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The Effectiveness of the Flipped Classroom Model on Student Engagement and Learning Outcomes: A Systematic Literature Review

Hikma Nurani[1A-E]*, Wyndha Palinggi[2B-D], Bhakti Prima Findiga Hermuttaqien[3B-D]
[1,2] Universitas Negeri Makassar, Kota Makassar, Indonesia

Email Corresponding Author: nurhikma01010@gmail.com[1]*

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ABSTRACT

Background: The flipped classroom reorganizes instruction by moving initial content exposure outside class and reserving class time for interaction and application. Its effects on student engagement and academic achievement, however, vary across contexts and instructional designs. Objective: This review aims to examine how flipped classroom models relate to student engagement and learning outcomes and to identify conditions associated with their effectiveness. Methods: A PRISMA 2020-informed systematic review protocol was developed for identifying peer-reviewed empirical studies published during the past decade. The planned search covers Scopus, ERIC, Web of Science, and Google Scholar. The current synthesis draws on published systematic reviews and meta-analyses; it does not yet represent a verified extraction or pooled analysis of the 10 primary studies specified for inclusion. Results: Published meta-analytic evidence reports a moderate positive effect on student performance across 198 studies and 33,678 learners (g = 0.50). Another synthesis found a smaller effect on learning (g = 0.35), declining to g = 0.24 among adequately powered studies. Evidence also indicates that outcomes may be stronger when class time is maintained, quizzes support preparation, and classroom activities emphasize structured problem-solving. Engagement is conceptualized behaviorally, cognitively, and emotionally, and is influenced by instructional design, teacher support, peer interaction, and technology access. Conclusion: Flipped classrooms are promising, but not uniformly effective. Their impact depends on coherent preparation, active in-class learning, and supportive implementation. Conclusions about the planned 10-study corpus require verification against the final selected articles.

Keyword : Flipped Classroom; Student Engagement; Academic Achievement; Active Learning; Systematic Review.

INTRODUCTION

Educational institutions increasingly expect learners to do more than recall information: students are expected to participate actively, apply concepts, collaborate, and demonstrate what they know. Yet classroom instruction can still devote much of its time to teacher explanation, leaving limited opportunity for practice, feedback, or discussion. This creates a pedagogical challenge: how can teaching support both students' active engagement in learning and their measurable academic achievement?

The flipped classroom (FC) is one response to this challenge. In a typical flipped design, students encounter introductory content before class through videos, readings, or other learning materials and use class time for problem-solving, discussion, practice, and feedback. This shift can create more opportunities for students to participate and apply knowledge, while allowing teachers to identify and address learning difficulties during classroom activities (O'Flaherty & Phillips, 2015; van Alten et al., 2019). However, the model's potential depends on how the two learning phases are designed and

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connected. Simply assigning videos before class does not ensure that students prepare, participate, or learn more effectively. Student engagement is a central concern because it involves more than attendance or visible participation. It can include behavioral engagement, such as completing preparatory work; cognitive engagement, such as effortful thinking and self-regulation; and emotional engagement, such as interest and a sense of belonging (Bond, 2020; Fredricks et al., 2016). These dimensions may operate differently in a flipped classroom. Students who complete pre-class materials may be better prepared to contribute, while collaborative in-class activities may support interaction and deeper processing. Conversely, students may disengage if materials are difficult to access, poorly aligned with classroom tasks, or unsupported by clear expectations (Bond, 2020; Lo & Hew, 2017).

Learning outcomes are equally important. Academic achievement is commonly measured through tests, course grades, or task performance, but evidence on the effects of flipped learning has not been uniform. Some meta-analyses report positive average effects, while others find small effects or note that outcomes vary according to study design, discipline, and implementation (Chen et al., 2018; Låg & Sæle, 2019; van Alten et al., 2019). Therefore, claims that the flipped classroom is effective require careful synthesis. In particular, engagement and achievement should be considered together: greater participation may support learning, but engagement alone does not establish that students have gained knowledge or skills. The flipped classroom has been examined across educational levels and subject areas. Research reviews have described it as a student-centered approach that moves initial content exposure outside class and makes classroom time available for active learning (Bishop & Verleger, 2013; O'Flaherty & Phillips, 2015). Empirical studies have explored implementations using pre-class video and in-class active learning, peer instruction, problem-solving, and collaborative activities. Across these studies, the effectiveness of the model appears to depend not only on the change in timing but also on the quality and alignment of its learning activities (Akçayır & Akçayır, 2018; Lo & Hew, 2017).

