A STUDY ON THE RELATIONSHIP BETWEEN TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE (TPACK), SELF-CONFIDENCE, AND TEACHING COMPETENCY OF B.Ed. STUDENTS IN NAGALAND

Thesis submitted to Nagaland University in Partial Fulfilment of the Requirements for the Degree of Doctor of Philosophy in Education

By

LAVANYA S.

Regn. No: Ph.D/TED/00678

UNDER THE SUPERVISION OF

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DEPARTMENT OF TEACHER EDUCATION

SCHOOL OF HUMANITIES AND EDUCATION

NAGALAND UNIVERSITY

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CERTIFICATE

This is to certify that **Ms. LAVANYA .S.**, bearing **Registration No: Ph.D/TED/00678,** from the Department of Teacher Education, Nagaland University, has completed her Ph.D. Thesis entitled **"A Study on the Relationship between Technological Pedagogical Content Knowledge (TPACK), Self-Confidence, and Teaching Competency of B.Ed. Students in Nagaland",** under my supervision and guidance.

I affirm that this work is original and has not been submitted previously, either in part or in full, for the award of any degree at any other university or institution. Based on its quality and adherence to academic standards, this thesis is deemed fit for submission for the award of the Degree of Doctor of Philosophy (Ph.D.) in Education.

Place: **(Dr. Gyanendra Nath Tiwari)**

Supervisor

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DECLARATION

I, **Lavanya S.**, hereby declare that this Thesis entitled **"A Study on the Relationship between Technological Pedagogical Content Knowledge (TPACK), Self-Confidence, and Teaching Competency of B.Ed. Students in Nagaland"** is the result of my original research work conducted under the supervision of **Dr. Gyanendra Nath Tiwari**, Department of Teacher Education, Nagaland University.

I have duly acknowledged all the sources referenced in this work. Furthermore, to the best of my knowledge, this thesis has not been submitted previously, either in part or in full, for the award of any degree at any other university or institution. This is being submitted to the Nagaland University for the degree of Doctor of Philosophy in Education.

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PLAGIARISM FREE UNDERTAKING

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Date of Submission	17-09-2025
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With warm regards and appreciation.

Place: **LAVANYA S.**

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TABLE OF CONTENTS

LIST OF ABBREVIATIONS

B.Ed.	Bachelor of Education
MHRD	Ministry of Human Resources Department
NCTE	National Council of Teacher Education
NCERT	The National Council of Educational Research and Training
NCF	National Curriculum Framework
NEP	National Educational Policy
ICT	Information Communication Technology
OCED	Organisation for Economic Co-operation and Development
SPSS	Statistical Package for Social Sciences
TPACK	Technological Pedagogical Content Knowledge
UGC	University Grant Commission
UNESCO	United Nations Educational, Scientific, and Cultural Organization
Df	Degree of Freedom
N	Number of Samples
SD	Standard Deviation
ANOVA	Analysis of Variance

CHAPTER – I

INTRODUCTION

1.1. Introduction

"Education is the most powerful weapon which you can use to change the world" – Nelson Mandela

Education serves as a cornerstone for individual growth and societal progress. It goes beyond merely transmitting facts, nurturing critical thinking, civic responsibility, and a commitment to lifelong learning. Education equips individuals with vital skills, values, and attitudes that enable them to contribute positively to their communities. It is essential for fostering economic prosperity, strengthening social connections, and promoting cultural awareness. In an age of rapid change, the role of education is crucial for adapting to technological advancements, addressing global challenges, and fostering equitable development (UNESCO, 2015; NCF, 2015). The rise of the information economy further highlights the necessity for high-quality education, which is vital for preparing individuals for professional and personal achievements. Modern educational systems must adapt to focus on abilities such as evaluative thinking and critical reasoning, digital literacy, and a global perspective.

1.2. The National Education Policy (NEP) 2020

The Indian government introduced the National Education Policy (NEP) 2020, which presents a transformative vision for the education system, emphasizing inclusivity, creativity, and innovation. It shifts away from traditional rote learning methods towards a more integrated, flexible curriculum that promotes problem-solving, logical analysis, and innovation.

