

Low Cost Technology-Enabled Supervision of B.Ed. Interns: Proposing LCOD Supervisory Model

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Abstract

As against the reforms suggested by NEP 2020 and NCFESE 2023 supervision of B.Ed. internship in India is persistently characterized by bottlenecks such as halo effects, leniency, implicit biases, being infrequent, isolated and geographical constraints. Besides such personal implicit and contextual limitations associated with physical observation the extreme digital divide and systemic deprivation of a huge percentage of schools in India also impediments technology enabled education and teacher preparation advocated by NEP 2020. UDISE+ data reveals acute shortage of functional computers, internet access and overall digital foundations in many Indian schools. Using an analytical framework based on secondary sources the study evaluates the pedagogical reliability and cost effectiveness of shifting from excessive real time synchronized and individualized physical supervision to asynchronous flexible more inclusive digital observation. The study proposes a low cost own device (LCOD) supervisory model having the potentialities of wide access based on own smart mobiles, tablets using open access software and low/free cloud storage. This model runs in asynchronous mode, records videos which is uploaded, observed by supervisors, self and peer followed by parameter based evaluations with the help of digital rubrics and checklists. The model offers scalable solutions at par with policy recommendations promoting accessibility, quality and inclusion in supervision of B.Ed. interns.

Key Words- B.Ed. Internship, LCOD Supervision Model, Low Cost Technology, Technology-enabled Supervision, NEP 2020, NCFSE 2023

Introduction

Supervision of B.Ed. (Bachelor of Education) interns which are commonly called student teachers is considered as most crucial component in the whole teacher education programme. It is the phase where the theory of science of teaching meets the practical art of instructional delivery and classroom management. Supervisors help interns to apply research based modern techniques in their classrooms (Darling-Hammond et al. 2023). Supervisors promote reflective practice by involving interns introspect their actions and experiences leading to change and developments (Suphasri 2021). By providing precise, constructive and timely feedback supervisors ensure improvements in teaching skills in real class settings. However traditional

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supervision is criticized on being subjective, inconsistent and suffering from spatial and contextual limitations of internship schools and B.Ed. colleges/departments. Personal biases such as horn effect, halo effect, implicit bias, central tendency bias, leniency bias and relational subjectivity of the supervisors (Michela 2023, Cannon & Cipriani 2022, Lloyd 2021, Shaffer 2015) needs to be addressed in the modern era of technological advancement. Further the limitations of the traditional supervisory models related with frequency (Tshabalala, 2021), distance, context (Kidd et al. 2020) and logistics also require attention which may be reduced through robust technology integration.

The Study

National Education Policy (NEP) 2020 strongly advocates integration of technology in education to improve teaching learning process and enhancement of professionalism among the teaching community. It suggests digital platforms such as DIKSHA and SWAYAM in order to nurture an ecosystem in which professional development of teachers may be promoted with consistency (Ministry of Education, 2020). Based on the foundations of NEP 2020 National Curriculum Framework for School Education (NCFSE) 2023 envisions an inquiry based experiential pedagogy (NCERT, 2023) requiring supervisors towards a more data driven feed back to interns. Technology based supervision in the light of policy recommendations is no longer a luxury but has become a necessity to ensure quality teacher education and internship.

Another aspect that needs immediate attention is concerned with widespread digital inequality spread across Indian education system. NEP 2020 followed by NCFSE 2023 strongly support and suggests measure for technology driven teaching and learning in Indian classrooms but underinvestment and unequal distribution of digital infrastructure in Indian educational institutions leads to participation gaps that may result in poor resource settings for many interns (Sood & Pandey, 2021). According to researches about 43% of Indian schools do not have functional computers (iDream Education, 2025). Similarly many schools especially in rural areas are struggling for uninterrupted internet connections (Ministry of Education, 2025). Technology, according to UNESCO (2023) might further enhance the existing inequalities if fails to provide solutions that are cost-effective.

The present study is an effort to look into the genesis behind technology-enabled supervision that is cost effective based on recommendations of various studies and policy documents. The study also tries to propose a cost effective technology-enabled model of supervision for B.Ed. interns.

Objectives of the Study

1. To study the personal and contextual limitations associated with existing supervision of B.Ed. internship.
2. To study the digital limitations and technological affordability existing in Indian schools.
3. To proposes Low Cost Own Device (LCOD) model of supervision for B.Ed. interns.

