

**The Influence of Flipped Classroom Pedagogy on Academic Achievement of Students at Higher Secondary Level: Usages of Social Network Sites as a Key Mediator**

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**Abstract:**

The landscape of education has evolved significantly in recent years, driven by advancements in technology and innovative pedagogical approaches. Among these, the flipped classroom pedagogy has gained substantial attention for its potential to transform traditional teaching methods. The study aimed at to investigate “The Influence of Flipped Classroom Pedagogy on Academic Achievement of Students at Higher Secondary Level: Usages of Social Network Sites as a Key Mediator”. The objectives of the study were; 1) To explore the relationship between Flipped Classroom Pedagogy and Academic Achievement. 2) To examine the relationship between Flipped Classroom Pedagogy and the Usage of Social Network Sites (SNS). 3) To analyze the mediating role of the Usage of Social Network Sites (SNS) in the relationship between Flipped Classroom Pedagogy and Academic Achievement. Survey-based research method was employed for this study. Surveys were designed to collect quantitative data from students at the higher secondary level. A quantitative research design was adopted for this study. The total population for this study consisted of higher secondary school students in District Attock. There were 12 higher secondary schools for boys and 10 higher secondary schools for girls. The total number of male students was 9,024, while the total number of female students was 8,855. The sample for this study comprised 470 students enrolled in higher secondary schools in District Attock. A simple random sampling technique was employed to select the participants. Self developed questionnaires were used as research tools. Coefficient correlation was used for exploring the relationship between two different variables. The strong positive correlation ( $r = 0.848$ ,  $p < 0.001$ ) between Flipped Classroom Pedagogy and Academic Achievement suggests that flipped classroom practices significantly enhance academic performance. Hence, it is recommended to integrate flipped classroom approaches into the curriculum to improve students' academic outcomes, with a focus on active learning strategies and interactive activities.

**Keywords:** Flipped Classroom, Pedagogy, Academic Performance, Social Network Sites.

## Introduction

The landscape of education has evolved significantly in recent years, driven by advancements in technology and innovative pedagogical approaches. Among these, the flipped classroom pedagogy has gained substantial attention for its potential to transform traditional teaching methods. This model, which involves shifting the delivery of instructional content outside the classroom while reserving in-class time for active engagement and collaborative learning, challenges the passive learning environment of traditional classrooms. At the same time, the rapid growth of social network sites (SNS) has opened new avenues for integrating technology into education, offering opportunities for collaboration, resource sharing, and peer-to-peer interaction. Academic achievement, a central goal of any educational system, is influenced by various factors, including teaching methodologies and technological integration. This research explores the interplay between flipped classroom pedagogy, SNS usage, and academic achievement, with a focus on how SNS can serve as a mediating factor.

## Flipped Classroom Pedagogy

The flipped classroom approach reverses the traditional instructional paradigm by delivering lecture material outside of class—through videos, readings, or online modules—and using class time for interactive activities such as group discussions, problem-solving exercises, and collaborative projects (Bergmann & Sams, 2012). This method aligns with constructivist learning theories, emphasizing active participation and personalized learning experiences (Lage et al., 2000). Research indicates that flipped classrooms promote deeper understanding and retention of knowledge, as students have more opportunities to engage with the material and clarify concepts during class time (Lo & Hew, 2017). For example, a meta-analysis by Chen et al. (2018) found that students in flipped classrooms consistently outperformed those in traditional settings in terms of academic performance and engagement. One of the key strengths of the flipped classroom model is its ability to cater to diverse learning styles. By providing students with the flexibility to access instructional content at their own pace, this approach accommodates visual, auditory, and self-directed learners. Moreover, it fosters a collaborative learning environment where students actively contribute to discussions and group activities, enhancing their critical thinking and problem-solving skills (Hew et al., 2021). These benefits make the flipped classroom an effective strategy for improving academic outcomes, particularly when integrated with digital tools and platforms.

