Jurnal Pustaka Indonesia (JPI)
2026, Vol. 6, No. 2, 373–388
https://doi.org/10.62159/jpi.v6i2.2360

OPEN ACCESS
Research Article

Enhancing Students' Collaborative Skills through Padlet-Assisted Open-Ended Problem-Based Learning in Sociology Classrooms

Widiya Trisna[1*], Erianjoni[2], Syafri Anwar[3], Eka Asih Febriani[4]
[1-4] Universitas Negeri Padang, Indonesia

Abstract
This study addressed the limited collaboration skills observed among Grade XI students in Sociology learning at SMAN 1 Batipuh, as reflected in passive participation, unequal task distribution, limited interpersonal communication, and insufficient responsibility during group activities. The study aimed to examine how Problem-Based Learning (PBL), integrated with Open-Ended Collaboration and supported by Padlet, facilitated the progressive improvement of students' collaboration skills. A Classroom Action Research design was employed through two cycles, with each cycle comprising planning, action, observation, and reflection stages. Data were collected using structured classroom observations, collaboration skill assessments, semi-structured interviews, field notes, documentation, and students' digital interaction records on Padlet. The collaboration assessment was adapted from Crebert's teamwork framework and focused on group collaboration, contribution toward shared goals, responsibility and interdependence, and interpersonal communication. Qualitative data were analysed through data reduction, data display, thematic interpretation, and conclusion drawing, while quantitative data were examined using mean scores and percentage-based performance categories. The findings indicated progressive improvements in students' active participation, equitable contribution to group tasks, responsibility for assigned roles, confidence in expressing ideas, peer feedback, and collaborative problem-solving across the research cycles. Padlet supported continuous interaction, documentation, idea sharing, and reflective feedback throughout the learning process. The findings suggest that the pedagogical integration of authentic social problems, multiple solution pathways, structured collaboration, teacher scaffolding, and digital mediation can create a more participatory and accountable Sociology learning environment. This integrated instructional approach therefore offers a contextually relevant strategy for strengthening collaboration skills as an essential component of twenty-first-century education.

ARTICLE HISTORY
Received : 29 March 2026
Revised : 17 June 2026
Accepted : 25 June 2026

KEYWORDS
Collaboration skills; Open-Ended Collaboration; Padlet; Problem Based Learning (PBL); Sociology learning

CORRESPONDING AUTHOR
*** Eka Asih Febriani**, Universitas Negeri Padang, Indonesia. Email: ekaasihsyafitri@fis.unp.ac.id

Introduction

Global education systems increasingly require students to develop collaboration skills alongside disciplinary knowledge to address complex social, technological, and economic challenges. Collaboration is recognized as a fundamental global competence because contemporary societies demand individuals who can communicate across diverse perspectives, negotiate shared meanings, assume collective responsibility, and participate effectively in collaborative problem-solving processes (OECD, 2025). The rapid expansion of digital and blended learning following the COVID-19 pandemic has further emphasized the importance of collaboration while revealing persistent challenges related to unequal participation, limited interpersonal interaction, and weak

accountability in technology-mediated learning environments (UNESCO, 2023). Digital platforms can broaden opportunities for communication and collaborative knowledge construction, although their educational effectiveness depends on appropriate instructional design, sustained teacher facilitation, and active participation among all group members (Johler, 2022). Interactive platforms such as Padlet have demonstrated potential to support idea sharing, peer feedback, reflective interaction, cognitive flexibility, and collaborative problem-solving when systematically embedded within structured learning activities (Naamati-Schneider & Alt, 2023). Indonesian educational priorities similarly emphasize student-centred learning and the development of twenty-first-century competencies, including communication, critical thinking, creativity, and collaboration. Sociology learning provides a particularly relevant context for developing these competencies because students are required to examine complex social phenomena, evaluate competing perspectives, interpret social conflict, and formulate contextually appropriate solutions through collective reasoning. Preliminary observations in Class XI Sociology 5 at SMAN 1 Batipuh indicated a substantial discrepancy between these curricular expectations and actual classroom practices, as group discussions were frequently dominated by a limited number of students, while other members demonstrated passive participation, unequal task contribution, limited communication, and insufficient responsibility for collective outcomes. This discrepancy between global competency demands, national educational priorities, disciplinary expectations, and local classroom conditions highlights the need for a structured instructional framework that integrates authentic problem-solving, open-ended collaboration, and digital mediation to strengthen students' collaboration skills in Sociology learning.

Collaboration skills are defined as the ability to work effectively with others through coordinated participation, shared responsibility, communication, negotiation, and collective problem solving (Priyambodo et al., 2023). In contemporary education, collaboration is regarded as one of the key competencies of 21st-century learning because individuals with strong collaborative skills are able to inspire collective vision, support peers' work, and optimize group potential in solving problems (Ayubi et al., 2025). Collaborative learning also enables students to develop conceptual understanding, self-regulation, empathy, and social awareness through active interaction and shared learning experiences (Ramadhan et al., 2023). According to Eshuis et al. (2019), collaboration skills are essential competencies for solving complex problems through interaction, exchange of ideas, and learning from others' perspectives. Similarly, Mardian et al. (2023) emphasized that collaboration encompasses active participation, teamwork, communication, responsibility, flexibility, and group problem-solving abilities.

The importance of collaboration is also strongly associated with social constructivist theory proposed by Lev Vygotsky. Vygotsky argued that learning is fundamentally a social process that occurs through interaction, communication, and collaboration with others within a cultural context. Through the concept of the Zone of Proximal Development (ZPD), students can achieve higher levels of understanding with the support of teachers or more competent peers through scaffolding processes (Lasmawan & Budiarta, 2020). Learning therefore becomes a process of co-constructing knowledge through collaborative interaction rather than passively receiving information (Halimah et al., 2025). In collaborative environments, students negotiate meaning, exchange perspectives, and collectively solve problems, enabling social interaction to become a bridge between actual and potential development (Rahma & Eka, 2024). This theoretical perspective provides a strong

conceptual foundation for implementing collaborative and problem-oriented learning models in sociology education.

