FLIPPED CLASSROOM AND ACADEMIC ACHIEVEMENT: EVALUATING STUDENT PERFORMANCE OUTCOMES

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ABSTRACT
This study evaluates the effectiveness of the flipped classroom (FC) model in enhancing English language learning outcomes among second-year primary education majors compared to traditional classroom (TC) instruction. Using a mixed-methods approach, the research analyzed term-end results and Telegram-administered surveys assessing student perceptions, engagement, and performance. Quantitative data revealed statistically significant improvements in the FC group, with mean scores increasing from 62.00 to 68.00, while the TC group showed marginal gains (39.90 to 41.52). Effect sizes grew over time, suggesting cumulative learning benefits. The FC approach also reduced outcome variability, evidenced by lower standard deviation and coefficient of variation values. Qualitative findings highlighted enhanced speaking confidence, vocabulary retention, and comprehension, with a strong student preference for continuing the model. However, successful implementation requires targeted support, including time-management workshops and structured pre-class guidance. The results demonstrate FC's potential as a transformative pedagogical tool in language education, though careful planning and iterative evaluation remain essential to address variability in student adaptation. This study contributes to FC literature by addressing gaps in longitudinal analysis and discipline-specific applications, offering actionable insights for educators in primary education contexts.

KEYWORDS: flipped classroom, English language learning, academic performance, blended learning, pedagogical innovation

INTRODUCTION
The flipped classroom (FC) is a student-centered pedagogical approach that inverts traditional teaching methods (Algayres & Triantafyllou, 2019). Building on this foundation, the model consists of three stages: pre-class preparation, in-class application, and post-class work (Nwosisi et al., 2016). This structure allows students to engage with basic concepts before class, transforming class time into an opportunity for active learning and knowledge application (Mostafa & Elsamanoudy, 2018).

Expanding on these benefits, the FC approach promotes self-directed learning, deeper understanding, and engagement (Roehl et al., 2017). Central to this model are two core principles: active learning, which emphasizes student participation in interactive activities during class (Mostafa & Elsamanoudy, 2018), and pre-class preparation, where students independently review materials beforehand (Lewis et al., 2017). Importantly, technology serves as a key enabler of the FC process, supporting both out-of-class learning and in-class activities (Rahman et al., 2015). While student perceptions of FC are generally positive, it's worth noting that ongoing refinement of the approach remains necessary to optimize learning outcomes (Lewis et al., 2017).

LITERATURE REVIEW

Recent studies have highlighted the potential benefits of flipped classrooms in higher education, particularly for improving academic performance and fostering higher-level thinking skills. Specifically, research has shown that flipped classrooms can lead to increased semester grades, better performance on analytical questions, and improved long-term retention of knowledge (Torres-Martín et al., 2022). Notably, these benefits appear most pronounced among lower-performing students, who tend to outperform their counterparts in traditional classrooms (Day, 2018). However, challenges persist, such as motivating students to engage with pre-class materials (Zainuddin et al., 2019). While these findings are promising, there remains a need for more rigorous assessment of flipped classrooms' impact on student learning gains throughout an entire semester, comparing them with control groups in traditional lecture-based formats (Fogarty, 2017). Future research should focus on identifying the specific aspects of flipped classrooms that contribute to improved learning outcomes and how these can be leveraged in other undergraduate courses.

Building on this foundation, the flipped classroom model has gained traction in higher education as a student-centered approach, though its theoretical foundations have been questioned (Koh, 2019). This model aligns with Bloom's taxonomy, promoting higher-order thinking through problem-solving and self-directed learning (Lin, 2022). It emphasizes personalization, collaboration, and self-direction, with positive learning outcomes observed in cases supporting collaborative learning and performance review (Koh, 2019). The flipped classroom's theoretical basis includes Benjamin Bloom's Mastery Learning, which emphasizes core ideas, processing procedures, and evaluation (Deng, 2019). The model can also be connected to Gardner's multiple intelligences theory, offering opportunities for active and differentiated learning experiences (Campión, 2020).

In addition to its theoretical grounding, recent studies have explored the impact of flipped classrooms on academic performance and learning outcomes. While FC implementation has shown positive effects on student engagement, motivation, and self-directed learning skills (Zainuddin et al., 2019), there is a lack of rigorous, longitudinal research confirming its effectiveness (Bernard, 2015). Some studies indicate that FC can improve academic performance to a limited extent and make learning more enjoyable (Foldnes, 2016). However, a longitudinal study by Torres-Martín et al. (2022) found statistically significant improvements in academic performance using FC methodology compared to traditional teaching. The success of FC in higher education depends on careful planning, implementation, and evaluation (Mupita et al., 2020). Despite these findings, there remains a need for more robust, long-term studies to fully understand the impact of FC on academic performance and to address the current gaps in research (Bernard, 2015; Zainuddin et al., 2019).