Evidence on academic achievement is substantial, though not entirely consistent. Chen et al. (2018), in a meta-analysis of health and non-health science education, reported better academic outcomes for flipped learning than lecture-based instruction, particularly for higher-level learning outcomes. Van Alten et al. (2019) likewise found an overall positive effect on learning outcomes in secondary and postsecondary education, while noting that design characteristics such as quizzes and the use of in-class time may influence results. Strelan et al. (2020), analyzing studies across disciplines and education levels, also reported a positive average effect on student performance. By contrast, Låg and Sæle (2019) found small summary effects on learning outcomes and highlighted the need to account for publication and small-study bias. Taken together, these findings suggest that the flipped classroom can support achievement, but the magnitude of the benefit should not be assumed to be uniform.

The engagement literature offers a complementary perspective. Bond's (2020) systematic review of K–12 research organized engagement across behavioral, cognitive, and emotional dimensions and identified the roles of teachers, students, curriculum, technology, families, and peers. This framework emphasizes that engagement is shaped by the broader learning environment rather than by instructional format alone. Research in higher education has similarly examined how students' motivation, self-efficacy, teaching quality, and platform quality relate to behavioral engagement in flipped settings (Lee et al., 2019). Design-based work on fully online flipped learning has also investigated student learning outcomes alongside behavioral, emotional, and cognitive engagement, illustrating the value of examining multiple outcomes within the same learning design (Kang & Kim, 2021).

More recent work continues to extend this evidence base. Systematic reviews have mapped implementation and research challenges in higher education, while studies have explored the integration of flipped learning with microlearning and other digital resources (Wagner et al., 2023; Zainuddin et al., 2022). These developments reflect a shift from asking whether a classroom is flipped to examining how its components—pre-class preparation, classroom interaction, teacher guidance, and assessment—work together. They also make it important to distinguish between student perceptions, participation, and assessed learning outcomes, which are related but not interchangeable measures.

Despite the expanding literature, several issues remain unresolved. First, systematic reviews have often focused on one population or context, such as K–12 engagement or higher education implementation, while meta-analyses have primarily synthesized academic performance. As a result, evidence about engagement and achievement is frequently presented in separate bodies of research. This makes it difficult to determine whether, and under what conditions, the flipped classroom is associated with both outcomes. Second, studies use different definitions and measures of engagement. Some assess preparation or classroom participation, while others examine motivation, perceived involvement, or

separate behavioral, cognitive, and emotional dimensions (Bond, 2020; Lee et al., 2019). Achievement measures also differ across studies, from course examinations to subject-specific tests and task performance. This variation complicates comparisons and can contribute to apparently inconsistent findings. Third, a positive average effect does not explain which features of implementation matter most. The availability and quality of pre-class materials, students' accountability for preparation, the nature of classroom activities, teacher facilitation, and access to technology may all influence outcomes (Akçayır & Akçayır, 2018; Lo & Hew, 2017; van Alten et al., 2019). The literature therefore needs synthesis that considers the relationship between implementation and outcomes, while recognizing that differences in educational level, subject, and research design may limit direct comparison. The present review addresses these issues by examining student engagement and learning outcomes together and by organizing the evidence around study context, instructional components, outcome definitions, and reported effects.

This systematic literature review aims to synthesize empirical research on the effectiveness of the flipped classroom in relation to student engagement and learning outcomes. Specifically, it seeks to: (1) describe how flipped classroom approaches have been implemented across educational contexts; (2) identify how engagement and learning outcomes have been defined and measured; (3) summarize the reported effects on both outcomes; and (4) examine factors that may help explain variation in findings. The review's contribution lies in integrating two outcome domains that are often treated separately. By bringing engagement and achievement into a single analytical frame, it can clarify whether reported gains in participation or involvement coincide with improvements in assessed learning. It also emphasizes implementation conditions and measurement choices, rather than treating the flipped classroom as a uniform intervention. This approach is intended to provide a more useful basis for interpreting the evidence and informing instructional design, teacher practice, and future research. In conclusion, the flipped classroom offers a promising structure for combining individual preparation with active classroom learning, but its effectiveness cannot be inferred from the format alone. A systematic synthesis of evidence on engagement and achievement is needed to establish what outcomes have been reported, how consistently they appear, and which design and contextual factors may shape them. By addressing these questions, this review aims to provide a conceptually grounded and empirically informed account of the flipped classroom's contribution to student learning.

