

Research Article

Effect of Flipped Classroom on Improving Independence and Learning Achievement in Social Studies in Junior High School

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Abstract: This study investigates (1) the impact of the Flipped Classroom model on students' learning independence in Social Studies, (2) its effect on Social Studies achievement, and (3) its simultaneous influence on both variables among Grade VIII students at SMPN 10 Satap Liukang Tangaya. A quantitative approach was applied using a quasi-experimental method with a Non-Equivalent Control Group Design. The sample comprised 33 students, with 17 assigned to the experimental class and 16 to the control class. Data collection instruments included a learning independence questionnaire, Social Studies achievement tests, observation sheets, and documentation. The data were analyzed through descriptive statistics, normality and homogeneity tests, paired samples t-tests, independent samples t-tests, and MANOVA using SPSS. The findings reveal that the Flipped Classroom model significantly enhances students' learning independence, as evidenced by independent samples t-test results (Sig. < 0.05). It also significantly improves Social Studies learning outcomes, indicated by higher posttest scores in the experimental class compared to the control class (Sig. < 0.05). Furthermore, MANOVA results confirm a significant simultaneous effect on both learning independence and achievement (Sig. < 0.05). These results demonstrate that the Flipped Classroom model effectively improves the overall quality of Social Studies instruction for Grade VIII students.

Keywords: Flipped Classroom; Learning Independence; Learning Outcomes; MANOVA; Social Studies.

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1. Introduction

Education in the twenty-first century faces increasingly complex competency demands alongside rapid advances in information technology and economic globalization. Educational graduates are no longer required merely to master factual knowledge, but are expected to demonstrate critical thinking, effective communication, collaboration, and creativity in order to navigate a dynamic and uncertain labor market (Ilham et al., 2025; MY et al., 2023). Consequently, learning practices must be directed toward strategies that foster active student engagement, develop personal responsibility for learning, and facilitate meaningful social interaction as the foundation of high-quality education. In this context, pedagogical transformation has become imperative to ensure that learning processes are not solely oriented toward short-term cognitive outcomes, but also toward the development of autonomous and adaptive learners.

This paradigm shift in education is marked by a transition in the teacher's role from the primary source of knowledge to a facilitator who supports students' knowledge construction processes. The integration of educational technology has expanded access to diverse learning resources, enabling students to learn flexibly according to their individual needs and learning

pace (MY et al., 2025). Conventional, teacher-centered instructional approaches are increasingly regarded as insufficient, as they limit opportunities for exploration, reflection, and critical dialogue. Therefore, the use of technology in learning should not be viewed merely as the adoption of digital tools, but rather as a means to strengthen learner autonomy and enrich the overall quality of pedagogical interaction.

One pedagogical approach that has emerged in response to these changes is the Flipped Classroom model. This model shifts content delivery outside the classroom through online media, while face-to-face class time is devoted to discussion, problem-solving, and the application of concepts in collaborative settings (Tiwari & Dalal, 2024). Through this mechanism, students are expected to enter the classroom with preliminary understanding, allowing learning activities to occur at a deeper cognitive level. In addition to enhancing academic interaction, the Flipped Classroom provides teachers with greater opportunities to offer personalized and contextual feedback tailored to students' learning needs (Nazariana et al., 2024). Theoretically, this approach positions students as active agents in the learning process and supports the simultaneous development of cognitive and affective domains.

Within the framework of self-directed learning, the Flipped Classroom is believed to strengthen learning autonomy by training students to manage their study time, independently utilize learning resources, and regularly reflect on their understanding before and after classroom instruction. The initial preparedness developed through independent learning allows classroom activities to focus on conceptual deepening, critical discussion, and contextual problem-solving, which directly contribute to improved learning outcomes ((Kanjung et al., 2018; Muhajir & Syahrul, 2022). Thus, the effectiveness of the Flipped Classroom lies not only in optimizing instructional time, but also in its capacity to cultivate active, reflective, and responsible learners.

However, these ideal learning conditions have not been fully realized in educational practice, particularly in regions characterized by geographical challenges and limited infrastructure. Preliminary observations at SMPN 10 Satap Liukang Tangaya indicate that Social Studies instruction continues to face several constraints, including limited instructional time, the dominance of teacher-centered methods, and low levels of student readiness and learning autonomy. Learning activities have not adequately covered the full scope of the curriculum, resulting in superficial conceptual understanding and student achievement that remains below the school's Minimum Mastery Criteria. Furthermore, many students are not accustomed to preparing learning materials prior to lessons, show limited initiative in seeking additional learning resources, and remain dependent on direct teacher guidance. These conditions highlight the urgent need for more adaptive and flexible instructional strategies that promote active participation and learning responsibility, particularly in island-region contexts.