Moreover, the flipped classroom approach has shown significant potential in enhancing higher-order thinking skills (HOTS) among students. Multiple studies have demonstrated its effectiveness in improving problem-solving, critical thinking, and creative thinking abilities (Alsowat, 2016; Suprapti et al., 2021). This instructional strategy involves students engaging with lecture materials outside of class, allowing for more interactive and collaborative activities during class time (Priyaadharshini & Sundaram, 2018). Research has found that flipped learning not only enhances HOTS but also increases student engagement and satisfaction (Alsowat, 2016). The use

of content videos in flipped learning has been particularly effective in developing HOTS (Suprapti et al., 2021). Furthermore, students generally perceive the flipped classroom approach positively, appreciating the opportunity for deeper discussions, debates, presentations, and project-based learning (Kusmiyati & Martani, 2023). These findings suggest that the flipped classroom model is well-suited for fostering HOTS in 21st-century education.

Expanding on this, meta-analyses on flipped classroom efficacy reveal positive effects across various educational contexts. The approach significantly improves student achievement in secondary education compared to traditional instruction (Wagner et al., 2020). At the university level, flipped classrooms enhance academic performance, although potential publication bias favoring the method is noted (Martínez et al., 2018). A comprehensive meta-analysis across disciplines and education levels found a moderate positive effect on student performance, with humanities showing the strongest benefit. The primary factor contributing to this effect is the opportunity for structured, active learning and problem-solving (Strelan et al., 2020). Additionally, flipped classrooms can enhance students' self-efficacy, particularly in technical subjects and with short-duration interventions. However, careful course design is essential to optimize effectiveness, and results should be interpreted cautiously due to study limitations and heterogeneity (Sun et al., 2023).

Despite these promising findings, research on the flipped classroom model has produced mixed results. While some studies report improved student performance (Burak et al., 2017; Akçayir & Akçayır, 2018), others find no significant difference in quiz scores between traditional and flipped approaches (Hotle & Garrow, 2016). Zuber (2016) notes inconsistent theoretical frameworks and inconclusive evidence of improved assessment outcomes. Challenges include inadequate student preparation for class and lower student satisfaction with the learning experience (Dereshiwsky, M. I., 2015). However, the flipped model may promote greater learner autonomy and better retention of material (Burak et al., 2017). The literature suggests there is still equipoise regarding the effectiveness of the flipped classroom, with confounding factors often not controlled for in studies (Hotle & Garrow, 2016). Further research is needed to determine consistent theoretical frameworks, methods, and ways to enhance the flipped classroom experience (Zuber, 2016).

Despite extensive research on the flipped classroom (FC) model, there remains a lack of studies that use semester-end grades as a key metric for evaluating its effectiveness. Many studies focus on short-term assessments, self-reported student perceptions, or specific skills rather than comprehensive academic performance over an extended period. Additionally, research on FC in English for Specific Purposes (ESP) remains limited, particularly within the context of second-year students majoring in primary education. This study addresses these gaps by providing longitudinal data on the impact of the FC model in an ESP setting, offering valuable insights into how this approach influences academic achievement over multiple semesters.

INTERVENTION: DESCRIPTION OF THE FLIPPED CLASSROOM MODEL

The implementation of the flipped classroom (FC) model began with a thorough analysis of the university syllabus to ensure alignment between course topics and instructional materials. Educational videos were carefully selected from open platforms such as YouTube and Khan Academy to match the syllabus content. Then, these resources were organized into topic-specific folders and supplemented with additional materials to enhance comprehension.

Google Classroom was established as the primary platform for material distribution and progress tracking. At the end of each week, students were required to reflect on their learning experience by sharing their thoughts on what they found helpful or challenging. This allowed the instructor to provide timely responses and foster a supportive learning environment.

To help students who faced technical difficulties, a designated computer was secured in the faculty's computer lab, where students could access materials, study, or download resources onto a USB stick for offline use. Additionally, a Telegram group was created to offer real-time support, enabling the instructor to address student inquiries, clarify pre-class materials, and maintain engagement outside the classroom.

