

Competency-Based Online Teaching Supervision Process for Technical and Vocational Preservice Teachers

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Abstract – The aim of this study is to assess the teaching proficiency of technical and vocational preservice teachers. This assessment aims to pave the way for the effective management of online teaching oversight based on established competency standards. Additionally, the study explores the integration of digital technology in the realm of online teaching supervision. The research approach employed a combination of research and development, utilizing content analysis of relevant literature and research, while also constructing supervision models. The findings revealed that the teaching proficiency of technical and vocational preservice teachers encompassed various facets, including the formulation of comprehensive learning management plans, the use of enriching learning activities, the execution of teaching strategies, the utilization of media and technology, and the implementation of measurement and evaluation methods. The process of online teaching supervision was found to involve a few distinct stages, namely preparation for supervision, the execution of supervision activities, guidance and mentorship, continual improvement coaching, and the subsequent reporting of coaching outcomes. Furthermore, the integration of digital technology into online teaching oversight was shown to manifest itself in two principal approaches: synchronous and asynchronous modes.

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Keywords – Supervision, teaching competencies, technical, vocational preservice teachers.

1. Introduction

In a curriculum for undergraduate students majoring in education, one of the significant regulations for every sub-major included in a curriculum standard is to strengthen the teaching experiences and responsibilities. Undergraduate students majoring in education are required to conduct their teaching that could practice and perform in a real teaching environment. This approach aims to enrich the learning journey, providing teachers with authentic experiences in schools, including practical teaching responsibilities mirroring those of working educators. Guidance and oversight of these student teachers fall under the responsibility of instructors from various professional backgrounds who also act as mentors. The instructors' role is to assess teaching performance, identify challenges, offer guidance, provide recommendations, and refine teaching methodologies. This comprehensive oversight is designed to cultivate professionalism among student teachers, preparing them adequately for their practical teaching endeavors while ensuring a high quality. As evidenced by the research of Izwah and Politeknik [1], this supervisory process plays a pivotal role within the education system.

The educational system places a strong emphasis on ensuring that teachers possess the necessary competencies aligned with the standards established by educational regulatory bodies. Consequently, the supervision of teacher trainers should prioritize the assessment of these teacher competencies. Simultaneously, the competencies required for technical and vocational student and in-service teachers markedly differ from those of their counterparts in other vocational fields [2]. This distinction stems from the fact that technical and vocational teachers need to embody competencies that directly mirror real-world work scenarios [3].

Their competencies are rooted in the specialized fields of technical and vocational education, enabling them to meet professional standards when assuming roles as technical and vocational teachers. The supervision of student teachers should ideally take place within the educational institutions in which they conduct their teaching. However, advancements in technology have enabled an alternative approach, allowing supervisors to provide online oversight. Due to sudden technological changes which have prompted educational institutions to adopt online supervision methods, replacing traditional face-to-face interactions [4]. Teacher trainers can establish an online system to effectively oversee various aspects of teaching students. This includes creating an online repository for teaching documents, facilitating the submission of student teaching outcomes, and collecting diverse data related to teaching performance. Consequently, the adoption of online coaching and student supervision management information systems has become a prevalent practice across numerous educational institutions, particularly evident during COVID-related lockdowns [5].

Supervision to evaluate the competence of technical and vocational student teachers continues to rely predominantly on traditional face-to-face methods, involving the assessment of teaching quality and practical skills - both core components for industrial educators. Both in-service teachers and student teachers are required to meet technical and vocational education standards specific to their professional domains. The evaluation process employs a combination of observations, interviews, and practical appraisals [6], with a particular emphasis on gauging key competencies of on-campus technical and vocational students a method distinct from other assessment techniques in the field. The concept of online teaching supervision has emerged as a viable approach, particularly concerning digital teaching resources and information available as digital files via the Internet. Support tools [7], as well as educational materials and technology that students can access and present online [8], contribute to this method. However, to enable teacher trainers to effectively conduct online supervision, training in technology utilization is imperative [9]. The utilization of free and open-source tools not only proves feasible, but also empowers student teachers during their training [10]. Furthermore, distance teaching supervision involves leveraging educational technology to enhance the supervision process, thereby benefiting both teacher trainers and student teachers [11]. In terms of evaluating the competency of technical and vocational student teachers, some aspects can also be appraised online.