Methodology Used in the Study

Present study mainly adopts an analytical framework based on secondary sources which is

qualitative by nature. This method integrates data and informations mainly from secondary sources to frame a concrete story based on systematic analysis. The genesis behind technology enabled supervisory has been studied through developing a theoretical framework based on the recommendations of NEP 2020, mandates of NCFSE 2023 and other empirical studies in a coherent manner. Further the necessity of cost effective model has been examined based on gaps existing between ground realities in Indian classrooms and policy targets. Finally a cost effective scalable model has been proposed based on real field difficulties and overall objectives of the whole supervisory practices.

Policy Genesis behind Technology-enabled Teacher Education and Professional Development

A review of NEP (National Educational Policy) 2020 and NCFSE (National Curriculum Framework for School Education) 2023 in relation to issues pertaining to teacher education reflects a transition of isolated, monotonous, traditional teaching practice towards a more vibrant, technology enabled holistic internship. NEP 2020 considers quality teacher education as the most crucial factor in any schooling system by providing competent teachers.

NEP 2020 provides a blue print of integration of digital infrastructure by advocating Unified digital infrastructure. Digital Infrastructure for Knowledge Sharing (DIKSHA) and SWAYAM needs to be promoted and made operational in order to ensure comprehensive professional development and effective content delivery (Ministry of Education, 2020). The policy suggests use of technology in order to deal with isolation and inconsistencies in the teacher training. In case of B.Ed. internship this implies continuous and dynamic supervision with the support of technology. NEP 2020 advocates transparent objective assessment procedures through the establishment of National Professional Standards for Teachers (NPST). Use of latest technology is extremely important in order to achieve this goal through ready to use digital data and rubrics.

NCFSE (National Curriculum Framework for School Education) 2023 suggests strategies to translate the mission of NEP 2020 into classroom practices. It suggests a shift from traditional rote learning towards inquiry driven one. For B.Ed. interns and supervision it may imply as more of a process orientation than an existing product oriented approach. NCFSE 2023 recommends use of digital tools and simulation in the classrooms. The supervisors in the era of technological advancements therefore need to equip their interns with the skills necessary for effectively integrating ICT tools in their teaching and lesson planning activities (NCERT, 2023).

Studying the Personal and Contextual Limitations associated with existing Supervision of B.Ed. Internship

Traditionally supervision of B.Ed. suffers from a number of shortcomings which supports the need for a technology enabled supervisory. Some of the personal and situational limitations have been noted below in a tabular format along with references and their possible outcomes.

Table 1.1- Personal and Contextual Limitations related with Supervision

S/No.	Limitations	Brief Description	Probable impacts	References
1	Central tendency and Leniency	In order maintain good relationship or minimize conflicts with the students supervisors give average or generous scores	Stagnant professional development in the absence of objective and differentiated feedbacks	(Lloyd, 2021)
2	Horn and Halo Effects	When overall rating is influenced by very few or single positive (Halo) or negative (Horn) trait	Faulty evaluation and assessment ignoring the diverse and multi dimensions of teaching competence and skills	(Michela, 2023) (Shaffer, 2015)
3	Implicit Prejudices	Subconscious biasness on the basis of language, gender, personality, belief or race	Unequal and inconsistent assessment and grading of the trainees	(Cannon & Cipriani, 2022)
4	Contextual and logistic Inconsistencies	Irregular, speedy, unfamiliar supervision because of limitations related with high student teacher ratio, long traveling time or unfamiliarity with students and schools	Unreliable, infrequent, rushed, and subjective feedbacks and grading	(Tshabalala, 2021) (Kidd et al., 2020)

Table 1.1 highlights the traditional shortcomings that are seen in supervision of prospective teacher trainees often associated with personal prejudices and institutional limitations. Limitations, such as providing faulty feedbacks or average marking or even high or low level of remarks contradicting to actual situation of the intern students in many cases is a common phenomena in many teacher trainee institutions. In some cases supervisors are also influenced by factors which are not related with overall teaching proficiency or competence. In many cases supervisors over rate or under rate its students due to external pressures or taking into account the marking patterns of other training institutions. In some cases quality of observation is influenced by corrupt practices (Zaman 2025). Such biases in scoring are known as leniency and central tendency biases if done in order to preserve good relations or avoid conflicts by granting generous or average marking.

When supervisors are over influenced by one or very few negative (horn) or positive (halo) characteristics of trainees instead of observing in entirety ensuring diverse teaching competencies, this leads to faulty evaluation of practice teaching. Similarly supervisors may suffer from implicit biases based on trainees’ demographic backgrounds leading to inconsistent grading or observation. Objective observation of trainees is severely impacted if it is done in hurry or inconsistently because of situational (long traveling times), logistic (lack of minimum facilities in the classroom) or number (adverse trainee supervisor ratio or overcrowded or very few children in the classroom) barriers.

