Exploring Research Trends on Google Classroom: An Analysis from Methodologies to Result-Based Recommendations

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Abstrak—This study explores research trends related to Google Classroom as a digital learning platform, focusing on the analysis of methodologies, research subjects, effectiveness, and resulting recommendations. Using a descriptive meta-analysis approach, this study reviewed 42 articles from Scopus Q1-Q4 indexed journals obtained via Elicit.com. The findings reveal a significant increase in Google Classroom usage during the COVID-19 pandemic, with a dominance of quantitative methodologies (47.6%) emphasizing effectiveness and learning outcomes. University students emerged as the dominant subjects, reflecting the platform's popularity in higher education. Additionally, Google Classroom has proven effective in supporting independent learning, collaboration, and student engagement. Key recommendations include intensive training, the development of interactive features, and enhanced technological infrastructure to ensure the platform's sustainability and relevance in the future. This study concludes that Google Classroom is a flexible and adaptive learning tool, yet it requires more comprehensive implementation strategies to maximize its potential in digital education.

Kata kunci:
Digital Education,
Google Classroom,
Learning Management System,
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INTRODUCTION

In the current digital era, education is undergoing a significant transformation through the integration of technology in the learning process. Google Classroom, as one of the leading Learning Management System (LMS) platforms, has garnered considerable attention in academic research within the field of education. The utilization of this technology in educational contexts offers various conveniences and efficiencies, such as interactive classroom and material management, streamlined communication between teachers and students, and enhanced learning experiences through easily accessible resources (Chiablaem, 2021).

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Previous studies have explored diverse aspects of Google Classroom usage, ranging from improving teaching efficiency to its impact on student engagement in the learning process. Varianytsia et al. (2023) highlight that Google Classroom facilitates a collaborative learning ecosystem and supports the implementation of student-centered pedagogy. However, the platform is not without challenges. Issues such as teacher resistance to technological change, inadequate training, and the need for robust technological infrastructure hinder the full adoption of the platform in broader educational contexts (Saidu et al., 2022).

This study aims to investigate how Google Classroom has been adopted in various educational contexts and evaluate its effectiveness in supporting the learning process. The analysis seeks to identify trends in research on Google Classroom, uncover potential research gaps, and formulate recommendations for more effective use of the platform in the future.

Furthermore, this study seeks to understand educators' perceptions of the technology and the factors influencing their acceptance of Google Classroom as a teaching tool. Additionally, it examines comparative usage across different countries to assess whether significant differences exist in the acceptance and utilization of this cloud-based technology in diverse educational environments. The findings of this study are expected to aid in designing more effective strategies for the implementation of Google Classroom, considering not only technological needs but also the pedagogical and cultural factors influencing its acceptance.

Successes and Challenges in Utilizing Google Classroom

The use of Google Classroom has been proven to improve the grammatical mastery of EFL students in Oman by providing a structured framework that significantly enhances students' performance in grammar (Al-Yahyai et al., 2023). Furthermore, the platform has been used to increase student motivation and academic performance across various subjects (Ali & Zaini, 2020), as well as to facilitate online assignment submissions in a mechatronics system design course, creating measurable differences in student performance (Fusic, 2021). Additionally, the utilization of Google Suite for Education, which includes Google Classroom, has significantly enhanced students' collaborative skills, demonstrating a highly positive impact on their learning processes and outcomes (Talib et al., 2021).

In a study conducted by Solomon Oluyinka and Maria Cusipag (2021), Google Classroom was found to enhance student engagement in teaching and learning processes in several higher education institutions in the Philippines. The platform was used not only as a medium for delivering materials but also as an effective interaction tool between students and teachers. Educators participating in the study testified that the accessibility and flexibility of Google Classroom enabled them to provide quicker and more efficient feedback to students, as well as enhance collaboration among students through discussion and group assignment features.

Conversely, a study by Abdullah Alqahtani (2019) highlighted the failure of Google Classroom implementation in a university in Saudi Arabia, where technical constraints and inadequate teacher training were the primary barriers. In this case, some educators faced difficulties in managing virtual classes due to a lack of understanding of Google Classroom's features. Students also reported frustration due to access issues and unintuitive navigation. This underscores that the successful

utilization of e-learning technology heavily depends on adequate technical infrastructure support and effective training for educators.

