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Lane lines for flipping the Indian Classroom: A Teacher-Educator Perspective

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ABSTRACT
Flipped learning has been associated with positive learning outcomes and increased student engagement but the literature review highlights the lack of 'know how' to actually implement the concept of flipped learning into real-life practice. The current study aimed at garnering responses from 64 teacher-educators with experience in flipped approach about features appropriate for flipping a secondary stage classroom. For this, a semi-structured interview schedule was used to collect data which was analysed for preferred features. It was concluded that flipped learning has the potential to revolutionise school education provided technological and foundational hurdles are mounted. A partial flipped model with a strength of 16-25 students which uses short duration video lessons created and curated by teachers and subject experts was determined to be most appropriate. Student paced lessons which aimed at improving students' understanding with small embedded quizzes and collaborative discussion (both online and in-class) were recommended. The study provides a practical framework to put flipped learning into practice. The study would be beneficial for stakeholders looking to implement this blended pedagogical approach as well as for researchers looking to analyse flipped learning further.

Keywords: Flipped Learning, Teacher Education, Technology Integration, Implementation Challenges

LANE LINES FOR FLIPPING THE INDIAN CLASSROOM: A TEACHER-EDUCATOR PERSPECTIVE

With the unprecedented influx of technological advancements in every sphere of human life, education systems around the globe are under increasing pressure to use new information and communications technology to equip the learners with 21st century competencies and knowledge. The school system modeled during the Industrial era has long been under attack for its failure to stimulate creativity and critical thinking as the paradigm of teaching and learning has shifted from student-centered learning to student self-directed learning (Sumardi et al., 2020). NEP 2020 has stressed the amalgamation of innovation, technology and education stating, "technology will impact education in multiple ways, only some of which can be foreseen at the present time". Gamification in lessons, Online Learning Management Systems, use of QR codes in textbooks - these are but a few examples as how education is incorporating technology in an unprecedented manner. By fusing aspects of in-person instruction with technology-enabled learning to connect individuals remotely, educators have been developing new ways to deliver education. The change in student demographics along with accessible Internet technologies and increasing interests in finding alternatives to traditional learning spaces has facilitated the educationists to contemplate newer modes of instruction. Flipped classroom is one of the many concoctions that have emerged in the process.

Flipped Learning

Flipped learning which has classroom components supplemented by remote online lessons or exercises is classified as one of the four rotational models in Staker and Horn's (2012)

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categorisation of blended learning (others being – Station-rotation, Lab-rotation and Individual-rotation). This strategy came into light as chemistry teachers Jonathan Bergmann and Aaron Sams from Woodland Park High School recorded live classes and streamed them online for students who could not attend (Bergmann & Sams, 2014; Ozdamli & Asiksoy, 2016). Before the phrase was coined, however, previous studies had experimented with similar activities, using terms such as "inverted classroom" (Lage et al., 2000) in which students learn the primary course content outside of class and actively engage with the content during class.

Flipped Learning is a rotation-model implementation in which within a given course or subject (e.g., math), students rotate on a fixed schedule between face-to-face teacher-guided practice (or projects) on campus during the standard school day and online delivery of content and instruction of the same subject from a remote location (often home) after school (Staker & Horn, 2012). A Flipped Classroom differs from students who are only using the internet to complete homework at night because the majority of the content and instruction are delivered online in flipped setup. Since the Flipped-Classroom model gives students the ability to select where they receive online instruction and content as well as how quickly they progress through the online components, it aligns with the notion that blended learning involves some degree of student control over time, place, path, and/or pace. The in-class interaction is focussed on what the learners have learned independently transforming the classroom into a dynamic and collaborative workspace filled with activities like discussions, projects and student demonstrations showcasing what they have learned.

