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Google Classroom and Self-Regulated Learning among Indonesian EFL Students: A Sequential Explanatory Mixed-Methods Study

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ABSTRACT

Self-regulated learning (SRL) remains underexplored in relation to specific learning management platforms across different SRL dimensions, particularly in post-pandemic Indonesian higher education. This study investigated how Google Classroom (GC) supported SRL among fifth-semester EFL students enrolled in a Computer Assisted Language Learning (CALL) course at Universitas Sulawesi Barat, Indonesia. A sequential explanatory mixed-methods design was employed, with quantitative data gathered from 47 students via a validated 12-item Likert-scale questionnaire, followed by semi-structured group interviews with 33 students across 11 purposively selected groups of three. Survey results indicated a high overall mean (M = 3.90, SD = 0.80, α = .933) across six SRL dimensions, with Planning and Time Management perceived as most strongly supported (M = 4.14) and Social Learning as least supported (M = 3.63). Thematic analysis yielded four themes: deadline notifications as a primary regulatory trigger, flexible material access enabling autonomous learning, unstable internet connectivity as a structural barrier, and limited collaborative affordances within the platform. The findings indicate that students perceived GC as particularly useful for planning, time management, and self-monitoring, although its support for social learning and co-regulation remained limited. These results carry practical implications for CALL pedagogy, platform design, and digital infrastructure investment in comparable higher education contexts.

Keywords : Google Classroom, Self-Regulated Learning, EFL, CALL, Mixed Methods

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INTRODUCTION

Digital platforms have become a defining feature of contemporary higher education, reshaping how students organize their learning and interact with course content. Among the competencies that matter most in this landscape, self-regulated learning (SRL) stands out as particularly consequential. Understood as the capacity to direct one's cognitive processes, motivation, and behavior toward meaningful learning goals (Zimmerman, 2002), SRL underpins academic persistence and achievement, and its cultivation has grown more urgent as students navigate technology-rich environments with diminishing face-to-face support.

Learning management systems (LMSs) have emerged as one of the most widely adopted tools for structuring this navigation. Google Classroom (GC), in particular, has achieved significant uptake across Indonesian higher education institutions, offering integrated spaces for assignment management, resource sharing, peer feedback, and lecturer communication (Muslem et al., 2024; Prahani et al., 2022). A growing body of research consistently links LMS engagement with improved learner organization, time management, and self-monitoring, processes that map directly onto the core phases of Zimmerman's (2000) cyclical SRL model. Yet despite the volume of studies examining GC in Indonesian EFL contexts (Albashtawi & Al Bataineh, 2020; Aleksius et al., 2022; Debbyanti & Subekti, 2022), the specific mechanisms through which the platform supports or constrains distinct SRL dimensions remain inadequately theorized.

This gap is particularly consequential in the Indonesian context. Tertiary education in Indonesia has undergone considerable digital disruption in recent years, driven by the COVID-19 pandemic and compounded by persistent infrastructural inequalities between urban and rural learning environments (Gemiharto & Priyadarshani, 2022; Rifa'i, 2023). EFL programs place additional demands on students' self-regulatory resources, requiring them to engage with English as both the medium of instruction and the object of learning. The Computer Assisted Language Learning (CALL) course represents a particularly productive site for investigating these dynamics, as it sits at the intersection of digital literacy, autonomous learning, and language acquisition (Guo & Lee, 2023; Ritonga et al., 2024). Yet most prior studies have relied on either quantitative surveys or qualitative exploration in isolation, and the majority were conducted under fully online or emergency remote teaching conditions, leaving a meaningful gap in understanding how GC supports SRL in blended or post-pandemic higher education settings (Tzimas & Demetriadis, 2024).

The present study addresses this gap directly. To our knowledge, it is among the first to examine GC through the lens of multiple SRL dimensions simultaneously, using a sequential explanatory mixed-methods design that integrates quantitative and qualitative evidence within a single theoretically grounded account. The study focuses on CALL students in an Indonesian post-pandemic higher education context, and critically, it surfaces a contrast that prior research has not explicitly documented: while GC appears to support individual SRL processes reasonably well, its capacity to facilitate social co-regulation is considerably more limited. These four features, the multi-dimensional SRL focus, the mixed-methods design, the post-pandemic Indonesian CALL context, and the individual-versus-social SRL contrast, collectively constitute the novelty of this work.

The study was conducted with fifth-semester students enrolled in the CALL course at the Department of English Language Education, Faculty of Teacher Training and Education (FKIP), Universitas Sulawesi Barat, a public university in West Sulawesi Province. This population offers a compelling case: these students are simultaneously users of technology-enhanced learning environments and future teachers who will design them, meaning their SRL development carries implications beyond their own academic trajectories.

Against this background, the study is guided by three research questions. The first is addressed through the quantitative phase of the study: (1) To what extent do fifth-semester EFL students perceive Google Classroom as supportive of their self-regulated learning across key SRL dimensions? The second and third are addressed through the qualitative phase: (2) Which features of Google Classroom do students most frequently identify as facilitating self-regulation, and why? (3) What structural and platform-level factors constrain the full development of self-regulated learning through Google Classroom in the CALL course?

