Journal of Policy Research, 8(3), 272-277
https://jprpk.com
https://doi.org/10.5281/zenodo.7265575

Flipped Classroom Approach and University Student's Academic Performance

Sarwat Sultana[1], Abdul Raheem[2], Wali Muhammad[3], Armando D. Del Mundo[4], Syed Zubair Haider[5]

Abstract

A cutting-edge approach to higher education, the flipped classroom meets the demands of university students while simultaneously fostering their capacity for higher-order reasoning and problem-resolving. This study explored the influence of the flipped classroom technique on student educational achievement to better identify students' prospects in blended learning circumstances. Statistics were gathered via structured questionnaire surveys given to various students in three departments at the Balochistan and Quaid-i-Azam universities, Pakistan (Management Sciences, Computer Science, and Education). 250 university students from both urban and rural backgrounds completed the survey, which had two sections: demographics and measurement items. The measurement items used a 5-point Likert tier with 29 queries fluctuating from "1, strongly disagree," to "5, strongly agree." Employing a flipped-class structure in schooling technology was advantageous and frequently showed improved student academic accomplishment when compared to the conventional lecture-based strategy. According to statistical data, students fared better when doing their homework and assignments during class meetings and discussions as well as their video lectures at home. Students preferred flipped learning to regular lectures. The flipped classroom is a fantastic teaching method that has a significant positive impact on student academic learning consequences. Additionally, because the flipped classroom approach can increase students' motivation and academic success, students respond favourably to it. The flipped classroom approach is also compatible with the expanding use of adaptive learning and educational technology in the classroom. The use of technology and the primary teaching technique in the educational process can therefore have a favourable effect on students' academic achievement.

***Keywords*:** Flipped Classroom, Academic Performance, educational achievement

1. Introduction

Recent years have seen quick and well-organized shifts in the structure of education systems all around the world. The outcomes of these sorts of reforms will determine the degree to which developed and developing countries are interested in rethinking and introducing novel approaches to the learning and instructing processes. To keep up with the rapid pace of change brought on by the tremendous shifts in the informational and knowledge domains, several countries have attempted to make structural improvements to their instructional methods.

It's crucial to comprehend how a flipped classroom operates before looking at its larger effects. To shift learning responsibilities from teachers to students, the flipped classroom restructures how time is spent both within and outside of the classroom. An alternative to the standard lecture format enables more project-based, hands-on learning. Students strive toward a same objective (Alexander et al., 2019). Learners have viewed the video lecture and finished their readings before class. Throughout the lesson, students put their recently acquired abilities to use. This aids in reinforcing and putting knowledge to use. Not the activity itself, but how interactive and student-centered it is, should determine how important an activity is during class time. The other two elements of flipped learning are built upon this all-encompassing method of instruction. Students in high school, college, or university are not now the subject of research.

The issue the learner was having wasn't resolved using the suggested learning strategies. In flipped classes, students had a hard time picking up theoretical knowledge. This text discusses learning pauses, grasping the course information, and motivation. Students argued over whether they should learn more about certain subjects outside of class and insisted on hearing the instructor cover the fundamentals first. Experts recommended active learning in the classroom rather than assigning tasks for pupils to complete outside of the classroom or at home.

According to the study, kids don't do their work as attentively outside of school as they do within. Due to this, the flipped classroom paradigm cannot be used outside of the classroom or on school property. Cruz (2019) asserts that the FC model exhibits both the positive and negative characteristics that relate to academic performance or achievement of students learning under these principles.