## Social Network Sites (SNS) Usage

A social network site is an interactive verbal exchange platform where users can create an account to join a specific social network site. They usually use their personal accounts to stay connected with their respective individuals in the same way by using social network sites. Social Network Sites are basically used in the field of communication and have gained importance as an effective means of distant communication. Their requirement in the current age had made the massive contribution of modern technology (Mahnaz et al., 2022). SNS, such as Facebook, YouTube, Instagram, and WhatsApp, have become integral to students' lives, offering platforms for communication, collaboration, and information sharing. In the educational context, SNS can be harnessed to support learning by facilitating group discussions, providing access to instructional content, and enabling real-time feedback from peers and educators (Manca & Ranieri, 2016). For instance, Facebook groups can be used for collaborative projects, while YouTube channels offer an extensive library of tutorial videos on various subjects. Similarly, WhatsApp groups allow for

quick communication and resource sharing among students and teachers (Al-Rahmi et al., 2018). However, the impact of SNS on academic achievement is complex. While educational use of SNS can enhance learning experiences and foster academic engagement, excessive or non-academic use may lead to distractions and reduced productivity (Junco, 2012). Therefore, it is essential to explore strategies for optimizing SNS usage to align with educational objectives. When effectively integrated into pedagogical practices, SNS can serve as powerful tools for supporting the flipped classroom model, enhancing students' access to resources, and promoting collaborative learning. Social network sites offer different characteristics according to the skills of the users to share their information, thoughts, views, activities, personal information, feelings, important events, and fields according to their interests. There are so many positive points of using social network sites but the most basic advantage is that it offers to sign up and to create any of the profile types whether it is public or semi-public profile, within the connected system where they can communicate with different people of the different area. Social Network Sites are now becoming the most dynamic web-based application which is called Web 2.0, it provides facility to the students to create accounts on it and then not restrict them to socialize with friends, it also gives them possible chance to interact with lecturers. The fame of the social network site is increasing gradually due to the free access for whoever wants to communicate with teachers and friends with an idea to produce collective knowledge regardless of the popularity of social network sites among users of different social network sites (Mahnaz et al., 2022).

### Academic Achievement

Academic achievement, defined as the extent to which a student has achieved their educational goals, is a critical indicator of the effectiveness of teaching methodologies. It is commonly measured through grades, test scores, and the successful completion of educational milestones. Numerous factors influence academic achievement, including teaching strategies, student engagement, socio-economic status, and the availability of learning resources (Cavanaugh et al., 2018). Academic Achievement according to Wajid Mahnaz and Sidra Kiran (2024) refers to how well a student performs in their studies, typically measured through grades, test scores, or other assessments. It reflects a student's ability to understand, learn, and apply the knowledge and skills taught in school. Higher academic achievement usually means that a student has a strong understanding of the material and can demonstrate it effectively through exams or assignments. The flipped classroom model, with its emphasis on active learning and personalized instruction, has been shown to positively impact academic achievement. Research by Van Alten et al. (2019) demonstrated that students in flipped classrooms exhibited higher academic performance compared to their peers in traditional settings, largely due to increased engagement and interaction during class time. Similarly, the integration of digital tools and platforms into the learning process has been associated with improved academic outcomes. By providing students with access to a wealth of resources and opportunities for collaboration, SNS can play a significant role in enhancing academic achievement.

### Interrelationship Between Flipped Classroom Pedagogy, SNS Usage, and Academic Achievement

The integration of SNS into the flipped classroom model presents a unique opportunity to enhance academic achievement. SNS platforms can serve as extensions of the classroom, enabling students to access instructional content, engage in discussions, and collaborate on projects beyond school hours. For example, teachers can use YouTube to deliver lecture videos, Facebook groups for class discussions, and WhatsApp for sharing assignments and providing feedback (Gikas & Grant,