LITERATURE REVIEW

Self-Regulated Learning: Theoretical Foundations

Self-regulated learning is best understood not as a fixed trait but as a dynamic, cyclical process through which learners actively manage their cognition, motivation, and behavior in pursuit of educational goals (Zimmerman, 2000). The conceptual scaffold for the present study is Zimmerman's (2002) three-phase model, which distinguishes forethought, performance, and self-reflection as the core regulatory phases. In the forethought phase, learners set goals, analyses tasks, and select strategies before engaging with learning activities. The performance phase involves applying those strategies in real time, monitoring progress, and exercising volitional control to sustain effort. The self-reflection phase then encompasses self-evaluation and adaptive responses that feed back into subsequent forethought cycles. This recursive structure is what makes SRL not merely a skill to be possessed but a process to be cultivated and, importantly, one that can be scaffolded by the learning environment itself.

Panadero's (2017) comprehensive review of six major SRL models situates Zimmerman's framework within a broader theoretical landscape encompassing metacognition, emotion regulation, and social context. The social dimension is particularly relevant here. Hadwin et al. (2017) extend traditional individual-level SRL models by articulating co-regulation and socially shared regulation as distinct but interrelated phenomena that emerge in collaborative learning environments. Where individual SRL concerns a learner's capacity to manage their own regulatory processes, co-regulation involves one learner scaffolding another's regulation, and socially shared regulation emerges when a group collectively regulates its learning. These distinctions matter for the present study because they allow us to ask not only whether GC supports SRL in general, but whether it supports the full spectrum of regulatory processes, individual and social alike.

Research consistently confirms the relationship between SRL and academic outcomes in online and blended contexts. Broadbent and Poon (2015), in a systematic review of 14 studies, identified time management, self-monitoring, and help-seeking as the strongest SRL predictors of academic achievement in online higher education. Zhu et al. (2020) found that SRL orientation significantly predicted both attitudes toward online learning and intention to persist in online courses, while Doo et al. (2023) demonstrated through meta-analysis that self-directed learning exerts a meaningful positive effect on outcomes in MOOC environments. These converging findings make a compelling case for designing digital learning environments that actively scaffold SRL rather than assuming it will emerge spontaneously.

Google Classroom as a Learning Management System and SRL Scaffold

Learning management systems have become essential infrastructure in contemporary higher education, providing integrated environments for content delivery, assessment, communication, and administrative management (Prahani et al., 2022; Sanchez et al., 2024). Google Classroom, as a purpose-built educational LMS, offers a suite of features, assignment creation and submission, deadline notifications, multimedia resource sharing, peer and instructor feedback, and discussion streams that collectively constitute a digital infrastructure for learning management (Furqon et al., 2023; Navarro et al., 2021).

What makes GC particularly interesting from an SRL perspective is the way its specific features map onto the phases of Zimmerman's (2000) cyclical model. The deadline notification and reminder system most directly supports the forethought phase by externalizing goal and time structures that learners have not yet fully internalized, a function consistent with Dabbagh and Kitsantas's (2012)

argument that digital platforms can scaffold SRL by making regulatory prompts visible and actionable. The assignment submission and progress-tracking features support the performance phase by providing real-time feedback on task completion status, creating the informational conditions for self-monitoring. The comments and feedback features support the self-reflection phase by enabling learners to review lecturer and peer evaluations and adapt their subsequent approaches accordingly. By contrast, GC's discussion stream, the feature most directly associated with collaborative and social regulatory activity, has consistently emerged as one of the platform's least utilized affordances (Gerada & Efondo, 2024; Labibah et al., 2024; Muslem et al., 2024).

Studies examining GC adoption across diverse educational contexts have generally returned positive findings. Albashtawi and Al Bataineh (2020) reported that EFL students in Jordan rated GC highly for its organizational clarity and communication efficiency. Aleksius et al. (2022) found that Indonesian EFL students valued GC's centralized interface for reducing the cognitive load associated with managing multiple platforms. Debbyanti and Subekti (2022) corroborated these findings in a high school EFL context, and Wulandari and Mandasari (2023) documented persistently positive student perceptions even under emergency remote learning conditions. More recent work has begun to probe specific affordances more critically: Muslem et al. (2024) found that Indonesian EFL teachers most frequently used GC's assignment and announcement features while discussion and quiz functionalities remained underutilized, a pattern attributable to both pedagogical habit and platform design limitations. Tuffahati and Nugraha (2021) applied the Technology Acceptance Model to GC in Indonesian settings and confirmed that perceived usefulness significantly predicted student learning motivation, particularly in relation to organizational and reminder functionalities.

Google Classroom, SRL, and the CALL Context

The intersection of GC use, SRL development, and CALL pedagogy represents a theoretically productive but empirically underdeveloped area of inquiry. CALL environments inherently demand considerable learner autonomy: students must navigate digital interfaces, select from available resources, self-monitor comprehension, and sustain engagement without the continuous scaffolding of synchronous face-to-face instruction (Guo & Lee, 2023; Ritonga et al., 2024). These demands align closely with the competencies foregrounded in SRL theory, suggesting that a well-designed LMS could meaningfully augment learners' regulatory capacities in CALL settings specifically.