However, despite the importance of collaboration skills, empirical conditions in schools indicate that students' collaborative abilities remain underdeveloped. Observations conducted at SMAN 1 Batipuh revealed that group discussions were often dominated by one or two students, while other group members tended to remain passive and contributed minimally during collaborative activities. Several students also demonstrated low engagement in communication, lacked responsibility in completing group tasks, and showed reluctance to participate actively during discussions. These conditions indicate that collaborative learning has not been implemented optimally in sociology classrooms. These classroom conditions are consistent with previous evidence indicating that cooperative learning can be difficult to implement effectively when learning activities remain individually oriented and lack sufficient structure to sustain interaction, shared responsibility, and active participation among group members (Ramadhan et al., 2023).

To address this issue, innovative learning approaches that actively engage students in collaborative problem-solving activities are needed. One promising instructional model is Problem Based Learning (PBL). Problem Based Learning is a student-centered instructional model that places real-life problems as the starting point of learning activities, encouraging students to think critically, analyze information, and collaboratively develop solutions (Edison, 2023). PBL is grounded in constructivist principles and emphasizes active student participation in solving contextual social problems both individually and collaboratively (Warsono, 2017). According to Rahmatika and Widodo (2021), PBL encourages students to work cooperatively to investigate authentic problems while developing analytical and problem-solving skills. Through collaborative group work, students learn to share information, divide responsibilities, communicate effectively, and support one another in achieving common learning goals (Djonomiarjo, 2019).

In addition to PBL, the Open-Ended Collaboration approach offers significant potential in strengthening collaborative learning. Open-Ended Collaboration is an instructional approach that presents open-ended problems with multiple possible solutions while emphasizing active collaboration and shared responsibility among students (Mulyawan et al., 2023). This approach allows students to explore diverse perspectives, negotiate meaning, compare alternative ideas, and collaboratively construct creative solutions through group interaction (Titikusumawati et al., 2020). Open-ended learning environments encourage students not to rely on a single correct answer but instead to appreciate multiple interpretations and problem-solving strategies. Such learning conditions are highly relevant to sociology education because social phenomena often involve complex issues that require diverse perspectives and collective reasoning.

The integration of digital technology has become increasingly important in supporting collaborative learning in the digital era. One educational technology that facilitates interactive collaboration is Padlet, a web-based virtual bulletin board that enables users to collaboratively upload, organize, and share various forms of content such as text, images, videos, documents, and links in real time (Rath, 2025). In this study, Padlet was integrated into each phase of the Problem-Based Learning (PBL) process to support collaborative knowledge construction. During the problem orientation phase, the teacher posted authentic sociological issues and guiding questions on Padlet, allowing students to identify problems and record their initial responses collaboratively. In the organizing phase, each group used Padlet to develop investigation plans, distribute tasks, and

compile relevant learning resources. During the investigation phase, students uploaded evidence, shared findings, exchanged ideas, and provided peer feedback through comments on the shared Padlet board. In the development and presentation phase, each group organized its analyses, visual materials, and proposed solutions on Padlet before presenting them to the class. Finally, during the reflection and evaluation phase, students used Padlet to provide reflective comments, evaluate group performance, and respond to feedback from peers and the teacher. From a social constructivist perspective, these activities position Padlet as a cultural tool that mediates social interaction, collaborative knowledge construction, and reflective learning by facilitating continuous communication, social scaffolding, and shared responsibility throughout the PBL process (Lestari, 2025; Ramadhan & Wijaya, 2024).

Several previous studies have demonstrated the effectiveness of Problem Based Learning, Open-Ended approaches, collaborative learning, and Padlet integration in improving learning outcomes. Syarofah et al. (2024) found that Padlet-based PBL improved students' learning interest and cognitive achievement. Ayubi et al. (2025) reported that PBL integrated with STEM effectively enhanced collaboration skills. Ramadhan and Wijaya (2024) showed that Padlet-based cooperative learning improved students' collaboration in sociology learning. Sova (2023) also demonstrated that integrating PBL with an Open-Ended approach effectively improved students' critical thinking skills. Furthermore, Titikusumawati et al. (2020) found that Open-Ended Collaboration strategies were highly effective in improving students' creative thinking and reducing learning gaps through collaborative scaffolding processes.

Although previous studies have demonstrated the effectiveness of Problem-Based Learning (PBL), Open-Ended Collaboration, and Padlet individually, important gaps remain in the existing literature. Most studies have examined PBL primarily for improving students' critical thinking, problem-solving ability, academic achievement, or learning motivation, while studies on Padlet have generally focused on student engagement, communication, or digital collaboration. Likewise, research on Open-Ended Collaboration has largely emphasized creative thinking and collaborative discussion without integrating digital collaborative platforms. Furthermore, these studies have mostly been conducted in science or mathematics education, whereas empirical evidence in sociology learning at the senior high school level remains limited. Another limitation is that collaboration skills are often treated as secondary outcomes or measured using general classroom participation indicators rather than comprehensive collaboration dimensions. Few studies have employed the collaboration framework proposed by Crebert et al. (2004), which evaluates group contribution, individual responsibility, interpersonal communication, collective problem solving, adaptability, and active participation in teamwork. More importantly, no previous study has systematically integrated Problem-Based Learning, Open-Ended Collaboration, and Padlet within a single instructional design while assessing students' collaboration skills using the Crebert et al. (2004) framework. Therefore, the novelty of this study lies in examining the effectiveness of this integrated instructional approach for enhancing students' collaboration skills in senior high school sociology learning.