Previous studies have demonstrated the effectiveness of the Flipped Classroom in improving both learning outcomes and learner autonomy. Research by (Zai & Listyarini, 2023) and (Safriana et al., 2023) reported significant improvements in learning outcomes through the implementation of the Flipped Classroom, with N-Gain values categorized as moderate to high. In addition, studies by (Husnawati, 2023) and (Mulyati et al., 2022) confirmed that this model positively contributes to the development of students' learning autonomy. Nevertheless, these studies exhibit several limitations, including a predominant focus on science subjects and higher education settings, separate analyses of learning autonomy and achievement, and a lack of research conducted in island regions with infrastructural constraints. This empirical gap indicates that existing findings have not yet comprehensively explained the effectiveness of the Flipped Classroom in junior high school Social Studies, particularly when learning autonomy and achievement are examined simultaneously.

Based on this research gap, the present study is essential to extend empirical understanding of Flipped Classroom implementation within the context of Social Studies learning in island regions. This study is expected to contribute theoretically by strengthening empirical evidence on the relationship between instructional models, learning autonomy, and learning outcomes, while also offering practical implications for the development of contextual and sustainable instructional strategies. Accordingly, the purpose of this study is to analyze the effect of the Flipped Classroom model on students' learning autonomy, Social Studies achievement, and the simultaneous effect on both variables among eighth-grade students at SMPN 10 Satap Liukang Tangaya.

2. Literature review

2.1. Flipped Classroom Learning Model

The Flipped Classroom model repositions initial learning activities as independent study conducted prior to face-to-face instruction, while classroom time is dedicated to higher-order learning activities such as discussion, problem-solving, and concept application (Kurniawan, 2021). This instructional arrangement aligns with contemporary educational demands by fostering active student engagement while providing opportunities for the development of higher-order thinking skills and learner autonomy (Yusuf, 2025). Conceptually, the Flipped Classroom assumes that foundational understanding developed through digital learning resources enhances the quality of in-class interaction; however, its effectiveness is highly contingent upon student readiness and the supporting learning ecosystem.

The primary strength of the Flipped Classroom lies in its ability to shift the instructional focus from teacher-centered delivery to student-centered learning, thereby promoting interactivity, learner agency, and compatibility with technology-enhanced instruction (Boyer, 2013). Nevertheless, the model also presents implementation challenges, particularly its reliance on technological access and the demands it places on students' time management and self-regulation skills. These limitations may pose significant barriers in contexts characterized by unequal access to digital infrastructure or among learners who have not yet developed effective independent learning strategies (Husnawati, 2023). Accordingly, the Flipped Classroom should not be regarded as a universal solution but rather as a pedagogical model requiring deliberate instructional design and contextual adaptation.

The Flipped Classroom is theoretically grounded in constructivism, active learning theory, and technology-based learning, which collectively explain why this model has the potential to enhance learning processes and outcomes. From a constructivist perspective, effective learning occurs when students actively construct knowledge through interaction with experiences and their environment rather than passively receiving information. The Flipped Classroom reinforces this principle by shifting content exposure to independent study and utilizing classroom time for collaborative meaning-making, thereby promoting deeper and more reflective understanding (Jiang et al., 2023).

Consistent with this view, active learning theory emphasizes that meaningful learning occurs when students are directly engaged in activities requiring concept application, reasoning, and problem-solving. Within the Flipped Classroom, the classroom functions as a space for higher-order cognitive engagement through discussion, practice, and collaborative tasks, which theoretically enhances knowledge retention and transfer to real-world contexts (Poudel & Sharma, 2022). Furthermore, technology-based learning theory conceptualizes technology not merely as a medium but as an enabling system that supports flexible access, personalized learning pace, and expanded learning interaction. Digital materials, online platforms, and virtual resources in the Flipped Classroom increase accessibility and facilitate collaboration while reinforcing conceptual understanding through structured in-class activities (Wang et al., 2020). The synthesis of these theoretical perspectives underscores that the effectiveness of the Flipped Classroom depends on the balanced integration of knowledge construction, active engagement, and technological support.