The flipped classroom is becoming a more popular learning environment choice among students and teachers. Because of the popularity of collaborative movies, in-class events, and digital conferencing technology, flipped teaching space are more prevalent in American schools (Johnston, 2016). Some people think that the most effective method to

[1] Corresponding Author, MPhil Education and Leadership Management, Pakistan, Email: sultanasarwat89@gmail.com
[2] Department of Disaster Management & Development Studies, University of Baluchistan, Quetta, Baluchistan, Pakistan
[3] Lecturer, Faculty of Social Sciences and Humanities, Baluchistan University of Information Technology Engineering and Management Sciences, Quetta, Baluchistan, Pakistan
[4] Quality Assurance Officer/ IT Laboratory Instructor, University of Technology and Applied Sciences-Salalah, Oman
[5] Assistant Professor, Department of Educational Training, The Islamia University of Bahawalpur, Pakistan

incorporate technology into the educational system is to use flipped classrooms. Others dispute it (Cabi, 2018). The flipped classroom has been investigated in relation to info systems (Davies et al., 2013), engineering, sociology, and humanities (Kim et al., 2014), math and English composition studying (Yilmaz Zengin, 2017).

Investigators and educators have put a lot of effort into finding fresh approaches to include students in the classroom. Flipped classrooms will expand more widely in higher education in the coming years, claim (Yildrim and Kiray 2017). The outmoded face-to-face teaching model is spun on its head by integrated learning. This paradigm develops a new method of teaching and learning using the technology now in use. It instructs students in theoretical material outside, and in class, they put what they've learnt to use (Strayer, 2012; Bergmann and Sams, 2012). In a flipped lecture hall, scholars' do their work at home and learn about assignment simulations.

This study attempted to determine whether the standard classroom teaching method, which prioritizes lectures and provides few opportunities for student involvement, was causing a decline in student engagement and academic achievement. To see if a flipped classroom could benefit secondary pupils, researchers examined how it affected their involvement and academic performance. In this study, academic performance in flipped and conventional classes was compared. The researcher gained a greater awareness of the advantages of the flipped classroom method by seeing how it altered students' learning experiences. This study topic was chosen because, given additional time in class to review pre-recorded videos and engage in activities, it would enable students to take more possession of their education. The effectiveness and excitement of the pupils using this cutting-edge teaching strategy may increase (van Alten et al., 2019).

The goal of this investigation is to ascertain how the flipped classroom strategy affects students' perceptions of their learning process, growth, and motivation levels over the course of the curriculum.

2. Methodology

The commissioning of a study on the students' overall academic achievement included the flipped classroom learning strategy. In order to obtain data for this exploratory experiment, the researcher largely used a questionnaire. Because there is no information available regarding the relationship between students' academic progress and their participation in flipped classrooms, it was vital for students to take part in the study. The research was quantitative, and a bi-annexed survey was used to evaluate the academic performance of scholars who were enrolled in Pakistan's Balochistan and Quaid-i-Azam universities (demographics and measurement items, using a five-point Likert scale ranging from "1, strongly disagree," to "5, strongly agree"). Pupils attending Balochistan and Quaid-i-Azam universities who were majoring in computer science, education, or management were the intended recipients of the information. The researcher had a terrible time and came close to giving up trying to get in touch with each and every member of the target group. The researcher planned to sample members of the target population after determining an adequate sample size with the help of Gay's method. Gay et al. (2009) claim that if there are 5,000 people in the population being examined, the full population is irrelevant and that a sample of up to 400 respondents is almost thought to be adequate. This was found in their study on the topic. The degree of homogeneity or heterogeneity of the target population is another factor that can affect the size of the sample.

Table 1: Gay's Sample Size Distribution

Population	Sampling size
< 100	Whole population
~ 500	Half of population
~ 1,500	$1/5^{th}$ of population
> 5,000	Total 400

A random sampling method was used, which is ideal for leading survey studies in situations where the populace is already known. In accordance with the guidelines outlined by the Gay approach, a total of 1218 respondents were included in the sample, and 250 of those respondents were selected at random.

Table 2: Population Distribution (Students)

Population	Department of Education	Department of Management Sciences	Department of Computer Science	Total
University of Baluchistan	72	38	38	148
Quid-i-Azam University	60	410	600	1070
Total of Students	132	448	638	1218

The researcher distributed survey questionnaires to acquire data from those who answered. The investigator was able to gather more accurate info regarding the flipped classroom method and the scholastic performance of the students as a consequence of the investigator's own development of a questionnaire. In order to conduct an assessment of the data obtained from the responses to the survey, analytic procedures such as SPSS were utilized. The researcher is given the ability to collect and evaluate the necessary data through the use of SPSS analysis.
An example of the survey is presented below.