Flipped learning in India

Flipped learning provides a framework for aligning instruction with Bloom's Taxonomy by shifting the focus from passive listening to active learning and higher-order thinking skills with lower orders achieved through learners' independent study and higher levels are engaged within the classroom as student-teacher interaction. Numerous studies across grades and disciplines have been conducted globally on flipped learning. Meta-analyses associated flipped learning with positive learning outcomes and significant positive effect on cognitive and affective domains on school students (Bredow et al., 2021; Låg and Sæle, 2019; Li et al., 2024 & Van Alten et al., 2019). In India, Jha et al. (2024) found flipped classrooms advantageous for medical students and reported positive perception of students towards the approach as it improved performance and engagement. They also suggested detailed planning and consistent efforts as prerequisites for effective execution. Studies done on school students have found flipped learning associated with improved test scores and retaining capacity of students, increased parental interest and positive student perception (Gayathri et al., 2019; Ligi, 2019; Manoharan & Birundha, 2019). Mohanty and Parida (2016) recommended collaboration rather than substitution of flipped learning with traditional methods. Kundu et al. (2022) while reporting better results for face-to-face students than flipped or online groups advocated flipped classroom model as a viable alternative to the traditional classroom, especially in mathematics courses at elementary level as schools aimed to become more resilient in the face of abrupt and unforeseen closures.

RATIONALE OF THE STUDY

The literature lacks explicit guidance for teachers on in-class arrangements, despite the fact that the flipped classroom has been described as a general paradigm shift in which what was formerly done in the classroom (i.e., learning primary course content) is now done outside of the classroom. Previous research shows that students may have negative perceptions about flipped classrooms when there is no set structure (Strayer, 2012). The lack of 'know how' to actually implement the concept of flipped learning into real-life practice are obstacles often encountered: a finding that has been validated in related educational research (Bergmann & Sams, 2012; Findlay-Thompson & Mombourequette, 2014). Eppard and Rochidi (2017)

attempted to provide a framework for flipped learning based on the existing literature but their efforts were concentrated on theoretical underpinnings rather than a practical guide. The almost limitless design possibilities may seem daunting to potential faculty members considering this method of teaching, thus an investigation to define design specifications of flipped classrooms such as pace of classrooms and optimal face-to face instruction could provide guiding light to members who are willing to try flipped learning but unsure where to begin (Uzunboylu et al., 2015). Though flipped learning prides itself in providing numerous possibilities, it is pertinent that some form of uniformity in terms of structure and implementation is provided to willing teachers and educators who may at first feel overwhelmed by the fear of additional workload and uncertainty of success. Chellapan et al. (2018) highlighted the importance of exactness to avoid conceptual confusion while introducing flipped classroom models. Mohanty and Parida (2016) while stating the lack of research regarding the efficacy of flipped learning in India, stressed upon the need to know the basis of implementation of flipped classroom so that it explicitly benefits teaching and learning, in comparison to the traditional mode of teaching. Rai and Gautam (2025) proposed a prospective framework to flip pre-service teacher programs based on the theoretical inputs identified in the related literature synthesized with the theory of learning by teaching. The current study focuses on proposing a framework for secondary level based on the responses of teacher-educators who have experimented with flipped learning. The responses from teacher-educators with experience of flipped classrooms are expected to provide key insights about the structure and implementation of flipped learning given their deep pedagogical knowledge, years of practical experience and technological exposure (Latorre-Cosculluela et al. 2021). The current study focused on asynchronous video lessons as Zhang et al. (2006) favored video lectures over other e-learning environments highlighting the importance of integrating interactive instructional video into e-learning systems.

RESEARCH OBJECTIVES

While research has demonstrated the potential benefits of flipped learning, a significant gap exists in understanding how to effectively implement this approach in real-world classroom settings. This study aimed to address this gap by exploring the perspectives of experienced teacher-educators on the key features and considerations for successfully implementing flipped learning in secondary education. For this, the study was guided by following objectives -

1. To gain insights from the flipped experiences of teacher-educators regarding opportunities and challenges of flip learning
2. To prepare a draft of asynchronous video lesson based flipped classroom derived from the responses of teacher educators

METHODS

Participants

Data was collected from the teacher-educators from the Department of Education in the University of Lucknow and its affiliated colleges within the Lucknow city. The participants were identified through gatekeepers (Lamprianou, 2022) i.e. heads of the department, principals and senior professors. The participation in the study was completely voluntary and a total of 64 teacher-educators (42 females and 24 males) agreed to participate in the study. Participants were selected through purposive sampling as the study required those teacher-educators who had experience of flipped classrooms for at least one semester. The sample size was guided by the 10+3 recommendations of Francis et al. (2009) where initial analysis required at least 10 interviews and data saturation was reached when no new themes or information emerged from three consecutive interviews.