2013). These platforms can also facilitate peer-to-peer learning, where students can support each other by sharing insights and resources. However, the effectiveness of SNS as a mediating tool depends on its usage patterns. While educational use of SNS can support the flipped classroom model and enhance learning outcomes, excessive use for nonacademic purposes can lead to distractions and negatively impact academic performance (Khan et al., 2021). Therefore, it is crucial to establish guidelines for SNS usage to ensure that it aligns with educational objectives. Understanding the balance between leveraging SNS for educational purposes and mitigating potential distractions is key to optimizing their role in the flipped classroom model. Flipped classroom pedagogy, when combined with the strategic use of social network sites, holds significant potential for enhancing academic achievement among higher secondary students. By redefining the roles of in-class and out-of-class activities and leveraging SNS as mediating tools, educators can create a more engaging, collaborative, and personalized learning environment. However, the success of this integration depends on thoughtful implementation, clear guidelines, and ongoing assessment to ensure that the use of SNS supports educational goals rather than detracts from them. Further research is needed to explore best practices for integrating SNS into flipped classrooms and to understand the long-term effects on academic achievement.

### **Objectives of the Study:**

1. To explore the relationship between Flipped Classroom Pedagogy and Academic Achievement.
2. To examine the relationship between Flipped Classroom Pedagogy and the Usage of Social Network Sites (SNS).
3. To analyze the mediating role of the Usage of Social Network Sites (SNS) in the relationship between Flipped Classroom Pedagogy and Academic Achievement.

### **Hypotheses:**

- H1:** There is a significant positive relationship between Flipped Classroom Pedagogy and Academic Achievement of students at the higher secondary level.
- H2:** There is a significant positive relationship between Flipped Classroom Pedagogy and the Usage of Social Network Sites (SNS) among students at the higher secondary level.
- H3:** The Usage of Social Network Sites (SNS) significantly mediates the relationship between Flipped Classroom Pedagogy and Academic Achievement of students at the higher secondary level.

### **Literature Review:**

The rapid integration of technology in educational settings has led to transformative changes in how teaching and learning occur. Among the emerging pedagogical innovations, the flipped classroom model has gained prominence for its potential to enhance student engagement and improve academic achievement. The flipped classroom inverts traditional teaching methods by delivering instructional content outside the classroom, usually through videos, while in-class time is dedicated to active learning activities (Bergmann & Sams, 2012). In parallel, the use of Social Network Sites (SNS) in educational contexts has become more prevalent, providing a platform for students to collaborate, interact with peers, and share learning resources. The role of SNS as a mediator in the flipped classroom has garnered increasing attention, particularly in relation to academic achievement. This literature review explores the definitions and key findings associated with flipped classroom pedagogy, SNS usage, and academic achievement, focusing on the potential mediating role of SNS in flipped classrooms.

### Flipped Classroom Pedagogy: Definition and Effectiveness

The flipped classroom model represents a pedagogical shift from traditional face-to-face instruction to a more student-centered approach. According to Bishop and Verleger (2013), this approach involves the delivery of instructional content outside the classroom (e.g., via video lectures), and the in-class time is used for activities that promote deeper learning, such as discussions, problem-solving exercises, and collaborative group work. This model emphasizes active learning and student engagement, key principles derived from constructivist learning theories (Lage, Platt, & Treglia, 2000). By flipping the traditional model, educators aim to create more opportunities for personalized learning and enhance student participation. Research on the flipped classroom suggests positive impacts on student engagement and academic outcomes. Chen et al. (2018) found that flipped classrooms, especially in STEM fields, significantly improve student learning by increasing interactivity and enabling more individualized support. Furthermore, Lo and Hew (2017) observed that the use of flipped classrooms enhances student collaboration and fosters a deeper understanding of subject matter compared to traditional teaching methods. The model encourages students to take responsibility for their own learning, which leads to higher retention and a better grasp of complex concepts (Gannod, Burge, & Helmick, 2008). In a meta-analysis of flipped classrooms, Van Alten et al. (2019) reported that flipped classrooms improve both student engagement and academic achievement, particularly in settings where active learning strategies are integrated. This is supported by O’Flaherty and Phillips (2015), who found that flipped classrooms promote a more interactive and student-centered learning environment, leading to better academic performance. However, the effectiveness of flipped classrooms can be influenced by various factors such as the quality of instructional content, student preparedness, and the nature of in-class activities (Hew et al., 2021).

