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Assessing the Efficacy of Google Classroom as an Instructional Medium in Blended Learning Environments: A Systematic Review and Meta-synthesis

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Article Info

Abstract

This systematic review and meta-synthesis examined the impact of Google Classroom in blended learning environments, focusing on its effectiveness in enhancing student collaboration, interaction, and learning outcomes across different educational levels. A total of 11 peer-reviewed journal articles, published between 2020 and 2023, were selected based on strict inclusion criteria, emphasizing experimental and quantitative studies in English-language academic publications. The findings revealed a dominant concentration of research from Indonesia, reflecting regional efforts to integrate educational technology. Most studies employed experimental designs, utilizing Google Classroom as an intervention in blended settings, and targeted subject areas such as English language instruction, mathematics, and Islamic education. The review found that Google Classroom positively influenced student engagement, language proficiency, reading comprehension, and overall academic achievement, particularly in higher education contexts. However, it also identified several challenges, including limited teacher adoption and technological barriers in some settings. The synthesis demonstrated that Google Classroom served as a flexible and effective tool in a range of instructional contexts. It offered valuable insights for policymakers and educators aiming to strengthen technology-enhanced learning practices. This review contributed to the existing literature by highlighting the platform's educational potential and calling for more diverse, inclusive, and scalable implementations across regions and subject disciplines.

1. Introduction

The educational landscape has undergone significant and unprecedented transformations due to the global impact of the COVID-19 pandemic. In response to efforts aimed at curbing the virus's spread, governments worldwide implemented widespread closures of schools, colleges, and universities. This disruption affected over 60% of the global student population, highlighting the scale of the educational crisis (UNESCO, 2020). In recent years, increased attention has been directed toward the digital transformation of the education sector.

Although innovation in education has historically progressed at a slower pace compared to other industries, the COVID-19 pandemic accelerated the sector's shift toward digitalization (Kang, 2021) [14]. The abrupt transition to remote and online learning compelled academic institutions to adopt innovative approaches to sustain instructional delivery. Among these approaches, blended learning—an educational model that integrates traditional face-to-face instruction with online learning components—emerged as a practical and effective solution. The urgent need to incorporate digital tools into educational practice led to the widespread adoption of platforms such as Google Classroom. As the most widely used learning management system during asynchronous classes (Santiago *et al.*, 2021) [28], Google Classroom facilitated the transition to remote and blended learning environments. Its intuitive interface and seamless integration with other Google applications offered educators and learners an accessible, centralized platform for communication, assignment distribution, grading, and scheduling (Jotform, 2023) [13]. These features proved essential in maintaining instructional continuity during a period of significant disruption.

In the context of this systematic review, the global educational response to the COVID-19 pandemic serves as a critical backdrop. The study investigates the effectiveness of Google Classroom as an instructional tool within blended learning environments. It aims to evaluate the platform's impact on student engagement, learning outcomes, and overall educational experiences. By doing so, the review underscores the pivotal role of Google Classroom in supporting technology-enhanced learning during an era marked by rapid and unforeseen changes in the academic domain.

1.1 Research Questions
This study assessed the efficacy of Google Classroom as an instructional medium in blended learning environments through a systematic review and meta-synthesis. Specifically, it answered the following research questions:
1. What characteristics do the studies that were included in the systematic review have in terms of:
- Journal publication characteristics
- Geographical characteristics
- Study design
- Educational level
- Sample focus
- Subjects
- Intervention
- Methodological characteristics

2. What is the impact of using Google Classroom in blended learning environments on student collaboration and interaction?
3. To what extent does the effectiveness of Google Classroom in promoting learning outcomes vary across different educational levels such as collegiate, senior high school, junior high school, and elementary levels?

1.2 Literature Review
The literature review conducted in this study served as a comprehensive exploration of the foundational frameworks that inform the investigation into the efficacy of Google Classroom in blended learning environments. Central to this review was an examination of systematic review methodologies, emphasizing their structured, transparent, and replicable nature—characteristics that have established them as the gold standard in synthesizing research evidence. The review also highlighted essential methodological tools, including Harzing's Publish or Perish, Zotero, and the PRISMA 2020 guidelines, which facilitated efficient literature retrieval, organization, and the rigorous execution of the review process. Furthermore, the review contextualized Google Classroom within blended learning frameworks, mapping the current state of scholarly discourse on its pedagogical applications. Collectively, these discussions established the theoretical and methodological foundation for the present study and informed the systematic evaluation of learning outcomes and teaching experiences associated with Google Classroom in blended learning settings.

1.2.1 Systematic Review and Conceptual Framework
Systematic reviews and meta-analyses have been widely recognized as the highest standard in synthesizing research evidence due to their methodological rigor, transparency, and reproducibility (Clarke & Stewart, 1994) [4]. These approaches are applicable across various disciplines and are particularly valued for their ability to provide objective, evidence-based conclusions through clearly defined procedures (Tetzlaff, Tricco, & Moher, 2010) [35]. Despite their overlapping intent to summarize existing studies, systematic reviews differ significantly from traditional literature reviews in terms of methodology, depth of analysis, and research design.

According to Lyn (2013), a systematic review is a comprehensive and structured synthesis of primary research studies aimed at answering a specific research question by identifying, appraising, and integrating high-quality evidence. In contrast, literature reviews often rely on narrative and interpretive methods, offering a more descriptive summary of existing research. These distinctions also extend to the number of authors involved, time requirements, analytical frameworks, and the nature of the questions being explored.