This could involve supplementing supervisors' meetings at practice schools to gain insights into the actual training conditions. Such an approach is poised to enhance the overall quality of student training.

2. Literature Review

In this study, the competency-based online teaching supervision process for technical and vocational preservice teachers requires an analysis of teaching theory and supervision methodology as follows

2.1. *Pre-Service Technical and Vocational Teachers' Competencies*

Pre-service technical and vocational teachers are required to possess teaching competencies that align with established professional teaching standards. This underscores the importance of engaging in practical teaching experiences within educational institutions. Moreover, beyond their proficiency in terms of instructing students within their respective domains, it is imperative for these student teachers to acquire practical competencies [12]. These competencies encompass not only general teaching aptitude, but also extend to crafting comprehensive learning management plans, designing effective teaching and learning activities, implementing teaching methodologies, harnessing media and technology for instructional purposes, and assessing learning outcomes proficiently. Furthermore, in the context of a rapidly evolving digital landscape, multifaceted digital literacy is essential, encompassing a broad spectrum of digital skills, in alignment with the insights of Roll and Ifenthaler [13]. Additionally, a strong grasp of information and communication technology competencies is indispensable. Students pursuing a teaching career must dedicate time to enhancing their proficiency in this area, as it serves as a pivotal tool for effective instruction [14]. Furthermore, a comprehensive grasp of the Technological Pedagogical Content Knowledge (TPACK) approach, as outlined by Demirtas and Mumcu [15], and Altun [16], is pivotal. This entails not only possessing subject-specific knowledge, but also the ability to seamlessly integrate technology, pedagogy, and content to optimize the teaching and learning experience.

2.2. *Teaching Supervision on the Competency Base of Pre-Service Technical and Vocational Teachers*

Technical and vocational teachers exhibit distinct characteristics compared to teachers in other disciplines due to their technical and vocational backgrounds.

They are tasked with instructing technical and vocational subjects, as their role involves educating industrial technicians at both vocational certificate and higher vocational levels within specialized courses offered by vocational colleges that focus on industry-specific content. Given this distinctive context, the need for specialized supervision for technical and vocational student teachers is essential [17]. Considering the emphasis on practical learning within vocational education institutions, the planning of supervision for these student teachers must encompass a process that is closely aligned with practical application [18].

Teaching supervision is a fundamental aspect of managing and facilitating the learning process for student teachers. Across various domains of the teaching profession, the practice of sending such individuals to educational institutions for training is customary. The process of teaching supervision encompasses several sequential stages: initial planning supervision, in-school supervision, provision of guidance and recommendations, enhancement of teaching methodologies, culminating in supervisory assessment [19]. The role of in-service professors is one of the roles of university professors who must act as in-service professors, mentors, and trainers [20]. Furthermore, the establishment of a strong rapport with the broader social community and the continual development of professional competencies are pivotal components for student growth and success [21].

2.3. Digital Technology for Supervision of Teaching

The utilization of digital tools to provide instruction to pre-service technical and vocational students holds immense significance and urgency within the contemporary era [22]. In the aftermath of the transformative impact of the COVID-19 pandemic on educational paradigms, the mastery of digital competencies has emerged as a pivotal skill set for aspiring educators in this new epoch [23]. This is underscored by the escalating demand for communication tools in the educational landscape, necessitating both students and technical and vocational educators to adeptly employ a plethora of tools to interact with learners and pedagogical overseers. The exchange of vital aspects such as knowledge dissemination, discernment, practical applications, and assessment is pivotal [24]. Evidentiary research demonstrates that digital technology stands as an effective conduit for communication between mentors and mentees within educational establishments.

This platform not only facilitates the supervision of teaching and practical exercises, but also enables the secure archival of relevant data. As a result, a comprehensive evaluation of educators' proficiency across diverse domains, encompassing learning, pedagogical techniques, multimedia production, and instructional assessment, becomes feasible [25].

Educators engaged in teaching supervision must possess online supervision competencies. Proficiency in utilizing information and communication technologies is essential, enabling seamless communication and access to information, akin to the methods employed in teaching students [26]. This proficiency enhances the capacity to oversee the teaching of students, employing both synchronous and asynchronous approaches [27]. Across various nations, university professors are progressively embracing online supervision technologies to augment the efficacy of their supervisory practices [28], [29], [30]. Consequently, a comprehensive exploration of the online supervision processes becomes imperative. This exploration will serve to advance the competency-oriented training of technical and vocational student teachers, aligning them effectively with the demands of the technology-driven era.