### Social Network Sites (SNS) in Education

SNS such as Facebook, Twitter, Instagram, and YouTube are integral to students' social lives and are increasingly being used in educational contexts. Manca and Ranieri (2016) suggest that SNS can enhance educational experiences by providing students with additional avenues for communication, collaboration, and resource sharing. These platforms allow students to form learning communities, engage in discussions, and access educational materials, which can enhance both academic engagement and achievement (Junco, 2012). The potential of SNS in educational settings has been explored in numerous studies. Al-Rahmi et al. (2018) found that SNS use fosters collaborative learning environments where students can exchange ideas, clarify doubts, and engage in group activities that enhance their understanding of course material. Manca and Ranieri (2016) emphasize that SNS provide a space for informal learning, which complements formal classroom instruction and encourages continuous learning outside of class. However, the relationship between SNS usage and academic performance is multifaceted. While Junco (2012) found a positive relationship between the use of SNS for academic purposes and student engagement, excessive SNS use for non-academic purposes has been linked to negative academic outcomes. Huang et al. (2020) highlighted that students who spend excessive time on SNS for non-academic purposes tend to perform poorly academically. Thus, the key to optimizing SNS usage lies in ensuring that students use these platforms for educational purposes, as suggested by Wang et al. (2018), who found that clear guidelines and structured use of SNS for learning can lead to better academic outcomes.

### SNS as a Mediator in the Flipped Classroom Model

SNS can serve as a powerful mediator in the flipped classroom model, helping to bridge the gap between out-of-class learning and in-class activities. Gikas and Grant (2013) argue that SNS platforms, by enabling continuous communication and collaboration among students, can enhance the effectiveness of the flipped classroom. Through SNS, students can engage in preclass discussions, share resources, and participate in group projects, thereby reinforcing the content they encounter outside the classroom. The mediation of SNS in flipped classrooms is critical in promoting deeper learning. Al-Rahmi et al. (2018) found that SNS facilitate peer-to-peer learning, which enhances the understanding of course material and encourages critical thinking. SNS allow students to ask questions, engage in discussions, and collaborate on assignments before coming to class, ensuring that in-class time is used more effectively for active learning. According to Gikas and Grant (2013), students who engage in discussions on SNS platforms before attending flipped classroom sessions are better prepared to participate in problem-solving activities during class, leading to improved academic performance. Further research by Chen and Jang (2018) supports the view that SNS can enhance self-regulated learning in flipped classrooms. Self-regulated learning, which involves setting learning goals, monitoring progress, and adjusting learning strategies, is essential in the flipped classroom setting, where much of the learning happens outside of class. SNS platforms provide students with spaces to reflect on their learning, receive feedback, and access additional resources, thereby supporting self-regulation and enhancing academic outcomes. Moreover, Hew et al. (2021) argue that SNS enable students to engage with learning materials asynchronously, allowing them to learn at their own pace and revisit content as needed. This flexibility is particularly important in the flipped classroom model, where students often have different levels of prior knowledge and learning speeds. Zimmerman (2002) suggests that students who are able to regulate their learning through tools like SNS tend to perform better academically.

### Academic Achievement: Influences and Measurement

Academic achievement is a key outcome that educators seek to enhance through innovative pedagogies like the flipped classroom. It is typically measured through assessments, exams, grades, and other evaluations of student performance. Research has consistently shown that flipped classrooms can lead to better academic achievement. Bishop and Verleger (2013) reported that flipped classrooms result in higher grades, better exam scores, and greater satisfaction among students compared to traditional instruction. Furthermore, flipped classrooms promote the development of critical thinking, problem-solving, and collaboration, all of which contribute to academic success (Van Alten et al., 2019). The relationship between SNS usage and academic achievement is nuanced. On the one hand, Junco (2012) found that students who engage with SNS for academic purposes, such as participating in online study groups or accessing course-related resources, tend to achieve higher academic outcomes. On the other hand, Huang et al. (2020) caution that excessive use of SNS for non-academic purposes can detract from students' study time and negatively impact their academic performance. This suggests that while SNS can be a powerful tool for enhancing academic achievement, their potential to improve performance is contingent upon their appropriate use in educational contexts. The flipped classroom model, when combined with the strategic use of SNS, holds significant potential for improving academic achievement. SNS provide a valuable tool for enhancing student engagement, promoting collaboration, and supporting self-regulated learning, which are essential components of successful flipped classrooms. The research reviewed in this literature highlights the positive effects of flipped classrooms on academic achievement, with SNS playing a key mediating role in facilitating

collaboration and reinforcing learning outside the classroom. However, to maximize the effectiveness of SNS in the flipped classroom model, clear guidelines must be established to ensure that students use SNS platforms for educational purposes. Further research is needed to explore the long-term impact of SNS usage on academic outcomes and to identify best practices for integrating SNS into flipped classroom pedagogy.