Studying the digital limitations and technological affordability existing in Indian schools

The quality of infrastructure and logistics in intern schools where trainee teachers spend a considerable percentage of time plays a pivot role in quality supervision and training of B.Ed. students. More importantly the administrative and teachers support in proper utilization of resources and guidance of trainees in close coordination with the supervisors and teacher training institutions is crucial in successful completion of whole internship activities. As discussed earlier based on the recommendations of NEP 2020 and provisions of NCFSE it is clear that sound updated technological infrastructure in the schools is a prerequisite for 21st century schools and classrooms. An effort has been made in the table below to highlight the specific school related challenges and the impact on B.Ed. supervision based on Ministry of Education UDISE+ (2024-25) and other recent review of related studies.

Table 1.2- School Level Digital Limitations and Impact on Technology based Supervision

Limitations Category	School Level Digital challenges	Impact on Technology Enabled Supervision	References
Hardware Deficits	Only 63.5% of schools in India have access to internet. Lack of fund for high speed broadband and proper internet facilities particularly in disadvantaged/rural schools. Hinders optimum performance of national digital platforms like DIKSHA which needs high bandwidth internet speed.	Restrains real-time synchronous video recording and reporting by the supervisors affecting proper use of national digital platforms.	(Ministry of Education 2025), (Rau's IAS 2025)
Operational gaps	There is an increase in the number of schools with non-functional computer by 63,598 within a time span of two years leading to a total number of 99,184 schools with non-functional computer facilities in 2024–25. Challenges in bearing the recurring costs on periodic hardware upgrades,	Shortage of maintenance budget for repair, upgrading and licensing is leading to useless, outdated and broken digital equipments in schools leads to	(Ministry of Education 2025), (IEEE CTU 2023)

	software licensing and hardware repairs.	diminishing impact on effective training and supervision.	
Connectivity Challenges	The reach of projects such as BharatNet to about 2.15 lakh Gram Panchayats is losing its impact because of factors such as physical damage to Optical Fiber Cables, and linking the internet from panchayat bhawans to schools and rural households. Many schools do not have fixed line broadband leading to delay in transition towards FTTH (high speed fiber).	These delays in transition and connectivity issues has direct impact on intern schools and effective supervision particularly in rural areas.	(Ministry of Communications 2026) (Indiaspend 2025), (PIB 2025)
Energy Shortages	UDISE+ reports almost schools (93.6%) at present having connectivity of electricity. But the durability and reliability of power supply is still a big challenge. Frequent electricity cuts and shortage of funding for power backups (inverter or solar panels) is reported by many schools.	Digital labs and the high speed fiber in schools become useless. Scheduled observation of B.Ed. interns based on fixed point technologies becomes very difficult.	(Ministry of Education 2025), (Cenerva Report 2025)
Training Gaps	Number of teachers in Indian schools is more than 1 crore, their certification in digital training still minimal. Many teachers still lack very basic skill of data entry for which they use to travel block level offices. Lack of funding is limiting computer literacy among teachers.	Effective and frequent use of digital equipments and software both by interns and supervisors requires specialized quality digital training.	(Ministry of Education 2025), (iDream Education 2025)

From table 1.2 it is clear that at present every four out of ten schools in India do not have even the basic access to technological infrastructure and hardware leading to huge digital divide limiting access to all online services and platforms by government of India for the schools. This has direct bearing on synchronous and real time video meetings, recording or reporting. Another shortcoming is associated with approximately hundred thousand schools with non functional computers which suffer problems related with maintenance, repair, broken hardware parts, outdated software and licensing etc. Such limitation makes use of technology in training and supervision less impactful and more ritualistic.

Despite the increase in reach of projects such as BharatNet to about 2.15 lakh Gram Panchayats, the table also highlights the connectivity issue by highlighting factors such as physical damage to Optical Fiber Cables, and delay in internet connections from the panchayat bhawans to schools and rural households hindering the seamless delivery of high-speed internet. Most of the villages in the country have mobile coverage, but the transition to high-speed fiber (FTTH) for schools has been phased and delayed, with many rural schools still awaiting fixed-line broadband. The table also draws attention towards electricity related problems in schools. No doubt reach of electricity connections and supply has improved but when it comes to schools particularly in rural areas uninterrupted power supply and absence of optional power backups is a serious issue that needs attentions.