By leveraging comprehensive literature analysis and critical evaluations of Google Classroom usage across various studies, this research aims to provide in-depth insights into innovative ways of integrating technology into education to enhance the quality of learning and interaction in virtual classrooms. This analysis is expected to serve as a guide for educators and educational policymakers in maximizing the potential of digital learning technologies in the future.

Based on this framework, this study seeks to answer the following research questions: (1) What are the trends in Google Classroom research over the years? (2) What methodologies are most commonly used in studies on Google Classroom? (3) How does the implementation of Google Classroom vary based on research subjects, such as teachers, students, or other groups? (4) What factors contribute the most to the effectiveness of Google Classroom in improving learning outcomes? (5) What are the most frequently proposed recommendations in studies about Google Classroom, and how might their implementation influence the platform's future usage?.

METHODE RESEARCH

This study employs an approach similar to that used by Susetyarini and Fauzi (2020), utilizing a descriptive meta-analysis method to explore research trends related to Google Classroom from various aspects, including publication trends, research methodologies, research subjects, effectiveness factors, and proposed recommendations (Hackenberger B. K., 2020). This study utilizes secondary data collected through the Elicit.com platform, with a filter for Scopus-indexed journals from Q1 to Q4. Elicit is an AI-based tool designed to assist researchers and professionals in finding, filtering, and analyzing scientific information from various academic sources. This platform is highly beneficial for locating journal articles, understanding relevant literature, and answering research questions based on evidence.

The research approach adopted is descriptive qualitative, aiming to provide a comprehensive mapping of research outcomes related to Google Classroom. The dataset comprises 42 scientific articles selected through Elicit.com using the following filters: Scopus-indexed journals (Q1 to Q4), publication years between 2018 and 2024, and a research focus on the implementation, effectiveness, and challenges of Google Classroom in education. The keywords used for the search included "Google Classroom In Education..

RESULTS AND DISCUSSION

In the graph below illustrates the progression of research on Google Classroom from 2018 to 2024, reflecting intriguing dynamics influenced by various external factors and changes in the education system.

Figure 1: Annual Trends in Google Classroom Research Analysis

Below is a more detailed analysis of the trends in research on Google Classroom during this period:

Initial Adoption and Growing Interest (2018–2020)

In 2018, Google Classroom was still a relatively new platform in the education sector, with limited research conducted. However, by 2019, interest in Google Classroom began to emerge, as educators started recognizing its potential as an effective learning tool. Studies have shown that the integration of Google Classroom greatly facilitated students' access to learning materials and improved their autonomy in learning (Umairah & Zulfah, 2020; Bervell et al., 2022).

The year 2020 marked a pivotal moment with a significant surge in research. The COVID-19 pandemic pushed educational institutions to rapidly adopt remote learning solutions. Google Classroom emerged as a popular choice due to its features, such as task management, online discussions, and quick feedback mechanisms, which effectively supported online learning (Salas-Rueda et al., 2022). Additionally, the platform demonstrated its capability to enhance students' motivation and deliver positive outcomes on academic performance, as reported in various studies during the pandemic (Rosyada & Sundari, 2021; Fusic, 2021).

With features designed for ease and efficiency, Google Classroom became an essential part of educational transformation during the pandemic era. Its widespread adoption highlighted the platform's potential to continue contributing to innovative learning in the future (Talib et al., 2021).

Consolidation and In-Depth Understanding (2021)

Despite the ongoing pandemic, 2021 saw a stabilization in the number of studies related to Google Classroom, signifying that the platform had become an integral part of educational infrastructure in many institutions. Research during this year focused on optimizing its usage and exploring features of Google Classroom that had not been fully utilized. For example, studies demonstrated how the platform enhanced interaction and collaboration between students and teachers through integration with tools like Google Meet and Google Drive, which significantly supported online learning (Palmares et al., 2023).

Additionally, data security became a critical focus. Research emphasized the importance of privacy protection when managing student and teacher data on cloud-based platforms. Enhancing security measures and building user trust emerged as key steps in optimizing Google Classroom for sustainable digital learning (Alqahtani, 2019).

Evaluation and Reflection (2022–2023)
The decline in the number of studies in 2022 and 2023 may suggest several factors. First, there might be a sense that many fundamental aspects of Google Classroom had already been well understood, leading researchers to shift their focus to new technologies or alternative approaches in educational technology. Second, after widespread and rapid implementation, there could be a phase of evaluation and reflection on how the technology integrates with other teaching methods and its long-term impact on educational outcomes.