The defining characteristics of the Flipped Classroom emphasize the relocation of basic instructional activities to out-of-class settings and the use of classroom time for active, collaborative learning. Independent learning outside the classroom allows students to regulate their learning pace, revisit materials, and develop preparedness prior to in-class sessions. This characteristic, however, presupposes a level of self-regulation that enables students to meaningfully process digital content rather than merely consuming it passively. In the classroom, student engagement increases as learning activities focus on discussion, group work, and contextual application of knowledge, transforming the classroom into a socially rich learning environment.

Within this model, the teacher's role shifts toward that of a facilitator who provides personalized guidance and constructive feedback, particularly when students encounter conceptual or procedural difficulties. Technology serves as a critical enabler by providing access to learning materials and supporting interactive learning experiences through quizzes, discussion forums, and digital tools. Additionally, the emphasis on collaboration makes the Flipped Classroom particularly relevant for strengthening students' social and communication skills through structured group activities, which can deepen understanding and enhance learner

confidence (Fiqri et al., 2024). At the same time, these characteristics reveal potential vulnerabilities related to student readiness, instructional design quality, and the availability of adequate technological support.

The instructional syntax of the Flipped Classroom outlines a systematic sequence that integrates independent learning with in-class collaborative activities. (Bishop & Verleger, 2013) describe stages beginning with independent pre-class learning to establish foundational knowledge, followed by interactive classroom activities for diagnosing understanding and deepening content mastery, application through projects or simulations to develop critical thinking and collaboration, and concluding evaluation as a means of reflection and reinforcement. This structure positions the classroom as a space for confirmation, elaboration, and application of knowledge, making learning success dependent on the quality of pre-class materials and in-class activity design.

An alternative sequence proposed by Ulfa et al (2014) similarly emphasizes pre-class independent study, random group formation, facilitated discussion using cooperative learning strategies and guiding questions, and evaluation through quizzes or tests to reinforce the academic significance of classroom activities. Both instructional sequences highlight the pedagogical logic of the Flipped Classroom: pre-class preparedness is a prerequisite for effective in-class engagement. Thus, the model's effectiveness is determined not simply by reversing instructional order, but by the coherence between pre-class materials, classroom activities, and assessment strategies.

2.2. Student Learning Autonomy

Learning autonomy refers to an individual's capacity to act and make decisions independently without excessive reliance on others and constitutes a foundational element of effective learning. Practically, autonomy reflects the ability to think critically, solve problems, and assume responsibility for one's actions, enabling individuals to function effectively in increasingly complex environments (Sa'diyah, 2017). From a developmental perspective, autonomy is shaped not only by internal motivation but also by learning opportunities created through social interaction and decision-making experiences (Hidayanti et al., 2023). Accordingly, learning autonomy has become a central concern in modern education due to its direct relationship with students' readiness to manage academic demands.

Education plays a crucial role in fostering autonomy through instructional strategies that encourage critical thinking, independent problem-solving, and collaborative engagement. Student-centered approaches, including active learning and problem-based learning, are particularly effective in strengthening learners' confidence and self-regulation capacities (Waruwu & Waruwu, 2023). This perspective reinforces the argument that autonomy is not merely an individual trait but the product of interaction between instructional design, social environment, and opportunities for learner responsibility.

Learning autonomy encompasses integrated cognitive, affective, and psychomotor dimensions that enable individuals to think, feel, and act responsibly. In adolescent development, Steinberg identifies three core dimensions: emotional autonomy, behavioral autonomy, and value autonomy. Emotional autonomy involves the ability to manage emotional needs without excessive dependence, behavioral autonomy reflects the capacity to make decisions and act based on informed judgment, and value autonomy refers to the ability to define personal principles of right and wrong independent of external pressures. This framework is particularly relevant for research on learning autonomy at the junior high school level, where students are navigating developmental transitions and heightened social influence.

Learning autonomy is observable through behavioral indicators across emotional, intellectual, social, and economic dimensions, reflecting individuals' capacity for self-management, decision-making, and responsible action (Hidayati, 2014). In educational contexts, emotional autonomy relates to self-confidence and resilience, intellectual autonomy to creativity and problem-solving ability, social autonomy to initiative and communication skills, and economic autonomy to effective resource and time management. These indicators demonstrate that learning autonomy extends beyond solitary study and represents a multidimensional form of self-regulation. (Desmitha, 2009) further characterizes autonomous individuals as realistic, objective, tolerant of ambiguity, capable of reconciling conflicting values, and oriented toward self-fulfillment. Similarly, (Safitri & Maryanti, 2022) identify autonomy through behaviors opposite to dependency, such as proactivity, independent problem-solving, and emotional resilience. This synthesis highlights learning autonomy as a construct encompassing psychological disposition, cognitive capacity, and observable behavior within learning processes.