PARTICIPANTS

The study was conducted with second-year students majoring in primary education at Nukus State Pedagogical Institute during 2 terms; each term lasted 15 weeks. A total of N=50 undergraduates participated, selected through convenience sampling, as the instructor was actively teaching at the Faculty of Primary Education. The participants, aged 18 to 30, were future primary school teachers, with a majority being female, as this field is more popular among women.

At Nukus State Pedagogical Institute, instruction is available in five languages. For this study, Russian-speaking groups were chosen, and all subjects, except for English, were taught in Russian. The students' English proficiency levels ranged from A1 to B2 according to the Common European Framework of Reference for Languages (CEFR). Moreover, there is no diagnostic test for English placement; students are assigned to groups based on their entrance exam scores. As a result, English proficiency levels can vary within each group. Given this variation, Russian was a useful scaffold to support comprehension and learning in the flipped classroom environment.

DATA COLLECTION

Data collection for this study relied on two primary sources: term-end results and a Telegram-based survey conducted at the end of the term. The term results provided a quantitative measure of student performance, allowing for an assessment of academic progress under the flipped classroom model. The Telegram survey captured students' perceptions of the flipped classroom approach.

The survey included questions such as:

Did the flipped classroom approach help improve your English skills? (Yes/No)

If no, please specify why?

Did you feel adequately supported by the instructor through Google Classroom and Telegram? (Yes/No)

Would you recommend the flipped classroom model to other students? (Yes/No)

If no, please specify why?

Would you like to continue with the flipped classroom model next semester? (Yes/No)

The survey responses provided qualitative insights into students' experiences, preferences, and perceived effectiveness of the flipped classroom model, complementing the term-end results in evaluating the intervention.

ANALYSIS
Analysis consisted of quantitative and qualitative approaches to evaluate the effectiveness of the flipped classroom model.

Quantitative Analysis:
Descriptive statistics (mean, standard deviation, and percentage changes) were used to compare semester results between the traditional classroom (TC) and flipped classroom (FC) groups.
A paired t-test was applied to determine whether the differences between Term 1 and Term 2 results were statistically significant.

Survey Analysis:
Responses from the Telegram survey were calculated as the percentage of students who responded "Yes" or "No" to each question.
Open-ended responses were categorized thematically to identify common reasons for dissatisfaction or reluctance toward the flipped classroom approach.
This analysis provided both statistical insights into performance differences and qualitative feedback on student perceptions of the flipped classroom model.

LIMITATIONS
This study has several limitations that should be considered when interpreting the results:
- **Sample Size Constraints:** The number of participants may limit the generalizability of findings. A larger sample across multiple institutions would provide more robust conclusions.
- **Lack of Longitudinal Data:** While this study tracks performance across two terms, the longer-term impacts of the flipped classroom model on academic achievement and retention remain unclear.

Despite these limitations, the findings offer valuable insights into the effectiveness of the flipped classroom model for ESP learners.

RESULTS
Analysis of Survey Responses
The survey results indicate a strongly positive perception of the flipped classroom model among participants.
1. **Did the flipped classroom approach help improve your English skills?**
   - A majority (80%) of students responded "Yes", highlighting improvements in speaking confidence, vocabulary expansion, and better comprehension of materials.
   - Those who answered "No" cited reasons such as:
     - Difficulty in self-learning without direct teacher guidance.
     - Struggles with understanding video materials due to varying English proficiency levels.
     - A preference for traditional in-class instruction over independent pre-class preparation.

2. **Did you feel adequately supported by the instructor through Google Classroom and Telegram?**
   - Most participants (80%) answered "Yes", emphasizing that:
     - They received quick responses to their questions on Telegram.
     - Google Classroom was well-structured, making it easy to track materials.
     - The instructor's feedback was timely and helpful in addressing challenges.
   - A few "No" responses were related to:
     - Internet connectivity issues, which affected access to materials.
     - Hesitation to ask questions in the Telegram group.
3. **Would you recommend the flipped classroom model to other students?**
   - A high percentage of students (90%) said "Yes", pointing out:
     - Increased engagement and motivation to learn English.
     - The benefit of reviewing materials at their own pace.
     - The ability to revisit recorded lessons and discussions.
   - Those who answered "No" mentioned:
     - Struggles with self-discipline in completing pre-class tasks.
     - Initial confusion in adapting to the new learning format.
4. **Would you like to continue with the flipped classroom model next semester?**
   - 100% of respondents said "Yes", indicating strong acceptance of the method.
   - Key reasons included:
     - Feeling more confident in speaking and participating.
     - Increased autonomy in learning and managing time.
     - Continuous support from the instructor through online platforms.
     - Overcoming initial doubts and adapting to the method successfully.