Any system updated and rich in material infrastructure cannot functions in the absence of well trained and efficient human resource to ensure optimum output. Table above highlights the issue of teachers' digital training. Only a small percentage (30% to 35% according to UDISE+ 2024-25) of 10 million Indian teachers are efficient enough to handle computers and run basic functions and data entry required at school level. They are dependent on block level and district level officials and technicians for basic digital works, data entries and trouble shoot technical issues. In the absence of quality specialized training interns and supervisors smooth effective and full utilization of digital technology is hardly seen on the ground.

The gaps and challenges pertaining to hardware, software, connectivity, electricity and training and skill development all requires a lot of funding, judicious distribution, actual and time bound disbursement to deal with digital divide challenges. In order to make supervision and training technologically empowered at present it is inevitable to devise cost effective alternatives that has a larger reach and access.

Looking into the above deliberations it is evident that B.Ed. intern supervision at present is suffering many shortcoming including personal biases, contextual limitations and affordability issues. These have been time and again discussed and advocated by several studies in general and policy documents and reports in particular. Technology bridges many of these gaps and provides solutions by ensuring quick, unbiased, real time monitoring and feed back to supervisors as well as interns. However discussions further supplements that so far Indian schools and internship is concerned being technology cost effective is also a primary consideration which is besides financial is also a strategic necessity.

Proposing Low Cost Own Device (LCOD) Supervisory Model for B.Ed. Interns

Both NEP 2020 and NCFSE 2023 stress the need to revisit the teacher education programme by integrating technology and emphasizing competency based teaching, and reflective practices (Ministry of Education 2020, National Council of Educational Research and Training 2023). Earlier school based internship which was popularly called practice teaching relied heavily on supervisors physical visit and observation of interns teaching multiple times. This practice as elaborated earlier requires huge resources, requires in many cases travelling schools that are geographically far located from teacher training institutions and is inconsistent (Torsh 2016). In order to deal with such shortcomings a technology enabled cost effective supervision

model is proposed which is asynchronous consisting of video recording and cloud based feedback.

This supervisory model is an effort to bring intern students and supervisors own devices which are readily available fruitfully utilize for teaching and training process. This model is an effort to modify traditional supervision into data driven flexible reflective observation with the help of low cost own devices. This model is based on the principle of BYOD which means bring your own device. The intern and supervisors bring their own smart mobiles, or if available their basic webcams, tablets etc which are already available (IRIS Connect 2025). Such basic low cost devices may be made available by the intern school or teacher training institutions but will definitely eliminate expensive purchases which data already shows is at present not feasible in many Indian schools.

This model starts with taking proper consent from the intern students and school regarding digital recording and use of internship activities and procedures. It is made clear that the data recorded and deposited and transmitted will be kept confidential and used only for training purpose. In the absence of such assurance interns might not feel comfortable which may hamper their naturalistic teaching during internship.

As a second step proper recording of the intern instructions and students engagement will be ensured using own devices which are readily available to the school, supervisors and interns. Fixed small time slots of recording over the whole class (may be 20 seconds after each five minutes from all zones spread over 40 minutes class duration) against each lesson is ensured. While recording the whole class is segregated into four zones (front right, front left, back right and back left). Mutual devices of one another intern will be used to ensure proper recording of all interns. This reduces several biases that may be there as discussed earlier intentionally or unintentionally among the supervisors. Such recorded teachings are very effective in self assessment and overview by the interns themselves.

The next step is concerned with submission of recorded videos. Cloud based free or low cost platforms like Google Drive, DIKSHA linked digital repositories or Microsoft OneDrive may be used for the same. Each intern is provided a separate link generated for their observation portfolio. Each intern uploads its recorded lesson through their secured cloud link. Such uploading may be done in asynchronous mode during non peak hours form school college free WIFI/internet facilities reducing individual interns or supervisors cost on data. Such use of technology, storage and uploading are all steps towards integrating technology into teaching and learning and promotion of public scalable digital infrastructure mandated in NEP 2020 and NCFSE 2023.

Step four of the model includes observation of uploaded lesson by the supervisor in asynchronous mode as per convenience in a time bound manner through various video assessment platforms such as Google Docs/Forms or GoReact and record/report their comments/remarks (GoReact 2025) in a rubric or time stamped format. Personal biases of the supervisors are reduced (Torsh 2016). Supervisors may observe several times and making video movement and pace controlled as per requirement making observation more accurate. Technology enabled assessment has the advantage to provide specific feed back without much

noting and drafting by directly pausing exact moments and putting remarks at the same time through the use of digital techniques. It is easier to calculate the time spend on different activities during the lesson delivery by the intern. Through heat maps (Martinez-Maldonado et al. 2019) one can easily access and provide feedback regarding students movement, gaps in particular segments and components, gaps in engagement, judicious movement (Abbot et al. 2014) or attention towards back bencher or better performing students.

