for a shift from rote learning to deeper historical analysis.

It is essential to change teaching approaches, utilize more engaging and participatory processes, and provide adequate learning resources to improve history learning outcomes. Students also need to be encouraged to build confidence and see the relevance of history in their lives. Learning focusing on high-level cognitive abilities, such as critical analysis and historical reflection, must be improved to enrich students' understanding of history. The data show that although students appear to be less likely to make mistakes in aspects of higher-order thinking skills, this is likely due to a lack of emphasis on those aspects in learning and evaluation. History learning richer in analysis and problem-solving will be more challenging and encourage students to think more deeply, ultimately improving their critical thinking skills.

LFE in history learning is still in the development stage. If developed further, it has the potential to show promising results. This approach offers an effective way to correct mistakes and build students' critical and analytical thinking skills. In the future, developing a more integrated curriculum with LFE principles can pave the way for more interactive, reflective, and in-depth history learning. Mistakes in history learning can be an effective tool to explore

the broader context and cause-and-effect relationships between historical events. This allows students to see the big picture and understand historical dynamics more comprehensively.

One of the main challenges is changing the paradigm of students and teachers regarding mistakes. Mistakes should be considered an integral part of the learning process, not failures that should be avoided. Implementing this approach requires consistent support and adequate pedagogical skills from teachers. Teachers must create a safe and supportive environment where students feel comfortable making and discussing their mistakes. Educators must learn to apply the LFE approach effectively, using the necessary tools and strategies to create a supportive learning environment.

The limitations of this study include several aspects. *First*, this study only focuses on students' perception of errors in history learning, without a comparative analysis with error-based learning models in other fields of study. *Second*, this study uses a survey method with questionnaires, so it does not delve deeply into students' experiences in dealing with and overcoming mistakes through interviews or observations. *Third*, the aspects analyzed are limited to the factors that cause errors and the role of teachers in providing feedback, without further exploring the impact of learning from mistakes on improving historical understanding in the long term. *Fourth*, this research was only conducted in a few regions in West Java, so the results could not necessarily be generalized to other regions with different characteristics. Further research is needed to evaluate the long-term impact of this approach on history learning and to develop more structured methods for integrating it into history curricula. In addition, further research could be conducted to see if students who are familiar with this approach show improvements in their historical analysis or critical thinking skills.

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