Contextual factors in Indonesian higher education, however, complicate this picture. Internet connectivity disparities (Gemiharto & Priyadarshani, 2022; Miras et al., 2023), uneven levels of digital literacy (Mahmud et al., 2025; Sari et al., 2024), and institutional resource constraints (Rifa'i, 2023) all mediate the relationship between platform availability and actual learning quality. Maru et al. (2021) documented that lecturers at eastern Indonesian universities identified platform reliability and student internet access as primary constraints on effective online instruction, while Alom et al. (2023) found that infrastructural barriers significantly mediated the relationship between LMS availability and learning outcomes. These realities must be held alongside any account of GC's SRL-supportive potential in Indonesian CALL programmes.

Two further observations from the broader SRL-technology literature inform the present study. Heikkinen et al. (2023), in a systematic review of learning analytics interventions targeting SRL, found that few existing platform-based supports adequately address all three phases of Zimmerman's cyclical model, raising important questions about the completeness of GC's SRL scaffolding across the full regulatory cycle. Klimova et al. (2022) reported that university students' capacity for self-regulated online learning was heterogeneous and context-dependent, reinforcing the need for studies that treat SRL not as a stable individual trait but as an emergent response to specific platform affordances and

constraints. Together, these observations frame the present study's core inquiry: not whether GC supports SRL in general terms, but how, to what extent, and under what constraints it does so across the multiple dimensions that constitute the full SRL cycle, and what the implications are for both individual and social regulatory processes.

METHODS

Research Design

This study employed a sequential explanatory mixed-methods design (Creswell & Creswell, 2017; Ivankova et al., 2006), structured across three phases. In Phase 1, quantitative survey data were collected from the full student cohort to establish the overall scope and pattern of GC's contributions to SRL across six theoretically grounded dimensions. In Phase 2, semi-structured group interviews were conducted with a purposively selected subset of participants to explain and contextualize the patterns that emerged from the quantitative data. In the integration phase, qualitative findings were interpreted directly against the quantitative results, with each interview theme mapped onto the SRL dimensions that most required explanation. This design is appropriate when the researcher seeks not to build theory from scratch but to illuminate why specific quantitative patterns have emerged, a purpose that aligned directly with the present study's objective of understanding the mechanisms underlying students' SRL experiences with GC.

Participants and Sampling

Participants were drawn from fifth-semester students enrolled in the CALL course at the Department of English Language Education, Faculty of Teacher Training and Education (FKIP), Universitas Sulawesi Barat, Indonesia. All students enrolled in the course during the study semester were invited to participate in the survey phase, yielding a full-cohort sample of 47 students. Participation was entirely voluntary, and informed consent was obtained from all participants prior to data collection. Given that this was an exploratory institutional study conducted within a single department, the sample size is acknowledged as a contextual constraint rather than a design limitation, findings are appropriately interpreted as representing this specific population rather than Indonesian EFL students more broadly.

For the interview phase, 11 groups of three students each (n = 33) were purposively selected to represent a range of quantitative response profiles, including high, moderate, and low scorers on the overall SRL scale (Cohen et al., 2017). This sampling strategy ensured that the qualitative phase could meaningfully account for the variance observed in Phase 1, consistent with the integrative logic of sequential explanatory design. Groups were formed by the researchers based on survey response profiles rather than pre-existing social groupings, in order to ensure representational diversity across the SRL score range.

Quantitative Instrument

The quantitative instrument consisted of a 12-item Likert-scale questionnaire (1 = Strongly Disagree; 5 = Strongly Agree) structured around six SRL dimensions derived from Zimmerman's (2002) cyclical model and adapted to the GC context: (1) Goal Setting, (2) Planning and Time Management, (3) Task Strategies, (4) Self-Monitoring, (5) Social Learning, and (6) Reflection and Feedback. Each dimension was operationalized through two items, a deliberate constraint imposed by the need to maintain a manageable survey length for student participants while still capturing the conceptual breadth of Zimmerman's framework. It is acknowledged that two-item subscales place limitations on dimension-level reliability estimates, and inter-item correlations are therefore reported alongside

Cronbach's alpha coefficients to provide a more stable indication of internal consistency at the subscale level.

The instrument was developed through a two-stage validation process. In the first stage, item content was reviewed by two subject matter experts in EFL and educational technology, who assessed the relevance, clarity, and representativeness of each item relative to its designated SRL dimension. Items were revised based on expert feedback before proceeding to the second stage, in which the instrument was piloted with a small group of students not included in the main study. Pilot data were used to assess item clarity and to compute preliminary reliability estimates. Following pilot refinement, the final instrument demonstrated strong overall reliability (Cronbach's $\alpha = .933$), with dimension-level alphas ranging from .536 (Self-Monitoring) to .839 (Planning and Time Management). The comparatively modest alpha for the Self-Monitoring dimension reflects the functional heterogeneity of its two constituent items, progress-checking and feedback review, while both theoretically associated with the performance phase of SRL, may represent partially independent regulatory behaviors. Inter-item correlations for this dimension are reported in the Results section to supplement the alpha coefficient.