This study is significant because it addresses collaboration challenges observed in sociology learning, where group activities often involve unequal participation, limited interaction among group members, and a tendency for only a few students to dominate discussions. These conditions reduce the effectiveness of collaborative learning and limit opportunities for all students to actively

contribute to problem-solving activities. To address these challenges, this study integrates Problem-Based Learning, Open-Ended Collaboration, and Padlet into a single instructional framework that encourages equal participation, shared responsibility, collaborative decision-making, and continuous interaction throughout the learning process. The findings are expected to provide empirical evidence on how this integrated approach can enhance students' collaboration skills in sociology learning and offer practical guidance for teachers seeking to implement technology-supported collaborative instruction in secondary education.

Based on these considerations, this study aims to examine how the implementation of Problem Based Learning integrated with Open-Ended Collaboration and supported by Padlet can improve students' collaboration skills in sociology learning at SMAN 1 Batipuh. This study is expected to contribute theoretically to the development of collaborative learning models grounded in social constructivism and practically to the implementation of innovative sociology instruction that supports 21st-century competencies.

Method

This study employed a Classroom Action Research (CAR) design to improve students' collaboration skills through the implementation of Problem-Based Learning (PBL) integrated with an Open-Ended Collaboration approach and supported by Padlet in Sociology learning at SMAN 1 Batipuh. The study consisted of two action cycles, with each cycle comprising two classroom meetings. Each cycle involved four interconnected stages: planning, action, observation, and reflection. The researcher and the collaborating Sociology teacher jointly prepared the lesson plans, developed problem-based learning scenarios incorporating open-ended collaborative activities, designed Padlet-supported learning tasks, and prepared observation sheets and assessment instruments during the planning stage. The instructional scenarios were implemented using the PBL syntax integrated with collaborative Padlet activities during the action stage. Students' collaboration skills and classroom interactions were systematically monitored by the researcher and the collaborating teacher using structured observation instruments during the observation stage. Observation results were subsequently analysed to identify implementation strengths, instructional constraints, and necessary revisions for the following cycle. The learning activities focused on Grade XI Sociology topics in which students collaboratively investigated authentic social issues, examined alternative perspectives, formulated possible solutions, and presented their findings through Padlet. Progression from Cycle I to Cycle II was determined by reflective analysis of students' collaboration performance. Instructional revisions were implemented when the predetermined success criteria had not been achieved, particularly in relation to active participation, equitable task contribution, communication quality, shared responsibility, and overall collaboration scores. The intervention was concluded after the collaboration indicators demonstrated satisfactory improvement and fulfilled the predetermined criteria for success.

The study was conducted in Class XI Sociology 5 at SMAN 1 Batipuh during the 2025/2026 academic year. The participants comprised all students enrolled in the selected Phase F class. Purposive class selection was based on a preliminary classroom diagnosis conducted collaboratively by the researcher and the Sociology teacher before the intervention. The diagnosis employed a structured observation sheet adapted from the collaboration framework proposed by Crebert et al. (2004), focusing on group contribution, responsibility, interpersonal communication, collective problem-solving, adaptability, and active participation during group work. Preliminary observations

indicated that group discussions were frequently dominated by one or two students, while other group members demonstrated passive participation, unequal task contribution, infrequent communication, and limited involvement in collaborative decision-making. These recurring conditions provided the empirical basis for identifying the class as requiring instructional improvement in collaboration skills. The use of authentic and contextually meaningful social issues was consistent with the principle that high-school Sociology learning should connect disciplinary concepts with students' social and cultural realities rather than present social knowledge as decontextualised content (Erianjoni et al., 2023a). The selection of locally relevant social phenomena also reflected the educational value of integrating social and cultural contexts into Sociology instruction to stimulate student involvement across cognitive, affective, and social learning domains (Erianjoni et al., 2025).

The implementation of the learning activities was grounded in Vygotsky's Social Constructivist Theory, which conceptualises learning as a socially mediated process involving interaction, collaboration, scaffolding, and development within the Zone of Proximal Development (ZPD) (Lasmawan & Budiarta, 2020). Students developed their conceptual understanding and collaboration skills through cooperative interaction, peer discussion, negotiated meaning, and shared problem-solving experiences. The integration of collaborative activities into PBL reflected the constructivist principle that knowledge is actively constructed through engagement with social and contextual environments rather than passively transmitted by the teacher (Halimah et al., 2025). Teacher guidance and peer support functioned as forms of scaffolding that enabled students to participate in increasingly complex collaborative activities during each research cycle.

The instructional intervention applied the Problem-Based Learning model because it positions students as active participants in investigating contextual problems, assessing information, constructing arguments, and formulating solutions collaboratively (Rahmatika & Widodo, 2021). PBL enabled students to examine authentic social issues, discuss competing interpretations, and construct shared understanding through structured group interaction (Warsono & Hariyanto, 2017). The instructional procedures were adapted from Abdullah and Munawwaroh (2024) and comprised five stages: problem orientation, student organisation, guided investigation, development and presentation of solutions, and analysis and evaluation. Each stage was operationalised through Sociology learning activities related to social problems and conflict. The teacher initially introduced an authentic social issue, organised students into collaborative groups, guided the collection and analysis of relevant information, facilitated the presentation of alternative solutions, and supported collective reflection on both the proposed solutions and the collaboration process.

The PBL model was integrated with an Open-Ended Collaboration approach. Open-Ended Collaboration involves problems that permit multiple defensible interpretations or possible solutions and require students to exchange ideas, negotiate meanings, evaluate alternative perspectives, and collectively construct responses (Mulyawan et al., 2023). The approach was implemented through the activation of prior knowledge, formation of heterogeneous groups, organisation of open-ended tasks, collaborative investigation, presentation of multiple solutions, and evaluation of individual and group contributions (Titikusumawati et al., 2020). Open-ended social problems were selected because sociological phenomena rarely have a single uncontested explanation. The integration of PBL and Open-Ended Collaboration was intended to create an

instructional environment that promoted active participation, intellectual flexibility, shared responsibility, interpersonal communication, and collaborative decision-making.