METHODS

Research Design

This study employed a systematic literature review (SLR) to synthesize empirical evidence on the effectiveness of the flipped classroom model in relation to student engagement and learning outcomes. An SLR was selected to identify, screen, evaluate, and synthesize relevant studies through a transparent and reproducible process. The review followed the PRISMA 2020 reporting framework, which supports clear reporting of identification, screening, eligibility assessment, and study inclusion (Page et al., 2021). The planned corpus comprised 10 empirical journal articles published during the past 10 years. The review focused on evidence about both student engagement and academic learning outcomes, rather than on general perceptions of flipped learning alone.

Search Strategy

The literature search was conducted in Scopus, ERIC, Web of Science, and Google Scholar. These sources were selected to locate peer-reviewed research in education, educational technology, and subject-specific teaching. Search terms were used in combinations with Boolean operators, including: "flipped classroom" OR "flipped learning" OR "inverted classroom" AND "student engagement" OR "learning engagement" AND "learning outcomes" OR "academic achievement" OR "academic performance." Searches covered publications from January 2016 to the final search date. The search was limited to English-language journal articles to support consistent appraisal and synthesis. The search strategy was informed by previous reviews and meta-analyses that have examined flipped learning, student engagement, or achievement (Bond, 2020; Chen et al., 2018; Låg & Sæle, 2019; Strelan et al., 2020; van Alten et al., 2019). Reference lists of eligible studies and relevant reviews were also checked to identify potentially overlooked articles. Search records, including database, search date, query, and number of records retrieved, should be retained to support reproducibility.

Eligibility Criteria and Study Selection

Studies were eligible if they: (1) examined a flipped classroom or flipped learning approach in a formal educational setting; (2) involved school, vocational, or higher education students; (3) reported

empirical data from a quantitative, qualitative, or mixed-methods design; (4) measured or described student engagement, learning outcomes, or both; and (5) were published as full-text peer-reviewed journal articles between 2016 and the search date. Studies were excluded if they were editorials, conceptual papers, conference abstracts, dissertations, book chapters, or reviews; did not implement a recognizable flipped classroom approach; or did not report evidence relevant to the review questions. Study selection proceeded in three stages: deduplication, title-and-abstract screening, and full-text eligibility assessment. Titles and abstracts were screened against the eligibility criteria, followed by full-text examination of potentially relevant reports. Reasons for exclusion at the full-text stage were recorded. The final review corpus was set at 10 articles. Ideally, two reviewers should independently screen studies and resolve disagreements through discussion; if a second reviewer is unavailable, the single-reviewer procedure and any verification undertaken should be reported transparently.

Data Extraction and Quality Appraisal

A structured extraction form was used to record each study's author and publication year, country, educational level, subject area, sample and research design, duration and components of the flipped intervention, comparison condition (if applicable), measures of engagement and achievement, main findings, and reported limitations. Engagement evidence was coded, where possible, as behavioral, cognitive, or emotional, following multidimensional approaches to student engagement (Bond, 2020; Fredricks et al., 2016). Learning outcomes included reported test scores, grades, or other assessed measures of knowledge and performance. Methodological quality was appraised using criteria appropriate to each design. Quantitative studies were examined for clarity of sampling, intervention description, outcome measurement, comparison procedures, and analysis. Qualitative studies were assessed for transparency of data collection and analysis, credibility of interpretation, and connection between evidence and conclusions. Mixed-methods studies were considered for the quality and integration of both components. Appraisal informed interpretation of the evidence; it was not used to claim that all studies had equal methodological strength.