3. Research Scope

The research scope consists of two sections as follows.

3.1. Research Inquiries

RI1. What comprises the spectrum of teaching competencies demonstrated by pre-service technical and vocational teachers?

RI2. What delineates the procedural framework for enacting performance-centric online supervision among pre-service technical and vocational teachers?

3.2. Research Objectives

RO1. Assess the teaching competencies exhibited by pre-service technical and vocational teachers.

RO2. Formulate an online supervision process rooted in competency-based principles, tailored to the needs of pre-service technical and vocational teachers.

4. Research Methodology

The research method consisted of two main components according to the research objectives as follows.

4.1. Approaches for Evaluating the Teaching Competency of Pre-Service Technical and Vocational Teachers

The assessment of teaching competency on the part of technical and vocational student teachers was carried out using a documentary research approach. In this regard, the content analysis method was employed to scrutinize teaching methodologies and the competencies of student teachers. The SCOPUS database served as the primary source of analysis, involving a comprehensive review of 10,868 documents as part of the investigative process. (TITLE-ABS-KEY (preservice AND teacher)) AND (education)

720 document results: (TITLE-ABS-KEY (preservice AND teacher)) AND ((education)) AND (supervision)

131 document results: (TITLE-ABS-KEY (preservice AND teacher)) AND (((education)) AND (supervision)) AND (online)

33 document results: (TITLE-ABS-KEY (preservice AND teacher)) AND ((((education)) AND (supervision)) AND (online)) AND (digital)

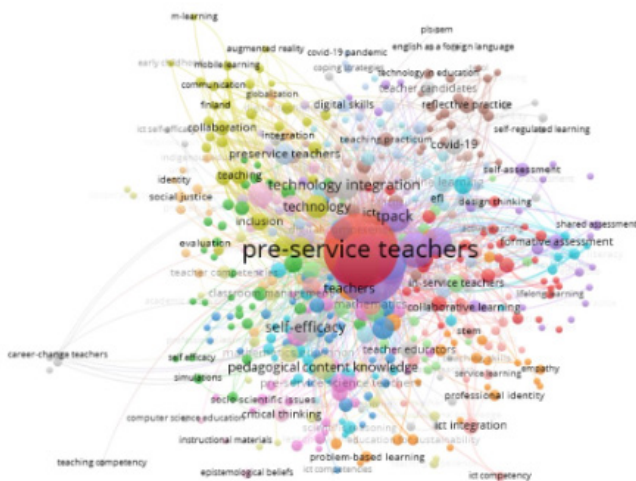


Figure 1. Pre-service teachers using bibliometric analysis

Table 1. The teaching competencies of pre-service technical and vocational teachers

Teaching Competencies	Description	Reference concept
MIAP	<ul style="list-style-type: none"> • Create learning plans based on student learning standards by using MIAP. 	[12], [31], [32]
TPACK	<ul style="list-style-type: none"> • Determine teaching content. • Specify teaching and learning activities. • Choose a teaching technique suitable for the content based on TPACK. 	[15], [16], [32], [33]
Hands-on	<ul style="list-style-type: none"> • Demonstrate work and teaching practice step-by-step. • Students take correct action according to the specified methods 	[3], [32]
Digital Tools	<ul style="list-style-type: none"> • Online documents and worksheets. • Communicate and present online. • Communicate with professors and mentors reading online. 	[26], [31], [35], [36], [37]
Progress	<ul style="list-style-type: none"> • Evaluate learners' progress through an online system. • Measure the performance according to actual conditions. 	[36], [37], [38]

4.2. A Method for Developing a Competency-Based Online Supervision Process for Pre-Service Technical and Vocational Teachers

Once the desired proficiency level of pre-service technical and vocational teachers is achieved, their accomplishments will be integrated with the teaching supervision process. This integration aims to steer the supervision towards the intended objective. Consequently, a pedagogical supervision process was structured as a competency-centred model for student teachers. This approach deviates from the conventional teaching supervision of student teachers.