### **Research Methodology:**

#### **Research Method:**

A survey-based research method was employed for this study. Surveys were designed to collect quantitative data from students at the higher secondary level. This method allowed for the systematic gathering of information regarding the usage patterns of Social Network Sites, Big Five Personality Traits, and Academic Achievement. The survey instruments included self-developed tools specifically tailored to measure the constructs of interest, ensuring the collection of relevant and reliable data for hypothesis testing.

#### **Research Design:**

A quantitative research design was adopted for this study to investigate The Influence of Flipped Classroom Pedagogy on Academic Achievement of Students at Higher Secondary Level: Usages of Social Network Sites as a Key Mediator. This design allowed for the collection and analysis of numerical data to test the relationships between these variables and the mediating effects of academic performance. A correlation approach was employed to examine how SNS usage patterns relate to personality traits and academic success, providing a robust framework for hypothesis testing and statistical analysis.

#### **Population:**

The total population for this study consisted of higher secondary school students in District Attock. There were 12 higher secondary schools for boys and 10 higher secondary schools for girls. The total number of male students was 9,024, while the total number of female students was 8,855. These students formed the target population for investigating the relationship between Social Network Sites usage, Big Five Personality Traits, and Academic Achievement.

#### **Sample and Sampling Technique:**

The sample for this study comprised 450 students enrolled in higher secondary schools in District Attock. A simple random sampling technique was employed to select the participants. This technique ensured that every student had an equal chance of being included in the study, thus minimizing selection bias and enhancing the generalizability of the findings. By using random sampling, the study aimed to obtain a representative sample that reflects the characteristics of the broader student population in the district.

#### **Research Tool:**

Self-developed questionnaires were used as research tools. One of them was Usage of Social Network Sites (USNSs). A research tool is vital for collecting accurate and reliable data that aligns with the study's objectives. It ensures valid measurement of variables, minimizes biases, and enhances the credibility of findings. A well-designed tool is crucial for meaningful analysis and robust conclusions.

### Reliability of Research Tool:

Table 1: Factor / Variable / Item-wise Internal Consistency of USNSs Tool

<b>Variable</b>	<b>No. of Items</b>	<b>Cronbach's Alpha (<math>\alpha</math>)</b>	<b>Level of Internal Consistency</b>
<b>Facebook</b>	05	0.965	Excellent
<b>WhatsApp</b>	06	0.969	Excellent
<b>Instagram</b>	06	0.979	Excellent
<b>Twitter</b>	06	0.979	Excellent
<b>TikTok</b>	06	0.974	Excellent
<b>Overall (USNSs)</b>	29	0.917	Excellent

The reliability analysis of the Usage of Social Network Sites (USNSs) tool reveals excellent internal consistency across all subscales, with Cronbach's alpha values ranging from 0.965 to

0.979, indicating a highly reliable instrument. Specifically, the subscales for Facebook ( $\alpha = 0.965$ ), WhatsApp ( $\alpha = 0.969$ ), Instagram ( $\alpha = 0.979$ ), Twitter ( $\alpha = 0.979$ ), and TikTok ( $\alpha = 0.974$ ) each demonstrate excellent reliability, ensuring the tool consistently measures social media usage behaviors. The overall USNSs scale, with a Cronbach's alpha of 0.917, further confirms the tool's excellent internal consistency. These results suggest that the USNSs instrument is dependable for accurately capturing students' social media usage patterns in the context of this study.

### Validity of Research Tool:

**Content validity** of the research tool was found by sharing it with five experts of the field of educational research. Their recommendations are adopted to make the research tool more effective.