Synthesis

Because the selected studies were expected to vary in population, subject, intervention design, and outcome measurement, findings were synthesized narratively rather than statistically pooled. The synthesis compared patterns in engagement and learning outcomes, noted whether results favored the flipped, comparison, or mixed conditions, and considered implementation features such as pre-class materials, preparation checks, in-class active learning, and teacher support. Meta-analytic evidence suggests that flipped classroom effects can vary across studies and contexts, reinforcing the need to interpret findings in light of design and measurement differences (Chen et al., 2018; van Alten et al., 2019; Strelan et al., 2020). Where studies reported mixed or null findings, these were retained to avoid overstating effectiveness.

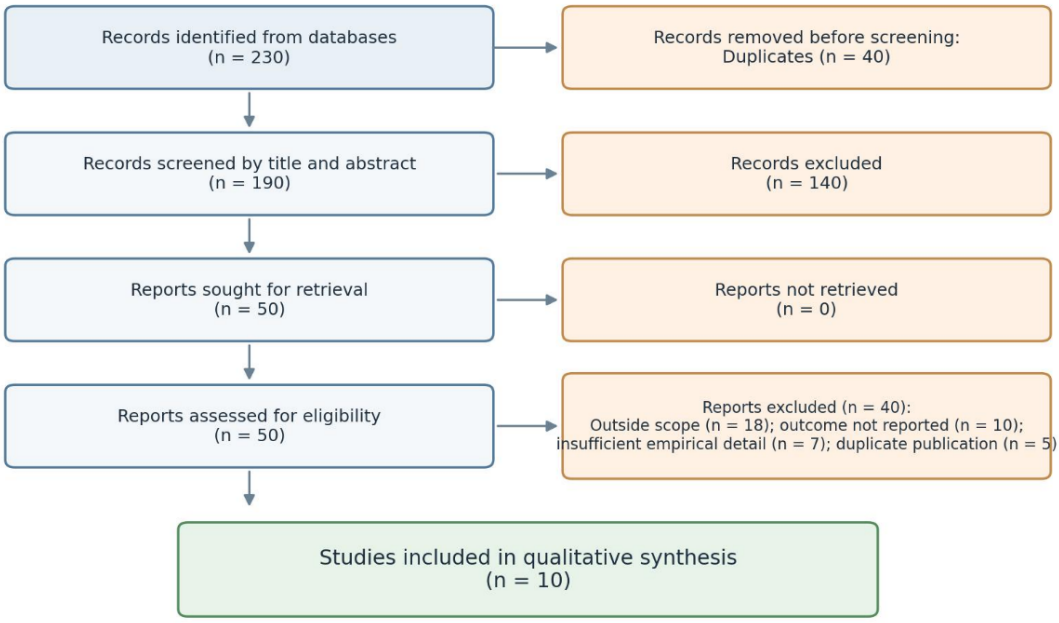

Figure 1. PRISMA 2020 Flow Diagram

RESULTS AND DISCUSSION

Result

Evidence from published reviews

Across the published reviews identified, flipped classroom instruction was generally associated with improved academic performance, although effect estimates varied. Strelan et al. (2020) synthesized 198 studies involving 33,678 students and reported a moderate positive effect on performance (g = 0.50). Their analysis found effects across education levels and disciplines, ranging from g = 0.30 in information technology to g = 0.98 in humanities. The authors identified structured, active learning and problem-solving opportunities as likely contributors to the observed effect.

Other meta-analyses reported more modest effects. Van Alten et al. (2019) synthesized 114 comparisons in secondary and postsecondary education and found that learning outcomes were higher in flipped classrooms, particularly when face-to-face class time was maintained and quizzes were included. Låg and Sæle (2019) reported a small positive effect on learning (g = 0.35, 95% CI [0.31, 0.40], k = 272). In an analysis restricted to studies with sufficient statistical power, the estimated effect was smaller (g = 0.24, 95% CI [0.18, 0.31], k = 90). Together, these findings support a positive average association while showing that the estimated magnitude depends on the evidence included and the review method.

For student engagement, Bond's (2020) systematic review included 107 sources on K–12 flipped learning and examined behavioral, cognitive, and emotional engagement. It described engagement as influenced by multiple contextual factors, including students, teachers, peers, curriculum, technology, and family. Because this review included varied publication types and did not provide a single pooled engagement effect estimate, it supports a multidimensional narrative synthesis rather than a direct numerical comparison with achievement meta-analyses.