To guide the systematic review process, the University of Maryland recommends a structured sequence of steps, based on the A Guide to Conducting Systematic Reviews by the Cornell University Library (2023). These steps include articulating the research question, establishing inclusion and exclusion criteria, conducting a thorough literature search, screening and selecting studies based on pre-defined criteria, extracting relevant data, assessing risk of bias, synthesizing results, and evaluating evidence quality—often summarized using the PRISMA 2020 flow diagram. This structured process ensures methodological consistency and enhances the reliability of findings.

Furthermore, the model developed by Cochrane Consumers and Communications presents a visual roadmap for researchers conducting systematic reviews. This framework begins with issue identification and question development, proceeds through protocol writing and literature searching, and culminates in study selection, critical appraisal, synthesis, and interpretation of findings. Such structured visualization is exemplified in Figure 1, which served as a guiding framework for this study.

Building upon this foundation, the current research employs a systematic review methodology to examine the

instructional utility of Google Classroom in blended learning settings. The study draws from the approach of Mediana (2025), whose systematic review on the integration of Desmos in mathematics education highlighted the pedagogical potential of educational technology when assessed through rigorous and methodical review processes. Similar to Mediana's work, this study seeks to provide a structured and evidence-based perspective on how Google Classroom influences teaching practices and student learning outcomes.

Through adherence to the systematic review approach and the guidance provided by Figure 1, the goal of this study was to produce a comprehensive analysis of the educational experiences and learning outcomes related to the use of Google Classroom. This dedication to methodological rigor raised the bar for the credibility and dependability of the study's findings, contributing meaningful insights to the discourse on technology-mediated education. In doing so, the study upholds the principles of the gold standard in research review methodologies.

By integrating these frameworks and processes, this systematic review ensures a methodologically sound and transparent assessment of the role of Google Classroom in blended learning. It contributes to a growing body of literature that critically examines digital platforms' capacity to support student engagement, instructional delivery, and academic performance in evolving educational landscapes.

1.2.2 Harzing's Publish and Perish, Zotero, and PRISMA 2020

To ensure a structured and evidence-based approach in identifying and evaluating relevant literature, this study utilized well-established digital tools and reporting frameworks integral to systematic reviews. One such tool, Publish or Perish, developed by Anne-Wil Harzing, serves as a citation analysis software that retrieves scholarly data from platforms such as Google Scholar. It generates various research impact metrics including total citations, h-index, and g-index, enabling researchers to assess the academic influence and relevance of published works (Will-Harzing, 2016) [38]. In the context of this study, it facilitated the identification of high-impact publications that aligned with the research objectives.

Complementing this, Zotero was adopted for comprehensive reference management. As a widely used open-source platform, Zotero enables researchers to collect, organize, and annotate bibliographic information. Its capabilities include tagging, note-taking, and automated citation formatting—making it especially useful for managing the extensive literature included in systematic reviews (Emilio, n.d.). Each source gathered during the review was annotated using Zotero's note feature, ensuring traceability and aiding in the synthesis process.

The methodological framework for reporting the review adhered to the PRISMA 2020 guidelines—an updated and internationally endorsed standard for transparent and reproducible systematic reviews. PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) outlines essential items to include in the reporting of systematic reviews, such as search strategies, inclusion criteria, data extraction methods, and risk of bias assessments (Distiller SR Inc., 2023) [6]. By encouraging systematic reviewers to disclose the steps taken throughout the review process, PRISMA enables readers to independently evaluate the rigor and applicability of the findings.

Although PRISMA was originally designed for systematic reviews in healthcare research, its structured checklist has proven applicable across various disciplines, including education and the social sciences. Whether synthesizing qualitative studies, quantitative data, or employing mixed methods approaches, the flexibility of the PRISMA 2020 guidelines supports nuanced analysis of complex educational interventions. This adaptability is reflected in studies such as Mediana, Funa, and Dio (2025) [21], whose meta-analysis on inquiry-based learning (IbL) demonstrated the efficacy of structured synthesis in drawing meaningful conclusions about conceptual understanding in STEM fields. Similarly, the present review adopts the PRISMA model to ensure transparency and methodological soundness in analyzing the pedagogical impact of Google Classroom within blended learning environments.

By leveraging tools like Publish or Perish and Zotero in tandem with the PRISMA 2020 reporting structure, this study ensures a rigorous, systematic, and replicable evaluation of the educational implications of digital learning technologies. These components not only strengthened the validity of the review but also aligned with recognized practices in recent meta-analytic and systematic studies in education.

1.2.3 Google Classroom and Blended Learning Environments

Google Classroom was developed by Google with the primary objective of enhancing blended learning experiences within educational contexts. Designed with user-friendliness in mind, the platform allows educators to create virtual classrooms that replicate the structure and function of traditional learning environments. As noted by Iftakhar (2016) [10], Google Classroom facilitates greater collaboration between instructors and learners while reducing the administrative burden typically associated with paperwork. The platform supports multiple instructors per class and provides features that streamline communication and assignment management.

Janzen (2017) [12] emphasized that Google Classroom was deliberately developed to be more intuitive and less complex compared to other learning management systems. Its core functionalities include real-time assignment tracking, integrated email communication, and streamlined feedback mechanisms, allowing both class-wide announcements and individualized messaging. These tools enhance the efficiency of teaching workflows and foster more responsive teacher-student interactions.