Two additional open-ended questions invited students to identify the GC features they found most helpful for self-regulation and to suggest platform improvements. These responses were coded independently by two members of the research team, with multiple feature mentions permitted per respondent. Coding discrepancies were resolved through discussion until consensus was reached.

Qualitative Instrument

The qualitative instrument comprised eight semi-structured interview questions addressing students' subjective experiences of GC in relation to goal-setting, time management, motivation, feature utility, and perceived barriers. Questions were developed iteratively following the analysis of Phase 1 data, ensuring that the interview protocol directly addressed the quantitative patterns most in need of explanation, a procedure consistent with the sequential explanatory approach (Ivankova et al., 2006). The interview guide was reviewed by one member of the research team not involved in instrument development to assess question clarity and potential leading bias before use.

Data Collection and Analysis

Quantitative data were collected via an online survey administered through GC during the final weeks of the CALL course. Data were analysed using descriptive statistics: means, standard deviations, and frequency distributions, calculated in Python using the panda’s library. Cronbach's alpha coefficients and inter-item correlations were computed at both the dimension and scale levels to assess internal consistency.

Qualitative data were collected through semi-structured group interviews conducted with the 11 selected groups. Each interview lasted approximately 45–60 minutes and was audio-recorded with participants' consent. Interviews were conducted in a combination of English and Bahasa Indonesia, reflecting the bilingual competence of the student participants and the naturalness of code-switching in this educational context. Responses originally produced in Bahasa Indonesia were translated into English by one bilingual member of the research team prior to analysis, with semantic fidelity prioritized over literal equivalence; a second bilingual team member reviewed all translations for accuracy and consistency.

Thematic analysis followed the six-phase framework of Braun and Clarke (2006): familiarization with the data, initial code generation, theme search, theme review, theme definition and naming, and report production. Initial coding was conducted independently by two members of the research team,

generating a total of 47 initial codes across the 11 interview transcripts. These codes were subsequently grouped into candidate themes through discussion, yielding four overarching themes that were reviewed and confirmed by all three members of the research team. Discrepancies at the coding stage were resolved through structured discussion until consensus was reached; no formal inter-coder reliability statistic was computed, consistent with Braun and Clarke's (2006) reflexive approach to thematic analysis, which treats coding as an interpretive rather than a mechanical process.

RESULTS AND DISCUSSIONS

Results

1. Quantitative Findings: Survey Data

a. Overall Scale Reliability and Descriptive Statistics

The 12-item SRL questionnaire demonstrated excellent internal consistency at the scale level (Cronbach's α = .933), indicating that the instrument measured GC-mediated SRL perceptions in a coherent and stable manner. Across all 47 participants, the overall mean was M = 3.90 (SD = 0.80). Based on the interpretation threshold adapted from Riduwan (2015) whereby scores of ≥ 3.50 are classified as High, 2.50–3.49 as Moderate, and below 2.50 as Low on a five-point Likert scale — students' collective perceptions of GC's SRL-supportive role fell within the High category. Table 1 presents item-level descriptive statistics.

Table 1. Descriptive Statistics for Individual Survey Items

Item	SRL Dimension	Statement	Mean	SD	Category
Q1	Goal Setting	I set specific goals for completing assignments on google classroom.	3.98	0.71	High
Q2	Goal Setting	Using google classroom helps me stay focused on my learning objectives.	3.79	0.88	High
Q3	Planning & Time Mgmt	I effectively plan my time to complete assignments before deadlines.	3.96	0.81	High
Q4	Planning & Time Mgmt	Google classroom reminders help me manage my study schedule.	4.32	0.91	High
Q5	Task Strategies	I break down assignments into manageable steps using google classroom.	3.74	0.77	High
Q6	Task Strategies	I use additional resources provided in google classroom to complete my tasks.	3.81	0.80	High
Q7	Self-Monitoring	I regularly check my progress on assignments in google classroom.	4.11	0.70	High
Q8	Self-Monitoring	I review feedback from lecturers and peers on google classroom to improve my work.	3.96	0.78	High
Q9	Social Learning	I feel comfortable asking questions or seeking clarification through google classroom.	3.66	0.87	High
Q10	Social Learning	I use discussion features in google classroom to interact with peers and lecturers.	3.60	0.88	High
Q11	Reflection & Feedback	I reflect on my performance after submitting assignments on google classroom.	4.04	0.81	High
Q12	Reflection & Feedback	I use feedback on google classroom to identify areas for improvement.	3.85	0.78	High

Scale interpretation: High ≥ 3.50; Moderate = 2.50–3.49; Low < 2.50.

All 12 items fell within the High category, with means ranging from 3.60 (Q10: use of discussion features) to 4.32 (Q4: GC reminders help manage study schedule). The relatively narrow range of 0.72 scale points suggests a generally homogeneous pattern of positive endorsement across the cohort, though meaningful within-group variation is nonetheless apparent. Items Q4, Q7, Q11, and Q1 registered the four highest means, while Q10, Q9, and Q5 were consistently lower, pointing to relative strengths in planning and monitoring dimensions and relative weaknesses in social and strategic ones.

b. SRL Dimensions: Comparative Analysis

Table 2 presents dimension-level means, standard deviations, Cronbach's alpha coefficients, and comparative rankings.