### Exploratory Factor Analysis of USNSs (Research Tool)

Exploratory Factor Analysis (EFA) was conducted to evaluate the construct validity of the Usage of Social Network Sites (USNSs) research tool. Initially, the tool consisted of 5 variables/factors, with a total of 29 items before performing the EFA. Data was collected from 450 respondents, and the responses were organized in an Excel sheet for further analysis. SPSS Statistics 25 was used to carry out the EFA. Each variable was labeled appropriately, such as for Facebook, with items named F1, F2, F3, F4, and F5. This same naming convention was applied to the remaining four variables and their corresponding items.

Factor Analysis Table 2: KMO and Bartlett's Test Result of USNSs

<b>KMO and Bartlett's Test</b>	<b>Value</b>
<b>Kaiser-Meyer-Olkin Measure of Sampling Adequacy</b>	0.868
<b>Bartlett's Test of Sphericity</b>	Approx. Chi-Square
<b>Degrees of Freedom (df)</b>	406
<b>Significance (Sig.)</b>	0.000

The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy was 0.868, indicating that the sample size is suitable for conducting factor analysis. Bartlett's Test of Sphericity produced a chi-



square value of 36,885.894 (df = 406, p < 0.001), which was statistically significant, supporting the appropriateness of factor analysis for the dataset.

**Data Analysis:**

The study aimed to determine the impact of the independent variable on the dependent variable; hence, the correlation coefficient was employed to assess the relationship between the two variables. IBM SPSS (PROCESS macro by Andrew Hayes) was employed to investigate the mediating effect of academic achievements in the “Relationship Between Social Network Sites Usage and Big Five Personality Traits of Students at Higher Secondary Level students”.

**Demographic Variable:**

Table: 3 Genders of Respondents

Gender of Respondents				
		Frequency	Percent	Valid Percent
Valid	Male	243	51.7	51.7
	Female	227	48.3	48.3
	Total	470	100	100

The gender distribution of the responses indicates that 243 (51.7%) were male and 227 (48.3%) were female, from a total sample size of 470. This signifies a comparatively equitable representation of both genders in the study, guaranteeing varied perspectives in the analysis.

Table: 4 Relationships between Flipped Classroom and Academic Achievement

Correlations			
		Flipped_Classroom	Academic_Achivement
Flipped Classroom	Pearson Correlation	1	.848**
	Sig. (2-tailed)		.000
	N	300	300
Academic_Achivement	Pearson Correlation	.848**	1
	Sig. (2-tailed)	.000	
	N	300	300

\*\* . Correlation is significant at the 0.01 level (2-tailed).

The correlation analysis reveals a strong, positive relationship between Flipped Classroom Pedagogy (FC) and Academic Achievement (AA). The Pearson correlation coefficient is 0.848, which indicates a significant positive correlation at the 0.01 level (p < 0.001). This suggests that as the use of flipped classroom pedagogy increases, academic achievement tends to improve as well. The significance value of 0.000 confirms that this relationship is statistically meaningful. With a sample size of 300, these results highlight the importance of flipped classroom teaching methods in enhancing students' academic performance.

Table: 5 Relationships between Flipped Classroom and Usage of SNSs

		Flipped_Classroom	Usage_SNSs
Flipped_Classroom	Pearson Correlation	1	.954**
	Sig. (2-tailed)		.000
	N	300	300
Usage_SNSs	Pearson Correlation	.954**	1
	Sig. (2-tailed)	.000	
	N	300	300

\*\* . Correlation is significant at the 0.01 level (2-tailed).

The correlation analysis shows a very strong positive relationship between Flipped Classroom Pedagogy (FC) and the Usage of Social Network Sites (SNSs). The Pearson correlation coefficient of 0.954 indicates an extremely strong correlation, with a significance level of 0.000 ( $p < 0.001$ ), confirming the relationship is statistically significant. This suggests that as the use of flipped classroom pedagogy increases, students are more likely to engage with SNSs. With a sample size of 300, these results highlight that flipped classroom methods are strongly associated with increased usage of social network sites among students.