Adjustments and Future Prospects (2024)
A further decline in 2024 may indicate that Google Classroom has become deeply integrated into educational practices, making it less compelling as an independent research subject. However, this could also mark the beginning of a new phase where educators and researchers explore innovative ways to extend beyond the platform's standard functions. For instance, integrating emergent technologies like artificial intelligence and machine learning could create more adaptive and responsive learning environments.

Conclusion
Overall, this graph illustrates how classroom technology evolves from initial adoption to becoming an industry standard, and how global crises can accelerate the adoption and research of educational technologies. These trend analyses provide valuable insights for educational stakeholders in planning and adapting teaching strategies for the future.

Figure 2: Results of Methodological Trends in Google Classroom Research

Based on the displayed pie chart, the following is an analysis of research methodology trends related to Google Classroom:

Dominance of Quantitative Methodology

A total of 47.6% of research on Google Classroom employs a quantitative approach. This indicates that most researchers prefer to measure aspects that can be statistically analyzed, such as the effectiveness of Google Classroom, student engagement levels, or its impact on learning outcomes. For instance, a study by Palmares et al. (2023) used a quantitative approach to analyze student engagement with Google Classroom through data mining techniques, yielding significant findings on interaction patterns within the platform.

Quantitative methodology enables researchers to obtain structured and measurable data, allowing for more objective conclusions and broader generalizations. Another study by Huang et al. (2021) supports the importance of this methodology in evaluating student satisfaction and teaching effectiveness by integrating Google Classroom into blended learning methods. This approach is frequently used to explore the relationship between platform features and learning outcomes, such as improved reading and writing skills in online learning contexts (Baharudin & AlJarrah, 2023).

Use of Qualitative Methodology

Research employing qualitative approaches accounts for 28.6% of the total studies. This method is typically used to understand user experiences, perceptions, or perspectives on Google Classroom, such as teachers' and students' opinions on ease of use or challenges in its implementation. Qualitative methodology is essential for gaining in-depth insights that often cannot be captured through quantitative measures.

Mixed Methods Approach

Approximately 23.8% of studies use a mixed-methods approach, combining quantitative and qualitative methods. This approach provides the advantage of merging measurable quantitative data with deeper insights from qualitative data. Mixed methods are often used to provide a more comprehensive perspective, especially in complex educational research, such as studies on technology acceptance among students and teachers.

Implications of Findings

The significant proportion of quantitative approaches suggests that many researchers focus on measurable aspects of Google Classroom usage. However, the considerable share of qualitative and mixed-method approaches reflects the importance of understanding subjective and contextual aspects. Studies employing mixed methods offer a balanced contribution between objective data and in-depth understanding, making it a potentially more adopted methodology trend in the future.

Conclusions and Recommendations

Overall, these methodological trends reflect a diversity of approaches in research on Google Classroom, demonstrating that this topic is flexible enough to be explored from multiple perspectives. Future researchers are encouraged to continue leveraging mixed methods to achieve more holistic results, particularly if the

research aims to provide practical recommendations for the development of digital education.

