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Navigating Online Learning: A Comprehensive Review of Secondary School Teachers' Pedagogical and Technological Skills

Dr. Meenakshi Dwivedi
Assistant Professor
Department of B.Ed./M.Ed.
M.JP Rohilkhand University, Bareilly, UP, India.

Dr. Rambabu Singh
Assistant Professor
Department of B.Ed./M.Ed.
M.JP Rohilkhand University, Bareilly, UP, India.

"This review paper is part of a research project work titled- Impact of 'Teaching-Innovate': A Capacity Building Program for Online Teaching on Teaching Competencies in the Context of Pedagogical and Technological Roles of Secondary School Teachers: A Study in the Light of NEP-2020 funded by Indian Council of Social Science Research (ICSSR), New Delhi, India. We gratefully acknowledge ICSSR, New Delhi for the financial support, which enabled us to synthesize and analyze the existing literature on Online Teaching and Learning."

Abstract-

The objective of this research paper is to assess the technological and pedagogical competencies of secondary school teachers in teaching online and to investigate any challenges they encounter in managing students' learning and technological issues within the online learning environment. The results reveal that the main pedagogical challenges faced by teachers in online teaching encompass classroom management difficulties, motivating and engaging students, and assessing students' performance online. Preparing and delivering online content, managing online tools, ensuring online safety and digital citizenship, technical troubleshooting and management are also crucial for teachers. For this, comprehensive capacity building of teachers is recommended.

Keywords: Online teaching, pedagogical, technological, troubleshooting, capacity building.

Introduction-

When an online learning environment is discussed, it is not just referred to as one particular type; Rather, it is found as a spectrum of technologically advanced educational environments, with subcategories labelled as distance learning, blended learning, e-learning, and online learning. However, each of these learning environments has different expectations and assumptions (Moore, Dixon-Dean & Galen, 2011). Distance learning involves using technology for noncontiguous two-way communication between learners and teachers to achieve learning goals (Garrison and Shale, 1987). Blended learning is known as combining traditional instructor-led classroom learning and technology-based learning (Kim, 2007) to produce effective, efficient and flexible learning (Stein & Graham, 2014). E-learning refers to all forms of technologically assisted instruction and learning that are procedural and intended to affect the creation of knowledge based on the learner's unique experiences, practices, and knowledge. (Tavangarian, 2004). Online learning is defined as accessing learning activities through the use of technology (Benson, 2002; Carliner, 2004; Conrad, 2002), but it is sometimes thought of as learning "wholly" on the online platform (Oblinger & Oblinger, 2005) and occurs in all learning areas and domains (Victoria State Government, 2017).

Each type of learning environment uses technology either little or more making them entirely different from the traditional classrooms and so, in present times learning-teaching has become more advanced and resourceful. Many advanced digital technologies are readily available to support teaching and learning. Like, the application software in the form of LMS (Learning Management System) fosters an environment for engagement and learner achievement and supports an inclusive learning environment (Bradley, 2021). It enables students to sign up for classes, monitor their grades, and view changes and course announcements. (Al-Fraihat et al., 2020; Watson & Watson, 2012).

Educational apps including interactive simulations, digital textbooks, and learning games are useful resources for educational professionals (Zilz & Pang, 2021). Web-based tools that allow individuals to do learning activities together online like working on a group assignment or project, virtual discussions, texting, file sharing, and assessment (Tarun, 2019) promote collaborative learning. Integrating AR and VR technologies into problem-based learning activities increases students' learning achievement and promotes their positive attitudes towards learning (Fidan & Tuncel, 2019; Wu, et al. 2021). These technologies allow students to immerse themselves in the virtual world and interact with digital content in new ways contributing to their better conceptual understanding and long-term retention.

Using these technological advancements in the teaching-learning process effectively is the teachers' responsibility. Although teachers are given exposure to pedagogy and educational technology since their pre-service training stage as the latest technology is replacing the old ones every day, pedagogical aspects are altering too. In this situation, the old pedagogy and technology suitable for traditional classes do not work in online learning environments. Teachers encounter several challenges when they navigate the online learning environment (Davis,

Gough & Taylor, 2019). Thus, teachers need to be introduced and skilled with the new technological and pedagogical advancements regularly through capacity building especially when they are using online learning environments. Without having sound knowledge of newly advent technologies and pedagogies and without being skilled in using those cannot produce effective learning experiences for learners.