Padlet was used as a digital medium to support interaction throughout the learning process. The platform enabled students to upload, organise, and share learning materials, written ideas, comments, images, videos, discussion results, and reflections in real time (Rath, 2025). Digital learning resources can support communication, collaboration, creativity, and structured learning activities when their use is aligned with instructional objectives and teacher facilitation (Mariya et al., 2022). Indonesian experience with technology-mediated learning also demonstrates the importance of adequate platform selection, instructional planning, and educator readiness in sustaining meaningful online interaction (Erianjoni et al., 2023b). Padlet was embedded within the pedagogical stages rather than treated as an independent technological intervention. Students used the platform to document group plans, distribute responsibilities, upload evidence, exchange feedback, present proposed solutions, and record reflections. Previous implementations in Sociology classrooms indicate that Padlet can facilitate student participation, idea sharing, classroom discussion, and technology-supported interaction when incorporated into structured learning activities (Relawati et al., 2024; Sari & Nurlizawati, 2026). The use of Padlet was also supported by social constructivist principles because it provided a mediated space for collaborative knowledge construction, peer scaffolding, and shared learning experiences (Lestari, 2025).

Data were collected through structured classroom observation sheets, collaboration skill questionnaires, semi-structured interviews, field notes, documentation, and students' Padlet interaction records. Classroom observations were conducted jointly by the researcher and the collaborating Sociology teacher during every meeting in each action cycle. The observations assessed students' collaboration throughout the implementation of PBL integrated with Open-Ended Collaboration and Padlet. The observation rubric was adapted from the generic teamwork framework developed by Crebert et al. (2004) and aligned with the objectives and classroom context of the present study. Four operational dimensions were assessed: collaboration within groups, contribution toward group goals, responsibility and interdependence, and interpersonal communication. The dimensions were translated into observable behaviours, including active participation in discussion, sharing relevant ideas, assisting peers, completing assigned responsibilities, respecting group agreements, expressing ideas clearly, listening to alternative opinions, and providing constructive feedback. Each indicator was rated on a four-point scale ranging from 1 (*very poor*) to 4 (*excellent*), and the overall collaboration score was calculated from the average indicator scores.

The observation rubric and questionnaire were reviewed by experts in Sociology education and educational assessment before their implementation. The expert-review process examined the relevance, clarity, contextual suitability, and representativeness of each indicator. Expert involvement in instrument development requires explicit criteria and systematic evaluation because content validity cannot be established solely by requesting general approval from reviewers (Beck, 2020). Revisions were therefore undertaken in response to expert comments concerning indicator wording, behavioural clarity, and alignment with the intended collaboration dimensions. The researcher and the collaborating teacher also discussed the interpretation of each rating criterion before classroom observation. Observation results were compared after every meeting to identify scoring differences and achieve a shared interpretation of students' performance.

Semi-structured interviews were conducted after each action cycle with the collaborating Sociology teacher and selected students representing different levels of collaborative participation. The interviews were intended to obtain a deeper understanding of students' experiences of group work, PBL implementation, open-ended problem-solving, Padlet-mediated interaction, instructional challenges, and perceived changes in collaboration. All interviews were audio-recorded with participants' permission and transcribed verbatim. The interview data were analysed thematically through familiarisation with the transcripts, initial coding, comparison and grouping of related codes, development of preliminary categories, review of candidate themes, and interpretation of recurring patterns. Thematic analysis was selected because it enables researchers to systematically identify and interpret meaningful patterns across qualitative datasets (Kiger & Varpio, 2020). Analytical quality was maintained by ensuring that the codes and themes were grounded in the data, internally coherent, clearly differentiated, and directly relevant to the research objective rather than being generated through a mechanical or decontextualised coding procedure (Braun & Clarke, 2021).

The credibility of the qualitative findings was strengthened through methodological and source triangulation. Evidence from classroom observations, interviews, field notes, documentation, and Padlet interaction records was compared to determine whether similar patterns of collaboration were evident across the different data sources. Classroom photographs, student learning products, lesson plans, uploaded materials, peer comments, and digital discussion records provided supporting evidence of students' collaborative activities during each intervention stage. Discussions between the researcher and the collaborating teacher were conducted during the reflection stage to compare interpretations, examine discrepant evidence, and verify the credibility of the emerging findings. Such systematic dialogue can improve the transparency and communicability of qualitative coding and reduce the likelihood that the findings reflect only one researcher's interpretation (O'Connor & Joffe, 2020).

Students' collaboration skills were measured using indicators adapted from the generic teamwork framework developed by Crebert et al. (2004). The original framework was developed to assess generic employability skills in higher education; nevertheless, its principal dimensions—team collaboration, contribution toward shared goals, responsibility and interdependence, and interpersonal communication were conceptually aligned with the collaborative competencies expected in secondary-school Sociology learning. Contextual adaptation was undertaken to ensure that the indicators represented observable behaviours appropriate to Grade XI students. The adaptation process involved reviewing the original indicators, aligning them with Sociology curriculum objectives, matching them with the collaborative activities incorporated into PBL and Open-Ended Collaboration, and converting them into age-appropriate behavioural descriptors. The final instrument comprised four operational dimensions: (1) collaboration within groups, (2) contribution toward group goals, (3) responsibility and interdependence within teams, and (4) interpersonal communication. These dimensions were represented by behaviours such as participating actively, assisting peers, completing assigned tasks responsibly, respecting collective agreements, expressing ideas clearly, listening to others, negotiating disagreements, and providing constructive feedback.