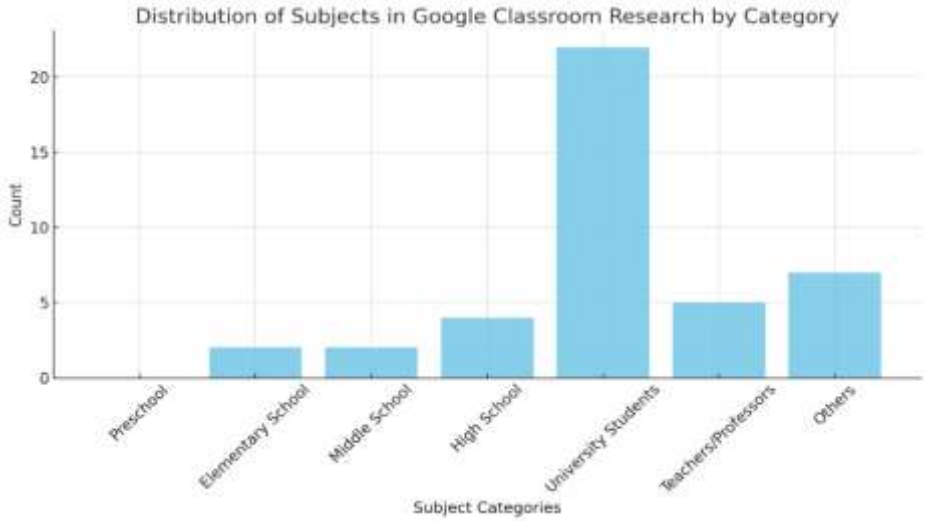

Figure 3: Results of Research Subject Analysis on Google Classroom

The graph illustrating the distribution of research subjects related to Google Classroom, categorized by educational levels and roles, provides valuable insights into how the platform is utilized across various educational settings. Below is a detailed analysis based on the data:

Dominance of University Students

The majority of the reviewed studies focus on university students, totaling 22 studies. This highlights Google Classroom's popularity in higher education. Its use at the university level demonstrates that the platform is deemed effective in supporting independent and collaborative learning, which are critical in higher education. For instance, a study by Huang et al. (2021) found that integrating Google Classroom into blended learning enhanced student satisfaction and academic achievement.

Other research shows that Google Classroom allows students to engage more actively in the learning process through online discussions and collaborative task management. This is supported by studies highlighting features like Stream and Classwork, which help create a more organized and interactive learning environment (Muslem et al., 2024). Moreover, Hussein et al. (2022) emphasized that the continued use of Google Classroom among students is significantly influenced by their perceptions of its ease of use and perceived benefits, which are key factors in sustaining technology adoption.

Teachers and Professors as Research Subjects

Teachers and professors were the focus of five studies, underscoring the importance of Google Classroom as a teaching aid. These studies highlight the platform’s role in professional development and pedagogical effectiveness. For example, Sharpe and Young (2023) demonstrated that Google Classroom is effective in helping

teachers design inclusive learning materials and provide feedback tailored to students' needs.

Other research has found that Google Classroom supports educators in managing classes more efficiently, particularly in task management, feedback delivery, and communication with students. These studies underline how the platform enhances teacher-student interaction and fosters a more interactive learning experience (Muslem et al., 2024). Through its integration, educators have greater opportunities for innovation in teaching and can better facilitate technology-based learning (Oluyinka & Cusipag, 2021).

Focus on High School Students

Research involving high school students, accounting for four studies, highlights the importance of Google Classroom in supporting the transition to digital learning. At this level, the platform is used to promote independent and collaborative learning, essential for preparing students for higher education.

Research on Middle and Elementary School Students

Although fewer in number, studies involving middle and elementary school students each comprising two studies demonstrate a growing interest in applying educational technology at earlier stages of formal learning. These studies aim to identify effective strategies to support teaching and learning processes in foundational education.

Other Categories and Early Childhood Education (ECE)

The absence of research involving Early Childhood Education (ECE) and the existence of seven studies categorized as "Other" highlight opportunities for further exploration of Google Classroom's usage outside traditional formal education settings.

Conclusion

This analysis concludes that Google Classroom plays a key role in supporting education across various levels, particularly in universities. However, the findings also highlight the need for further research to deepen the understanding of how to optimally use the platform in lower educational levels and non-traditional educational groups. Ensuring that all segments of society can benefit from educational technology remains a priority.

Figure 4: Results of Google Classroom's Contribution to Learning Effectiveness Analysis

Based on the displayed pie chart, the following is an analysis of Google Classroom's contribution to learning effectiveness:

Effectiveness as the Primary Contribution (38.1%)
Google Classroom's greatest contribution lies in its effectiveness in learning. This includes the platform's ability to improve student outcomes, enhance teaching efficiency, and simplify the management of learning materials. The high percentage indicates that Google Classroom is regarded as a tool capable of accelerating and streamlining the learning process, particularly in online environments.

For example, in a study involving the use of Google Classroom, there was a significant increase in students' academic performance, with achievement levels rising from 44% to 94% after its implementation (Huang et al.).

Sustainability as a Key Focus (28.6%)
Approximately 28.6% of the studies highlight Google Classroom's contribution to the sustainability of the learning process, such as providing access to materials anytime and anywhere, as well as supporting long-term learning. This is highly relevant in the context of digital learning, which requires high flexibility to meet the diverse needs of students and educators.

