



Research Article

INTEGRATION OF FLIPPED CLASSROOM MODEL IN TEACHER EDUCATION PROGRAMME

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ABSTRACT



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Modern education requires new teaching methods that promote active learning, critical thinking, and digital literacy, as traditional approaches are insufficient to engage today's learners. The Flipped Classroom Model offers educators a chance to prepare for 21st-century classrooms by fostering active learning, integrating technology, and adopting a more student-centered pedagogy, wherein content is delivered outside the classroom and classroom time is utilized for interactive activities. The analysis aims to emphasize the integration of flipped classrooms in teacher education programs, the benefits of this model for student involvement, and evaluate the challenges faced by pre-service educators during the implementation of the flipped classroom approach. The researcher employed an exploratory research methodology and conducted a field survey to ascertain trainee instructors' perceptions and experiences of the flipped classroom idea in teacher education. The study participants were individuals who have experienced flipped classroom instruction as students or trainees. The research indicates that flipped classroom training improves pedagogical competence, technological skills, and the readiness of pre-service teachers for contemporary teaching, as facilitated by a structured curriculum and digital technology. It fosters engagement, direct instruction, personal reflection, and learner-centered pedagogy. The challenges include digital inequalities, faculty resistance, workload demands, and institutional obstacles. The study concludes that the flipped classroom model is a technology-driven strategy that cultivates essential pedagogical and digital competences in pre-service teachers, so preparing them for 21st-century teaching.

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1. Introduction

The 21st century has witnessed major reforms of knowledge creation, its access and sharing as a result of the influence of technologies, globalization processes, and the constantly changing societal demand. That is why education systems all over the globe are being pressed to develop learners with abilities to think critically, work collectively, be innovative, communicate and be able to use technology effectively. Teachers have turned into instructors in learning, planners of learner experience and joint learners with the students. Teacher education programmes should be changed to meet the emerging demands; they should no longer be based on conventional models of education, but rather on vibrant, practice based and technology facilitated pedagogies.

A flipped-classroom model seems to be one of the options, as it transfers the acquisition of knowledge that serves as a foundation to independent activities outside the classroom and provides the skills of active learning, group problem-solving and reflection. Adopting the flipped classroom model within the context of teacher education programme will allow pre-service teachers to get the feel of innovative pedagogy and also know how

it was designed and implemented and the effects it had on the learners and the teachers. It is through this dual lens that they are able to develop their essential skills which include digital literacy, delivery of technology-driven instructions, designs and facilitation of learner-based environments, classroom management within collaborative groupings and application of formative and performance-based assessments.

The flipped approach aligns with constructivist learning theory, emphasizing learner agency, contextual understanding, and knowledge construction through active participation. This paper explored how the flipped classroom model can enhance future educators' pedagogical skills, examining its theoretical underpinnings, implementation strategies, benefits, and challenges. The goal is to reimagine teacher education as the blooming of pedagogical innovation, empowering future teachers to meet the evolving needs of learners in a diverse, technology-rich, and rapidly changing world.

Flipped Classroom Model

The flipped classroom model is a teaching method that combines online content with in-class activities, promoting student-centred learning (Bergmann & Sams, 2012). Students

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watch lectures, read materials, or complete preparatory tasks before class, and then engage in discussions, problem-solving, collaborative projects, or hands-on activities guided by the teacher. The teacher can be regarded as a facilitator promoting further vision and thinking. The method embraces participation by students, independence and application of the learning experience, and is thus applicable when it comes to instilling the facilities needed to teach and learn in the 21st century.

Traditional classroom Vs Flipped Classroom Model

The conventional instructional system is professor centred using lectures and passive learning. Students are supposed to do their homework or assignments before or after school in the absence of the teacher. The flipped classroom approach, in turn, utilizes the delivery of content beyond the classroom using online resources that enable active learning. This model enhances students to become more independent in their learning, favours differentiation of instructions and gives students flexibility in their advancement. The teacher functions as a facilitator where he can assist and guide students as they investigate the material intensively. Technology is also used in the flipped classroom and promotes 21st century skills such as collaboration, critical thinking, and digital literacy, which are necessary. On the whole, flipped classroom offers a more flexible, interactive and student-centred learning experience. It was discovered that the flipped classroom approach is more effective as compared to the traditional teaching (Boyras & Ocak, 2017; Cetin Koroglu & Cakir, 2017; Ekmekci, 2017; Huang & Hong, 2016; Yu & Wang, 2016; Keskin, 2023; Ray & Sikdar, 2024).