Blended learning, as defined by Bersin (2004) [2], refers to the strategic integration of multiple instructional modalities across varied times and locations. Rohani (2016) [27] further argued that e-learning tools, such as Google Classroom, play a pivotal role in blended learning environments by facilitating seamless communication between educators and students. Chai and Tan (2010) [3] supported this view, stating that blended learning increases learner engagement and encourages more active participation in educational activities.

Gallagher (2005) [8] also highlighted the benefits of Google Classroom in improving the management of assignments and homework, allowing for easy submission, monitoring, and evaluation of student work through digital channels. The platform enables teachers to set deadlines and provide timely feedback, which encourages student accountability and time

management.

Shaharanee *et al*. (2016) [29] underscored the value of Google Classroom for both instructors and learners, citing its organizational features, such as paperless document storage and centralized access to class materials. These functionalities contribute to a more efficient and environmentally sustainable educational process. Similarly, Latif (2016) [18] characterized blended learning as an instructional model that harmonizes the strengths of face-to-face teaching with those of virtual education. Within this model, it becomes imperative for teachers to serve as facilitators, guiding students in navigating and utilizing digital tools like Google Classroom effectively.

The broader impact of technology on education has also been well-documented. Garrison and Anderson (2002) [9] asserted that technological advancements have transformed not only the delivery of education but numerous aspects of modern life. According to Smeets (2005) [30], integrating technology in the classroom offers significant opportunities for creating enriched learning environments. Furthermore, Vykorystannia (2016) suggested that online platforms promoting collaborative engagement between teachers and students can foster academic integrity and enhance the overall professionalism within virtual learning spaces.

2. Research Methodology

This study utilized a systematic review methodology grounded in the structured guidelines outlined by the Cornell University Library (2023) and promoted by the University of Maryland. The review process involved: (1) clearly defining the research objective; (2) establishing selection parameters; (3) searching and retrieving relevant literature; (4) screening records against predefined inclusion and exclusion criteria; (5) extracting critical data from accepted studies; (6) evaluating for potential bias; and (7) synthesizing findings and appraising the quality of evidence. This approach aligns with the recommendations of Mediana and Dio (2025) [21], who emphasized methodical planning and rigor in reviewing educational technologies.

To support efficient citation management and source evaluation, the researchers used two major digital tools: Zotero, for organizing bibliographic data and annotating sources, and Harzing's Publish or Perish, for identifying high-impact studies based on citation metrics (Will-Harzing, 2016) [38]. These tools were essential in managing the large volume of academic literature and ensured traceability and transparency throughout the review process.

Moreover, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines were employed to document the study selection process and visualize the flow of identified, screened, and included studies. As in the meta-analytic work by Mediana, Funa, and Dio (2025) [21], applying PRISMA ensured the systematic identification of eligible records and justified the exclusion of less relevant or methodologically weak studies. This increased the overall reliability and clarity of the evidence base.

2.1 Criteria for Inclusion and Exclusion

The inclusion criteria were established prior to the literature search and were designed to select only those studies that directly addressed the research focus. Eligible studies had to meet the following requirements: (a) published between 2013 and 2023; (b) peer-reviewed and indexed in Google Scholar;

(c) written in English; (d) utilized quantitative, mixed-methods, or observational research approaches; (e) focused on basic, secondary, or tertiary educational settings; and (f) provided full-text access and relevant data on learning outcomes, student engagement, or instructional use of Google Classroom in blended learning contexts.

Studies were excluded from the review if they: (a) appeared in non-peer-reviewed sources such as blogs, news articles, or editorials; (b) were published prior to 2013; (c) lacked a defined research design or empirical methodology; (d) were written in a language other than English; (e) focused exclusively on corporate training or informal settings; (f) lacked any data relevant to Google Classroom usage; or (g) were inaccessible in full-text format. These criteria followed the quality assurance considerations proposed by Mediana and Dio (2025), ensuring that only credible and high-quality sources were synthesized.

Search Strategy and Study Identification

To identify a relevant and focused sample of studies, the Harzing Publish or Perish application was employed to retrieve literature from the Google Scholar database. This tool extracts citation data and ranks studies based on indicators such as total citation count, h-index, and average citations per year, making it a valuable source for identifying high-impact academic research (Will-Harzing, 2016) [38].

Search terms included combinations of: Google Classroom, blended learning, instructional technology in education, virtual classrooms, and learning management systems. For each keyword or phrase, the top 50 most-cited entries were considered—amounting to a total of 200 initial records. This approach was inspired by the citation impact selection technique adopted in prior studies (e.g., Mediana, Funa, & Dio, 2025) [21], where higher citation counts were considered proxies for academic influence and methodological robustness (Teplitskiy *et al*., 2022) [33].

Given the time-bounded nature of the review and the depth of analysis required, the most frequently cited records were prioritized, as suggested by Tenopir *et al*. (2015) [32] and Wang and Soergel (1998) [37], who observed that highly cited literature tends to reflect both scholarly interest and research quality.

To summarize, this study combined well-established systematic review protocols, digital research tools, and evidence-based inclusion metrics to ensure the reliability, transparency, and scholarly value of its findings.