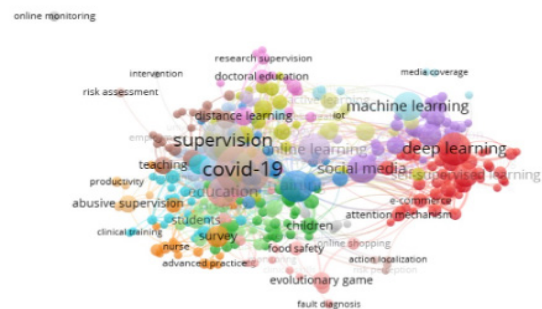


Figure 2. Supervision process for teaching using bibliometric analysis

Table 2. The online teaching supervision process

Online supervision process	Description	Reference concept
Supervision preparation	<ul style="list-style-type: none"> This phase requires university mentors to meticulously prepare documents, establish communication with educational institutions, inform mentors and trainee students, and methodically outline the supervision plan 	[18], [19], [20]
Supervision operations - Online supervision (Asynchronous) - Face to face supervision (Synchronous)	<ul style="list-style-type: none"> University mentors travel to meet with teaching students at educational institutions or online through supervision systems. Observe and monitor coaching (Mentoring). Interview students, classroom mentors, and students in the classes where the students train. 	[11], [19], [20], [27], [30], [39], [40], [41]
Mentoring, Coaching, and Consulting	<ul style="list-style-type: none"> Suggestions and recommendations for the training of student teachers (Consulting). Introduce teaching techniques (Coaching). Suggest ways to solve teaching problems. 	[19], [20], [30], [35], [40], [42]
Coaching Improvements	<ul style="list-style-type: none"> Check for student teacher coaching improvements. Review coaching procedures and collaborate with mentors and schools to improve coaching. 	[19], [20], [30], [40]
Reporting of training results	<ul style="list-style-type: none"> Summarize the results of student training with mentors and educational institutions. Evaluate the teaching results according to actual conditions and send results to the department. Report on the results of the teaching of student teachers, institutions, and students. 	[19], [20], [30], [40]

Table 3. Technology for supervision

Digital technology for supervision	Description	Reference concept
Synchronous; Realtime	Simultaneously employing digital technology for both supervision and instruction enables teacher trainers to interact with and oversee student teachers in real-time. This dual-function approach allows for mutual visibility between the supervisors and students, utilizing the foundational capabilities of digital tools.	[11], [13], [27], [28], [29]
Asynchronous	Utilizing digital technology for supervision involves teacher trainers and students to engage at various time points. Through digital communication tools, they interact without the need for in-person meetings, relying on a foundation of digital competence.	[28], [29], [13], [27], [11]

5. Results

The outcomes derived from the analysis of online supervision for pre-service technical and vocational teachers encompassed three key components: pedagogical proficiency, the online supervision process, and the utilization of digital technology within online supervision. The researcher engaged in interactive discussions and idea generation with supervisory personnel tasked with overseeing the instruction of pre-service technical and vocational teachers. The findings are presented in Table 4.

Table 4. Components of the supervision process

Components of the Supervision Process	Expert Opinion		
	\bar{x}	S.D.	Level of fitness
1. Teaching competency consists of:			
1) Development of the MIAP Learning Management Plan	4.90	0.32	Most
2) Activities designed to enhance the development of TPACK (Technological Pedagogical Content Knowledge) for effective learning:	4.90	0.32	Most
3) Acting (Hands-on)	4.80	0.42	Most
4) The use of media and technology (Digital Tools)	4.80	0.42	Most
5) Measurement and evaluation (Progress)	4.90	0.32	Most
2. The online teaching supervision process consists of:			
1) Supervision preparation	5.00	0.00	Most
2) Supervision operations			
- Online supervision (Asynchronous)	4.90	0.32	Most
- Face to face supervision (Synchronous)	4.90	0.32	Most
3) Mentoring, coaching, consulting	4.90	0.32	Most
4) Coaching improvements	4.90	0.32	Most
5) Reporting of training results	4.90	0.32	Most
3. Supervision information system			
1) Synchronous - Realtime - Face-to-face /conferencing	4.80	0.42	Most
2) Asynchronous	4.80	0.42	Most
4. The competency-based teaching supervision process consists of the following steps:			
1) The meeting stage, planning supervision activities, and sequence of activities are as follows:			
a) Divide teacher trainers into groups/classes.	5.00	0.00	Most
b) Determine subjects/select topics used in teaching practice.	4.90	0.32	Most
c) Define the objectives and scope of content for each topic.	4.80	0.42	Most
d) Determine the format for the preparation of the lesson plan.	4.80	0.42	Most
e) Set guidelines for conducting rehearsals.	4.90	0.32	Most
f) Establish teaching evaluation guidelines.	4.80	0.42	Most
g) Establish guidelines for supervising/advising student teachers.	4.90	0.32	Most
h) Establish rules to be used in teaching courses	4.90	0.32	Most
2) The preparatory supervision stage has the following sequence of activities:			
a) Materials to be used for	4.80	0.42	Most