3. Results

3.1. Demographic Data

The demographic information provided by respondents was collected into a table format in order to illustrate the pattern of demographic features. The respondent's gender, residency or location, and department were the three demographic characteristics that were found to be most important to the study. The following tables show examples of how the demographic data of the respondents was evaluated depending on the qualities that were discussed earlier in this section.
According to the data in the tables, there were a total of 250 respondents who disclosed their gender in the questionnaires that were distributed. Male students were 138, which accounts for 55.2%, and females were 112, which accounts for 44.8%. In addition, there were 59 respondents from the department of management science, representing 23.6% of the community, 110 respondents from the department of education, representing 44%, and 81 respondents from the department of computer science, representing 32.4%. According to the findings of the survey, 136 respondents were from metropolitan regions, which represented 54.4%, and 114 respondents were from rural areas, which represented 45.6% of the total. 140 people from University of Balochistan, Quetta participated, which accounts for 56% of the total, and 110 people from Quaid-i-Azam University, Islamabad, Pakistan participated, which accounts for 44% of the total.

Table 3: The Demographic Statistics of Investigation Respondents

Factors		f	(%)	Valid (%)	Cumulative (%)
Gender	Male	138.00	55.20	55.20	55.20
	Female	112.00	44.80	44.80	100.00
Department	Management Science	59.00	23.60	23.60	23.60
	Education	110.00	44.00	44.00	67.60
	Computer Science	81.00	32.40	32.40	100.00
Residence	Urban	136.00	54.40	54.40	54.40
	Rural	114.00	45.60	45.60	100.00
University	University of Balochistan, Quetta	140.00	56.00	56.00	56.00
	Quaid-i-Azam University, Islamabad, Pakistan	110.00	44.00	44.00	100.00

3.2. Descriptive Statistical Analysis

Table 4 lists the number of observations, together with the mean, highest and lowest values, and the standard deviation. Both dependent and independent variables were used in this investigation. Table 4 is available here and provides a wide descriptive statistic of the Flipped Classroom Approach and students' speculative performance. These pupils were drawn from three distinct departments. 250 college students participated in the research in Pakistan, where it obtained comprehensive data. The Flipped Classroom Approach has a minimum value of 15.08 and a maximum value of 60.38. The range of values is from 15.08 to 60.38, and the mean value is 40.66. On the Students' Academic Performance scale, the lowest possible score is 18.06, the highest possible score is 75.31, and the mean score is 51.60. While the standard deviation for the flipped classroom approach is 9.15, the standard deviation for students' academic performance is 10.48.

Table 4 Descriptive Data

	N	Min	Max	Avg	Std. Deviation
Flipped Approach	250	15.08	60.38	40.66	9.15
Pupil’s Academic Performance	250	18.06	75.31	51.60	10.48
Valid N	250				

3.3. Correlation

The researcher is able to establish the nature of the connection that exists between the various variables through the use of correlation. It's possible that the nature of the relationship is positive, negative, or neutral. And one more issue

is that the range of correlation is not infinite. The maximum possible range is +1, while the minimum possible range is -1. If the value of the correlation is close to +1 or it is +1, then the relationship between the variables is considered to be positive. On the other hand, if the correlation estimate is near to -1 or it is -1, then the relationship is considered to have a strong negative correlation. If the correlation value is 0, there is neither a positive nor a negative correlation; rather, the situation is neutral. Another thing to keep in mind is that while conducting correlation evaluation, the 2 variables may indicate both a positive and a negative quick association. It was discovered that there is a connection among the Flipped Classroom Approach and the scholastic achievement of students, as well as the information that was collected and evaluated using the Statistical Package for the Social Sciences (SPSS). The list of students' academic accomplishments that follows is as follows: Through the use of correlation analysis, we were able to analyze the connection that exists between the variables and the results. According to the results presented in the table that can be seen above, there is a correlation amongst the self-regulating variable "Flipped Classroom Approach" and the contingent variable "Students' Academic Performance." The coefficient of correlation is calculated to be 0.824. It may be deduced from the fact that there is a positive correlation between the Flipped Classroom Approach and the academic achievement of students that the Flipped Classroom Approach has ensued in an advancement in students' academic performance.