Table: 6 Mediation of Usage of Social Network Sites in the relationship between Flipped Classroom Pedagogy and Academic Achievement.

Run MATRIX procedure:

\*\*\*\*\* PROCESS Procedure for SPSS Version 4.2 \*\*\*\*\*

Written by Andrew F. Hayes, Ph.D. [www.afhayes.com](http://www.afhayes.com)

Documentation available in Hayes (2022). [www.guilford.com/p/hayes3](http://www.guilford.com/p/hayes3)

\*\*\*\*\*

Model : 4

Y : AA

X : FC

M : SNSs

Sample Size: 470

\*\*\*\*\*

OUTCOME VARIABLE:

SNSs

Model Summary

	R	R-sq	MSE	F	df1	df2	p
	.9542	.9104	.1910	3028.1168	1.0000	298.0000	.0000 Model
	coeff	se	t	p	LLCI	ULCI	constant
.2582	.0596	4.3318	.0000	.1409	.3755		
FC	.9097	.0165	55.0283	.0000	.8772	.9423	

\*\*\*\*\*

OUTCOME VARIABLE:

AA

Model Summary

R	R-sq	MSE	F	df1	df2	p
.8486	.7200	.7071	381.9368	2.0000	297.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.2132	.1183	1.8029	.0724	-.0195	.4460
FC	.8390	.1063	7.8941	.0000	.6299	1.0482
SNSs	.0441	.1115	.3959	.6925	-.1752	.2635

\*\*\*\*\* DIRECT AND INDIRECT EFFECTS OF X ON Y \*\*\*\*\*

Direct effect of X on Y

Effect	se	t	p	LLCI	ULCI
.1063	7.8941	.0000	.6299	1.0482	Indirect

effect(s) of X on Y:

Effect	BootSE	BootLLCI	Boot	ULCI
SNSs	.0402	.0865	-.1566	.1837

\*\*\*\*\* ANALYSIS NOTES AND ERRORS \*\*\*\*\*

Level of confidence for all confidence intervals in output:

95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals: 5000

----- END MATRIX -----

The results from the PROCESS procedure (Model 4) indicate a strong relationship between Flipped Classroom Pedagogy (FC) and the usage of Social Network Sites (SNSs). Specifically, FC significantly predicts SNS usage with a high regression coefficient ( $B = 0.9097$ ,  $p < 0.001$ ), suggesting that students exposed to FC are more likely to engage with SNSs. The R-squared value of 0.9104 indicates that FC explains over 91% of the variance in SNS usage, demonstrating the substantial influence of FC on SNS behavior. Additionally, FC has a strong positive effect on academic achievement (AA), with a coefficient of  $B = 0.8390$  ( $p < 0.001$ ), meaning that FC contributes significantly to higher academic performance. However, SNS usage does not show a significant effect on AA, as evidenced by the non-significant coefficient ( $B = 0.0441$ ,  $p = 0.6925$ ). This suggests that SNS usage by itself does not explain variations in academic achievement. When testing for the indirect effect of SNS usage as a mediator between FC and AA, the results show that the effect is not significant, with a bootstrap confidence interval that includes zero (BootLLCI = -0.1566, BootULCI = 0.1837). This indicates that SNS usage does not mediate the relationship between FC and AA. In conclusion, while FC enhances both SNS usage and academic achievement independently, SNS usage does not play a mediating role in the connection between FC and improved academic performance. These findings suggest that the positive impact of FC on academic achievement is direct, rather than mediated by SNS usage.

**Findings of the Study:**

1. The findings indicate a strong positive correlation ( $r = 0.848$ ,  $p < 0.001$ ) between Flipped Classroom Pedagogy and Academic Achievement, suggesting that an increase in flipped

classroom practices is associated with improved academic performance. This relationship is statistically significant at the 0.01 level.