Components of the Supervision Process	Expert Opinion		
	\bar{x}	S.D.	Level of fitness
vocational training			
b) Forms of vocational training experience	4.90	0.32	Most
c) Process of vocational training experience	4.70	0.48	Most
d) MIAP teaching method	5.00	0.00	Most
e) Vocational Experience Training Skills	4.60	0.52	Most
f) Assessment points and criteria for teaching assessment	4.90	0.32	Most
3) The supervision operation stage has the following sequence of activities:			
a) Observe teaching	4.90	0.32	Most
b) Give feedback after coaching	4.90	0.32	Most
c) Edit and submit lesson plans, other documents	4.80	0.42	Most
4) The meeting stage, supervision evaluation, has the following sequence of activities:			
a) Summary of teaching assessment	4.90	0.32	Most
b) Meeting, consulting, and reporting on supervision results	4.90	0.32	Most
Total average	4.87	0.12	Most

Table 4 displays the viewpoints regarding the constituents of the online supervision process for pre-service technical and vocational teachers, as indicated by experts who determined the cumulative scores. These perspectives can be categorized into the following three key components.

5.1. The Pedagogical Proficiency of Pre-Service Technical and Vocational Teachers

The journey of pre-service technical and vocational teachers in developing teaching competence commences with the formulation of a comprehensive learning management plan, known as MIAP. This plan encompasses the creation of a learning framework aligned with learners' standards, leveraging the MIAP platform. Additionally, pre-service teachers orchestrate engaging learning activities that leverage the Technological Pedagogical Content Knowledge (TPACK) framework, ensuring a holistic learning experience. Integral to this process is the meticulous delineation of teaching content and the subsequent design of corresponding teaching activities. In this pursuit, a judicious selection of teaching methodologies tailored to the content's nature and informed by TPACK principles, is imperative. Practical application forms a crucial facet, involving adeptly guiding students through hands-on experiences, methodically elucidating intricate steps, and facilitating meticulous practice in adherence to stipulated methodologies.

A key facet of their skill set lies in adeptly harnessing various media and digital tools, and effectively utilizing documents and online worksheets. Proficiency extends to proficiently communicating and presenting in online settings and fostering seamless interaction with both professors and mentors via virtual mediums. Moreover, student teachers are equipped to perform comprehensive measurement and evaluation procedures, gauging progress through online platforms while emphasizing the measurement of real-world performance.

5.2. Online Supervision Process

The collaborative role of teacher trainers commences during the preparatory phase of supervision. This initial step necessitates supervisory teachers compiling documents, establishing communication with schools, apprising school mentors and students, methodically strategizing supervision procedures, and ultimately carrying out the supervision process. This practice is applicable both in the context of online supervision (asynchronous) and face-to-face supervision (synchronous). Supervisory teachers travel to meet with school mentors within educational establishments or through online supervision platforms. They subsequently engage in observing mentoring sessions and conducting follow-ups. This involves conducting interviews with student teachers, and advisors in the training classes. The provision of guidance takes various forms, including mentoring, coaching, and consulting. These mentors offer advice on student teacher coaching, provide consultation to student teachers, introduce effective teaching techniques, propose remedies for teaching-related challenges, enhance coaching methodologies, assess improvements in student teacher coaching, review coaching protocols, and collaborate with advisors and schools to elevate the coaching process. Additionally, they create comprehensive training reports that encapsulate the outcomes of student teachers' training experiences in conjunction with advisors' insights and institutional evaluations. These reports are used to appraise teaching practices against real-world circumstances and use feedback to improve the teacher training curriculum.

5.3. Digital Technology for Supervision

Synchronous (Real-time): Utilizing digital technology for supervisory interactions in real-time, supervisors and teaching students engage in live sessions that could interact, observe, and leverage digital capabilities as the foundation.