Learning autonomy is shaped by the interaction of internal and external factors. (Syahputra, 2017) categorizes these influences into endogenous factors, such as innate potential and individual constitution, and exogenous factors derived from family and societal environments. This perspective underscores that autonomy is not solely a matter of personal will but is strongly influenced by environmental support, cultural values, and educational practices. A similar distinction is articulated by Chabib Thoha (Supriyanto, 2021), who associates internal factors with age maturity, gender, and intelligence, and external factors with cultural context, family upbringing, school education systems, and societal structures. Within the context of Flipped Classroom implementation, these factors are critical, as the model requires strong self-regulation and supportive learning environments. Variations in social, cultural, and institutional contexts may therefore moderate the relationship between instructional models and learning autonomy outcomes.

Learning autonomy is reflected in students' capacity to initiate learning activities independently and manage their learning processes without external coercion, encompassing self-confidence, self-control, responsibility, and problem-solving initiative (Suhardi et al., 2015). (Nahdliyin & Mahmudah, 2023) emphasize indicators such as initiative, confidence, motivation, discipline, and responsibility. Sumarmo (2004) expands these indicators to include diagnosing learning needs, setting goals, monitoring progress, interpreting challenges as opportunities, utilizing learning resources, selecting strategies, evaluating outcomes, and demonstrating self-efficacy. In this study, learning autonomy is operationalized using five indicators adapted from Widuoyekti (2021): responsibility-based independence, perseverance, initiative or creativity, self-control, and self-confidence. The selection of these indicators ensures alignment with the demands of the Flipped Classroom, which emphasizes pre-class preparation, self-regulation, and reflective learning.

2.3. Learning Outcomes

Learning outcomes are understood as the cumulative learning experiences encompassing cognitive, affective, and psychomotor domains, reflected in changes in students' abilities and behaviors following instruction (Rusman, 2015). The conceptualization of learning outcomes as holistic behavioral change underscores the need to view academic achievement beyond isolated competencies (Winardi, 2018). In formal education, learning outcomes are often operationalized as levels of achievement measured through test scores on specific subject matter, positioning assessment as a key mechanism for evaluating instructional effectiveness. Within the tripartite framework, Qiptiyah (Juhani & Hasyim, 2024) identifies cognitive, affective, and psychomotor domains as integral components of learning outcomes. This study focuses on the cognitive domain, consistent with the evaluation of Social Studies achievement through test-based measures. The cognitive domain encompasses knowledge, reasoning, and intellectual processes and is classically classified into six levels: knowledge, comprehension, application, analysis, synthesis, and evaluation (Dimiyati & Mudjiono, 2012; Nafiati, 2021). Limiting analysis to the cognitive domain provides conceptual clarity and facilitates measurable assessment of the Flipped Classroom's academic impact.

Learning outcomes result from the interaction of internal and external factors. Assessment of learning outcomes plays a crucial role in informing teachers about students' progress and guiding instructional decision-making for subsequent learning activities (Umam & Ahyani, 2017). Irfan et al (2023) identify internal factors such as ability, interest, talent, intrinsic motivation, and cognitive style, alongside external factors including teacher roles, instructional materials, learning strategies, assessment systems, physical resources, and family and community environments. This framework suggests that instructional models operate within a complex ecosystem of interacting influences. Pingge (2016) further delineates internal factors into physiological and psychological dimensions, including health, fatigue, intelligence, attention, interest, aptitude, motivation, and reasoning ability, while external factors encompass physical and social environments as well as instrumental elements such as curriculum, facilities, and teachers. Susanto (2016) reinforces this dichotomy by emphasizing that internal factors originate within learners, whereas external factors arise from family, school, and societal contexts. In the context of the Flipped Classroom, these factors are particularly salient, as the model requires independent learning readiness, technological access, and teacher capacity to design effective pre-class materials and in-class activities. Consequently, variation in learning outcomes may reflect differences in learner characteristics and contextual support rather than instructional design alone.