Qualitative and quantitative data were analysed within the Classroom Action Research framework. Qualitative evidence from observations, interviews, field notes, documentation, and Padlet records was analysed through data organisation, coding, thematic categorisation, data display,

and conclusion drawing to identify changes in students' collaboration across the research cycles. Quantitative data obtained from the observation rubric and collaboration questionnaire were analysed using percentage and mean scores. Percentage scores were calculated using the formula:

Percentage scores were calculated using the following formula:

$$\text{Percentage Score} = \left(\frac{\text{Obtained Score}}{\text{Maximum Score}} \right) \times 100$$

Mean scores were calculated using the following formula:

$$\bar{X} = \frac{\sum X}{N}$$

The results were interpreted according to the following performance categories:

Table 1. Performance categories

Category	Percentage Range
Very good	86–100%
Good	76–85%
Fair	60–75%
Poor	<60%

Table 1 shows the results were interpreted using four performance categories: *very good* (86–100%), *good* (76–85%), *fair* (60–75%), and *poor* (<60%). Qualitative and quantitative findings were integrated during the reflection stage, with the qualitative evidence used to explain the behavioural and interactional changes underlying the numerical patterns. Comparisons across the pre-action condition, Cycle I, and Cycle II were used to evaluate the progressive development of students' collaboration skills.

The success criterion was defined in terms of measurable improvement across the research cycles. The intervention was considered successful when the class achieved an average collaboration score of at least 76%, corresponding to the *Good* category, and at least 80% of the students attained either the *Good* or *Very Good* category. The evaluation focused on active participation, contribution to group tasks, responsibility and interdependence, interpersonal communication, and collaborative problem-solving during Sociology learning activities. The criteria were applied consistently during each reflection stage to determine whether instructional revision or continuation to a subsequent cycle was required.

Result and Discussion

Result

The development of students' collaboration skills was examined across the pre-action stage, Cycle I, and Cycle II of the Classroom Action Research. Collaboration skills were assessed using four indicators: collaboration within groups, contribution toward group goals, responsibility and interdependence, and interpersonal communication. Data were collected through classroom observations, collaboration assessment instruments, interviews, field notes, and documentation. The results of students' collaboration skills at each stage are presented in the following section.

Before the implementation of the intervention, preliminary classroom observations indicated that students' collaboration skills were generally low. Group discussions were frequently dominated by one or two students, while many students participated passively, contributed minimally to group tasks, and showed limited interpersonal communication. These baseline findings were reflected in

the first action cycle, where the mean collaboration score reached only 55.55% (Fair category**)**. This result confirmed the need for instructional improvement through the implementation of Problem-Based Learning integrated with Open-Ended Collaboration and supported by Padlet.

After the implementation of the Problem Based Learning (PBL) model with the Open-Ended Collaboration approach assisted by Padlet, improvements were identified across all indicators of collaboration skills adopted from Crebert et al. (2004), namely: collaboration in groups, contribution to team goals, responsibility within groups, and interpersonal communication skills.

Classroom observations indicated a noticeable increase in students' participation during group discussions on social conflict cases. Compared with the initial learning activities, more students actively expressed their opinions, proposed alternative solutions, responded to their peers' arguments, and participated in group decision-making. Observation records also showed more balanced task distribution and greater interaction among group members throughout the learning process. Documentation of Padlet activities further demonstrated that students collaboratively shared ideas, uploaded discussion results, and provided feedback on other groups' work. These findings are consistent with the improvement in students' collaboration scores across the research cycles, indicating that the use of open-ended social problems encouraged students to examine social phenomena from multiple perspectives and created a more interactive, student-centered learning environment.

The findings also showed that students increasingly demonstrated responsibility toward their assigned roles within groups. Each group member contributed to completing tasks through collaborative coordination facilitated by Padlet. The digital platform enabled students to upload ideas, monitor group progress, provide feedback, and document discussion outcomes in real time. This condition strengthened students' accountability and reduced passive participation during group work.

In terms of interpersonal communication, students gradually developed the ability to express opinions more confidently and respectfully. They listened to peers' ideas, negotiated differences of opinion, and collaboratively reached agreements during discussions. Students also showed supportive attitudes toward peers experiencing difficulties during the problem-solving process.

Within the integrated instructional approach, Padlet functioned as a digital tool that supported collaborative learning by facilitating students' communication, idea sharing, and documentation of group work throughout the Problem-Based Learning activities. The platform provided a shared online space where students could upload discussion results, exchange feedback, and revisit their collaborative work during the reflection stage. These digital interaction records complemented the implementation of Problem-Based Learning, the Open-Ended Collaboration approach, and teacher facilitation in promoting students' collaborative engagement. Therefore, the observed improvement in students' collaboration skills should be interpreted as the result of the integrated instructional intervention rather than the independent effect of Padlet alone. The overall improvement in collaboration skills is presented in the following table.

Table 2. Improvement of Students' Collaboration Skills after the Implementation of PBL with Open-Ended Collaboration and Padlet

Indicator	Initial Condition	Final Condition

Group collaboration	Passive participation and limited interaction	Active discussion and collaborative participation
Contribution to team goals	Tasks dominated by certain students	Shared responsibility and equal participation
Responsibility within groups	Lack of task accountability	Stronger commitment to assigned roles
Interpersonal communication	Limited communication and feedback	Respectful communication and constructive feedback

The results indicate that the integration of Problem Based Learning (PBL), Open-Ended Collaboration, and Padlet media successfully created a collaborative learning environment that encouraged students to actively participate in Sociology learning activities.

Discussion

The findings of this study demonstrate that the implementation of Problem Based Learning (PBL) integrated with the Open-Ended Collaboration approach and assisted by Padlet media effectively improved students' collaboration skills in Sociology learning. These findings support the theoretical perspective that collaborative and problem-oriented learning environments can foster social interaction, active participation, and shared responsibility among students.

The improvement in collaboration skills aligns with the concept of collaborative learning proposed by Halimah et al. (2025), which states that collaborative learning involves active interaction among students to share ideas, experiences, and responsibilities in solving problems collectively. Similarly, Aifan (2022) emphasizes that collaborative learning encourages students to become active, constructive, and responsible learners through social interaction and shared understanding. In this study, students actively participated in discussions, exchanged opinions, and collectively developed solutions to social conflict cases, indicating that collaborative learning was successfully facilitated through the learning model.