Relevance of Flipped Classroom to Teacher Education

Flipped classroom model is one of the most important methods in the practice of teacher education, because it is associated with active pedagogy, digital competence, reflective practice, flexibility, and innovation. It helps to move beyond passive presentation of course materials to interactive student-centred experiences through which pre-service teachers can be prepared to work in the classrooms of the future. The model also ensures that the teachers have digital competence through exposure to learning technologies to create learning contents, communication and instructional design. It promotes critical thought and engages future teachers in reflective practice that opens their minds to a deeper thought of how they are learning and how they will teach their students. The flexibility and the innovation are also encouraged using the flipped classroom which allows the pre-service teachers to test a variety of teaching techniques. It is also in line with 21st century skills in terms of being an integrated process that incorporates collaboration, critical thinking, creativity, and technological literacy. The flipped classroom can, therefore, become an effective model of new competent, reflective, and innovative educators.

2. Objectives

1. Investigate the possibilities of the incorporation of the model of the flip classroom in teacher education programme.
2. To discuss the advantages of flipped learning in terms of involvement of students and participation in classroom instruction.
3. To assess the difficulties of pre-service teachers when teaching the flipped classroom.

3. Methodology

3.1 Research Design

The researchers used an exploratory research design supported by a field survey. Marshall and Rossman (1999) suggested that qualitative research provides opportunities for exploratory and descriptive studies, utilizing context and setting

to gain a deeper understanding of the subject (Best & Kahn, 2006). The purpose of this design is to gain in-depth understanding of trainee teachers' perceptions and experiences related to the implementation of flipped classroom model in teacher education.

3.2 Participants

Prospective teachers enrolled in teacher education programme comprised the study's participants. Individuals, who were experienced with flipped classroom instruction, either as students or during their training, were the main focus of the selection process.

3.3 Data Collection Method

The researchers used classroom observations and semi-structured interviews to gather real-time insights into teacher trainees' behaviour and instructional dynamics in flipped classroom sessions. Systematic observations documented engagement patterns and interaction styles, while in-depth interviews provided qualitative data on trainees' perceptions, challenges, and reflections on the flipped classroom model.

3.4 Data analysis method

The study used a qualitative approach, employing thematic analysis to identify and report recurring patterns or themes across the dataset, allowing the researcher to interpret significant dimensions of participants' experiences beyond surface-level content. Qualitative data analysis merges analysis, interpretation, and often data collection with data analysis, with thematic analysis serving as a distinctive tool (Cohen et al., 2011). Braun & Clarke (2006) defined thematic analysis as a method for identifying, analysing, and reporting patterns or themes within data.

4. Data Analysis and Findings

4.1 Implementing Flipped Classrooms in Teacher Education Programme

The flipped classroom model in teacher education programme necessitates careful planning, curriculum redesign, and a shift in instructor and learner roles. Significantly, the flipped classroom greatly increased the pedagogical skills and exposed pre-service teachers to active learning methods and student-centered classrooms.

Table 1: Thematic analysis of flipped classroom model in teacher education programme

Theme	Coded data
Curriculum Design	Pre-class content, Active in-class engagement, post-class reflection
Technology Integration	Learning Management System, Video platforms, Collaboration tools, Feedback systems
Instructional Strategies	Learner-cantered, Reflective, Individualized, Tech-enhanced
Faculty Training	Professional development, Peer support, Institutional infrastructure

Curriculum Design

A flipped classroom is an educational technique in which pre-service teachers are taught using distinctive practises, in-class, post-class, and pre-class. Some core content is presented with pre-class activities, which consist of video lectures, digital textbooks reading, interactive modules, quizzes and simulations. Implementation activities such as collective issues and solutions, micro teachings, program workplans, case research and reflective conversation in-class gives pre-service teachers an opportunity to act and internalize their trainings. The activities after the classes can be reflections, assessments and follow-up research or observations in actual school environments. This strategy assists

pre-service educators in student preparation to apply knowledge and makes them ready to face the real world.