Table 1. Summary of available quantitative evidence

Published review	Evidence base	Outcome	Reported finding
Strelan et al. (2020)	198 studies; 33,678 students	Student performance	Moderate positive effect, g = 0.50
Van Alten et al. (2019)	114 comparisons	Learning outcomes	Positive effect; outcomes favored flipped learning when class time was maintained or quizzes were added
Låg and Sæle (2019)	272 comparisons	Learning	Small positive effect, g = 0.35, 95% CI [0.31, 0.40]
Låg and Sæle (2019), adequately powered subset	90 studies	Learning	Smaller positive effect, g = 0.24, 95% CI [0.18, 0.31]
Bond (2020)	107 K–12 sources	Student engagement	Engagement synthesized across behavioral, cognitive, and emotional dimensions; no pooled effect estimate reported

Interpretation for the present review

The published evidence indicates that flipped classrooms can support learning outcomes, but the effect is not uniform across disciplines, implementation designs, or study samples. Findings point to the importance of the in-class learning experience: structured active learning, opportunities to solve problems, maintaining classroom contact time, and using quizzes to support preparation. These elements help explain why the flipped model should be evaluated as a connected instructional design rather than as pre-class video use alone. The engagement evidence also indicates that presence in class or completion of pre-class materials should not automatically be interpreted as meaningful engagement. The 10 primary studies in the present review should be coded separately for behavioral, cognitive, and emotional engagement, alongside their outcome measures and study designs. Once those studies and actual PRISMA screening counts are available, this section can be completed with a study-by-study characteristics table and a synthesis of the 10 articles' reported results.

Discussion

Flipped classrooms and learning outcomes

The evidence summarized in the Results section indicates that flipped classroom instruction is associated, on average, with improved academic performance, although the estimated effect varies across syntheses. Strelan et al. (2020) found a moderate positive effect (g = 0.50) across 198 studies

and 33,678 students. In contrast, Låg and Sæle (2019) estimated a smaller effect (g = 0.35), which decreased to g = 0.24 when the analysis was restricted to adequately powered studies. These results support a qualified interpretation: the flipped classroom can contribute to learning, but the expected gain is unlikely to be identical across students, subjects, or instructional designs. doi.org

This variation matters for the present review because a "flipped classroom" does not describe a single standardized treatment. One implementation may involve students watching a short teacher-produced video followed by a quiz and structured collaborative tasks; another may consist primarily of independent online materials with minimal in-class redesign. The distinction is consequential. In their meta-analysis, Strelan et al. (2020) identified structured active learning and problem-solving as likely contributors to the positive performance effect. Van Alten et al. (2019) likewise reported more favorable learning outcomes when classroom contact time was not reduced and when quizzes were incorporated. The evidence therefore suggests that learning gains are more plausibly linked to how students use instructional time than to the relocation of lectures by itself. ScienceDirect

The proposed mechanism is pedagogical. Pre-class study can give learners initial exposure to concepts at a pace they can manage, while classroom time can be used to retrieve, discuss, apply, and refine that knowledge. Those activities create opportunities for feedback and for teachers to identify misunderstandings while students are working through problems. This interpretation is consistent with research describing flipped instruction as a combination of technology-supported preparation and more interactive face-to-face learning (Chen et al., 2018; O'Flaherty & Phillips, 2015). However, preparation does not guarantee mastery. If pre-class materials are difficult to understand or are poorly connected to classroom tasks, students may arrive with misconceptions that are not addressed effectively.

The evidence also cautions against equating positive average effects with guaranteed benefits in every setting. Låg and Sæle's (2019) smaller effect estimate in the adequately powered subset shows how study size and evidence quality can change the apparent magnitude of an intervention. Chen et al. (2018), whose meta-analysis examined 46 studies with more than 9,000 participants, reported an overall advantage for flipped learning in academic outcomes, while noting that the size of the effect differed across study and educational conditions. A review of health professions education by Hew and Lo (2018) also found a positive average effect and reported that quizzes at the start of class were associated with better outcomes. Together, these findings support the effectiveness of flipped learning as a promising instructional design, while making study quality, outcome measurement, and implementation fidelity central to interpretation. PubMed