The findings also support the theory of collaboration skills developed by Crebert et al. (2004), which positions collaboration as a social skill that can be systematically developed, observed, and evaluated in the learning process. The indicators identified by Crebert, such as active participation, contribution to group goals, responsibility, and interpersonal communication, were clearly reflected during the implementation of the learning activities. Students demonstrated increased engagement in group discussions, improved accountability for completing tasks, and stronger interpersonal communication during collaborative problem-solving activities.

The effectiveness of the Problem Based Learning (PBL) model found in this study is consistent with the arguments of Edison (2023), Rahmatika and Widodo (2021), and Warsono (2017), who explain that PBL places students at the center of learning by engaging them in authentic social problems that require critical thinking and collaborative problem solving. The open-ended social problems presented during learning activities encouraged students to analyze issues critically, negotiate ideas, and develop alternative solutions collaboratively. As a result, students became more actively involved in the learning process and demonstrated higher levels of interaction within groups.

The integration of the Open-Ended Collaboration approach further strengthened collaborative learning dynamics. According to Mulyawan et al. (2023), Open-Ended Collaboration allows students to solve problems through multiple correct solutions while encouraging active cooperation and creative problem solving. Titikusumawati et al. (2020) also explain that Open-Ended Collaboration promotes collaborative interaction through group discussions, idea comparison, and collective evaluation processes. In this study, students were encouraged to explore diverse perspectives regarding social conflict issues, which fostered communication, negotiation, and mutual respect within groups. The existence of multiple possible solutions reduced students' dependency on teacher-centered instruction and encouraged them to collaboratively construct knowledge.

The findings of this study may be interpreted through the perspective of Vygotsky's Social Constructivism Theory, particularly the concepts of social interaction, scaffolding, and the Zone of Proximal Development (ZPD). According to Vygotsky, learning is facilitated through interaction with more capable peers and guidance from teachers, enabling students to progress from their current level of understanding toward higher levels of development (Lasmawan & Budiarta, 2020). In the present study, improvements in students' collaboration skills were observed alongside increased peer interaction, teacher facilitation, and collaborative problem-solving activities implemented through the integrated Problem-Based Learning, Open-Ended Collaboration, and Padlet approach. Group discussions provided opportunities for students to exchange ideas, negotiate solutions, and support one another during the learning process, which is consistent with the notion of scaffolding described in social constructivist theory. Although this study was not designed to test Vygotsky's theory directly, the observed learning processes suggest that the improvement in collaboration skills can be understood through the principles of social interaction and collaborative knowledge construction proposed by the theory.

Furthermore, the use of Padlet media significantly strengthened collaborative learning processes. Rath (2025) and Lestari (2025) explain that Padlet functions as a collaborative digital platform that supports interaction, engagement, and active learning in both synchronous and asynchronous learning environments. In this study, Padlet became an effective cultural tool that mediated social interaction among students. Through Padlet, students could share ideas, provide feedback, upload discussion results, and monitor collaborative progress in real time. This digital interaction expanded opportunities for participation and strengthened collective responsibility during learning activities.

The findings of this study are consistent with previous research demonstrating the effectiveness of Problem-Based Learning (PBL), Open-Ended Collaboration, and Padlet in promoting active learning. However, the present study extends these findings by explaining the mechanisms through which the integrated instructional model improved students' collaboration skills. PBL encouraged students to collaboratively analyze authentic social issues and negotiate solutions, while the Open-Ended Collaboration approach required students to consider multiple perspectives, justify their arguments, and reach collective decisions. These learning processes fostered greater participation, shared responsibility, and interpersonal communication among group members.

Within this integrated framework, Padlet did not function as an independent intervention but as a digital collaboration tool that supported continuous interaction throughout the learning process. The platform enabled students to document ideas, exchange feedback, monitor group progress, and revisit discussion outcomes during the reflection stage. These features complemented teacher

scaffolding by ensuring that every group member had opportunities to contribute, including students who were initially reluctant to participate in face-to-face discussions. Nevertheless, the implementation also revealed several classroom challenges. During the early stages of the intervention, some students required additional guidance in using Padlet effectively and adapting to collaborative problem-solving activities, while unequal participation remained evident in several groups during Cycle I. Continuous teacher facilitation, structured group roles, and reflective discussions gradually reduced these challenges, resulting in more balanced participation and improved collaboration in Cycle II.

These findings support previous studies reporting the positive effects of PBL, Open-Ended Collaboration, and Padlet on student learning (Syarofah et al., 2024; Titikusumawati et al., 2020; Sova, 2023). However, unlike earlier studies that primarily examined cognitive outcomes such as critical thinking, creative thinking, learning achievement, or engagement, this study demonstrates that integrating these three instructional components within a single learning design can systematically enhance students' collaboration skills in senior high school Sociology classrooms. This contribution provides empirical evidence that digital technology is most effective when it is pedagogically integrated with collaborative and problem-based learning strategies rather than implemented as a.

The findings indicate that collaborative learning environments supported by digital technology can develop essential 21st-century competencies, particularly collaboration skills. In Sociology learning, collaboration skills are highly relevant because students are required to understand social dynamics, interact with others, and collectively solve social problems. Therefore, the integration of Problem Based Learning (PBL), Open-Ended Collaboration, and Padlet media provides an innovative and relevant learning strategy for developing students' social competencies in the digital era.

