Flip Classroom Instructional Approach: New Sphere of Teaching Methodology

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ABSTRACT
The past few decades have seen several methodologies and teaching techniques used in the classroom for secondary education worldwide. The COVID-19 pandemic has significantly transformed the education sector, compelling a swift transition to virtual learning and challenging traditional educational paradigms. One of the central themes of NEP 2020 is the idea of ICT-based classrooms and digital pedagogy. This paper aimed to investigate the effects of the traditional method and flip classroom instructional approach on the Achievement of students in learning science. The sample size consisted of 50 students selected based on matching by pretest scores, in which 25 students were in each group of control and experimental group. In this study data gathering tools included pretest and posttest achievement tests in science. For the analysis of data, the researcher has used t-tests and ANOVA for the present study. The result shows that the mean score of Achievement in science in the experimental group was significantly higher than that in the control group. Thus, it can be concluded that theFlip classroom instructional approach in learning practice created more impact on the engagement of students and their achievement in comparison to the traditional method of teaching.

Keywords: Flip Classroom Instructional Approach, Traditional Method, NEP-2020, Science Education, Achievement

INTRODUCTION
The Covid-19 pandemic has brought about significant changes in various sectors, notably affecting the business and education sectors. The sudden and global nature of the pandemic necessitated a rapid shift to virtual environments, impacting students and educators alike. Chiu (2021) notes that this unforeseen challenge compelled students to adapt to virtual classes, altering the traditional teaching and learning dynamic. This shift was not merely a temporary fix but led to a reevaluation and redesign of educational practices to meet the demands of remote learning environments. The necessity of continuing education in the face of global lockdowns and social distancing measures required innovative approaches to maintain engagement and effectiveness in learning.

The scale of the impact on education was massive. According to Ehsanifard et al. (2020), in 2020, 94% of learners globally experienced disruptions due to the pandemic. This statistic highlights the extensive reach of Covid-19's effects, touching nearly every learner worldwide. Among these affected learners were 1.58 billion children and youth across primary, secondary, and higher education levels in approximately 200 countries. This disruption forced educational institutions to rapidly develop and implement remote learning strategies, which varied in effectiveness depending on numerous factors, including technology access, teacher preparedness, and student adaptability.

One of the central themes of NEP 2020 that has captured most of the public attention is the idea of ICT-based classrooms and digital pedagogy. The successful implementation of ICT-based classrooms and digital pedagogy as envisioned in NEP 2020 will depend on several factors, including the availability of digital infrastructure, the development of high-quality educational apps and online resources, and the training of teachers in digital pedagogy. The emphasis on group activities and collaborative learning through digital means also highlights the policy's focus on creating a more engaging and supportive learning environment for students (NEP 2020).

Flipped learning provides a unique approach by leveraging the advantages of both online and traditional method of education. Unlike purely online or distance learning, flipped learning ensures that students benefit from direct interaction with instructors and peers during class time, while also gaining flexibility in accessing lecture content remotely. This method aims to enhance student engagement and deepen

understanding by allowing classroom time to be dedicated to active learning practices. Virtual classroom meeting, video, voice note, texts, assignments, quizzes,and evaluations. online through the course management website or WhatsApp.

The flipped classroom model, as described by Love et al. (2014), transforms the traditional educational approach by shifting the initial learning phase outside the classroom and dedicating class time to engaging student-centered activities.While the flipped classroom model offers significant advantages in terms of student engagement and active learning, its successful implementation in science education requires careful planning and consideration of various instructional elements. Teachers must navigate the challenges of selecting appropriate materials, sequencing activities effectively, and ensuring that in-class activities are interactive and aligned with learning goals. The lack of extensive research in this area highlights the need for more studies to develop and share best practices for flipped classroom lesson planning in science education.

The objectives of the study are
RO1: To study the Flip Classroom 5E Instructional Approach in science teaching.
RO2: To study the impact of the Flip Classroom 5E Instructional Approachand the traditional way of learning process on the students.
RO3: To study the effectiveness of the Flip Classroom 5E Instructional Approachand the traditional way of learning process in relation to academic achievement in science.