Learning outcomes encompass cognitive, affective, and psychomotor domains (Sudjana, 2020). The cognitive domain focuses on intellectual abilities such as knowledge, comprehension, application, analysis, synthesis, and evaluation. The affective domain emphasizes emotional and behavioral aspects, including value internalization and character development, while the psychomotor domain relates to physical skills and action. Within the psychomotor domain, mastery of fundamental movement skills serves as a foundation for physical competence and contributes to physical literacy (Mardhiyah et al., 2021). However, because this study examines academic achievement in Social Studies measured through cognitive assessment, analysis is confined to the cognitive domain to ensure conceptual and methodological consistency.

3. Proposed Method

3.1. Research Design and Context

This study employed a quantitative approach using a quasi-experimental design to examine the effect of the Flipped Classroom model on students' learning autonomy and Social Studies achievement. The research was conducted at SMP Negeri 10 Satap Liukang Tangaya, located in Sabalana, Liukang Tangaya District, Pangkajene and Islands Regency, South Sulawesi, Indonesia. The school represents an island-based educational context with distinctive geographical characteristics and instructional challenges, particularly in implementing technology-supported innovative learning models. Preliminary observations indicated low levels of learning autonomy and academic achievement in Social Studies, making this context relevant for investigating the effectiveness of the Flipped Classroom intervention. The study was carried out from August to October 2025 and included several stages: research preparation and institutional permission, development and validation of research instruments, implementation of the instructional treatment, data collection through pretests and posttests, data analysis, and reporting of findings.

3.2. Participants and Sampling

The population consisted of all eighth-grade students enrolled at SMP Negeri 10 Satap Liukang Tangaya during the 2025/2026 academic year. Given the relatively small population size, total sampling was applied, involving all 33 students. The participants comprised 20 male and 13 female students. The sample was then assigned into two groups through random assignment to ensure comparability between groups: an experimental group consisting of 17 students who received instruction using the Flipped Classroom model and a control group consisting of 16 students who received conventional instruction. This grouping was intended to strengthen the internal validity of comparisons between instructional conditions.

3.3. Experimental Procedure

The study followed a non-equivalent control group design, in which both groups were administered pretests and posttests, but only the experimental group received the Flipped Classroom treatment (Sugiyono, 2019). The experimental procedure was implemented in three main phases: preparation, intervention, and evaluation. During the preparation phase, learning materials and research instruments were developed and validated. In the intervention phase, the experimental group engaged in Flipped Classroom learning activities involving pre-class video-based instruction, in-class discussions, and collaborative projects, while the control group received conventional instruction through lectures, question-and-answer sessions, and routine exercises. In the evaluation phase, posttests were administered to assess changes in learning autonomy and Social Studies achievement.

3.4. Data Collection Instruments

Data were collected using three main instruments. Learning autonomy was measured using a questionnaire developed in the form of a five-point Likert scale, consisting of both positive and negative statements (Sinambela, 2023). Academic achievement in Social Studies was measured using a multiple-choice test aligned with the instructional content, administered as both a pretest and posttest. Each test item was scored dichotomously, with correct answers scored as one and incorrect answers scored as zero (Khaerudin, 2016). In addition, documentation techniques were employed to collect supporting data, including student lists, instructional schedules, teaching modules, curriculum documents, and report card records, to enhance data credibility.

3.5. Data Analysis

Data analysis was conducted quantitatively using SPSS (Statistical Package for the Social Sciences). Descriptive statistics were used to summarize the characteristics of the data, including means, standard deviations, minimum scores, and maximum scores for both pretest and posttest results in the experimental and control groups. Prior to hypothesis testing, classical assumption tests were conducted. Data normality was examined using the Shapiro–Wilk test, with significance values greater than 0.05 indicating normal distribution. Homogeneity of variances was tested using Levene’s test, with significance values greater than 0.05 indicating homogeneous variances. To test the research hypotheses, several inferential statistical analyses were applied. Independent samples t-tests were used to examine differences in posttest mean scores between the experimental and control groups for both learning autonomy and learning outcomes. Paired samples t-tests were conducted to assess within-group differences between pretest and posttest scores. In addition, multivariate analysis of variance (MANOVA) was employed to examine the simultaneous effect of the Flipped Classroom model on learning autonomy and Social Studies achievement. Statistical decisions were based on a significance level of 0.05, with values below this threshold indicating statistically significant effects.