Table 2. Descriptive Statistics and Reliability Coefficients by SRL Dimension

SRL Dimension	Items	Mean	SD	Cronbach's α	Rank	Interpretation
Planning & Time Mgmt	Q3, Q4	4.14	0.87	0.839	1st	High
Self-Monitoring	Q7, Q8	4.03	0.74	0.536	2nd	High
Reflection & Feedback	Q11, Q12	3.95	0.79	0.775	3rd	High
Goal Setting	Q1, Q2	3.88	0.80	0.727	4th	High
Task Strategies	Q5, Q6	3.78	0.77	0.824	5th	High
Social Learning	Q9, Q10	3.63	0.86	0.763	6th	High
Overall Scale	Q1–Q12	3.90	0.80	0.933	-	High

Interpretation threshold adapted from Riduwan (2015): High ≥ 3.50. Cronbach's α: Acceptable ≥ 0.70; Moderate = 0.50 - 0.69.

Planning and Time Management emerged as the dimension students perceived most strongly as supported by GC (M = 4.14, SD = 0.87, α = .839, r = .724). The item driving this dimension, Q4 (GC reminders help me manage my study schedule; M = 4.32, SD = 0.91) registered the highest individual mean in the entire scale, with 51.1% of students selecting Strongly Agree and 38.3% selecting Agree, for a combined endorsement rate of 89.4%. Self-Monitoring ranked second (M = 4.03, SD = 0.74), followed by Reflection and Feedback (M = 3.95), Goal Setting (M = 3.88), and Task Strategies (M = 3.78). Social Learning was consistently the weakest dimension (M = 3.63, SD = 0.86), with Q10 (use of discussion features; M = 3.60) representing the lowest-scoring item in the scale. Notably, 40.4% of students selected Neutral on Q10, suggesting widespread ambivalence toward GC's discussion feature rather than active dissatisfaction.

The Self-Monitoring dimension warrants particular attention. Despite its second-highest mean, it returned the lowest dimension-level alpha (α = .536) and the weakest inter-item correlation (r = .366) in the instrument, considerably below the acceptable threshold of .70. This pattern suggests that the two behaviors comprising this dimension, namely progress-checking (Q7) and feedback review (Q8), may function with some degree of independence within students' regulatory repertoires, rather than as a unified self-monitoring construct. This finding has implications for future instrument development and is discussed further in the Discussion section.

c. Most Helpful GC Features: Open-Ended Responses

In response to the open-ended item asking students to identify the GC features most helpful for self-regulation, responses were independently coded by two members of the research team. Multiple feature mentions were permitted per respondent, and coding discrepancies were resolved through discussion. Table 3 presents the coded feature frequencies.

Table 3. Frequency of GC Feature Mentions in Open-Ended Responses

GC Feature	Frequency (*n*)	Percentage (%)	Representative Quote (translated)
Reminders/ Notifications	41	87.2	"Amid so many tasks, sometimes I forget, but with the reminder feature, I am prompted to immediately work on the assignment."
Comments/ Feedback	11	23.4	"Through this feature, students can discuss with lecturers regarding materials and tasks that are not yet understood."
File Attachments	9	19.1	"This feature makes it easy for lecturers to send files or learning videos, and our learning time becomes more flexible."
Discussion Feature	3	6.4	"Class discussions can motivate students and assist in the learning process, making them feel more responsible for their own progress."
Grading/ Scores	1	2.1	"Scores from assignments can be seen, so I can evaluate whether there are still shortcomings or errors."

Note. Responses were coded for feature mentions; multiple features could be cited per respondent. Percentages indicate the proportion of respondents citing each feature at least once. Quotes are translated from Bahasa Indonesia.

The reminders and notification's function were cited by 41 of 47 respondents (87.2%), a concentration that directly mirrors Q4's status as the highest-scoring Likert item and provides an important convergent data point across the two quantitative strands. Comments and feedback features were the next most frequently mentioned (23.4%), followed by file attachments (19.1%). The discussion feature, despite being the subject of a dedicated Likert item (Q10) was mentioned by only three respondents (6.4%) as a helpful self-regulation tool, providing further convergent evidence for the consistently low Social Learning dimension score.

2. Qualitative Findings: Thematic Analysis of Interview Data

Thematic analysis of the 11 group interviews generated 47 initial codes, which were subsequently consolidated into four overarching themes through iterative discussion among the research team. The themes map directly onto the quantitative patterns identified in Phase 1: Themes 1 and 2 explain the high scores observed in Planning and Time Management and Task Strategies respectively, while Themes 3 and 4 account for the structural and platform-level factors underlying the barriers and limitations suggested by the quantitative data. Participant quotations are presented in English translation from the original Bahasa Indonesia, with the source interview group indicated.

a. Theme 1: Deadline Notifications as the Primary Driver of Self-Regulation

The most pervasive theme across all 11 groups centered on GC's deadline notification and reminder system as the primary mechanism initiating and sustaining self-regulated behavior. Students described the notification function not merely as an information tool but as a behavioral prompt, one that bridged the gap between passive awareness of an assignment and active, purposive engagement with it. This theme directly explains the quantitative pattern observed in Phase 1, where Q4 (GC reminders help me manage my study schedule) registered the highest mean in the entire scale (M = 4.32) and 87.2% of open-ended respondents identified notifications as their most valued GC feature.