2.2 Screening and Selection of Studies

Following the established inclusion and exclusion criteria, the researcher conducted a detailed examination of the 200 initial search results generated using Harzing's Publish or Perish software. Each entry was reviewed based on the following eligibility parameters: publication type, year of publication, language of the manuscript, study design, educational level of participants, and the nature of outcome measures. Full-text accessibility was also considered a mandatory condition for inclusion in the final analysis.

To ensure the screening process adhered to accepted research standards, the PRISMA 2020 framework was systematically applied. As widely utilized in contemporary systematic reviews, PRISMA (2020) provides structured guidance for transparent and replicable reporting of a review's objectives, procedures, and findings (DistillerSR Inc., 2023) [6]. This protocol allows readers to assess both the methodological

quality of the review and the contextual relevance of its findings to their own educational settings. As emphasized in the guidelines, documentation of every stage in the process—from identification to exclusion—must be conducted impartially and comprehensively to ensure an accurate assessment.

As shown in Figure 1 (PRISMA 2020 Flow Diagram), a total of 200 articles were initially identified using the keywords specified in the study eligibility section. After removing duplicates, outdated sources, and records automatically flagged as irrelevant by Zotero reference manager, a refined set of 124 publications remained for preliminary screening.

During this stage, 74 records were excluded for failing to meet the established criteria—such as non-peer-reviewed

publication status, language inconsistencies, or incompatibility with the study's objectives. This left a subset of 50 articles deemed suitable for retrieval. However, full texts were successfully accessed for only 28 studies, while 22 could not be retrieved due to access limitations.

A final eligibility check was conducted on the 28 accessible articles. Seventeen (17) were excluded based on further scrutiny, which revealed issues such as ambiguous or poorly defined methodology, unclear research design, absence of relevant outcome data, or failure to meet peer-reviewed publication standards. The remaining 11 studies were retained for the final synthesis phase of the systematic review.
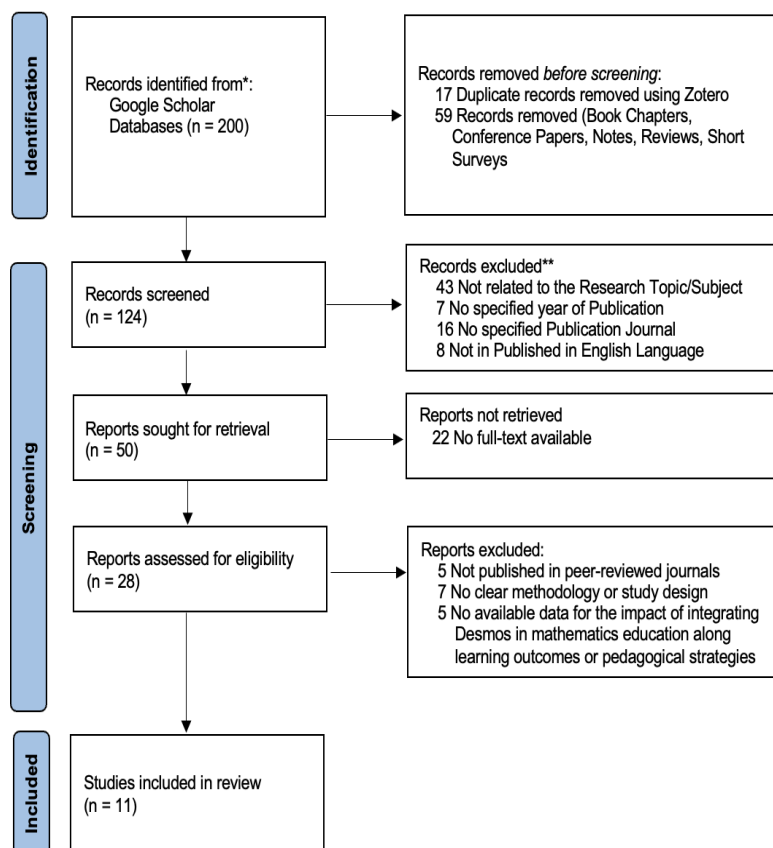

Fig 1: PRISMA 2020 Flow Diagram

2.3 Data Extraction and Coding Procedures
The researchers employed a structured data extraction protocol guided by a pre-established coding framework. Each selected study was reviewed and documented using a comprehensive extraction matrix. The following core information was systematically retrieved: study title, authorship, research objectives, geographical context of the study, publication year, participant profile, methodological design, type of journal or publication outlet, as well as major results and conclusions drawn from the investigation.

To enhance clarity and ensure consistency across data entries, studies were further categorized into three overarching domains: (1) Descriptive Characteristics – including region or country, educational level of respondents, and year of publication; (2) Research Design and Methodological Features – such as research approach, theoretical frameworks, duration of intervention, data gathering tools,

and type of analysis employed; and (3) Key Outcomes and Interpretations – including measured impacts, pedagogical implications, and recommendations offered by the authors (LibGuide, 2023) [19].

In addition, where available, information on how the studies conceptualized or contrasted 'traditional' learning environments versus digitally enhanced settings was also coded. This provided a contextual lens for interpreting intervention-based findings. To maintain organization and facilitate cross-study comparison, extracted data were tabulated in matrices. These tabular formats served to ensure coding fidelity and analytic consistency throughout the review process.