4. Results and Discussion

4.1. Result of Research

4.1.1. Assumption Testing for Parametric Analysis

Before hypothesis testing, prerequisite analyses were conducted to ensure that the data met the assumptions required for parametric statistical procedures, namely normality and homogeneity of variance.

a. Normality Test

Normality testing was performed to determine whether the distributions of learning autonomy and learning outcomes data in both the experimental and control groups followed a normal distribution. Given that the sample size was fewer than 50 participants, the Shapiro–Wilk test was applied. Data were considered normally distributed when the significance value (p) exceeded 0.05.

Table 1. Results of Normality Test (Shapiro–Wilk).

Variable	Shapiro–Wilk Sig.	Interpretation
Pretest Learning Autonomy (Experimental)	0.096	Normal
Pretest Learning Autonomy (Control)	0.100	Normal
Posttest Learning Autonomy (Experimental)	0.148	Normal
Posttest Learning Autonomy (Control)	0.244	Normal
Pretest Learning Outcomes (Experimental)	0.122	Normal
Pretest Learning Outcomes (Control)	0.155	Normal
Posttest Learning Outcomes (Experimental)	0.201	Normal
Posttest Learning Outcomes (Control)	0.506	Normal

Source: SPSS Output (Processed Data, 2025)

As shown in Table 1, all Shapiro–Wilk significance values were greater than 0.05. These results indicate that the distributions of both learning autonomy and learning outcomes data, at pretest and posttest stages in the experimental and control groups, were normally distributed.

b. Homogeneity of Variance Test

Homogeneity testing was conducted to examine whether the variances of learning autonomy and learning outcomes were equal across the experimental and control groups. Levene’s Test was used, with a significance value greater than 0.05 indicating homogeneous variances.

Table 2. Results of Homogeneity of Variance Test (Levene’s Test).

Variable	Levene Statistic (Based on Mean)	Sig.	Interpretation
Pretest Learning Autonomy	0.510	0.481	Homogeneous
Posttest Learning Autonomy	0.135	0.716	Homogeneous
Pretest Learning Outcomes	4.099	0.052	Homogeneous

Posttest Learning Outcomes	1.369	0.251	Homogeneous
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Source: SPSS Output (Processed Data, 2025)

The results presented in Table 2 show that all Levene’s Test significance values exceeded 0.05, indicating that the variances of learning autonomy and learning outcomes data were homogeneous across groups. With the assumptions of normality and homogeneity satisfied, parametric hypothesis testing was deemed appropriate.

4.1.2. Hypothesis Testing

Hypothesis testing was conducted to examine the effect of the Flipped Classroom model on students’ learning autonomy (Y₁) and Social Studies learning outcomes (Y₂). The analyses consisted of paired samples *t*-tests, independent samples *t*-tests, and a multivariate analysis of variance (MANOVA).

a. Paired Samples *t*-Test

Paired samples *t*-tests were employed to analyze within-group differences between pretest and posttest scores for both the experimental and control groups. A significance value below 0.05 indicated a statistically significant difference.

Table 3. Results of Paired Samples *t*-Test.

Variable	Sig. (2-tailed)	Interpretation
Pretest–Posttest Learning Autonomy (Experimental)	< 0.001	Significant
Pretest–Posttest Learning Autonomy (Control)	0.111	Not Significant
Pretest–Posttest Learning Outcomes (Experimental)	< 0.001	Significant
Pretest–Posttest Learning Outcomes (Control)	0.089	Not Significant

Source: SPSS Output (Processed Data, 2025)

As presented in Table 3, statistically significant improvements were observed in the experimental group for both learning autonomy and learning outcomes (*p* < .001). In contrast, the control group did not exhibit significant changes between pretest and posttest scores for either variable. These findings indicate that the Flipped Classroom model was effective in improving students’ learning autonomy and learning outcomes, whereas conventional instruction did not yield significant gains.

b. Independent Samples *t*-Test

Independent samples *t*-tests were conducted to examine posttest differences between the experimental and control groups. Statistical significance was determined at *p* < .05.

Table 4. Results of Independent Samples *t*-Test.