Objectives and Methodology-

The objective of this research paper is to assess the technological and pedagogical competencies of secondary school teachers in teaching online and to investigate any challenges they encounter in managing students' learning and technological issues within the online learning environment. To study the objectives, a total of sixty research papers were reviewed. The methodology involved the comprehensive analysis of existing literature and research on the teaching competencies of teachers in online learning environments. The review encompassed an extensive examination of sixty documents including academic articles, reports, and research publications, the synthesis and analysis of which provided a comprehensive overview of the pedagogical and technological skills of secondary school teachers based on the challenges and strengths while teaching in online learning environments.

A. Pedagogical and Technological Skills in the Online Learning Environment-

Pedagogical skills for online learning environments describe the collected practices, processes, procedures, and methods of teaching and learning used in an online classroom. Effective pedagogical skills are paramount to engage and facilitate student learning in the virtual environment. These skills include effective communication strategies (Young, 2006), well-structured course design (Bates, 2019), interactive and engaging techniques (Anderson and Drown, 2011), meaningful assessment and feedback mechanisms (Dixon, 2010), differentiated instruction to meet diverse learning needs (Asim, S., et al., 2020), facilitating collaborations (Haythornthwaite, 2006), and cultivating a supportive online community (Rovai, 2002). Technological skills for online teaching refer to teachers' ability to use technology effectively and safely in virtual classrooms. These include proficiency in online platforms and tools (Beardsley et al., 2021), content creation and sharing (Hargittai & Walejko, 2008), technical troubleshooting and management (Rafique et al., 2021), online safety measures (Tomczyk, 2019) etc. By improving these skills, teachers can build a rich and fulfilling online learning experience, ensuring that students thrive in the online learning environment (Hodges et al., 2020; Paloff & Pratt, 2013; Eom et al., 2006; Shea et al., 2006).

B. Pedagogical Challenges in Online Teaching-

Teachers perform a variety of roles to ensure effective pedagogy on online platforms, such as managing online classes, effective delivery of the learning material, engaging and motivating learners to learn, accurate assessment of students' performance etc. The threats that teachers encounter concerning these tasks are discussed below:

a. Classroom Management-

Several studies highlight significant challenges faced by teachers in managing online classes. Soleimani et al. (2016) identified issues such as course transitions, and group project distribution as potential disruptions to effective instruction, often exacerbated by disruptive student behaviour. The importance of class discipline for quality education is always emphasized but some difficulties in maintaining discipline during online classes are noted (Gurung, 2021). Melesse (2015) highlighted time constraints as a hindrance to implementing differentiated instruction, compounded by large class sizes, demanding schedules, and limited resources. Teachers experience stress due to inadequate classroom management, particularly in dealing with unruly student behaviour (Marquez et al., 2016).

b. Motivating and Engaging Students-

It is challenging for teachers to motivate students in online classes. The main reasons for this are trouble with nonverbal communication (Olszewski-Kubilius & Lee, 2004) and the absence of face-to-face interaction between students and teachers, and among peers, which hinders establishing rapport among them (Esra & Sevilen, 2021). Online learning environments are full of distractions and can be isolating, potentially restricting students' engagement in meaningful learning (Tallent-Runnels et al., 2006). Moreover, the dearth of real-time feedback and accountability makes students procrastinate and less motivated towards learning in online courses, particularly on asynchronous platforms (Serdyukov, 2020). Teachers are therefore recommended to opt strategies like building a sense of community among students (Brinthaupt et al., 2011), setting clear learning objectives (Bolliger & Inan, 2012), providing quality feedback (Sanderson & Greenberger, 2010) and real-time feedback (Lepper & Malone, 2021), and integrating interactive and multimedia elements (Tuma, 2021) and new technological tools (Housand & Housand, 2012) to enhance students' intrinsic motivation and engagement in online learning.