Key Metrics

• **Average Grade Increase:**
   · Traditional Classroom (TC): Increased from 39.90 (Term 1) to 41.52 (Term 2)
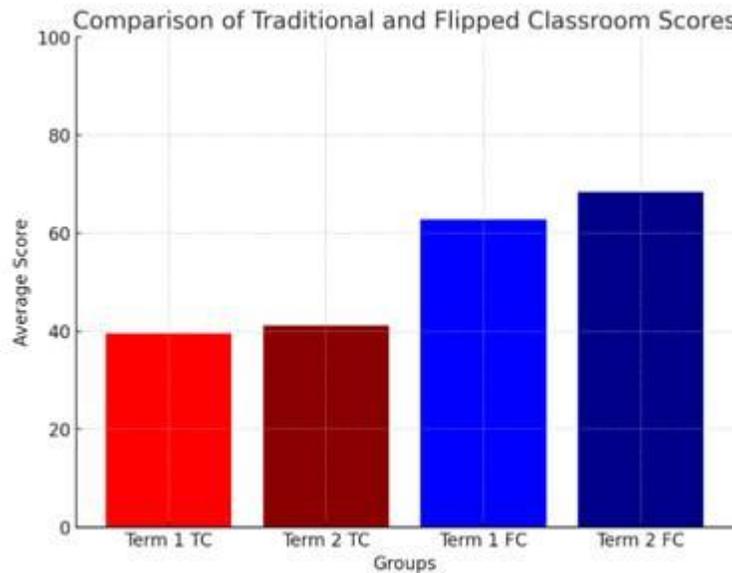   · Flipped Classroom (FC): Increased from 62.00 (Term 1) to 68.00 (Term 2)
   Note: All course grades were measured on a 100-point scale.
   · Improvement: FC students showed a greater increase in scores compared to TC students.
• **Pass Rate Improvement:**
   · The percentage of students scoring above 60% was higher in the FC group compared to the TC group, indicating better overall performance.

FIGURE 1. Bar Graph: Comparison of Term 1 and Term 2 averages for TC vs. FC.

Average Grade Increase:
Traditional Classroom (TC):
- Term 1: 39.90
- Term 2: 41.52

Flipped Classroom (FC):
- Term 1: 62.00
- Term 2: 68.00

Improvement:
- Traditional: +1.62%
- Flipped: +6.00%

• **Pass Rate Improvement:**
- Traditional Classroom: Minimal improvement from Term 1 to Term 2.
- Flipped Classroom: Noticeable increase from 62.00% to 68.00%.

TABLE 1

Descriptives					
	N	Mean	SD	SE	Coefficient of variation
Term 1 FC	27	62.000	19.409	3.191	0.313
Term 1 TC	22	39.903	26.863	4.825	0.673
Term 2 FC	27	68.000	9.393	1.544	0.138
term 2 TC	22	41.516	23.010	4.133	0.554

The descriptive statistics indicate notable differences between the Flipped Classroom (FC) and Traditional Classroom (TC) groups across both terms. In Term 1, the FC group had a higher mean score (M = 62.00, SD = 19.41) compared to the TC group (M = 39.90, SD = 26.86). The coefficient of variation (CV = 0.313 for FC vs. 0.673 for TC) suggests that performance in the FC group was more consistent, whereas the TC group exhibited greater variability in scores.

In Term 2, the FC group showed an improvement, with the mean increasing to 68.00 (SD = 9.39), while the TC group remained relatively stable at M = 41.52 (SD = 23.01). The lower standard deviation in FC (SD = 9.39) and CV (0.138) indicates that scores were not only higher but also more homogeneous in the flipped classroom approach.

Overall, these results suggest that students in the FC group performed better on average and with less variation compared to the TC group. The greater consistency in FC scores across terms may indicate a more structured learning experience, whereas the higher variability in TC suggests inconsistent performance levels among students.

TABLE 2

Paired Samples T-Test							
Measure 1		Measure 2	t	df	p	Cohen's d	SE Cohen's d
Term 1 FC	-	Term 1 TC	3.625	30	0.001	0.651	0.319
Term 2FC	-	Term 2 TC	5.706	30	< .001	1.025	0.346

The paired samples t-test results indicate a statistically significant difference between the Flipped Classroom (FC) and Traditional Classroom (TC) groups across both terms.

In Term 1, there was a significant improvement in the FC group compared to the TC group (t(30) = 3.625, p = 0.001, d = 0.651), suggesting a moderate effect size in favor of the flipped classroom. In Term 2, the difference became even more pronounced (t(30) = 5.706, p < .001, d = 1.025), with a large effect size, reinforcing the substantial impact of the flipped classroom approach.