Table 5: Correlation Analysis

	Correlation	**Flipped Approach**	**Pupil's Performance**
Flipped Approach	Pearson	1.00	0.82**
	Sig. (2-tailed)		0.00
	N	250.00	250.00
Pupil's Performance	Pearson	0.82**	1.00
	Sig. (2-tailed)	0.00	
	N	250.00	250.00

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

3.4. Regression Analysis

When a investigator has to anticipate the transformation in one mutable with respect to the change in another variable, they turn to regression analysis to help them make those predictions. Regression evaluation is employed to forecast the reasons and impacts of the variables. The relationship amongst the dependent and independent variables can be seen through the use of coefficient intercepts. The general rule of thumb is that a relationship is considered to be inconsequential if the value is larger than 5%, but the relationship is considered to be significant if the value is less than 5%. Through the use of regression analysis, it was shown that there is a substantial positive link between the Flipped Classroom Approach and the Academic Performance of Students (= 0.943, t = 22.889, P 0.05). The implementation of flipped classroom strategies had a statistically significant impact on the academic performance of students (R2 = 0.679, F = 523.893, P 0.05). Due to the fact that the P-value of the Flipped Classroom Approach is lower than the required alpha of 0.05, the findings are statistically significant. The P-value for the subject of Students' Academic Performance is lower than 0.05, which indicates that the finding is statistically significant. According to the R-squared statistic, our independent variable, which is expressed as 67 percent, has an influence on the dependent variable.

Table 6: Regression Analysis-Coefficients of Determination

Model	**R**	**R^2**	**Adjusted R^2**	**Std. Estimate Error**
1.	0.82	0.68	0.68	5.95

Table 7: Regression Analysis-ANOVA

Model		**SS**	**df**	**MS**	**F**	**P**
1.	Regression	18551.16	1	18551.16	523.90	0.00
	Residual	8781.74	248	35.41		
	Total	27332.897	249			

Table 8: Regression Coefficients

Model		**Unstd. Coefficients**		**Std. Coefficients**	**t**	**P**
		B	Std. Err	β		
1.	(Constant)	13.26	1.72		7.72	0.00
	Flipped Approach	0.94	.04	.82	22.89	0.00

Dependent Variable: Pupil's Performance

4. Conclusion

The students' overall performance improved when they completed their lectures by watching video teachings at home and completing their homework and preps in class as we conversed them. The results of a comparison between flipped classrooms and conventional lecture formats showed that flipped education results in higher student academic performance than conventional learning scenarios. Students chosen this scheme of learning to the more orthodox lecture-based education. The flipped classroom is an exceptional teaching scheme that has a beneficial effect on the academic learning results of the students.

References

Alexander, B., Ashford-Rowe, K., Barajas-Murph, N., Dobbin, G., Knott, J., McCormack, M., ... & Weber, N. (2019). *Horizon report 2019 higher education edition* (pp. 3-41). EDU19.

Bergmann, J., & Sams, A. (2012). *Flip your classroom: Reach every student in every class every day*. International society for technology in education.

Cabı, E. (2018). The impact of the flipped classroom model on students' academic achievement. *International Review of Research in Open and Distributed Learning*, *19*(3). https://doi.org/10.19173/irrodl.v19i3.3

Cruz, L.M.D. (2019). Flipped Classroom Model as Inverted Teaching Strategy in Senior High School Research Subjects. Context.

Davies, R. S., Dean, D. L., & Ball, N. (2013). Flipping the classroom and instructional technology integration in a college-level information systems spreadsheet course. *Educational Technology Research and Development*, *61*(4), 563-580. https://doi.org/10.1007/s11423-013-9305-6

Gay, L. R., Mills, G. E., & Airasian, P. W. (2009). *Educational research: Competencies for analysis and applications*. Merrill/Pearson.