Google Classroom offers "easy setup and convenient use." Teachers can organize multiple classes simultaneously, plan lessons, and invite other teachers to collaborate. The service allows for collaborative teaching, where up to 20 teachers can join a class. Additionally, "Google Classroom enables teachers and students to interact via private messages, providing 24-hour access to learning materials as soon as they are published or according to the class schedule (Varianytsia et al., 2023).

User Acceptance (19.0%)
The user acceptance aspect, encompassing both students and teachers, accounts for 19.0% of the contributions. This includes ease of use (user-friendly interface), adaptability to technology, and user satisfaction with Google Classroom. The high acceptance level is an indicator that Google Classroom effectively meets the needs of its users in online learning environments.

Google Classroom is considered easy to use by students, reflecting a high level of acceptance of this technology. This indicates its intuitive accessibility and functionality in supporting the learning process (Xhafaj et al., 2021). Additionally, Google Classroom fosters engagement and user satisfaction through its user-friendly interface and efficient integration with other tools such as Google Docs and Google Drive, which significantly influence user acceptance (Al-Yahyai et al., 2023).

Collaboration as the Lowest Contribution (14.3%)

Collaboration, whether among students or between students and teachers, accounts for 14.3% of the contributions. This includes Google Classroom's ability to support teamwork, material sharing, and interactive communication. Although the percentage is lower, this aspect remains important in enhancing interaction and student engagement in the learning process.

Figure 5: Results of Key Recommendations from Google Classroom Research

Based on the main recommendation chart derived from research on Google Classroom, here is a detailed analysis:

Training as the Primary Recommendation (18 Studies)

The majority of studies emphasize the importance of training for Google Classroom users, including both teachers and students. This reflects that technical skills and knowledge play a vital role in maximizing the platform's potential. These recommendations may include training on utilizing Google Classroom features, strategies for effective implementation in learning, and approaches to overcome technical challenges.

Interactive Features as a Key Focus (14 Studies)

A total of 14 studies recommend the development of interactive features in Google Classroom. This highlights the need to enhance user engagement through more collaborative features, such as live discussions, integration of interactive media, or

gamification. Interactive features can help boost student motivation and encourage more active participation in the learning process.

Technological Development (10 Studies)
Technological development is recommended in 10 studies, including suggestions to improve the platform's stability, accessibility, and compatibility. This also reflects the need for continuous innovation, such as integrating artificial intelligence technologies or enhancing user experiences to make them more personalized.

Implications and Conclusions
The chart shows that training is the primary recommendation, underscoring that the successful implementation of Google Classroom heavily relies on users' ability to understand and utilize the platform optimally. The development of interactive features and technology also remains a priority, indicating the ongoing need to enhance user experience and support the sustainability of digital learning. For future implementation, a combination of these three recommendations will be a strategic step to ensure Google Classroom remains relevant and effective in supporting education in the digital era.

CONCLUSION

This study provides a comprehensive overview of research trends on Google Classroom, including the methodologies employed, research subjects, effectiveness, and resulting recommendations. The key findings from this analysis can be summarized as follows (1) Research Trends, Google Classroom has seen a significant increase in research, particularly during the COVID-19 pandemic (2020). This surge reflects the platform's importance in supporting online learning across various educational levels, from primary schools to higher education. The stabilization in the number of studies in subsequent years indicates that Google Classroom has become an integral part of the digital education ecosystem. (2) Dominance of Quantitative Methodology, Most studies utilize quantitative methodologies, enabling measurable analysis of the effectiveness and impact of Google Classroom on learning. This approach provides robust generalizations, though qualitative and mixed-method approaches also highlight the importance of in-depth understanding of user experiences. (3) Research Subjects, University students are the primary focus of the studies, indicating Google Classroom's popularity in higher education. The platform is deemed effective in supporting independent and collaborative learning. Additionally, studies involving teachers and professors emphasize the platform's role in enhancing professionalism and pedagogical efficiency. (4) Effectiveness of Google Classroom, The platform has been proven to improve learning effectiveness, such as learning outcomes, student engagement, and teaching efficiency. However, this success heavily depends on the availability of training, technological infrastructure, and user acceptance. (5) Key Recommendations, Research recommends intensive training for users, the development of interactive features, and technological improvements as strategic steps to maximize the benefits of Google Classroom. These measures are crucial to ensure that the platform remains relevant and effective in supporting digital education in the future.

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