Technology Integration

The flipped classroom depends on the application of digital technology, and pre-service teachers have to be trained to use it to teach. Those tools can be defined as Learning Management System (LMS) platforms such as Moodle, Google Classroom and Canvas (to distribute contents), video tools such as YouTube, Loom, and Edpuzzle (to capture interactive lectures), and Slide decks and PDFs (to have active reading), collaborative applications such as Padlet, Jamboard, and Google Document (to collaborate inside a group), polling tools (such as Mentimeter or Kahoot!), interactive whiteboard, and smart classroom technology. The discussion forums, rubrics and e-portfolios as communication and feedback tools, could be used to conduct evaluations of microteaching. As future users of the tools in the classroom, teacher trainees will be exposed to them, not just as learners.

Instructional Strategies

The use of a flipped classroom would require all teachers to switch to a new teaching style, which is learner-based. Scaffolding, differentiation, peer teaching, reflective practice and active learning are new strategies. Scaffolding and differentiation enable students to pursue the content in diverse manners, peer teaching leads towards the co-teaching, reflective practice can develop

structured reflection and through active learning techniques deep learning and metacognition will be enhanced.

Faculty Training and Support

Technology increases the time spent in a classroom and enables learning among the students, which makes education providers become interested in implementing the FL model, which is often attributed to the activity of experienced educators (Plešec Gasparič et al., 2020; Wang & Zhu, 2019; Lai & Hwang, 2016). An effective management of the flipped classroom needs teacher educators to undergo training on educational technology and instructional design, digital pedagogy and assessment knowledge and skills. The topics of professional development are the organization of effective video and online material, providing active learning, employing formative assessment devices, the construction of inclusive digital materials, and student motivation management. Technical support, peering mentoring system, and incentives to drive innovation and cut teaching load should also be in built in the institutions.

4.2 Benefits of Flipped learning

The flipped classroom has great benefits to its users; it improves academic and pedagogical knowledge, practical teaching skills, technological fluency and, professional confidence of pre-service teachers, which makes them ready in the 21st century, classrooms.

Table 2: Thematic analysis of the data collected during interview to ascertain the advantages of flipped learning in terms of engaging and participation of students in the classroom teaching process

Theme	Data
Engagement	Active engagement, participatory learning and motivation increased
Practical Skills	Application of theory through lesson planning and microteaching
Digital Literacy	Exposure to educational technologies as learners and future teachers
Personalized Learning	Flexibility to learn at self-paced and review the content
Collaboration	Development of team activity and peer feedback skills
Reflective Practice	Progressive improvement through structured reflection
Readiness for Modern Classrooms	Readiness to teach in tech-integrated and student-centred environments

Enhanced Engagement and Active Learning

The flipped classroom promotes active learning, where one acquires the basics of the course at his own speed, and the skills are put to practices using discussions, case-based learning, cooperative projects and teaching simulations. Engagement is the complex construct which depends on various issues, including emotions, culture, behaviour and cognition (Kahu, 2013; Srinivasan & Kumar, 2020). It enhances motivation, inquisitiveness and critical participation, and makes the pre service teachers more invested in their learning as knowledge is co-created with peers as well as the instructors.

Practical Teaching Skill Development

The flipped model focuses on in-class activities that are practical and hands-on such as microteaching, lesson-planning, simulations, and feedback by peers. Such learning makes future teachers be ready to teach in the real world and boosts their confidence. The pre-service teachers are taught how to handle classroom dynamics and how to differentiate instruction, how to tailor the lessons by making use of interactive practice, which is not possible with lectures.

Improved Digital literacy and technology integration skills

The inverted learning environment model also introduces pre-service teachers to educational tools, such LMS environment,

video editing, digital assessment, and collaboration tools. This activity allows them to appreciate how technology aids pedagogy in such a blended or online learning environment and develops confidence in using ICT in their classrooms an important teaching skill in the 21st century.