Variable	t	Sig. (2-tailed)	Mean Difference	Interpretation
Posttest Learning Autonomy	2.778	0.009	10.63	Significant
Posttest Learning Outcomes	4.366	< 0.001	18.64	Significant

Source: SPSS Output (Processed Data, 2025)

Table 4. indicates that the experimental group achieved significantly higher posttest scores than the control group for both learning autonomy (*p* = .009) and learning outcomes (*p* < .001). The positive mean differences show that students taught using the Flipped Classroom model demonstrated greater autonomy and higher academic achievement than those taught using conventional methods. Accordingly, the first and second research hypotheses were supported.

c. Multivariate Analysis of Variance (MANOVA)

To examine the simultaneous effect of the Flipped Classroom model on learning autonomy and learning outcomes, a MANOVA was conducted.

Table 5. Results of MANOVA.

Multivariate Test	Value	F	Sig.
Pillai's Trace	0.384	9.357	< 0.001
Wilks' Lambda	0.616	9.357	< 0.001
Hotelling's Trace	0.624	9.357	< 0.001
Roy's Largest Root	0.624	9.357	< 0.001

Source: SPSS Output (Processed Data, 2025)

The MANOVA results in Table 5. show statistically significant multivariate effects across all test statistics ($p < .001$). The Wilks' Lambda value of 0.616 indicates a substantial multivariate difference between the experimental and control groups, while the Pillai's Trace value of 0.384 suggests that the Flipped Classroom model contributed meaningfully to the combined variance in learning autonomy and learning outcomes. These results confirm that the Flipped Classroom model had a significant simultaneous effect on both dependent variables, supporting the third research hypothesis.

4.2. Discussion

4.2.1. Effect of the Flipped Classroom on Students' Learning Autonomy in Social Studies

The findings demonstrate that the Flipped Classroom model had a significant positive effect on students' learning autonomy in Social Studies. The independent samples t -test revealed a statistically significant difference between the experimental and control groups ($p = .009$), with a mean difference of 10.63 favoring the experimental group. In addition, the paired samples t -test showed a significant increase in learning autonomy within the experimental group after the intervention ($p < .001$), while no significant change was observed in the control group. These results confirm the acceptance of the first hypothesis (H_1), indicating that the Flipped Classroom model effectively enhances students' learning autonomy.

From a pedagogical perspective, the Flipped Classroom positions students as active agents in the learning process. By engaging with instructional materials independently before classroom instruction, students are encouraged to take initiative, assume responsibility for their learning, and regulate their learning strategies. These characteristics correspond closely with core indicators of learning autonomy, including initiative, self-regulation, and responsibility. Consequently, the observed improvement in learning autonomy among students in the experimental group can be attributed to the inherent design of the Flipped Classroom, which systematically shifts learning responsibility from teacher-centered delivery to student-driven engagement.

The present findings are consistent with prior research reporting similar outcomes. Alfahral et al. (2025) found that the Flipped Classroom significantly improved students' learning autonomy compared to expository teaching methods, with a reported significance level of $p = .047$. This result reinforces the argument that Flipped Classroom-based instruction strengthens autonomous learning behaviors through structured pre-class activities. Likewise, Ningsih et al. (2024) reported a positive and significant effect of the Flipped Classroom on students' learning autonomy, emphasizing its role in fostering independent learning habits and learner accountability. Further support is provided by Fatimah et al (2022), who documented a significant effect ($p = .00$) and a 57% increase in learning autonomy based on N-gain analysis. Collectively, these findings confirm that the Flipped Classroom consistently promotes learning autonomy across diverse educational contexts.

4.2.2. Effect of the Flipped Classroom on Students' Learning Outcomes in Social Studies

In addition to learning autonomy, the Flipped Classroom model was found to significantly enhance students' learning outcomes in Social Studies. The independent samples t -test indicated a statistically significant posttest difference between the experimental and control groups ($p < .001$), with a mean difference of 18.64 favoring the experimental group. Moreover, the paired samples t -test revealed a significant improvement in learning outcomes within the experimental group following the intervention ($p < .001$), whereas the control group

showed no significant improvement. These findings support the second hypothesis (H_2), confirming the effectiveness of the Flipped Classroom in improving academic achievement.

Conceptually, the Flipped Classroom enables students to acquire foundational knowledge prior to classroom instruction, allowing in-class time to be devoted to higher-order learning activities such as discussion, problem-solving, and conceptual reinforcement. As a result, students enter the classroom with greater cognitive readiness, which facilitates deeper understanding and more effective engagement with Social Studies content. This learning structure not only enhances comprehension but also supports meaningful knowledge construction, ultimately leading to improved academic performance.