Group 1 articulated this process with particular clarity: *"When there is an assignment that comes in, we will check the type of assignment and match it with the learning material. Once we feel that we*

understand how to do the assignment, we will work on it as soon as possible. The deadline information on the classroom form, and the automatic warning notification when the deadline is approaching, help us stay on track." Group 5 described the motivational immediacy of deadline alerts: *"One of the features that is very helpful for us to work on tasks independently is the appearance of task deadline warnings, this makes us suddenly feel motivated to work on the assignment right away."* Group 8 offered a more reflective account, noting that the system supported proactive planning rather than merely reactive compliance: *"The reminder feature allows us to see the deadline for every task so that we can plan our time better. We can see all the tasks that need to be completed and prioritize which ones need to be done first based on urgency."*

b. Theme 2: Flexible Material Access and Autonomous Learning

A second theme concerned students' appreciation for GC's capacity to provide persistent, on-demand access to learning materials and how this affordance shaped their autonomous learning habits. This theme speaks directly to the Task Strategies dimension (M = 3.78) and helps explain why file attachments emerged as the third most frequently cited feature in open-ended responses (19.1%), despite receiving less attention than notifications. Students emphasized that the ability to revisit uploaded content at any time and from any location represented a qualitative difference from synchronous face-to-face instruction, one that allowed them to pace their own engagement with course material.

Group 7 described how material access supported independent study management: *"Google Classroom gives us easy access to learning materials, assignment schedules, and communication with lecturers. With this, we can manage our own study time, search for needed information, and complete assignments independently. This encourages us to become more active and responsible in the learning process."* Group 6 highlighted the iterative quality of this access: *"Direct access to materials and feedback from the lecturer also motivates us to be more responsible for assignments. It makes us more independent because we can access materials and revisit them repeatedly for study."* Group 8 similarly noted: *"The ability to access materials at any time allows us to learn at our own pace. We can use free time to understand the material more deeply without being limited by class time."*

c. Theme 3: Internet Connectivity as a Structural Barrier

A third theme, raised consistently across all 11 interview groups, concerned the pervasive and significant challenge posed by unstable internet connectivity. This theme was not anticipated by the quantitative instrument, which did not include items measuring infrastructure-related barriers, and it therefore represents one of the most important contributions of the qualitative phase to the overall understanding of GC-mediated SRL in this context. Students described connectivity disruptions as recurring and particularly disruptive during submission windows, when assignments had already been completed but could not be reliably uploaded.

Group 11 articulated the tension between regulatory intent and infrastructural constraint: *"The difficulty is certainly network disruption, because Classroom requires an internet connection. Usually when we want to upload assignments, what happens is that the task cannot be sent on time because we have to wait for a good network."* Group 2 situated the issue within broader socioeconomic frame: *"Not all students necessarily have internet access, or the internet in a student's area may not be good, making access difficult."* Group 1 identified a specific technical failure mode that compounded the problem: *"Sometimes I feel confused when I upload a file but after it is submitted the lecturer does not receive the file. Google should provide a notification that the file is empty or missing."*

d. Theme 4: Limited Collaborative Affordances and Desire for Enhanced Interactivity

The fourth theme reflected students' awareness of GC's limitations as a platform for collaborative and socially embedded learning. This theme provides the most direct qualitative explanation for the consistently low Social Learning dimension scores observed in Phase 1 (M = 3.63) and the near-absence of discussion feature mentions in open-ended responses (6.4%). While most groups expressed overall satisfaction with GC's organizational functions, a recurring concern was the absence of features that would support genuine peer interaction, formative self-assessment, and more active forms of collaborative engagement.

Group 11 recommended a specific structural addition: *"We recommend a wide discussion room feature that can be used without face-to-face contact, both online and offline, so that all students, especially those who are introverted, have the opportunity to contribute opinions and receive active participation scores."* Group 9 articulated the most elaborated vision for enhanced SRL support: *"A progress tracking dashboard, customizable reminders, and time management tools such as a Pomodoro timer would help students more actively manage their learning. Peer feedback features and a weekly reflection function would also help students take more control of their learning process."* Group 10 identified a paradoxical consequence of GC's notification design: *"Sometimes we miss reminders because too many notifications come in at once, especially when several courses are active simultaneously."*

Discussion

1. Students' SRL Perceptions Across Dimensions

The first research question asked to what extent students perceived GC as supportive of their SRL across key dimensions. The overall mean of M = 3.90 (α = .933) indicates a broadly positive and internally consistent pattern of perceptions, students in this cohort generally reported that GC was helpful for their self-regulation across all six dimensions measured. This finding is consistent with the established literature on GC's organizational affordances in Indonesian EFL contexts (Albashtawi & Al Bataineh, 2020; Wulandari & Mandasari, 2023), and extends it by mapping those perceptions onto the specific phases of Zimmerman's (2002) theoretical framework. Critically, however, the clear hierarchy among dimensions, with Planning and Time Management at the apex and Social Learning at the base, offers a more differentiated account than global satisfaction scores alone would permit.