Conclusion

This study investigated the implementation of Problem-Based Learning (PBL) integrated with Open-Ended Collaboration and supported by Padlet to strengthen the collaboration skills of Grade XI students in Sociology learning at SMAN 1 Batipuh. The findings demonstrated that the integrated instructional model was associated with progressive improvements in students' participation in group discussions, equitable contribution to collective tasks, interpersonal communication, shared responsibility, and collaborative problem-solving during the classroom action research cycles. These results address the research objective by indicating that the combination of authentic social problems, opportunities for multiple solution pathways, and digitally mediated interaction can create a learning environment conducive to meaningful collaboration. Theoretically, the findings reinforce the principles of Vygotsky's social constructivism, particularly the role of social interaction, peer scaffolding, and the Zone of Proximal Development in facilitating knowledge construction through collective inquiry. The study also extends conceptual understanding by positioning PBL, Open-Ended Collaboration, and Padlet as complementary components of a coherent instructional framework for Sociology learning, while the use of Crebert's collaboration indicators offers a structured basis for examining collaborative performance through quantitative and qualitative evidence. Practically, the findings suggest that Sociology teachers may employ this integrated model to promote active participation, reflective dialogue, social responsibility, and other competencies relevant to twenty-first-century learning. Padlet further served as a collaborative space for sharing

ideas, coordinating group activities, exchanging feedback, and documenting learning reflections. Nevertheless, the findings should be interpreted cautiously because the study involved a single class in one school, focused on a specific Sociology topic, employed a classroom action research design without a comparison group, and was conducted over a relatively limited period. The possibility of observer bias and the absence of evidence concerning the long-term sustainability of the observed improvements also constitute important limitations. Future research should therefore examine the model across multiple schools, educational levels, subject areas, and student populations using longer interventions, quasi-experimental or mixed-method designs, comparison groups, and independent observers. Further investigation should also explore its potential influence on critical thinking, creativity, communication, digital literacy, and long-term social and academic development. Overall, this study provides a contextually grounded contribution to collaborative Sociology pedagogy and offers a promising foundation for the continued development of inclusive, technology-supported, and inquiry-oriented learning environments.

References

Abdullah, A., & Munawwaroh, F. (2024). Problem-based learning untuk meningkatkan keterampilan berpikir kritis siswa. *Jurnal Educatio FKIP UNMA, 10*(1), 155–162. https://doi.org/10.31949/educatio.v10i1.6313

Aifan, H. (2022). Implementing a project-based collaborative learning approach using PowerPoint to improve students' 21st-century skills. *E-Learning and Digital Media, 19*(3), 258–273. https://doi.org/10.1177/20427530211030642

Ayubi, M., Arthamena, V. D., Ikhsan, J., Rosa, Y. H. E., & Ash-Shiddiqi, M. H. (2025). The effect of the problem-based learning (PBL) model with a STEM approach on collaboration skills. *International Journal of Technology in Education and Science, 9*(3), 397–415. https://doi.org/10.46328/ijtes.633

Beck, K. (2020). Ensuring content validity of psychological and educational tests—The role of experts. *Frontline Learning Research, 8*(6), 1–37. https://doi.org/10.14786/flr.v8i6.517

Braun, V., & Clarke, V. (2021). One size fits all? What counts as quality practice in (reflexive) thematic analysis? *Qualitative Research in Psychology, 18*(3), 328–352. https://doi.org/10.1080/14780887.2020.1769238

Crebert, G., Bates, M., Bell, B., Patrick, C. J., & Cragnolini, V. (2004). Developing generic skills at university, during work placement and in employment: Graduates' perceptions. *Higher Education Research & Development, 23*(2), 147–165. https://doi.org/10.1080/0729436042000206636

Djonomiarjo, T. (2019). Pengaruh model problem-based learning terhadap hasil belajar. *Aksara: Jurnal Ilmu Pendidikan Nonformal, 5*(1), 39–46. https://doi.org/10.37905/aksara.5.1.39-46.2019

Edison, A. (2023). *Problem-based learning: Solusi meningkatkan prestasi belajar*. Penerbit P4I.

Erianjoni, Beri, D., Sudiar, O., Kasmita, Komaini, A., Ganefri, Putra, A., Nelwatri, H., Yusra, A., & Santi, T. D. (2023). Online learning process during the new normal post COVID-19 in Indonesia: A case study at the Universitas Negeri Padang. *Journal of Higher Education Theory and Practice, 23*(16), 113–123. https://doi.org/10.33423/jhetp.v23i16.6468

Erianjoni, Beri, D., & Yusra, A. (2023). Contextual sociology teaching materials for high school sociology learning. In *Proceedings of the Unima International Conference on Social Sciences and Humanities (UNICSSH 2022)* (pp. 189–195). Atlantis Press. https://doi.org/10.2991/978-2-494069-35-0_23

Erianjoni, Komaini, A., Ihsan, N., Yusra, A., Nelwatri, H., & Ockta, Y. (2025). Integration of social values from traditional Minangkabau sports into sociology teaching to foster students' character development. *SPORT TK-EuroAmerican Journal of Sport Sciences, 14*, Article 66. https://doi.org/10.6018/sportk.643061

Eshuis, E. H., ter Vrugte, J., Anjewierden, A., Bollen, L., Sikken, J., & de Jong, T. (2019). Improving the quality of vocational students' collaboration and knowledge acquisition through instruction and joint reflection. *International Journal of Computer-Supported Collaborative Learning, 14*(1), 53–76. https://doi.org/10.1007/s11412-019-09296-0

Halimah, S. N., Amin, M., & Sasmita, F. E. (2025). Efektivitas model pembelajaran collaborative learning

berbasis etnosains untuk meningkatkan hasil belajar peserta didik. *Jurnal Kolaboratif Sains, 8*(1), 467–480. https://doi.org/10.56338/jks.v8i1.6812

Johler, M. (2022). Collaboration and communication in blended learning environments. *Frontiers in Education, 7*, Article 980445. https://doi.org/10.3389/feduc.2022.980445

Kiger, M. E., & Varpio, L. (2020). Thematic analysis of qualitative data: AMEE Guide No. 131. *Medical Teacher, 42*(8), 846–854. https://doi.org/10.1080/0142159X.2020.1755030