The results align with previous studies demonstrating the positive impact of the Flipped Classroom on learning outcomes. Abdullah (2024) reported that students taught using the Flipped Classroom achieved significantly higher learning outcomes than those taught using traditional instructional methods. Similarly, Zai & Listyarini (2023) found that Flipped Classroom implementation yielded average N-gain values of 0.56 and 0.62, along with very high student performance rates (91.5% and 97.5%) across instructional sessions. These studies suggest that the combination of pre-class preparation and in-class active learning creates a more student-centered and meaningful learning environment. Through structured discussions and problem-solving activities, students are able to correct misconceptions, reinforce conceptual understanding, and consolidate their mastery of Social Studies content.

4.2.3. Simultaneous Effect of the Flipped Classroom on Learning Autonomy and Learning Outcomes

The MANOVA results further indicate that the Flipped Classroom model exerted a significant simultaneous effect on both learning autonomy (Y_1) and learning outcomes (Y_2). All multivariate test statistics (Pillai's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root) yielded significance values below .001, leading to the acceptance of the third hypothesis (H_3). This finding suggests that the Flipped Classroom does not merely influence learning autonomy and learning outcomes independently, but rather enhances both variables in an integrated manner.

Pedagogically, this simultaneous effect implies that improvements in learning autonomy are closely linked to gains in academic achievement. Students who develop stronger autonomous learning skills through structured pre-class activities tend to demonstrate greater readiness and engagement during classroom instruction, which in turn supports deeper conceptual understanding and higher learning outcomes. Thus, the Flipped Classroom fosters a mutually reinforcing relationship between learning autonomy and academic performance.

This integrated impact can be attributed to the contrasting instructional approaches applied in the experimental and control groups. In the experimental group, students engaged in independent learning through instructional videos and learning materials prior to classroom sessions, followed by collaborative discussions and guided problem-solving during class. In contrast, the control group relied primarily on teacher-centered instruction, with limited opportunities for pre-class preparation or active in-class engagement. These differences in instructional design resulted in markedly distinct learning experiences, contributing to the observed disparities in learning autonomy and outcomes.

Furthermore, the MANOVA findings strengthen the partial effects observed in the individual t -tests by demonstrating that the Flipped Classroom model operates as a comprehensive instructional intervention. Rather than producing isolated improvements, the model simultaneously enhances key dimensions of the learning process and learning outcomes. Consequently, the Flipped Classroom can be regarded as an effective pedagogical approach for improving the overall quality of Social Studies instruction, particularly in contexts that require the development of independent learning skills alongside academic achievement.

5. Conclusions

This study concludes that the Flipped Classroom model has a significant effect on both students' learning autonomy and Social Studies learning outcomes among eighth-grade students at SMPN 10 Satap Liukang Tangaya, both partially and simultaneously. The implementation of the Flipped Classroom encouraged students to become more active, independent, and responsible in their learning through pre-class instructional activities, while also enhancing their conceptual understanding of Social Studies through in-class discussion and problem-solving. These findings indicate that shifting students' roles from passive recipients to active

learners produces consistent positive effects on both the quality of the learning process and academic achievement.

From a theoretical perspective, this study strengthens the argument that the Flipped Classroom functions as an effective pedagogical approach for integrating learning autonomy with academic achievement, particularly in junior high school Social Studies instruction. The findings suggest that improvements in learning outcomes are closely linked to the development of students' self-regulation and learning readiness. Practically, the results provide important implications for teachers and school administrators to adopt the Flipped Classroom as an innovative instructional alternative. Teachers are encouraged to design accessible and meaningful pre-class learning materials and to optimize interactive and collaborative in-class activities. At the institutional level, schools play a strategic role in supporting Flipped Classroom implementation by providing adequate technological infrastructure and facilitating continuous professional development for teachers to ensure the sustainability and effectiveness of technology-enhanced learning.

Despite its significant contributions, this study has several limitations that should be considered when interpreting the findings. First, the sample size was relatively small and limited to a single school in an island-region context, which restricts the generalizability of the results. Second, the study focused only on two dependent variables—learning autonomy and learning outcomes—without examining other factors that may mediate or moderate the effects of the Flipped Classroom. Future research is therefore recommended to involve larger and more diverse samples, include different educational levels and subject areas, and incorporate additional variables such as learning motivation, critical thinking skills, or digital literacy to provide a more comprehensive understanding of the effectiveness of the Flipped Classroom across educational contexts.

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