The hypotheses of the study are
H1: There will be no significant difference in the Pretest Achievement in Science of VIII standard students when to be taught with the Flip Classroom 5E Instructional Approachand Traditional Classroom Teaching.
H2: There will be no significant difference in Achievement in science at the Posttest level of VIII standard students when to be taught with the Flip Classroom 5E Instructional Approach and TraditionalTeaching.
H3: There will be no significant difference in Achievement in science at the Posttest level of VIII standard students when to be taught with theFlip Classroom 5E Instructional Approach and TraditionalClassroom Teaching.

LITERATURE REVIEW
Flipped classroom vs traditional methods: Impact on academic performance
The flipped classroom method is among the strategies that can greatly improve performance. In that case, students in flipped classrooms show an understanding of concepts through effective engagement (Sun et al. 2022).

Challenges faced by students and instructors when implementing flipped classrooms and traditional teaching methods
Challenges in Flipped Classroom Teaching
Students' engagement in the flipped classroom approach teaching method by reviewing materials before attending classes. Then passively listening to lectures, class time is dedicated to interactive discussions and activities. While this strategy offers advantages, like heightened student involvement and tailored learning experiences it also presents challenges that both teachers and learners must address.
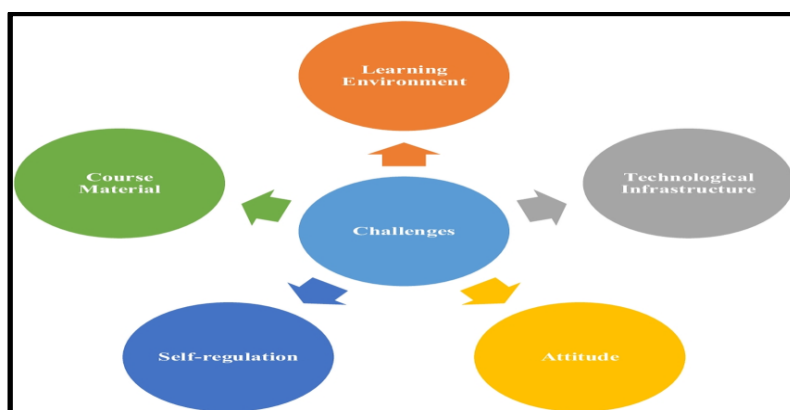

Figure 1: Challenges in Flipped Classroom Teaching
(Source: Han, 2023)

Creating high-quality learning materials for the flipped classroom approach is a time-consuming task for educators. This involves preparing class resources for students to review before attending class, which helps them participate in group discussions and activities effectively. Another challenge is that not all instructors can equip every student with the technology and expertise to engage with in-class materials efficiently. Some students may find it difficult to adapt to the flipped learning model due to its novelty or their preference for lecture-based teaching methods. Overcoming the hurdle of acceptance is crucial for both learners and teachers as it influences perceptions that classroom instruction is primarily geared towards purposes.

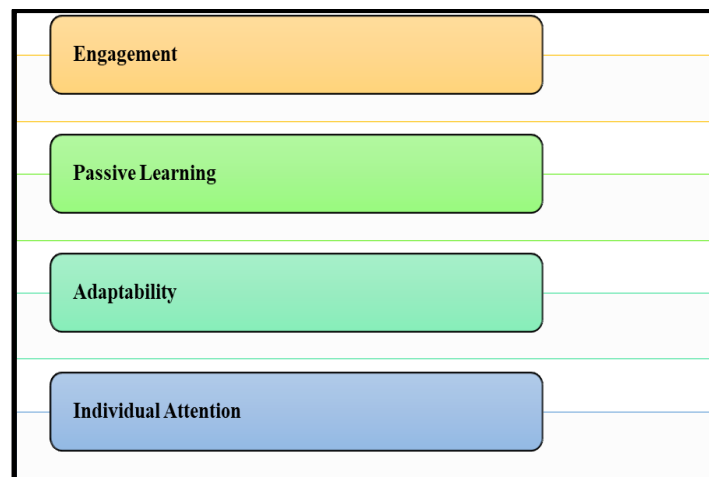**Challenges in Traditional Teaching Methods**