Instrument & Data Collection

Cross-sectional data was collected using a semi structured interview schedule developed by the researcher. Semi-structured interviews gave the researcher flexibility and opportunity to gain insights about respondents' experience, clarify doubts which arose and at times reassure confidentiality and seek explanation thereby increasing the response rate. Content and face validity of the tool was ensured through expert opinion. The data was collected through a mix of face-to-face meetings and telephonic interviews as per the convenience of the participants. The duration for the interview was scheduled to be 30 minutes and each session lasted between 20-35 minutes. The interview aimed at collecting information related to two broad domains - the insights on experience with flipped approach and the recommendations for structure and video lessons. The basic interview schedule had a total of 10 questions with the first four related to insights (e.g. What were the noteworthy challenges that you encountered in your flipped experience?) and the rest collected preferred settings for flipping the classroom at secondary stage (e.g. According to you, what should be the ideal model and class size for flipping a secondary Indian classroom?).

Data Analysis

The sessions were transcribed and their content analysed by the researchers for both identifying predefined and emergent themes as well as coding and categorising responses using hybrid thematic approach. An inductive approach was employed to capture and code the strengths and challenges that emerged from transcription while the preferred features were categorised deductively in the pre-decided categories identified through literature. The inductive codes from interview text resulted in a codebook which was used to record presence or absence of a particular theme in a given participant's response. A tally mark was awarded when a participant mentioned the specific theme. All tally marks under a code were counted which helped the researchers in quantifying the qualitative insights related to challenges and strengths to be summarised in a wordcloud. A word cloud based on frequency of recurrent codes was generated using the free online tool *wordclouds.com* to visually represent the prominence of recurring themes regarding opportunities and challenges of flip learning at secondary stage while Google Sheets was used to organise, calculate and analyse quantitative data. The second author independently coded a randomly selected subset of the transcripts to verify the clarity and applicability of the initial codebook. A unified coding scheme was established through a series of consensus-building sessions. To ensure credibility, summaries of key findings were shared with a subset of participants to verify accurate reflection of their experiences in the interpretation.

RESULTS

Table 1
Results of Structure related dimensions

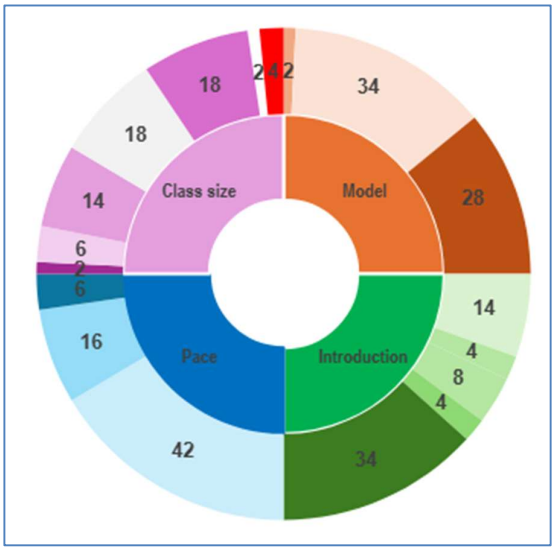
Element	Options	Number of responses	Percentage
Model	Traditional	2	3.125
	Partial	34	**53.125**
	Holistic	28	43.75
Introduction	Complete curriculum flipped	0	0
	Part of session flipped	14	21.875
	Subject flipped	4	6.25
	Unit flipped	8	12.5
	Chapter flipped	4	6.25
	Topic flipped	34	**53.125**
Pace	Student paced	42	**65.625**

	Instructor paced	16	25
	Pre-defined pace	6	9.375
Class strength	1-5	2	3.125
	6-10	6	9.375
	11-15	14	21.875
	16-20	18	**28.125**
	21-25	18	**28.125**
	26-30	2	3.125
	>30	4	6.25

Table 1 summarises the structure related features of a flipped classroom. As shown in figure 1, a partial flipped model for a class size less than 25 students was recommended by the teacher-educators. Small class size ensures that students receive focussed attention and engaged learning. Student paced flipping for a particular topic was found suitable for the secondary stage. This structural transparency allows learners to focus on the content and the novel learning processes without being hampered by confusion or uncertainty about the mechanics of the method itself.