2.4 Synthesis of Findings
Given the methodological diversity of the included studies—particularly the differences in research designs, data sources,

and analytical approaches—the researchers opted not to conduct a quantitative meta-analysis. Although some studies provided statistical outcomes related to learning performance, the nature of the review questions and the heterogeneity in reported metrics made numerical synthesis unsuitable (Petticrew & Roberts, 2008) [24].

Instead, a meta-synthesis was adopted to analyze and interpret the findings. This qualitative strategy allows for integration of varied methodological traditions and theoretical perspectives, enabling a more holistic understanding of the impact of Google Classroom integration in blended learning environments. A meta-narrative approach emphasizes the evolution of conceptual framings across diverse scholarly traditions and helps highlight patterns, divergences, and innovations across the literature base (Wong *et al*., 2013) [39].

As described by LibGuide (2023) [19], meta-synthesis summaries are especially useful in contexts where synthesis involves both qualitative and mixed-methods studies, and where interpretive insights rather than statistical generalizations are the central aim. Through this lens, the studies were narratively grouped and interpreted according to recurring themes, instructional outcomes, and pedagogical transformations linked to digital classroom integration.

3. Results and Discussion
This section presents the findings and discussions from the in-depth analysis of eleven (11) selected empirical studies that examined the effectiveness of Google Classroom in blended learning environments. Guided by the procedures outlined for data coding and extraction, the researchers employed a meta-narrative (narrative summary) approach to synthesize and interpret the results.

3.1 Study Characteristics
The eleven (11) journal articles were analyzed based on four major study characteristics: (1) journal publication details, (2) geographical distribution, (3) research design typologies, and (4) methodological approaches. These characteristics offered a contextual understanding of where and how the studies were conducted, in what types of journals they were disseminated, the nature of the research designs used, and how data were gathered and analyzed.

3.1.1 Journal Publication Characteristics
All eleven (n = 11) articles were published across different scholarly journals and conference proceedings. The journals include: Britain International of Linguistics Arts and Education (BIoLAE) Journal, J-SHMIC: Journal of English for Academic, SCHOOLAR: Social and Literature Study in Education, International Journal of English Language & Translation Studies, Journal of Languages and Language Teaching, International Journal of Education and Teaching Zone, International Journal of Emerging Technology in Learning, Edulingua: Jurnal Linguistics Terapan dan Pendidikan Bahasa Inggris, Al-Ishlah: Jurnal Pendidikan, Proceedings of the Seminar and Conference on Mathematics Education, Proceedings from the 9th Padang International Conference on Economics Education, Economics, Business and Management, Accounting and Entrepreneurship (PICEEBA 2022)

Out of these eleven journals and proceedings, six (6) specialize in educational linguistics, literature, and language teaching, one (1) focuses on educational technology, two (2)

are oriented toward general pedagogy and education, and two (2) are from academic conference proceedings.

All articles were published in peer-reviewed and open-access platforms, ensuring academic rigor and accessibility. Regarding indexation, all publications are indexed in Google Scholar. Additionally, multiple journals are cross-indexed in various databases such as GARUDA (4), Crossref (4), ResearchGate (3), SINTA (3), ORCiD (2), DOAJ (2), Elsevier EI Compendex (1), LearnTechLib (1), Mendeley (1), Academia.edu (1), ISSN (1), ISJD Neo (1), Indonesia Publication Index (IPI) (1), Indonesia OneSearch (1), Islamic World Science Citation Center (1), Linguistics Abstracts Online (1), Open J-Gate (1), Semantic Scholar (1), Reviewer Credits (1), Scientific Literature (1), Index Copernicus (1), and The Global Index for Continuous Resources (1).

Regarding the year of publication, three (3) articles were published in 2020, three (3) in 2021, two (2) in 2022, and three (3) in 2023. All of them were written in English. This distribution highlights the increased interest in digital learning technologies such as Google Classroom, particularly during the COVID-19 pandemic when educational systems worldwide shifted to online and blended modalities. The global health crisis accelerated the research and implementation of technology-mediated instruction, which is reflected in the publication trends of the included studies.

3.1.2 Geographical Characteristics
Among the included studies (n = 11), a significant majority— eight (8) studies—were conducted in Indonesia, while the remaining three (3) were distributed across Jordan, Libya, and Brunei, with one (1) study each. Although various studies from Asia, America, Africa, and Europe have examined Google Classroom integration, many were excluded based on the inclusion criteria. Specifically, the review purposefully omitted studies not published in English, those from non-peer-reviewed journals, and those employing purely qualitative methodologies that centered on user perceptions. This methodological selectiveness reflects a preference for studies providing quantifiable and objective insights into the efficacy of Google Classroom in blended learning environments.

The concentration of studies in Indonesia—representing 72.72% of the sample—indicates a regional academic interest in technology integration within education. Several factors may explain this focus, including widespread digital education initiatives, a growing student population, and strong institutional support for evaluating educational technology. The recurrence of Indonesian-based research further suggests that institutions in the country have taken an active role in investigating digital learning platforms, such as Google Classroom, especially during the COVID-19 pandemic when alternative learning modalities became critical.

Jordan, Libya, and Brunei, each contributing one (1) study (9.09% each), offer a broader, albeit limited, geographic diversity. Despite their smaller representation, their inclusion signifies a global interest in examining the pedagogical impact of Google Classroom across various cultural and educational contexts.