2. The findings show a very strong positive correlation ( $r = 0.954$ ,  $p < 0.001$ ) between Flipped Classroom Pedagogy and the Usage of Social Network Sites (SNSs). This statistically significant relationship indicates that increased implementation of flipped classroom methods is closely associated with higher SNS usage.
3. Flipped Classroom Pedagogy significantly enhances both SNS usage ( $B = 0.9097$ ,  $p < 0.001$ ) and academic achievement ( $B = 0.8390$ ,  $p < 0.001$ ). However, SNS usage does not significantly mediate the relationship between flipped classroom pedagogy and academic achievement (BootLLCI = -0.1566, BootULCI = 0.1837).

## **Discussion:**

### **Relationship Between Flipped Classroom Pedagogy and Academic Achievement**

The strong positive correlation ( $r = 0.848$ ,  $p < 0.001$ ) between Flipped Classroom Pedagogy (FCP) and Academic Achievement (AA) indicates that FCP significantly improves students' academic performance. This is supported by Abeysekera and Dawson (2015), who argue that flipped classrooms allow students to engage with content at their own pace outside class while fostering deeper in-class discussions, leading to better learning outcomes. Similarly, Chen et al. (2018) highlight that flipped classrooms improve cognitive engagement, enabling students to retain and apply knowledge more effectively. Lo and Hew (2020) also emphasize that flipped pedagogy enhances problem-solving skills and critical thinking, contributing to improved academic performance across diverse contexts. These findings align with the observed strong association in this study.

### **Relationship Between Flipped Classroom Pedagogy and Usage of SNSs**

The very strong correlation ( $r = 0.954$ ,  $p < 0.001$ ) between FCP and SNS usage highlights how flipped classrooms integrate social networking platforms to enhance learning. This relationship reflects the findings of Han and Ellis (2019), who observed that flipped classrooms often rely on SNSs for collaborative learning, peer feedback, and interactive content delivery. Similarly, Yu and Wang (2016) reported that SNSs are frequently employed in flipped classrooms to encourage real-time communication and knowledge sharing among students, thus fostering engagement. Zainuddin et al. (2019) further noted that SNSs play a vital role in flipped learning environments by enabling personalized and self-paced learning experiences, driving higher adoption of these platforms in educational settings.

### **Effect of Flipped Classroom Pedagogy on SNS Usage and Academic Achievement with Non-Significant Mediation**

The significant effects of FCP on both SNS usage ( $B = 0.9097$ ,  $p < 0.001$ ) and AA ( $B = 0.8390$ ,  $p < 0.001$ ), alongside the non-significant mediation by SNS usage (BootLLCI = -0.1566, BootULCI = 0.1837), align with existing literature. Tse et al. (2018) found that flipped classrooms directly improve academic performance through active engagement and interactive teaching methods, with SNS usage serving as a supplementary tool. Similarly, Stockwell et al. (2017) demonstrated that while SNSs enhance collaboration and resource sharing, their indirect effects on academic outcomes are minimal. Hung (2017) further emphasized that flipped pedagogy's direct benefits, such as fostering active learning and critical thinking, outweigh the indirect contributions of SNS usage, explaining the observed non-significant mediation in this study.

### Recommendations:

1. The strong positive correlation ( $r = 0.848$ ,  $p < 0.001$ ) between Flipped Classroom Pedagogy and Academic Achievement suggests that flipped classroom practices significantly enhance academic performance. **Hence, it is recommended** to integrate flipped classroom approaches into the curriculum to improve students' academic outcomes, with a focus on active learning strategies and interactive activities.
2. A very strong positive correlation ( $r = 0.954$ ,  $p < 0.001$ ) exists between Flipped Classroom Pedagogy and the Usage of Social Network Sites (SNSs), indicating increased SNS usage in flipped learning environments. **Hence, it is recommended** to utilize SNS platforms like WhatsApp, Facebook, and educational apps to complement flipped classroom pedagogy and promote collaboration and engagement among students.
3. Flipped Classroom Pedagogy significantly improves SNS usage ( $B = 0.9097$ ,  $p < 0.001$ ) and academic achievement ( $B = 0.8390$ ,  $p < 0.001$ ), but SNS usage does not significantly mediate the relationship between flipped classroom pedagogy and academic achievement. **Hence, it is recommended** to focus on strengthening the direct implementation of flipped classroom methods rather than relying heavily on SNS-mediated learning to maximize academic performance.

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