Figure 1

Two-Layer Doughnut Chart depicting Teacher-educators' responses on Structure of Flipped Classroom



Note. The inner ring represents four categories of structure attributes of flipped classroom: Preferred model (orange), Introduction of flipped learning (green), Pace of the classroom (blue) and Class size (purple). The outer ring shows corresponding subcategory responses for each category. The numbers in the outer ring reflect the number of responses in each subcategory.

Table 2

Video lesson structure

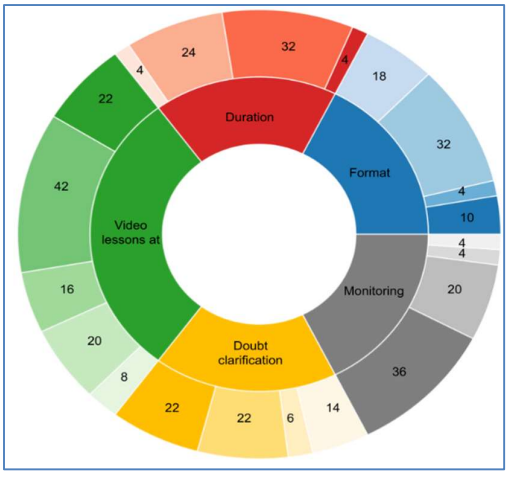
Elements	**Options**	**Number of Responses**	**Percentages**
Format	Voice over explanation using pen-tip	10	15.625
	Recorded video of classroom	4	6.25

	Animation based lecture (with teacher)	32	**50**
	Animation based lecture (without teacher)	18	28.125
Duration	0-10 mts	4	6.25
	10-20 mts	32	**50**
	20-30 mts	24	37.5
	> 30 mts	4	6.25
Video lessons at	At home	22	34.375
	At school	42	**65.625**
	Before class	16	25
	During class	20	31.25
	After class	8	12.5
Doubt clarification	Collaborative Discussion board	22	**34.375**
	In class discussion	22	**34.375**
	FAQs	6	9.375
	Audio/Video Conferencing	14	21.875
Monitoring	No monitoring	0	0
	Lesson embedded quizzes	36	**56.25**
	Discussion with teacher after watching	20	31.25
	Online supervision	4	6.25
	Peer review	4	6.25

Table 2 outlines the format of video lessons for a flipped classroom. Video lessons are a cornerstone of the flipped classroom model, playing a crucial role in its effectiveness. Small duration animated videos with the teacher's presence watched in school were suggested by teacher-educators. Monitoring was recommended to ensure students came to class after watching the lessons and their generic doubts had been resolved leaving the in-class interaction ample time for active learning activities. To visualise the overall response patterns, a two-layer doughnut chart (Figure 2) was created, presenting the relative distribution of participant responses across five categories and associated subcategories of video lessons for secondary stage flipped classrooms.

Figure 2

Two-Layer Doughnut Chart depicting Teacher-educators' responses on Video-lesson attributes of Flipped Classroom



Note. The inner ring represents five categories of attributes related to video lessons of flipped classroom: Duration of video lesson (red), Preferred format (blue), Monitoring tool (grey), Doubt clarification tool (yellow) and Preferred slot to watch video lessons (green). The outer ring shows corresponding subcategory responses for each category. The numbers in the outer ring reflect the number of responses in each subcategory.

MAJOR FINDINGS

- Teacher-educators are by and large favorable towards flipped approach due to its student-centric approach provided network and accessibility issues are sorted.
- Partial student-paced flipping should be introduced in a class of 16-25 students.
- Animated video lessons with teachers of 10-20 minutes duration should be curated with small quizzes to ensure monitoring and collaborative discussion boards as well as in-class discussion for doubt clarification.
- Creation and selection of video lessons must involve inputs from teachers and students as well as subject experts and professional content creators.

Experience with Flipped

Most teacher-educators recalled their excitement as they grappled with significant effort and time in the initial phases demanded by the shift from traditional lesson planning. Decisions regarding platforms, digital tools, content and in-class activities were modified as the situations arose. Students' enthusiasm overcame digital divide and technical glitches. As the focus was on trying out a pedagogical approach, there was no comparison with the control group or limited emphasis on academic scores but the learning output of the students was said to be improved in general. Few teacher-educators still employ flipped learning whenever they find enthusiastic candidates and enough leeway. The recurring themes of strengths and challenges have been summarised in Figure 3.