The prevalence of Indonesian studies is further substantiated by Koto *et al*. (2018), who argued that while research outputs in developed countries have plateaued due to saturation, ASEAN nations—particularly Indonesia—are experiencing rapid growth in scholarly productivity. Koto *et al*. (2018)

reported that research outputs in Indonesian institutions have increased by over 500%, a trend that aligns with the high frequency of Google Classroom-related studies originating from the country.

3.1.3 Study Design
Analysis of the study designs revealed that the experimental approach was the most frequently utilized among the eleven (n = 11) included articles. Specifically: Quasi-experimental designs with control and experimental groups were used in four (4) studies; pre-experimental designs, featuring a single group with pre-test and post-test, appeared in two (2) studies; true experimental design with controlled pre-test and post-test conditions was used in one (1) study.

In total, seven (7) studies employed an experimental design framework. These studies evaluated Google Classroom's impact on learners' academic performance and engagement by comparing results between traditional instruction and blended learning that integrated Google Classroom.

Additionally, three (3) studies used quantitative descriptive designs, while one (1) adopted a mixed-methods design combining qualitative and quantitative data. The quantitative descriptive studies often measured learners' academic performance or satisfaction levels, while the mixed-methods study assessed both numerical outcomes and students' acceptance of Google Classroom during remote instruction.

The dominance of experimental and quantitative designs underscores the researchers' intent to derive measurable evidence on the instructional efficacy of Google Classroom, particularly during and after the COVID-19 pandemic.

▪ Educational Levels
With respect to educational settings, the studies were distributed across various academic levels: Five (5) studies were conducted in higher education institutions; three (3) studies focused on the senior high school level; two (2) were carried out at the junior high school level; one (1) study was implemented in the elementary level.

The predominance of higher education research can be attributed to the greater autonomy and institutional capacity of universities to innovate during the pandemic. Higher education institutions were also better positioned to implement online and blended learning systems, supported by more robust digital infrastructure and more digitally literate stakeholders.

In contrast, the limited number of studies at the senior high school, junior high school, and elementary levels may reflect challenges such as limited access to devices, lack of digital literacy among learners, and infrastructural constraints—particularly in public school systems. For instance, in the Philippines, many public schools adopted modular learning through printed modules as part of the Department of Education's learning continuity plan, due to the limited availability of internet access and e-learning devices.

These observations are supported by Illanes *et al*. (2020) [11], who emphasized the need for higher education institutions to develop responsive, evidence-based learning systems during crises. Likewise, Kuo *et al*. (2014) [16] underscored that information and communication technologies (ICTs) have become central to modern teaching and learning, with blended learning now one of the most prevalent instructional methodologies in university settings.

▪ Sample Focus
All studies included in this review utilized distinct samples or participant groups in implementing their respective investigations. One study employed sixty (60) English Language Department students in their seventh semester at Malang University, selected via total enumeration or purposive sampling. Another study used stratified sampling to select two hundred and five (205) students from the Language and Arts Department at Universitas Riau in Indonesia. Additionally, sixty-eight (68) first-semester students at STMIK-AMIK Riau in Pekanbaru-Riau, Indonesia were selected using random sampling. Other studies included ninety (90) students from various departments at Sebha University in Libya and twenty-six (26) students enrolled in English as a Foreign Language (EFL) program in Jordan, selected through purposive sampling.

In terms of basic education participants, the studies included: Twenty-nine (29) Grade XI students from Salimpaun, Indonesia; twenty-five (25) Grade XI students from Patra Nusa, Indonesia; one hundred twenty-nine (129) Grade XI students from four classes at MA Darul Ulum Purwogondo, selected via simple random sampling; twenty-five (25) Grade VII students from Aya Sophia Islamic School Business Junior High School in Indonesia; fourteen (14) Grade VIII students from a junior high school in Jambi City, Indonesia; and seventy-eight (78) students from Brunei, chosen through stratified random sampling from Grades I, II, and III.

The variation in participant demographics and educational levels across the studies suggests a comprehensive examination of Google Classroom's efficacy in blended learning environments. The diversity in the samples—ranging from elementary to tertiary education—implies that Google Classroom has a broad scope of applicability across educational contexts and cultural settings. Furthermore, the use of various sampling techniques, including purposive sampling, stratified sampling, and simple random sampling, reflects deliberate efforts by researchers to ensure representative and contextually relevant data.

These findings collectively highlight Google Classroom's adaptability and suggest its potential effectiveness in meeting the diverse instructional needs of learners across different levels of education. The wide demographic coverage of the reviewed studies adds to a more inclusive and globally informed understanding of technology integration in education.

▪ Subjects
The studies reviewed examined the use of Google Classroom as an instructional platform in various subject areas. Predominantly, these studies focused on: English language teaching, Language and arts, English proficiency and speaking skills, reading comprehension, Writing performance in English as a Second Language (ESL) contexts, Literature and communication, Islamic education, Economics, and Mathematics.

It is evident that language-related subjects received more attention than science, technology, engineering, and mathematics (STEM) disciplines. This trend may be attributed to the compatibility between the instructional needs of language-based courses and the built-in features of Google Classroom—such as discussion boards, assignment modules, document sharing, and collaborative writing tools—which are conducive to language learning.

The preference for language instruction may also stem from

the relative ease with which such subjects can be delivered asynchronously or through text-based interactions. In contrast, STEM subjects—particularly mathematics and science—often require more specialized tools and platforms (e.g., MATLAB, GeoGebra, or PhET Simulations) for content delivery, making Google Classroom less immediately sufficient for comprehensive instruction in those areas.