Figure 2: Challenges in Traditional Teaching Method
(Source: Barkley & Major, 2020)

Traditional teaching methods that depend heavily on lectures are not suitable for today's learners. There are issues associated with this approach. In that case, lectures promote learning, requiring students to sit and listen without active engagement leading to boredom and lack of focus. As per the study by Chew & Cerbin (2021), lectures often move students quickly with a large amount of information, in a short period making it difficult for them to fully comprehend the material. Furthermore, lectures can become overly theoretical by using jargon and abstract concepts that may confuse students hindering their understanding of the content.

Benefits of flipped classroom teaching from the perspectives of students and instructors
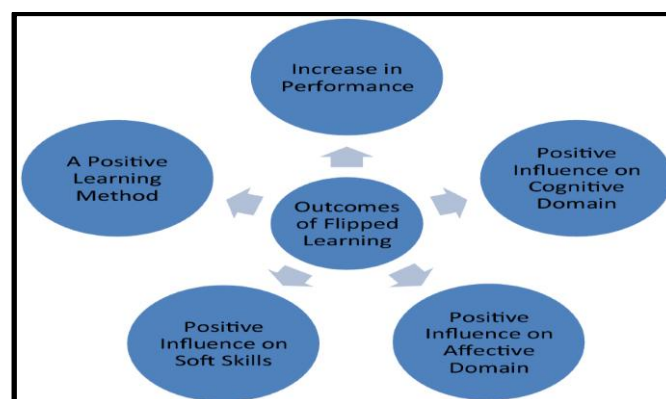**Perceived Benefits for Students**

Figure 3: Benefits of flipped classroom teaching
(Source: Cevikbas& Kaiser, 2022)

The flipped classroom approach is increasingly popular among educators, offering benefits for both teachers and students. This teaching method emphasises active learning, personalised pace, hands-on understanding, and peer collaboration. By implementing flipped classrooms, educators can allocate more

time to facilitating discussions, providing personalised assistance and creating dynamic and interactive learning experiences, ultimately leading to improved learning outcomes for students (Cevikbas& Kaiser, 2022).

Benefits for Instructors
Instructors use this teaching method to increase student engagement, increase the efficacy of teaching, and instant feedback on in-class exercises for instructors. Educators then get the classroom time to focus on effective, real-time, interactive and higher-level learning. On the other hand, flipped classrooms also promote effective pedagogic approaches focusing on social learning and tech integration (Webb & Doman, 2020). While each has its ups and downs, the flipped classroom approach can be animportant teaching method to improve student outcomes, if done right, with the requisite support.

METHODOLOGY
In this present research, the experimental method is used in the data collection method which included the pretest-posttest control and experimental groups. The study was administered among 50 students of VIII standard, out of which 25 students were involved in the traditional method and 25 students were involved in the flip classroom instructional approach. An achievement test of science was used to gather quantitative data in the study. SPSS software has been used to interpret the data that are collected from students' achievement pretest and posttest. In SPSS, t-test, ANOVA, and graphs have also been done to get statistical data interpretation.

Flip classroom instructional approach Resource
The researcher used WhatsApp voice notes, notes, YouTube videos, and open-access resources like PHET Interactive Simulation (https://phet.colorado.edu/), OLAB (https://www.olabs.edu.in/), and DIKSHA (https://diksha.gov.inl) to support the Teaching of science.