Figure 3

Strengths (green) & Challenges (red) of Flipped Learning as reported by Participants

Note. The word cloud shows participant-reported strengths (in green) and challenges (in red) of flipped learning. Font size reflects the relative frequency of each keyword mentioned across responses.

Perceived Benefits

A shift from traditional, teacher-centered passive approach to a more student centric active approach which incorporated technology was the sentiment most echoed during interaction with teacher-educators. A teacher-educator remarked - "*How wonderful it would be for a student to pause, rewind and replay parts of a lesson they did not understand at first go …"* while highlighting the repeatable nature of video lessons. Flexibility and personalised learning which encouraged students to take active participation in classroom activities was also associated with flipped approach. Flipped learning provides opportunities to bridge learning gaps in a diversified classroom as it caters to diverse learning needs and pace of students.

Hurdles in Implementation

Flipping a classroom involves logistic and network issues not to forget participation reluctance of both learners and administration. Both teachers and students have to be encouraged to break out of their mold and overcome their respective hesitancies. Students need extra guidance and support especially at the initial stage while teachers need training and resources to effectively implement flipped strategies. Content curation is an area that needs to be looked into before flipping a classroom.

DISCUSSION

Han and Røkenes (2023) opined challenges and advantages are two sides of the same coin in a flipped classroom as addressing the challenges would be beneficial as they presented opportunities for growth and learning. Teacher-educators were supportive of the idea of flipped learning and regarded it as an active, personalised and flexible approach provided challenges like initial hesitation and technological hurdles were addressed. The study acknowledged the challenges associated with implementing flipped learning, including technological barriers, teacher training and student motivation and engagement. Partial flip model which incorporated both video and in-class lectures were the most popular choice as it traces a middle path between traditional and novel teaching approach. This is in line with findings of Van Alten et al. (2019) which reported that when quizzes are introduced or the amount of in-person class time is not decreased, students in flipped classrooms attain better learning results than those in non-flipped courses. The teacher-educators preference for small class size is in tune with recommendations of Freeman et al. (2014) who found profound increased academic achievement in small sized STEM classes with active learning. Introducing flip to the uninitiated will be a daunting task and teacher-educators recommend flipping a topic as the best way where students take reins of learning in their hands. Video lectures are perhaps the most distinct feature of flipped learning and the use of existing videos with customisation may absolve some of the pressure of creating new lessons given that copyrights and credits are given their due and some profit-sharing mechanism is adopted. Half the responses favored lessons of duration of 10-20 minutes explaining and improving understanding of the topic, keeping in mind the cognitive and physical well-being of students. Truancy can be addressed using several monitoring methods but small quizzes would be appropriate as they would not only provide a formative assessment but also ensure the flow of learning is not disrupted as the students adapt to learn outside the classroom as the teacher settles in the role of a facilitator rather than protagonist.

CONCLUSION

The nature of flipped learning gives creative opportunities and flexibility in terms of implementation as it is associated with increase in student engagement and better student performances. The broader aim of the study was to chalk out a framework of features which teacher-educators, who had experienced flipped learning, felt would be relevant to introducing flipped approach to secondary stage students. Based on the interviews and questionnaire responses, it was concluded that flipped learning has the potential to revolutionise school

education provided technological and foundational hurdles are mounted. A partial flipped model for a class of 16-25 students which used short duration video lessons which were created and curated by teachers and subject experts. Student paced lessons which aimed at improving students' understanding with small embedded quizzes and collaborative discussion whether online or in-class was recommended.

The findings of this study carry significant implications for educators, policymakers, and researchers. For educators, the study provides valuable guidance on how to effectively implement flipped learning in their classrooms. For policymakers, the findings highlight the need for adequate infrastructure and professional development support to facilitate the successful adoption of this innovative pedagogical approach. For future research, an experimental study of recommendations of the study can be carried out to evaluate the academic efficacy of the model. Further, opinions of students, parents and teachers are vital as they are important stakeholders whose views would be significant in implementation of flipped learning. A similar study can be carried out to incorporate their suggestions as well. In flipped learning, multiple formats such as websites, audio clips and pdfs are used to enhance the learning experience of the students along with the possibility of synchronous engagement. The current study focused on the use of asynchronous video lessons which can be expanded to include other possible synchronous and asynchronous technologies.

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