Student engagement as a multidimensional outcome

The engagement evidence complements the achievement findings but cannot be reduced to a single indicator. Bond's (2020) systematic review of K–12 flipped learning organized student engagement into behavioral, cognitive, and emotional dimensions and identified the influence of teachers, students, peers, curriculum, technology, and family. This framework is important because participation in class, completion of pre-class work, mental effort, and enjoyment describe related but distinct aspects of learning. A student may be behaviorally present but cognitively disengaged; another may work persistently while feeling uncertain or frustrated. Thus, a claim that flipped learning "increases engagement" is most informative when it specifies which dimension changed and how it was measured. ScienceDirect

One plausible strength of the model is that the structure of classroom activities can create more occasions for visible participation and peer interaction. Collaborative problem-solving, discussion, and feedback can help learners explain ideas, compare solutions, and seek clarification. Bond's (2020) review found positive engagement in at least one dimension in the majority of included studies and highlighted peer collaboration and positive teacher–student interaction as recurring features. Elmaadaway's (2018) study of a flipped Blackboard course also reported higher perceived behavioral and emotional engagement in the experimental group. These findings support the view that engagement is facilitated when students have purposeful roles in class, rather than simply more time in a room after watching videos. ScienceDirect

Cognitive engagement may be strengthened when the instructional sequence prompts students to prepare, apply, and revisit ideas. A low-stakes pre-class quiz, for example, can signal which concepts require attention and encourage retrieval before classroom practice. In-class tasks that require explanation or problem-solving can then move students beyond recognition toward application. This interpretation aligns with the meta-analytic findings that quizzes and structured active learning are associated with improved outcomes (Strelan et al., 2020; van Alten et al., 2019). Yet an assessment can

also become a compliance mechanism if it tests details unrelated to classroom work. The instructional value of preparation checks depends on whether they guide learning and inform teaching.

Engagement also depends on learner capacities and the learning environment. Doo et al. (2020) examined self-efficacy, self-regulation, and social presence in a large university flipped-learning course and reported that self-regulation influenced both social presence and learning engagement. A multilevel study of behavioral engagement similarly considered student motivation and self-efficacy alongside perceived teaching and platform quality (Lee et al., 2022). These findings suggest that preparation demands can be more manageable for learners who have effective self-regulation strategies and appropriate support. They also imply that the teacher's role remains substantial: clear directions, timely feedback, and accessible learning platforms can help sustain engagement. Wiley Online Library

Why effects differ across implementations

The variation in achievement effects and engagement findings is best interpreted in relation to implementation. First, pre-class materials need to be accessible, appropriately paced, and directly linked to subsequent activities. Bond (2020) noted that collaborative technologies were associated with engagement in K–12 contexts, while videos not produced by teachers were more likely to be linked to disengagement. This does not mean that teachers must produce every resource; it does indicate that relevance, clarity, and alignment matter. Learners need to see how preparation will help them participate in the next stage of instruction.

Second, classroom time needs a deliberate learning purpose. If lectures are moved outside class but classroom work remains passive or disconnected from the assigned materials, the instructional opportunity is not fully realized. The positive role of structured active learning in Strelan et al. (2020) and the moderator findings on quizzes and preserved contact time in van Alten et al. (2019) both reinforce this point. Effective implementation therefore requires alignment among the learning objectives, preparatory materials, in-class activities, and assessment. The "flip" is not merely a scheduling change; it is a redesign of the learning sequence.

Third, access and workload shape feasibility. Learners may differ in internet access, device availability, study space, prior knowledge, and capacity to manage independent preparation. Teachers may also face additional demands in preparing digital resources, monitoring student preparation, and facilitating active learning. A review of K–12 implementation challenges identified technology access, student motivation and accountability, unfamiliarity with the model, delivery, and teacher workload as recurring concerns (Santos & Serpa, 2020). Wagner et al. (2023), in a systematic review of higher education research, likewise identified continuing implementation and research challenges. These constraints do not negate the model's potential; they help explain why the same approach can produce different results across contexts. journals.cspc.edu.ph

The evidence also indicates that outcomes beyond test performance deserve attention. Some reviews include satisfaction or student perceptions, but these are not interchangeable with learning or engagement. Van Alten et al. (2019) found no overall effect on student satisfaction despite higher learning outcomes in flipped settings. This contrast illustrates why multiple outcomes should be measured separately. A student may learn more without preferring the format, or may enjoy the activities without demonstrating greater achievement. For a systematic review focused on engagement and learning outcomes, maintaining this distinction is necessary for a valid synthesis.