c. Designing & Delivering Online Course-

Teachers face challenges when it comes to designing and delivering effective online courses. Teachers lack motivation in appropriately and effectively designing and delivering online courses (Hoyt & Oviatt, 2013 and Allen & Seaman, 2010). They struggle to adapt teaching methods to the digital medium, affecting their ability to deliver engaging content (Simonson et al., 2019). They feel difficulty in creating new materials or adapting existing ones from traditional face-to-face instruction to suit the online environment (Li & Irby, 2008) particularly for deaf and hard-of-hearing students (Almahasees et al., 2021). They lack adequate training and support for designing

interactive online courses (Kyei-Blankson & Keengwe, 2009). To address these challenges, Koehler, Mishra, Hershey, and Peruski (2004) encourage teachers to consider content, pedagogy, and technology integration when designing online courses, emphasizing the importance of a holistic approach.

d. Assessment and Feedback-

Teachers face difficulties in assessing students, particularly due to students' limited technological competency (Saputra et al., 2022). Assessing collaboration in online settings is complex, with concerns about students contributing intelligently and staying on topic (Swan et al., 2006). Developing specific grading rubrics is suggested as a more effective approach. Tauh et al. (2021) discuss challenges related to the validity and reliability of online assessments in higher education, emphasizing the importance of various assessment methods such as online quizzes. Gurung (2021) underscores the need to engage students and track their progress in online learning, while Albrahim et al. (2020) note that teachers may feel uncomfortable and stressed when dealing with technology-rich classrooms, which can discourage faculty from teaching online. Overall, these studies highlight the multifaceted challenges and considerations in online education and assessment.

C. Technological Challenges in Online Teaching-

Several critical challenges emerge in online teaching in the context of technology usage. Esteve-Mon et al. (2020) highlighted a deficiency in teachers' technical skill sets, particularly in using advanced digital tools. Teachers often rely only on Google Forms and exhibit low competence in using other online assessment tools (Layco et al., 2022), highlighting a need for improved digital skills. Teachers encounter challenges in preparing and delivering online learning content, sometimes lacking competence in using online tools and managing online learning (Erawati et al., 2021). For Digital Citizenship and Online Safety concerns, Kritzinger (2017) stressed the role of teachers in promoting cyber safety, advising students to deliver safety messages, and monitoring students' behaviour during online teaching.

In Technical Troubleshooting and Management, Khanna et al. (2020) revealed that teachers faced technology-related problems during online classes, underscoring the need for technical issue-solving training. Teygong et al. (2012) emphasized the importance of technical support in using and troubleshooting hardware and software, while there is a need to provide teachers with adequate ICT facilities and training (Murithi & Yoo, 2021 and Salsabila et al., 2020) to facilitate effective online learning.

Conclusion and Recommendations-

Pedagogical challenges faced by teachers in online teaching encompass classroom management difficulties such as addressing disruptive student behaviour and time constraints for differentiated instruction. Motivating and engaging students online is also challenging due to the absence of face-to-face interaction, distractions, and the lack of real-time feedback. Designing and delivering effective online courses pose challenges. Assessment and feedback in

online settings require addressing students' technological competency and developing effective grading rubrics by teachers.

On the technological front, teachers often lack proficiency in using various online tools and platforms, with a heavy reliance on Google Forms. Challenges include preparing and delivering online content, managing online tools, and ensuring online safety and digital citizenship. Technical troubleshooting and management are crucial, as teachers frequently encounter technology-related problems during online classes, underscoring the importance of technical issue-solving training and adequate ICT facilities and support.

To address the pedagogical and technological challenges in online teaching, government and educational institutions should prioritize continuous professional development of teachers, offering training in classroom management, time management, differentiated instruction, and effective course design. Encouraging the creation of interactive and collaborative online environments, along with strategies for student engagement and motivation, is crucial. Supporting teachers in developing specific grading rubrics for online assessments can enhance their ability to evaluate student progress accurately. Comprehensive digital skills training, establishing robust technical support systems, and ensuring teachers have access to essential ICT resources should also be ensured by the institutions. Training on online safety and digital citizenship should be provided, alongside the adoption of adaptive technology solutions and collaboration platforms to simplify online teaching.

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