Self-Learning and one-on-one Learning

The flipped approach is flexible in learning as it enables the learners to stop, rewind and replay pre-class notes when they want to study. This facilitates the differentiated learning so the pre-service teachers can move at their own pace and follow a particular route. Such adaptability is helpful to students who require additional time to digest challenging materials, as well as to decrease the level of apprehensiveness and increase retention. The method imitates the concept of universal design of learning offering various paths of engagement and presentation.

Improved Teaming and Learning with Peers

With the flipped classroom, a collaborative learning environment is obtained, whereby there are meaningful interactions with peers. It fosters teamwork, communication, and critical analysis where activities, such as lesson planning and feedback, can be organised. Observation, criticism, support of one another is taught to the pre-service teachers so that they can collaborate later in school. The method establishes a community of professional learning during the initial stages of training.

Infusion of Reflective Teaching Practices

The flipped model supports the effective teaching by offering numerous occasions of reflection like post-class reflections, self-evaluation after microteaching or fellow-review, reflective conferences with mentors or teachers. Such practices inform pre-service teachers with a reflective way of thinking to make the constant evaluation and improvement of their teaching methods.

Musla the 21st Century Classroom Realities

As a result of being exposed to a flipped learning environment, pre-service teachers will be in a better position to teach in hybrid or blended classrooms, build flipped lessons, and use student-centred approaches. They also get more responsive to face the various learner demands and be able to react to new education technologies and trends.

4.3 Challenges faced during the Flipped Classroom

Implementation

The flipped classroom is one of the perspectives of teacher education that bears potential but experiences difficulties on technological, methodological, institutional, and cultural levels in its implementation. It is imperative to note that comprehending and responding to such issues is essential to attain its desired results. The scholar adopted the narrative inquiry approach alongside the stakeholders to discuss the issues that the people had to go through in the flipped classroom. His analysis of these stories has helped researcher clarify the nature of the challenges and suggest the mitigation of the same.

Digital Divide and inequities in access

A big impediment to the implementation of flipped classrooms is unequal access to technology among pre-service teachers. Among them are lack of devices at home, unstable internet connection and digital illiteracy among the students. This might result into the teachers lagging behind or losing interest in the needed tools and platforms. In mitigating such a challenge, institutions ought to consider the availability of hardware support, solutions to internet access, or offline learning provision.

Faculty resistance and preparedness

The shift toward the flipped model, instead of a traditional lecture, requires a drastic change in the instructor behaviour. The usual obstacles are the resistance based on the fear of losing control, a lack of training in the instructional design, and fears about redesigning the courses. Some of the solutions would be professional development continuance, peer support groups, providing rewards as innovation through recognition, grants or adjustment of workload and allowing new best practices to be observed in successful implementations to generate a buy-in and to create models of best practice.

Quality Assurance & Content Creation

Flipped classroom depends upon its pre-class and in-class learning content, which is efficient. Faculty can have a problem in producing content in multimedia which is engaging and involves a risk of utilizing used-to-be generic resources and frequent refreshment of resources. It is recommended that instructional design teams must be established, that open educational resources should be used, that the standards and rubrics that secure video and digital material quality assurance should be developed.

Student Preparedness and Accountability

The flipped model makes the students active in consumption of pre-class materials compared to the traditionally passive roles. The difficulties are that pre-service teachers do not accomplish the pre-class tasks because of time limits, their disinterest, or self-control requirements, and their poor preparation results in unproductive in-class experience. Strategies would be short,

informal tests that are low stakes, interesting, brief, and interactivity as well as training the students on time management and digital learning.

Assessment Alignment

There are various reasons that traditional assessment not fully reflective of learning outcomes of a flipped classroom method including difficulties in measuring collaboration and creativity, as well as practical teaching skills, mismatch between active learning method and the (standardized) exams, and incapacities to measure engagement with digital content. It is suggested that performance-based grading should be used, a peer-review rubric is to be introduced and a learning analytic system should be implemented as a feedback tool.