The last step involves technology enabled storage and retrieval that gives ample of time to interns and their peer for self reflection and learning from their peers as per their convenience and free time enhancing overall quality of internship programme. By observing their own recorded lessons interns identify strength as a source of motivation and confidence and gaps to be improved. Similarly it gives ample of opportunity for peer observation (taking care of privacy and confidentiality controls) by making small groups of interns to give fruitful feedbacks on one another lessons. Again like supervisors technology here also reduces the limitation related with personal preferences or likes or dislikes since recorded videos show exact engagement patterns, time spend on different tasks gaps and strengths. It also facilitates observing own/peer teachings in once own pace and convenience. In the Table 1.3 below an effort has been made to highlight in brief different steps followed in sequential manner along with activities, logistics required, possible outcomes and references against each step in the model.

Table 1.3- Tabular representation of Low Cost Own Device (LCOD) Supervisory Model

Step	Activity	Logistics Required	Outcomes	References
I	Ensuring Consent and Confidentiality of the interns	Lesson Plans with necessary Permissions, Consent forms by Interns and Confidentiality Assurance by the Supervisor and Training institution	Making Technological integration Ethically and Legally compliant in order to develop a sense of confidence among interns for natural delivery of lessons. This is essential to record videos, their storage and transmissions.	(IRIS Connect 2025)
II	Low Cost Own Device Video recording	Smart mobiles, Webcams, tablets and Tripods etc that are readily available to most of the interns	Proper recording of intern lesson delivery, their teaching styles and students engagement.	(IRIS Connect 2025)
III	Submission and Storage on Cloud Based Platforms	Free or low cost Colud platforms such as Google Drive,	Developing Observation portfolios that are centralized with secured links for each intern	(NCERT 2023), (MoE 2020)

		DIKSHA, Microsoft OneDrive		
IV	Supervisors feedback and remarks in Asynchronous Mode	Own device supported Video evaluation tools such as GoReact or Google Forms/Docs.	Facilitates objective rubric based and time-stamped feedback in a detailed manner without much noting or drafting highlighting time moments particular gestures etc.	(GoReact 2025), (Torsh 2016)
V	Self evaluation and Peer Observations for more professional Growth	Reflective Journals in digital format, rubrics, shared files and folders with taking care of confidentiality and Privacy norms in small groups of own class mates.	Enhanced self observation and awareness, understandings one own strength and weaknesses and promotion of Collaborative learning and multiple perspectives on various pedagogical aspects	(MoE 2020)

The Takeaway from LCOD Supervisory Model

The whole LCOD supervisory model is cost effective and takes into account integration of technology with affordability by the interns, schools and the supervisors. This model is flexible in terms of supervision from anywhere, observation at any time and feed back in simple but with more accuracy. This model enhances the lesson observation time in once own pace. Further the observation and feedback can be provided by more than one single teacher educator. It reduces the cost incurred on more travelling and time exhausted on single lesson observation. The remarks and feedbacks can be provided in a more objective manner and is also subject to be rechecked. In brief LCOD supervisory model is cost effective, less subjective, more involving, less rigid, reduced personal biases and fatigue of real time long remarks writing making it quite suited for present day B.Ed. interns and supervisors in Indian classrooms.

Conclusion

Traditionally supervision of B.Ed. interns suffered a number of limitations ranging from personal prejudices, halo effects, inconsistencies, physical and geographical limitations etc. In order to overcome such challenges most of studies and policy documents have advocated technology supported observation of internship activities. However challenges such as lack of funding, quality hardware, operational challenges, problem of electricity and uninterrupted internet facilities are severe impediments in ensuring robust technology enabled supervision of B.Ed. interns in Indian schools. Taking into account all these challenges a cost effective technology enabled model of supervision for B.Ed. interns has been proposed which suits

Indian teacher training institutions and schools. Low cost own device supported LCOD model of supervision offers a concrete solution aligned with National Policy of Education 2020 and NCFSE 2023. This five step model takes into account ethical and legal constraints, is asynchronous, based on own device supported by free or low cost recording storage and evaluation techniques. The model is scientific flexible ensuring observation from diverse perspectives. The model enhances the quality of feedback, ensures evidence based observation and remarks and promotes reflective practices.

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