Design of the study

	Control Group	Experimental Group
1. Pretest	Achievement in science before the treatment	Achievement in science before the treatment
2. Treatment	Teaching science through the Traditional method	Teaching science through the flip classroom instructional approach
3. Posttest	Achievement in science after the treatment	Achievement in science after the treatment

Finding and analysis

Table 1. Pretest scores of the two groups (Control and Experimental group)

Sample	Mean	S.D.	Mean Standard Error	df	t- Value	P Value
Control group pretest scores	25.68	10.43	2.08	48	-.069	.946
Experimental group pretest scores	25.88	10.15	2.03			

Hypothesis 1
Table 1 shows that mean scores among VIII students in Experimental and Control groups on the pre-testare10.15 and 10.43 which means that both the two groups in the pretest are not significantly different. The calculated value of 'p' is .946 which is greater than the table value for the degree of freedom 48 at 0.05 level of significance which indicates no remarkable difference between the scores of the control group and experimental group. Therefore, the science subject achievement level of the two groups of class VIII standard students is not significantly different.

Table 2. Posttest scores of the two groups (Control and Experimental group)

Sample	Mean	S.D.	Mean Standard Error	df	t- Value	P Value
Control group posttest scores	26.08	10.76	2.15			

| Experimental group posttest scores | 34.24 | 10.09 | 2.01 | 48 | -2.76 | 0.008 |

Hypothesis 2
Table 2 shows that there is a significant difference in the scores on the post-test between the Experimental and Control groups. It is exhibited that mean scores among VIII students in Experimental and Control groups on the post-testare34.24 and 26.08 which means that both the two groups are different. The calculated value of 'p' is -2.76 which is less than the table value for the degree of freedom 48 at .05 level of significance. Therefore, the science subject achievement level of the two groups of class VIII standard students is significantly different. This suggests the flip classroom instructional approach has a significant effect on improving scores.

Table 3. Paired sample t-test of the two group (Control and Experimental group)

Sample	MEAN	S.D.	Mean Standard Error	t- Value	P Value
Control group pretest scores	25.68	10.43	2.05	-1.24	0.211
Control group posttest scores	26.08	10.76	2.15		
Experimental group pretest scores	25.88	10.15	2.03	-23.52	0.000
Experimental group posttest scores	34.24	10.09	2.01		

Hypothesis 3
Table 3 shows that the P value of the paired sample t-test for the pre and post-test scores of the experimental group is 0.000 which is less than 0.05, indicating that the flip classroom instructional approach can significantly improve the VIII standard students' performance in the experimental group. The P value of the paired sample t-test for the pre and posttest scores of the control group is 0.211, greater than 0.05. This indicates the traditional teaching method did not significantly improve the student's performance in the control group.

DISCUSSION
Findings have been highly indicative, thus establishing how Flipped Classroom Teaching is far better than the Traditional Teaching Approach in enhancing the academic performance of students. Analysis of results revealed that scores on post-tests were higher in the flipped classroom approach as compared to thetraditional teaching Approach.It explores that treatment means that the flip classroom instructional approach has a positive effect on school students' academic achievement in science.With the help of the flip classroom instructional approach, high-quality learning resources play a crucial role in fostering self-motivation among students. These resources, provided before class, help students prepare for active engagement and participation during classroom activities. This preparation not only boosts their readiness but also enhances their overall academic success.
For this method to be effective, educators should focus on creating well-structured and engaging learning materials before class sessions. These materials can include video lectures, readings, quizzes, or other interactive content that allows students to learn at their own pace. During class, teachers should then focus on organizing hands-on activities, discussions, and collaborative exercises that encourage deeper understanding and critical thinking (Talan &Batdi, 2020).

CONCLUSION
The study's main conclusion is that the flip classroom instructional approach in secondary school, compared to the traditional method, showed a significant difference in students' academic achievement and engagement in science teaching. This study explored how secondary students' learning experiences with the computer, and smart phone in the flip classroom instructional approach significantly effect in the achievement of students in science subjects. The flip classroom instructional approach to teaching science is helpful for teachers in gaining a level of student engagement in the teaching-learning process.

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