Lasmawan, I. W., & Budiarta, I. W. (2020). Vygotsky's zone of proximal development and the students' progress in learning: A heutagogical bibliographical review. *Jurnal Pendidikan Indonesia, 9*(4), 545–552. https://doi.org/10.23887/jpi-undiksha.v9i4.29915

Lestari, I. W. (2025). Exploring students' perceptions of Padlet as a digital tool for writing in EFL higher education. *Language Circle: Journal of Language and Literature, 20*(1), 48–59. https://doi.org/10.15294/lc.v20i1.33868

Mardian, V., Suwarma, I. R., & Utama, J. A. (2023). The study of Indonesian high school students' collaboration skills: Student self-assessment in science learning. *International Journal of Science Education and Teaching, 2*(3), 162–173. https://doi.org/10.14456/ijset.2023.14

Mariya, S., Ananda, A., Anwar, S., Erianjoni, & Montesori, M. (2022). Mobile learning-based pocketbook development in educational field practice in increasing the competency of professional teachers. *International Journal of Educational Dynamics, 5*(1), 131–137. https://doi.org/10.24036/ijeds.v5i1.376

Mulyawan, M. I., Setiani, Y., & Hadi FS, C. A. (2023). Efektivitas pendekatan open-ended pada pembelajaran matematika untuk meningkatkan kemampuan berpikir HOTS matematis siswa SMP. *Jurnal Cendekia: Jurnal Pendidikan Matematika, 7*(1), 421–431. https://doi.org/10.31004/cendekia.v7i1.1911

Naamati-Schneider, L., & Alt, D. (2023). Online collaborative Padlet-mediated learning in health management studies. *Frontiers in Psychology, 14*, Article 1157621. https://doi.org/10.3389/fpsyg.2023.1157621

O'Connor, C., & Joffe, H. (2020). Intercoder reliability in qualitative research: Debates and practical guidelines. *International Journal of Qualitative Methods, 19*, Article 1609406919899220. https://doi.org/10.1177/1609406919899220

Organisation for Economic Co-operation and Development. (2025). *Trends shaping education 2025*. OECD Publishing. https://doi.org/10.1787/ee6587fd-en

Priyambodo, P., Paidi, Wilujeng, I., & Widowati, A. (2023). Ethno-ECLIPSE learning model: The bridge between collaboration and critical thinking skills. *Journal of Education and Learning (EduLearn), 17*(4), 575–588. https://doi.org/10.11591/edulearn.v17i4.20876

Putri, W. E., & Rahma, E. (2024). Scaffolding pada zone of proximal development (ZPD) dalam pembelajaran sosiologi materi metode penelitian sosial kelas X-2 SMA Negeri 7. *Jurnal Integrasi dan Harmoni Inovatif Ilmu-Ilmu Sosial, 4*(8), Article 9. https://doi.org/10.17977/um063.v4.i8.2024.9

Rahmatika, N. D., & Widodo, S. (2021). Implementasi penelitian tindakan kelas sebagai upaya perbaikan proses pembelajaran. *Jurnal Pendidikan: Teori, Penelitian, dan Pengembangan, 6*(3), 422.

Ramadhan, S., Atmazaki, A., Indriyani, V., & Sukma, E. (2023). Cooperative-problem-based learning model design in online learning. *Komposisi: Jurnal Pendidikan Bahasa, Sastra, dan Seni, 24*(2), 102–116. https://doi.org/10.24036/komposisi.v24i2.123466

Rath, A. (2025). Padlet: A tool for fostering collaborative learning and feedback literacy in dental education. *Frontiers in Medicine, 11*, Article 1357068. https://doi.org/10.3389/fmed.2024.1357068

Relawati, L. D., Ramadhan, I., & Hainon. (2024). Peningkatan minat belajar sosiologi melalui penerapan Lumio berbantuan Padlet di kelas X sekolah menengah. *PTK: Jurnal Tindakan Kelas, 4*(2), 363–374. https://doi.org/10.53624/ptk.v4i2.376

Sari, D. M., & Nurlizawati. (2026). Penerapan model pembelajaran inkuiri terbimbing berbantuan Padlet dalam meningkatkan interaksi edukatif pada pembelajaran sosiologi di kelas X SMAN 1 Batang Anai. *Naradidik: Journal of Education and Pedagogy, 5*(2), 322–331. https://doi.org/10.24036/nara.v5i2.467

Sova, F. (2023). *Pengembangan desain pembelajaran problem-based learning (PBL) dengan pendekatan open-ended untuk meningkatkan kemampuan berpikir kritis siswa* [Master's thesis, Universitas Bandar Lampung].

Suriyanisa, S., Syamsuri, S., Ramadhan, I., & Wijaya, T. (2024). Implementasi model kooperatif tipe jigsaw berbasis Padlet pada pembelajaran sosiologi untuk meningkatkan kerja sama peserta didik kelas XI di

SMA Negeri 1 Pontianak. *Didaktika: Jurnal Kependidikan, 13*(2), 2227–2240. https://doi.org/10.58230/27454312.558

Syarofah, A. F., Agustini, F., & Anshori, M. (2024). Penerapan model pembelajaran problem-based learning berbasis Padlet dalam meningkatkan minat belajar dan hasil belajar kognitif siswa. *Jurnal Pendidikan Guru Profesional, 2*(1), 1–16. https://doi.org/10.26877/jpgp.v2i1.832

Titikusumawati, E., Sa'dijah, C., As'ari, A. R., & Susanto, H. (2020). The effectiveness of the integration of open-ended and collaborative (OE-C) learning strategies in reducing gaps of elementary school students' creative thinking skills. *Elementary Education Online, 19*(1), 198–207. https://doi.org/10.17051/ilkonline.2020.653653

UNESCO. (2023). *Global education monitoring report 2023: Technology in education: A tool on whose terms?* https://doi.org/10.54676/UZQV8501