It bears emphasis that these are perception data, not behavioral or outcome data. The survey instrument captures how students felt about GC's SRL-supportive role, not whether GC use actually produced measurable SRL improvements. This distinction matters: social desirability bias may have inflated positive responses, given that GC was the institutionally mandated platform and students were aware of the research context. The findings should therefore be read as evidence of perceived utility rather than demonstrated efficacy, a distinction that is maintained throughout this discussion.

The prominence of Planning and Time Management (M = 4.14) is consistent with Broadbent and Poon's (2015) finding that time management is among the strongest SRL predictors of online learning success, and with Dabbagh and Kitsantas's (2012) argument that digital platforms can scaffold the forethought phase of SRL by externalizing goal and deadline structures. The high Self-Monitoring score (M = 4.03) is similarly interpretable within Zimmerman's (2000) framework: GC's provision of real-time assignment status, visible deadlines, and accessible feedback creates the informational conditions for the performance monitoring and self-evaluation processes central to this phase. The modest reliability of the Self-Monitoring dimension (α = .536, r = .366), however, suggests that the two items comprising it, progress-checking and feedback review, may represent functionally distinct regulatory behaviors

that future studies should treat as separate constructs, consistent with Heikkinen et al.'s (2023) observation that platform-based SRL supports often address the three regulatory phases unevenly.

The central finding that warrants the most sustained attention and that represents this study's most distinctive theoretical contribution is the consistent gap between individual SRL support and social co-regulation support. Across both phases of the study, Social Learning emerged as the dimension students perceived as least supported by GC (M = 3.63), and this pattern was not merely a matter of degree. The 40.4% neutral response rate on Q10, the near-absence of discussion feature mentions in open-ended responses (6.4%), and the qualitative accounts of GC's collaborative limitations all converge on the same interpretation: GC's design fundamentally privileges individual regulatory processes over social and collaborative ones. This asymmetry, strong individual SRL scaffolding, weak social co-regulation support, is the study's core finding and its most practically significant contribution.

2. Features Perceived as Facilitating Self-Regulation

The second research question asked which GC features students most identified as facilitating self-regulation and why. Both the quantitative and qualitative data converge clearly on the reminder and notification system. The 87.2% mention rate in open-ended responses, Q4's position as the highest-scoring Likert item (M = 4.32), and the consistent centrality of notifications across all 11 interview groups together constitute robust triangulated evidence for this feature's perceived importance. Tuffahati and Nugraha (2021) documented a comparable pattern in their TAM-based study of GC in Indonesian higher education, finding perceived usefulness most strongly associated with organizational and reminder functionalities. Muslem et al. (2024) corroborated this, noting that deadline-related features were the most valued across Indonesian EFL teachers and students.

The qualitative data illuminate the mechanism underlying this pattern. Students described notifications not simply as reminders but as external triggers that initiated internal regulatory chains, prompting task review, strategy selection, time allocation, and goal re-calibration. This function aligns with Vygotskian conceptions of mediated learning, in which technological artefacts initially scaffold regulatory processes that are not yet fully internalized (Dabbagh & Kitsantas, 2012). Whether students in this cohort were moving toward internalized self-monitoring which Zimmerman (2002) identifies as a developmental trajectory in SRL, or remaining dependent on external notification prompts is a question the current cross-sectional design cannot answer. This represents one of the most compelling directions for longitudinal follow-up research.

File attachments and material access also emerged as meaningful perceived facilitators, supporting the autonomous review and resource utilization behaviors associated with the Task Strategies dimension (M = 3.78). This is consistent with Navarro et al.'s (2021) finding that ease of material access was a significant predictor of student satisfaction with LMS use, and with Zhu et al.'s (2020) demonstration that resource availability is associated with stronger SRL orientation in online learners.

3. Structural and Platform-Level Barriers

The third research question asked what structural and platform-level factors constrained the full development of SRL through GC. The qualitative phase identified two broad categories of constraint that the quantitative instrument alone could not have captured.

Internet connectivity was the most pervasive structural barrier, reported by all 11 interview groups, a finding that resonates with the digital divide literature specific to Indonesian contexts. Gemiharto and Priyadarshani (2022) documented persistent internet access disparities across

Indonesian provinces, while Miras et al. (2023) established that digital inequality in educational settings represents a systemic equity issue rather than merely a technical inconvenience, with direct consequences for learning outcomes. From an SRL perspective, unreliable connectivity is particularly damaging because it disrupts the performance phase of Zimmerman's (2000) model in a way that is beyond students' regulatory control: a student who has planned, motivated themselves, and completed an assignment cannot submit it on time due to network failure. This disconnection between regulatory intention and outcome has potential long-term consequences for self-efficacy, the motivational backbone of Zimmerman's framework (Klimova et al., 2022). It is worth noting that this barrier was raised spontaneously and consistently across all 11 groups, suggesting it is not a peripheral concern but a structural feature of the learning environment that substantively shapes students' regulatory experiences.