Nonetheless, the studies demonstrate that Google Classroom can still be integrated into a range of subjects and not just limited to the humanities. Its capacity to support task distribution, communication, and collaboration makes it a flexible tool, even if supplementary resources may be required for more complex subject matter in science and mathematics.

▪ Interventions

Seven (7) of the reviewed studies employed experimental designs wherein Google Classroom served as the primary instructional intervention for treatment groups. These studies aimed to evaluate the effectiveness of the platform in fostering student collaboration, interaction, and academic performance across various disciplines and educational levels.

The consistent integration of Google Classroom as an intervention suggests its perceived utility in enhancing blended learning environments. The experimental setups allowed researchers to compare outcomes between traditional instructional approaches and those augmented with digital tools. In particular, studies examined the influence of Google Classroom on academic performance, engagement, communication, and learning efficiency.

This methodological orientation reflects a structured approach to assessing the platform's impact, offering empirical evidence of its instructional value. Moreover, the platform's integration across varied contexts and subject areas underscores its adaptability and wide applicability in both developed and developing educational systems.

In general, the findings suggest that Google Classroom is an effective educational tool capable of enhancing traditional teaching methodologies. Its use appears to positively affect key pedagogical variables such as student engagement, collaboration, and academic achievement. These insights contribute to the growing body of research that supports the integration of learning management systems (LMS) like Google Classroom in diverse blended learning environments.

3.1.4 Methodological Characteristics

Among the studies included in this review, the majority adopted a quantitative research design, with only one (1) study employing a mixed-methods approach. Those utilizing quantitative-descriptive methodologies typically gathered data through surveys and interviews, often supported by explanatory frameworks. Meanwhile, studies employing quantitative-experimental designs implemented either:

Two-group comparisons (i.e., treatment vs. control groups) for quasi-experimental setups, or single-group pre-test and post-test designs for pre-experimental or true experimental frameworks. In contrast, the single mixed methods study combined interviews and questionnaires to collect both qualitative and quantitative data, offering a more holistic view of the learning experience.

The dominance of quantitative research across the reviewed studies reflects a clear preference for statistical analysis and empirical data in evaluating the effectiveness of Google Classroom in blended learning environments. As Daniel (2016) suggests, this preference may be attributed to the inherent strengths of quantitative methods—particularly their ability to generate objective, replicable, and statistically reliable findings. Moreover, the need to measure specific learning indicators—such as academic performance, language proficiency, and comprehension skills—further drives the prevalence of quantitative designs in this area.

The use of quasi-experimental designs—with treatment and control groups—demonstrates a deliberate effort to establish causal relationships and isolate the impact of Google Classroom on student outcomes. This methodological rigor is further enhanced by the application of pre-test and post-test measures, which allow researchers to track changes over time and link improvements directly to the intervention (Quasi-experimental and pre-experimental designs – Foundations of Social Work Research, 2020).

In contrast, the mixed-methods design, though used only once among the reviewed studies, signals the importance of capturing contextual nuances and learner perspectives that may be overlooked in purely quantitative analyses. Qualitative components such as interviews provide rich, descriptive insights that complement numerical data by revealing learners' attitudes, motivations, and lived experiences (StatPearls – Qualitative Study, 2022).

The methodological inclination toward quantitative approaches aligns with broader trends in educational research, where evidence-based decision-making is often grounded in measurable outcomes. For educators, school leaders, and policymakers, the empirical findings derived from quantitative research offer valuable insights into the impact of technological platforms like Google Classroom in blended learning environments.

Overall, while the predominance of quantitative methodologies reflects a strong empirical orientation, the integration of mixed methods—albeit limited—emphasizes the need for more comprehensive investigations that balance measurable outcomes with meaningful learner experiences.

3.2 Impact of Using Google Classroom in Blended Learning Environments on Student Collaboration and Interaction

The synthesis of findings from the reviewed studies underscores the multifaceted impact of Google Classroom in blended learning environments, particularly in enhancing student collaboration, interaction, motivation, and overall engagement. Several studies reported that Google Classroom significantly improved students' English language proficiency. For instance, Syakur (2020) [49] and Warman (2021) [51] both concluded that the platform played a pivotal role in improving academic performance in English education programs by creating an engaging and interactive learning atmosphere. These findings suggest that the platform not only facilitates content delivery but also enhances learner motivation and enjoyment.

Additionally, Khairani et al. (2020) [45] emphasized students' positive behavioral intention to use Google Classroom, with high acceptance rates and strong peer recommendation patterns, indicating social reinforcement in technology adoption among students. This behavioral inclination toward collaborative usage reflects the platform's social learning potential.

Beyond language instruction, Google Classroom was also

shown to positively influence academic outcomes in other subject areas. Habibie and Nashoih (2022) [43] demonstrated its effectiveness in Islamic education, while Sundari et al. (2023) [48] confirmed its value in mathematics learning environments. These studies illustrate the platform's adaptability across disciplines and underscore its utility in promoting student interaction even in content-heavy, structured subjects.