Johnston, B. M. (2017). Implementing a flipped classroom approach in a university numerical methods mathematics course. *International Journal of Mathematical Education in Science and Technology*, *48*(4), 485-498. https://doi.org/10.1080/0020739x.2016

Kim, S. H., Park, N. H., & Joo, K. H. (2014). Effects of flipped classroom based on smart learning on self-directed and collaborative learning. *International journal of control and automation*, *7*(12), 69-80. https://doi.org/10.14257/ijca.2014.7.12

Strayer, J. F. (2012). How learning in an inverted classroom influences cooperation, innovation and task orientation. *Learning environments research*, *15*(2), 171-193. https://doi.org/10.1007/s10984-012-9108-4

Tomlinson, C. A., & McTighe, J. (2006). *Integrating differentiated instruction & understanding by design: Connecting content and kids*. ASCD.

Van Alten, D.C., Phielix, C., Janssen, J., & Kester, L., (2019). Effects of flipping the classroom on learning outcomes and satisfaction: A meta-analysis. Educational Research Review, 28, 100281.

Vygotsky, L. S., & Cole, M. (1978). *Mind in society: Development of higher psychological processes*. Harvard university press.

Yildirim, F. S., & Kiray, S. A. (2016). Flipped classroom model in education. *Research Highlights in Education and Science*, *2*, 1-8.

Zengin, Y. (2017). Investigating the use of the Khan Academy and mathematics software with a flipped classroom approach in mathematics teaching. *Journal of Educational Technology & Society*, *20*(2), 89-100.

Appendix

QUESTIONNAIRE	
Research Questionnaire for Students Dear respondent, This survey aims to investigate the "impact of Flipped Classroom Approach on Student's Academic Performance at the university level". The data that you will give will be utilized distinctly for educational purposes and will be kept confidential. So, you are kindly requested to provide the correct data. If you are unsure about a question, please make your best effort to choose the most reasonable answer.	
DEMOGRAPHIC INFORMATION	
1. Please indicate your gender	**2 Department**
a. Male b. Female	a. Computer Science b. Engineering c. Social Sciences d. Other, please specify..
3. Residence/locality	**4 University name**
a. Urban b. Rural,	a. University of Baluchistan b. Quidi-Azam University

Please tick your answer						
S#	**Questions**	**Strongly Disagree**	**Disagree**	**Undecided**	**Agree**	**Strongly agree**
1	This approach allows me to ask more ‘questions inside the classroom.					
2	I wish more instructors used this approach.					
3	‘This approach attracts my attention to the learning and teaching process.					
4	With this approach, we have to do more ‘work out of the classroom.					
5	This approach can be a suitable teaching strategy.					
6	This approach can improve interest in exploring topics.					
7	‘This approach is more engaging than the traditional classroom.					
8	This approach gives me less class time to practice the concepts of the course.					
9	This approach, along with the delivery of content outside class and problem-solving in class, is an instructional method appropriate for my specialization.					
10	This approach can improve interest in the class.					
11	This approach gives me greater ‘Opportunities to communicate with other students.					
12	I would recommend this approach to a friend.					
13	Flipped courses did not limit my interaction with instructors.					
14	‘With flipped classroom approach, I feel more prepared for my exam.					
15	‘This approach encourages me to practice critical and creative thinking.					
16	Learning foundational content before class greatly enhances my understanding of the material.					
17	I feel that watching videos and taking notes contribute efficiently to my learning.					
18	I like watching the lessons on video.					
19	I try to learn as much as possible while ‘watching the videos.					
20	I frequently pause or repeat parts of the Videos to increase my understanding of the material.					
21	This approach allows me to ask more questions inside the classroom.					
22	I felt prepared to complete course tasks in class after listening to the video content.					
23	This approach reduces the effort to understand the basic knowledge of the subject matter.					
24	I am more motivated to learn the concepts of course via this approach.					
25	This approach improved collaborative earning.					
26	I got the ability to self-pace my learning with flipped courses.					
27	believe that I can learn the material with this approach instruction better than with traditional lecture-based instruction.					
28	This approach matches my learning style.					
29	This approach to learning has reduced my dependency on the instructor.					