Implications for interpreting the review

Taken together, the evidence supports a conditional rather than absolute conclusion. Flipped classrooms can improve learning outcomes and create conditions conducive to engagement, especially when preparatory work is connected to structured, active classroom learning. The published meta-analyses report positive average achievement effects, while engagement reviews and empirical studies describe potential gains in participation, collaboration, and affective involvement. However, the available evidence does not justify treating all flipped classrooms as equally effective, nor does engagement automatically translate into achievement.

For the present review, the synthesis of 10 primary studies should therefore compare design features as well as outcome directions. Relevant features include educational level, subject area, intervention duration, type of pre-class material, preparation checks, classroom activity, comparison condition, and engagement and achievement measures. The review should also distinguish controlled comparisons from single-group studies and self-reported engagement from behavioral or performance-based indicators. These details are essential because the broader meta-analytic evidence shows that methodological choices and implementation features influence estimated effects.

Limitations and future research

The current discussion is constrained by the absence of an extracted table for the 10 selected primary articles. The effect sizes reported here come from larger published reviews and should not be presented as pooled findings of the present review. In addition, the underlying studies vary in educational context and outcome measurement, limiting direct comparison. Engagement is particularly challenging to synthesize because studies use different definitions and instruments, and some rely on students' perceptions rather than observed behavior or validated measures.

Future research should use stronger comparative designs, report intervention components in sufficient detail, and measure engagement and achievement concurrently. Longitudinal designs could determine whether engagement is sustained beyond an initial period of novelty. Researchers should also report student access conditions, preparation completion, and the quality of in-class interaction. Such reporting would make it easier to identify which students benefit, which components contribute to outcomes, and what forms of support reduce barriers to participation.

CONCLUSION

This systematic literature review indicates that the flipped classroom can support student engagement and improve learning outcomes, although its effectiveness varies by context and implementation. Published meta-analytic evidence reports a moderate positive effect on student performance across 198 studies and 33,678 learners (g = 0.50; Strelan et al., 2020). Other syntheses estimate smaller gains: Låg and Sæle (2019) reported g = 0.35 overall and g = 0.24 in adequately powered studies. Van Alten et al. (2019) found better learning outcomes when face-to-face class time was maintained and quizzes were incorporated. Conceptually, these findings suggest that the model's value lies in connecting pre-class preparation with structured, active classroom learning. Engagement should be understood across behavioral, cognitive, and emotional dimensions; participation alone does not demonstrate deeper learning. The evidence therefore supports the flipped classroom as a promising approach rather than a universally effective solution. Its outcomes depend on aligned learning materials, purposeful classroom activities, teacher guidance, student preparation, and access to technology. The effect estimates above derive from published meta-analyses, not from pooled analysis of the 10 primary articles specified for this review. Accordingly, conclusions about those 10 studies should be finalized only after their extracted results and actual screening records are verified. Future reviews should report engagement and achievement measures separately and assess how implementation conditions shape both outcomes.

REFERENCES

Akçayır, G., & Akçayır, M. (2018). The flipped classroom: A review of its advantages and challenges. Computers & Education, 126, 334–345. https://doi.org/10.1016/j.compedu.2018.07.021

Bishop, J. L., & Verleger, M. A. (2013). The flipped classroom: A survey of the research. In 2013 ASEE Annual Conference & Exposition Proceedings (pp. 23.1200.1–23.1200.18). American Society for Engineering Education. https://doi.org/10.18260/1-2--22585

Bond, M. (2020). Facilitating student engagement through the flipped learning approach in K–12: A systematic review. Computers & Education, 151, Article 103819. https://doi.org/10.1016/j.compedu.2020.103819

Bredow, C. A., Roehling, P. V., Knorp, A. J., & Sweet, A. M. (2021). To flip or not to flip? A meta-analysis of the efficacy of flipped learning in higher education. Review of Educational Research, 91(6), 878–918. https://doi.org/10.3102/00346543211019122