Asynchronous: Utilizing digital technology for supervisory interactions across different time frames. Supervisors and student teachers, separated by time, communicate through digital platforms without the need for physical meetings, drawing upon their digital competencies.

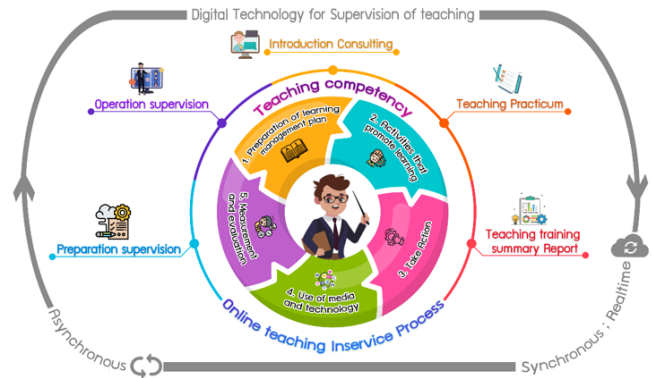


Figure 3. Online supervision process for pre-service technical and vocational teachers

6. Discussion

The cultivation of instructional competencies no longer necessitates direct in-person engagement with student teachers. Leveraging technological tools, supervising educators can facilitate the development of wishful technical and vocational teachers to embrace novel technologies and innovations through targeted training, a practice initiated during their tenure as student teachers [26]. Online supervision for students and teachers using digital technology will be on the rise [41]. The use of in-service technology helps in the process of reflection, bridges the gap in supervision, enables quick communication without waiting, improves student coaching immediately, records and schedules coaching effectively [30]. Therefore, the development of student trainers to use technology for teaching and learning is a continuously ongoing matter. This is important for developing the teaching competencies of coaching students [43].

The process of supervising online teaching has evolved from exclusive face-to-face supervision to a blended approach involving both in-person and online elements [44]. Despite this transformation, the core responsibility of teachers regarding observing classroom activities and overseeing instructional practices remains integral [6]. The teacher trainers must know the results of the student teachers' teaching from the mentor and the meeting of the students in the class they are teaching. This is to provide advice and consultation on various issues in coaching [25].

The supervision process entails offering advice on teaching strategies and methods, prioritizing practical teaching techniques that facilitate learners' attainment of competence and the enhancement of teaching practices in alignment with student teachers' professional proficiencies. Given the context of technical and vocational education training [17], the emphasis is on the practical skills that student teachers must acquire, moving beyond theoretical instruction to hands-on application. This approach is complemented by documenting learning outcomes following the MIAP (Monitoring, Implementation, Action, and Planning) procedures [34], evaluating student teachers' practical performance in accordance with the prescribed curriculum, and incorporating the educational institution's assessments. This coaching process, although routine, now incorporates additional online components, signifying a discernible shift.

Employing digital technology to aid in student teaching supervision, educators can adopt both synchronous and asynchronous methods, capitalizing on the widespread accessibility of technology to enhance the convenience of supervision [27]. Both students and supervisors must possess adept familiarity with information and communication technology, be able to proficiently navigate various technological tools and to swiftly adapt to new ones [28]. Furthermore, this approach increases the efficiency of teaching supervision, fostering ongoing interaction between supervisors and student teachers without the constraints of traditional on-campus appointments [29].

7. Conclusion

Competency-based online supervision is for teacher trainers who must supervise the coaching of technical and vocational student teachers, which is different from normal supervision. This approach necessitates adapting supervision techniques to encompass both online and in-person components. The focal point lies in supervision that accentuates pedagogy and practical application, aligning with the attainment of student teachers' competencies as outlined in the specific learning objectives for each professional domain. This form of supervision presents a formidable challenge for educators, demanding the adjustment of their supervisory approaches. It relies upon an information system to document supervision data. The traditional methods have transitioned to accommodate the digital age, reflecting the contemporary reliance on digital technology as a tool for work. Concurrently, students must continue receiving training to cultivate their practical skills and aptitude in tandem with their competencies.

Consequently, the supervisory process has evolved to conform to modern times, adapting approaches to suit both supervising educators and their students. This evolution also resonates positively with educational institutions, as these changes are expected to facilitate the growth of learners within these establishments and contribute to the progress of upcoming generations of student teachers.

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