The results demonstrate that students in the flipped classroom consistently outperformed those in the traditional setting, with a greater effect observed in the second term. This suggests that the flipped approach had a cumulative positive impact over time, leading to higher achievement and more stable learning outcomes.

DISCUSSION

The findings of this study highlight the effectiveness of the flipped classroom (FC) model in enhancing English language learning outcomes compared to the traditional classroom (TC) approach. The survey responses, along with quantitative performance data, provide compelling evidence supporting the benefits of FC while also identifying areas for improvement.

A majority of students reported that the flipped classroom approach improved their English skills, particularly in speaking confidence, vocabulary acquisition, and comprehension. These findings align with previous research indicating that FC fosters active learning and student engagement (Bergmann & Sams, 2012). The ability to review materials at their own pace was a key advantage, reinforcing the notion that self-regulated learning contributes to better retention (Zheng et al., 2020). Additionally, the high recommendation rate (100% willingness to continue with FC next semester) underscores the model's acceptance and perceived effectiveness.

The quantitative results further validate these perceptions. The FC group demonstrated a significant increase in mean scores (from 62.00 to 68.00) compared to the marginal improvement in the TC group (from 39.90 to 41.52). The lower standard deviation and coefficient of variation in the FC group suggest more consistent performance, indicating that the structured, student-centered approach may reduce variability in learning outcomes. The paired samples t-test confirmed statistically significant differences between FC and TC groups, with effect sizes increasing from moderate (d = 0.651) in Term 1 to large (d = 1.025) in Term 2, suggesting that the benefits of FC may compound over time.

Despite the overall success of the FC model, some students faced difficulties, primarily related to self-discipline in pre-class preparation and adapting to independent learning. These challenges are consistent with prior studies (Amutha & Balakrishnan, 2015), which found that students with lower autonomy or weaker foundational skills may struggle in flipped environments. Additionally, a few respondents cited internet connectivity issues and hesitation in asking questions on digital platforms, highlighting the need for equitable access and strategies to encourage participation.

Most students felt adequately supported through Google Classroom and Telegram, emphasizing timely feedback and well-organized materials. However, the reluctance of some learners to engage in online discussions suggests that fostering a more inclusive digital learning community could further enhance the FC experience. Future implementations could incorporate smaller breakout discussions or anonymous question submissions to mitigate this issue.

The success of the FC model in this study supports its adoption in English language instruction, particularly in contexts where student engagement and autonomous learning are prioritized. However, instructors should consider scaffolding strategies for students who struggle with self-directed learning, such as guided pre-class activities or optional synchronous support sessions. Future research could explore the longitudinal effects of FC on language proficiency, as well as comparative studies across different proficiency levels. Additionally, investigating hybrid models that blend FC with occasional in-person reinforcement may help address the challenges faced by less autonomous learners.

CONCLUSION

This study demonstrates the significant benefits of the flipped classroom (FC) model in enhancing English language learning outcomes compared to traditional classroom (TC) instruction. Both qualitative and quantitative data support the effectiveness of FC, with students reporting improved speaking confidence, vocabulary retention, and comprehension, alongside measurable academic gains. The FC group exhibited a notable increase in mean scores (from 62.00 to 68.00) and greater consistency in performance, as evidenced by lower standard deviations and coefficients of variation. Statistical analyses confirmed a significant difference between FC and TC groups, with effect sizes growing over time, suggesting that the flipped approach fosters cumulative learning improvements. Despite these advantages, some challenges were identified, including difficulties with self-regulated learning, internet accessibility, and initial adaptation to the FC structure. However, the overwhelmingly positive reception, with 100% of participants expressing a desire to continue with FC, highlights its potential as a sustainable and effective pedagogical strategy.

RECOMMENDATIONS

Based on the findings, the following recommendations are proposed to optimize the implementation of the flipped classroom model:

- Provide structured, guided pre-class activities (e.g., annotated notes, comprehension questions) to assist students who struggle with independent learning.
- Ensure all learning materials are available in low-bandwidth formats to accommodate students with unreliable internet access.
- Allow flexibility in assignment deadlines for students who may need more time to absorb materials independently.

The flipped classroom model presents a promising alternative to traditional instruction, particularly in language education, where active engagement and personalized pacing are crucial. By addressing the identified challenges through targeted support and adaptive strategies, educators can maximize the model's benefits, leading to more equitable and effective learning experiences. Future refinements and research will further solidify its role in modern pedagogy.

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