Furthermore, the study by Shofiyuddin et al. (2022) [46] demonstrated improved reading comprehension through Google Classroom, reinforcing its effectiveness in facilitating interactive language learning. Meanwhile, research conducted by Albashtawi and Al Bataineh (2020) [42] in Jordan pointed to the platform's pedagogical benefits, albeit noting a lag in instructor adoption, which could limit its full potential. This finding implies that institutional support and teacher training remain critical factors in maximizing the platform's benefits.

In summary, the collective results of the reviewed studies highlight Google Classroom's capacity to foster student interaction, engagement, collaboration, and academic achievement across a range of subjects. Nevertheless, challenges such as teacher hesitation and inconsistent implementation suggest areas for further investigation and professional development, especially in contexts where digital integration is still emerging.

3.3 Extent of the Effectiveness of Google Classroom in Promoting Learning Outcomes Across Different Educational Levels

An integrated analysis of the reviewed literature reveals that Google Classroom demonstrates a consistently positive effect on learning outcomes across diverse educational levels, from junior high school to tertiary education. The studies reviewed confirm the platform's efficacy in fostering student motivation, active participation, and academic performance, particularly in language-focused disciplines.

For instance, Syakur (2020) [49] reported that Google Classroom contributed significantly to higher achievement and student engagement in English language learning. Similarly, Khairani et al. (2020) [45] noted a 62% acceptance rate of Google Classroom among students in blended learning contexts, citing its effectiveness, ease of use, and potential to improve academic productivity. While the actual system usage was slightly lower than the acceptance rate, the findings suggest that students recognize the platform's benefits and are open to increased usage with proper integration and support.

In the context of Islamic education, Habibie and Nashoih (2022) [43] found that Google Classroom had a noteworthy impact on student achievement in Pendidikan Agama Islam (PAI) at SMP Plus Darussalam Jember. Their findings validate the platform's versatility and its capacity to be effective in specialized educational settings. Likewise, Shofiyuddin et al. (2022) [46] demonstrated Google Classroom's potential to improve reading comprehension at MA Darul Ulum Purwogondo, reinforcing its strength in facilitating language acquisition.

Cross-cultural relevance was also evident in research involving Libyan EFL students at Sebha University. Albdalla, Aljheme, and Abdulhadi (2021) [41] highlighted the platform's effectiveness in enhancing language proficiency, confirming its adaptability across different linguistic and cultural settings.

In mathematics education, Walid (2023) [50] and Sofya et al. (2023) [47] found that Google Classroom, when used in a blended learning setup, significantly improved conceptual understanding of mathematical concepts. These studies advocate for the platform's use in reinforcing abstract thinking and problem-solving skills—traditionally seen as less suited for asynchronous learning tools.

Overall, the effectiveness of Google Classroom across educational levels—ranging from junior high school to university—demonstrates its flexibility, scalability, and broad pedagogical applicability. Its positive impact spans multiple learning outcomes, including language proficiency, subject mastery, engagement, and conceptual clarity. However, the extent of its effectiveness is subject to institutional readiness, educator competence, and infrastructural support, signaling a need for more context-specific studies to better understand its nuanced implementation and to inform evidence-based educational technology policies.

4. Conclusions

This systematic review affirms the growing body of evidence supporting the effectiveness of Google Classroom in enhancing student learning outcomes across a range of subjects and educational levels within blended learning environments. The platform has been shown to positively impact student engagement, collaboration, academic achievement, and motivation, especially in language-related disciplines such as English, reading comprehension, and communication skills. While most of the reviewed studies employed quantitative methodologies, including experimental and quasi-experimental designs, their findings consistently demonstrated that Google Classroom contributes meaningfully to improved learning experiences when properly implemented. Moreover, the platform's accessibility and versatility make it an adaptable tool across different educational contexts and learner demographics, including secondary and tertiary education.

Despite these positive outcomes, the review also highlights areas that warrant further investigation. Limited adoption by instructors, inconsistent implementation strategies, and subject-specific challenges—particularly in science and mathematics—suggest the need for more targeted professional development and the integration of complementary digital tools. Additionally, a broader application of mixed-methods research would deepen the understanding of learners' experiences and instructional dynamics in using Google Classroom. As educational institutions continue to embrace technology-enhanced learning, strategic support for both educators and students is vital to fully realize the platform's potential. Overall, Google Classroom represents a valuable and scalable solution for promoting meaningful learning in increasingly digital and blended learning environments.

5. Recommendations

Based on the findings of this review, it is recommended that educational institutions integrate Google Classroom more strategically within blended learning environments, particularly in language and communication-based subjects where it has proven to be most effective. Teachers should be provided with continuous professional development and training not only on the technical use of Google Classroom but also on effective digital pedagogies that foster student

collaboration, engagement, and academic success. Integrating subject-specific tools—such as GeoGebra or PhET for mathematics and science—within the Google Classroom ecosystem may further enhance its effectiveness in content areas that require simulations, modeling, and interactive learning experiences.

Moreover, future research should aim to diversify methodologies by incorporating more mixed-method and qualitative studies to gain deeper insights into students' and teachers' lived experiences with the platform. Comparative studies across different educational levels and cultural settings can also help identify best practices and address context-specific challenges in the adoption of Google Classroom. Finally, policymakers and school leaders are encouraged to promote inclusive digital access by addressing barriers such as internet connectivity, device availability, and platform usability, particularly for students in underserved or rural areas. This will ensure that the implementation of Google Classroom fosters equity and meaningful learning for all.

6. Acknowledgement

7. References

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