Institutional and Cultural constraints

Flipped learning may not work within any institutions or national education systems because of inflexible curriculum, assessment-based cultures, and leadership support. Suggestions cover proposing policy-level support of the innovative pedagogy by supporting flipped classroom training by being part of accreditation policy of teachers and then scaling up the model across a few modules on the success.

Management of time and workload

Flipped courses are time consuming, particularly during the early phases because of faculty issues such as time spent developing video materials, restructuring and managing the learning activities and constant supervision. Those facing students in the field of workload include overworking the students with course work prior to their classes and the coursework versus other studies. Some of the strategies that can be used to balance the situation are partial flipping, peer production of the content as well as the provision of guidelines on what is expected of them in the way of time commitment towards pre-class work.

5. Discussion

Flipped classroom model represents the transition in teacher education with the traditional lecture-based teaching methodology towards the student-centred and reflective learning in teacher education. The model fosters active learning and reflective practice, a very important concept towards producing skilled and dynamic educators. Pre-service teachers process instructional materials, which may be videos, readings, and digital content, outside the classroom and could reflect on their learning experiences and adopt the theoretical knowledge. The process encourages constant thought about the way that they learn and how they think different teaching approaches work.

The flipped classroom also changes the definition of the role of the teacher that switches the position of a content distributor to a facilitator of the learning process, entailing stronger relations with the students and the facilitation of the most fundamental skills, including questioning, scaffolding, and providing feedback to the students. The early adoption sensitizes future teachers on establishing learner-centred settings inside their classrooms.

There is also technological confidence conferred on the pre-service teachers since they cover content creation, management and delivery using digital tools which make them feel and perform more confidently and competently. This empowerment plays a fundamental role in the 21st-century classroom where digital literacy is a competency inherent. Flipped learning classrooms allow teacher candidates to be very varied in the platforms and the application they use and has been seen to allow them to have the imagination of how they intend to incorporate technology into their work in the classroom in the future.

The flipped classroom model can only be successful when institutional support is in place, training is done and guidelines

are well outlined. It is essential that the pre-service teachers and their instructors acquire the correct technical expertise and pedagogical content knowledge on how to script the flipped lessons and deliver them. The core to the success of the model is life-long professional growing, access to online tools, and community-based learning setting.

6. Conclusion

The flipped classroom model constitutes a milestone in the 21st century to revamp the teacher education programmes. It presents an effective pedagogical framework that is comparable to active learning, student engagement and integration of technology. In this model both teacher and learner have redefined roles and there is now greater collaborative, reflective, and more student centred learning environment. Pre-service teachers have an opportunity to experience contemporary instructional design, microteaching practice and receive feedback, and increase digital literacy skills, reflective practice, and collaborative problem-solving. Nonetheless, effective implementation involves planning, faculty development, and access to technology, as well as the dedication of an institution to innovation. Equity, quality and sustainability need to address such challenges as the digital divide, faculty resistance, and alignment of assessments. Flipped classroom model holds a great potential as one of the methods of training future educators to succeed in complex, technology-integrated and learner-focused educational settings. With the integration of this model in teacher education programmes, it could both increase the pedagogical competence of the pre-service teachers as well as lead to more responsive, inclusive and future ready education systems.

Recommendations

Flipped classroom implementation in Curriculum

The kind of model that will surely need to be systematically integrated into the curriculum in the kind of teacher education that flipped classroom involves is the pre-class assignments online and in-class active learning activities. Learning outcomes are to be in line with a flipped approach to making application, analysis, and thinking critically. Modeling best practices can be done by putting an emphasis on pedagogical content knowledge and by inserting examples of flipped classroom practice in course modules. Such a strategy will help to achieve relevance to the object matter and instructional methods.

Training and the Release of Resources

The teacher candidates should possess the skills and resources to plan and work out proper flipped lessons such as workshops on how to create engaging digital content, learning management system training, learning how to manage time and motivate students, and access to multimedia creation tools and high quality open educational resources (OERs).

Promoting Peer Working

Flipped classrooms promote cooperation between the students and instructors through their promotion of collaborative lesson planning, promotion of the professional learning networks, integration of peer review and feedback frameworks, and promotion of mentorship. Such a method will promote exchanging practices, issues, and advances in flipped teaching, as well as providing novice teachers with the environment that will help them to adjust and learn.