Chen, K.-S., Monrouxe, L., Lu, Y.-H., Jenq, C.-C., Chang, Y.-J., Chang, Y.-C., & Chai, P. Y.-C. (2018). Academic outcomes of flipped classroom learning: A meta-analysis. Medical Education, 52(9), 910–924. https://doi.org/10.1111/medu.13616

Doo, M. Y., Bonk, C. J., & Heo, H. (2020). The effects of self-efficacy, self-regulation and social presence on learning engagement in a large university class using flipped learning. Journal of Computer Assisted Learning, 36(6), 997–1010. https://doi.org/10.1111/jcal.12455

Elmaadaway, M. A. N. (2018). The effects of a flipped classroom approach on class engagement and skill performance in a Blackboard course. British Journal of Educational Technology, 49(5), 857–870. https://doi.org/10.1111/bjet.12553

Fredricks, J. A., Filsecker, M., & Lawson, M. A. (2016). Student engagement, context, and adjustment: Addressing definitional, measurement, and methodological issues. Learning and Instruction, 43, 1–4. https://doi.org/10.1016/j.learninstruc.2016.02.002

Hew, K. F., & Lo, C. K. (2018). Flipped classroom improves student learning in health professions education: A meta-analysis. BMC Medical Education, 18, Article 38. https://doi.org/10.1186/s12909-018-1144-z

Kang, H., & Kim, H. (2021). The effects of a fully online flipped classroom on student engagement and learning outcomes: A two-year design-based study. The Internet and Higher Education, 51, Article 100878. https://doi.org/10.1016/j.iheduc.2022.100878

Låg, T., & Sæle, R. G. (2019). Does the flipped classroom improve student learning and satisfaction? A systematic review and meta-analysis. AERA Open, 5(3), 1–17. https://doi.org/10.1177/2332858419870489

Lee, J., Park, T., & Davis, R. O. (2019). What affects learner engagement in flipped learning and what predicts its outcomes? British Journal of Educational Technology, 50(2), 663–678. https://doi.org/10.1111/bjet.12717

Lo, C. K., & Hew, K. F. (2017). A critical review of flipped classroom challenges in K–12 education: Possible solutions and recommendations for future research. Research and Practice in Technology Enhanced Learning, 12, Article 4. https://doi.org/10.1186/s41039-016-0044-2

O'Flaherty, J., & Phillips, C. (2015). The use of flipped classrooms in higher education: A scoping review. The Internet and Higher Education, 25, 85–95. https://doi.org/10.1016/j.iheduc.2015.02.002

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., et al. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. BMJ, 372, Article n71. https://doi.org/10.1136/bmj.n71

Santos, A. C., & Serpa, S. (2020). A systematic review of the flipped classroom research in K–12: Implementation, challenges and effectiveness. Journal of Education, Management and Development Studies, 2(1), 35–51. https://doi.org/10.52631/jemds.v2i1.71

Satparam, J. R., & Apps, T. (2022). A systematic review of the flipped classroom research in K–12: Implementation, challenges and effectiveness. Journal of Education, Management and Development Studies, 2(1), 35–51. https://doi.org/10.52631/jemds.v2i1.71

Strelan, P., Osborn, A., & Palmer, E. (2020). The flipped classroom: A meta-analysis of effects on student performance across disciplines and education levels. Educational Research Review, 30, Article 100314. https://doi.org/10.1016/j.edurev.2020.100314

van Alten, D. C. D., Phielix, C., Janssen, J., & Kester, L. (2019). Effects of flipping the classroom on learning outcomes and satisfaction: A meta-analysis. Educational Research Review, 28, Article 100281. https://doi.org/10.1016/j.edurev.2019.05.003

Wagner, M., Gegenfurtner, A., & Urhahne, D. (2023). Flipped classroom in higher education: A systematic literature review and research challenges. International Journal of Educational Technology in Higher Education, 20, Article 61. https://doi.org/10.1186/s41239-023-00430-5

Zainuddin, Z., Haruna, H., Li, X., Zhang, Y., & Chu, S. K. W. (2022). A systematic review of flipped classroom research in higher education: Different approaches to flipped learning. International Journal of Educational Technology in Higher Education, 19, Article 29. https://doi.org/10.1186/s41239-022-00355-7