The Social Learning dimension's low scores and the qualitative data from Theme 4 point to a second category of constraint that is internal to the platform's design rather than external to it. Hadwin et al. (2017) emphasize that co-regulation and socially shared regulation require not merely the presence of communication channels but their active and meaningful use within a culture of collaborative inquiry. GC's current feature set characterized by one-to-one feedback flows and broadcast-style announcements rather than genuine peer-to-peer dialogue, appears to structurally inhibit the emergence of the social regulatory dynamics that EFL learners in particular need in order to negotiate shared understanding of complex linguistic and cultural content (Ritonga et al., 2024). Students' own recommendations for discussion rooms, peer feedback mechanisms, and gamified engagement reinforce this interpretation and point toward specific design directions that platform developers and institutional technology officers might usefully consider.

It is important, however, not to overstate these conclusions. The findings reported here represent the perceptions of one cohort at one institution, and they should be interpreted as generating hypotheses for future investigation rather than establishing generalizable claims about GC's SRL-supportive effects across Indonesian higher education. The value of this study lies in its granularity, in its capacity to map perceived strengths and limitations onto specific SRL dimensions and to explain those patterns through students' own accounts, rather than in the breadth of its generalizability.

CONCLUSIONS

This study set out to examine how Google Classroom was perceived to support self-regulated learning among EFL students in a CALL course at Universitas Sulawesi Barat, employing a sequential explanatory mixed-methods design to generate a theoretically grounded and empirically rich account of the platform's affordances and constraints. The findings reveal a productive asymmetry at the heart of students' GC experience: the platform was perceived as genuinely effective in scaffolding the individual regulatory processes associated with planning, time management, self-monitoring, and reflection, primarily through its deadline notification infrastructure, while falling considerably short in supporting the social learning and co-regulation dimensions that constitute the collaborative end of the SRL spectrum. This asymmetry is not incidental to GC's design; it reflects a structural feature of the platform that privileges individual task management over peer-to-peer regulatory dialogue.

The qualitative data add important texture to this picture. Connectivity barriers were reported spontaneously and consistently across all 11 interview groups, revealing that students' regulatory intentions, however well-formed, were frequently undermined by infrastructural constraints beyond their control. Perhaps more striking was the sophistication with which students articulated what they needed but did not currently have: structured discussion spaces, peer feedback mechanisms, progress

tracking dashboards, and customizable reminder systems. These accounts suggest that the students in this cohort were not passive recipients of whatever affordances GC happened to offer, but active learners with a reasonably developed sense of their own regulatory needs and the platform features that would better serve them.

Taken together, these findings carry practical implications across three levels. For lecturers and course designers, the results suggest that GC's most powerful SRL contribution lies in its organizational and notification infrastructure, and this strength can be leveraged strategically through deliberate deadline sequencing, progress checkpoint design, and metacognitive prompting via the announcement feature. Fostering the social dimensions of SRL, however, requires supplementary pedagogical interventions that GC does not natively provide, including structured peer review protocols, collaborative task formats, and explicit co-regulation scaffolding (Hadwin et al., 2017). For platform designers and institutional technology officers, the findings point toward investment in features that support all three phases of the SRL cycle, not only the forethought and performance monitoring functions that current usage patterns privilege. For policymakers and institutional leaders, the near-universal citation of connectivity barriers reinforces the urgent case for investment in digital infrastructure equity, particularly at universities in Indonesia's eastern regions where access disparities remain most acute (Maru et al., 2021; Rifa'i, 2023).

Several limitations qualify these conclusions and should inform how future research builds on this work. The study was conducted within a single department at one institution, which constrains the generalizability of findings to broader Indonesian or international EFL populations. The cross-sectional design precludes any causal inference: while students reported positive SRL perceptions in relation to GC use, the study cannot establish that GC use produced SRL improvements over time. Social desirability bias may have inflated survey responses, given that GC was the institutionally mandated platform. The Self-Monitoring dimension's modest internal consistency ($\alpha = .536$, $r = .366$) suggests that this construct may require more refined operationalization in future instruments. Future research should address these limitations through longitudinal designs that track SRL development over time, multi-institutional comparisons that account for infrastructural variation, and studies that incorporate behavioral trace data from GC's activity logs to triangulate and extend self-report findings. Experimental or quasi-experimental designs that evaluate specific lecturer-initiated interventions targeting GC's underutilized social features would be particularly valuable in determining whether the asymmetry documented here can be meaningfully reduced through deliberate pedagogical design.

The present study contributes to a growing body of evidence that effective CALL pedagogy requires not only appropriate platform selection but deliberate, theory-driven instructional design that leverages platforms' genuine strengths while actively compensating for their structural limitations. In contexts like Indonesian higher education where digital disruption has been rapid, infrastructural inequalities remain significant, and students are simultaneously learners and future teachers of technology-enhanced environments, understanding these dynamics with precision and nuance is not merely an academic exercise. It is a practical necessity.

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