Providing Continuous Care

To work with the flipped classroom paradigm, the teacher candidates and the faculty will need continuous support, such as a technical one regarding the platform and the content delivery questions, pedagogical support in solving the classroom management and instruction design problems, constant and

regular follow-up training to keep them abreast with the educational technologies, and the introduction of support teams to teacher training institutions.

Assessing Long-Term Effect

In order to maintain the sustainability and efficiency of the flipped classroom model, institutions are advised to devise assessment structures, carry out longitudinal research on the utilization of flipped classroom strategies, gather responses of students and faculty, and use data to influence policy, development of training programmes, and propagate evidence-based revisions in teacher education curriculum.

References

- Bergmann, J., & Sams, A. (2012). *Flip Your Classroom: Reach Every Student in Every Class Every Day* (pp. 120-190). Washington DC: International Society for Technology in Education.
- Best, J.W., Kahn, J.V. (2006). *Research in education* (pp. 253). New Delhi: Prentice Hall of India Pvt. Ltd.
- Boyras, S., & Ocak, G. (2017). Implementation of flipped education into the Turkish EFL teaching context. *Journal of Language and Linguistic Studies*, 13(2), 426-439.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101. <https://doi.org/10.1191/1478088706qp0630a>
- Cetin Koroglu, Z., & Cakir, A. (2017). Implementation of flipped instruction in language classrooms: An alternative way to develop speaking skills of pre-service English language teachers. *International Journal of Education and Development Using Information and Communication Technology*, 13(2), 42-55.
- Cohen, L., Manion, L., & Morrison, K. (2011). *Research methods in education* (7th ed.). Routledge.
- Ekmekci, E. (2017). The flipped writing classroom in the Turkish EFL context: A comparative study on a new model. *Turkish Online Journal of Distance Education*, 18(2), 151-167.
- Huang, Y. N., & Hong, Z. R. (2016). The effects of a flipped English classroom intervention on students' information and communication technology and English reading comprehension. *Educational Technology Research and Development*, 64(2), 175-193.
- Kahu, E. R. (2013). Framing student engagement in higher education. *Studies in Higher Education*, 38(5), 758-773. <https://doi.org/10.1080/03075079.2011.598505>
- Keskin, D. (2023). Implementation of flipped model in EFL reading classrooms. *Turkish Online Journal of Distance Education*, 24(3), 261-276.
- Lai, C.-L., & Hwang, G.-J. (2016). A self-regulated flipped classroom approach to improving students' learning performance in a mathematics course. *Computer & Education*, 100, 126-140. <https://doi.org/10.1016/j.compedu.2016.05.006>
- Marshall, C., & Rossman, C. B. (1999). *Designing qualitative research* (3rd ed.). Thousand Oaks, CA: Sage.
- Plešec Gasparič, R., Valenčič Zuljan, M., & Kalin, J. (2020). Flipped learning and teaching as an opportunity for innovative and flexible implementation of student groupings in higher education. *Journal of Elementary Education*, 13, 51-80. <https://doi.org/10.18690/rei.13.Spec.Iss.5-80.2020>

- Ray, S., & Sikdar, D. P. (2024). Comparative Analysis of Flipped Classroom Implementation in Western and Indian Indoctrination. *American Journal of Arts and Human Science*, 3(4) 63-71. <https://doi.org/10.54536/ajahs.v3i4.3638>
- Srinivasan, S., & Kumar, H. (2020). Flipped classroom model: A possibility in the Indian higher education system. *Journal of Critical Reviews*, 7(15), 1486–1490. <https://www.jcreview.com/admin/Uploads/Files/61db60a97cce75.56589604.pdf>
- Wang, K., & Zhu, C. (2019). MOOC-based flipped learning in higher education: Students' participation, experience, and learning performance. *International Journal of Educational Technologies in Higher Education*, 16, 33. <https://doi.org/10.1186/s41239-019-0163-0>
- Yu, Z., & Wang, G. (2016). Academic achievements and satisfaction of the clicker-aided flipped business English writing class. *Educational Technology & Society*, 19(2), 298–310.