The NEP aims to improve educational standards by prioritizing experiential, student-centered learning. It also advocates for a multidisciplinary approach in higher education, encouraging institutions to equip students with the freedom to select courses reflective of their interests. Notably, the policy introduces four-year undergraduate programs with flexible entry and exit options to improve accessibility and inclusivity. (NEP, 2020)

In light of the increasing prevalence of digital education, particularly post-pandemic, technology is an essential component of the framework of the NEP. The policy promotes the merging of technology into educational practices to ensure that everyone has equal access to digital resources, emphasizing the necessity for teachers to receive training in these tools to optimize learning outcomes.

As Rabindranath Tagore eloquently stated, “Education not only imparts knowledge but also fosters a peaceful and harmonious existence”. Citizens must engage proficiently with technology to navigate information in the contemporary digital landscape. Educational systems are transitioning from established teaching methodologies to digital frameworks, integrating Information and Communication Technology (ICT), and becoming integral to social, cultural, political, and economic contexts. Preparing future educators requires cultivating foundational ICT skills among B.Ed. students, providing them with a comprehensive knowledge of digital tools relevant to their teaching practices.

Despite diversifying career paths, educators' continuous professional development remains crucial. Teachers are responsible for educating students and facilitating their advancement in society. To meet this obligation, educators must be equipped with adequate resources to effectively share knowledge, values, and skills. Regrettably, the recent setback in the status and support for teachers has adversely impacted the standard of education and teacher motivation. Elevating the situation of the teaching profession is fundamental to attracting skilled individuals, encouraging innovative teaching approaches, and improving educational standards for the well-being of society. (OECD,2019)

1.3. The Significance of Technology on Education

Technology has profoundly influenced education, reshaping how learning is accessed and engaged. These modifications have considerably upgraded educational experiences and quality, particularly in India. This section explores the essential roles technology has played in transforming the country's education landscape. A primary advantage of technology is its ability to widen access to learning opportunities. Given India's diverse and geographically dispersed population, reaching out to a long-time remote has been a challenge. Technology facilitates the removal of this obstacle through online platforms, video conferencing, and e-learning resources, enabling students in the most isolated regions to access quality education. (MHRD, 2020)

Moreover, technology enriches the learning experience with interactive tools that enhance student engagement and effectiveness. Resources such as multimedia presentations, videos, simulations, and educational software facilitate the visualization of complex ideas to improve understanding. Additionally, online forums, collaborative platforms, and social media prompt peer learning, fostering a dynamic educational atmosphere.

Beyond enhancing learning, technology has revolutionized assessment methods. Traditional examinations often fall short of accurately measuring a student's knowledge. Modern tools such as online assessments, computer-based testing, and adaptive learning systems offer personalized feedback, identify areas for growth, and enable teachers to monitor student progress more effectively. Automated grading systems also free up time for educators, enabling them to emphasize personalized instruction. (UNESCO, 2021; OECD, 2018)

Technology has significantly influenced teacher education and skills enhancement as well. Online resources and courses provide educators with opportunities to refine their skills and stay current with innovative teaching methods. Webinars, virtual workshops, and online conferences facilitate networking and knowledge sharing among educators, empowering them to adapt to evolving educational demands. Furthermore, technology has addressed language barriers in multilingual countries like India, with digital content available for students with language challenges. Effective school administration is another area significantly improved by technology. Educational institutions utilize management systems to streamline operations, track data, and allocate resources, reducing bureaucratic obstacles and promoting effective communication between students, parents, and educators. (NCERT, 2023)

1.4. National Curriculum Framework (NCF) 2023: Integration of Technology:

The integration of technology in education has revolutionized teaching and learning processes, creating opportunities for innovative instructional methods. With tools like smartboards, educational software, and virtual classrooms, educators can enhance student engagement and cater to diverse learning styles. The National Curriculum Framework (NCF) 2023 underscores the importance of technology in fostering critical thinking and creativity among students. It emphasizes preparing learners for an information-driven economy by integrating digital tools across all stages of education, ensuring equitable access and skill development.

1.5. Meaning of TPACK:

TPACK stands for Technological, Pedagogical, and Content Knowledge. It is a framework that helps teachers integrate technology effectively into their teaching by combining three primary forms of knowledge:

1. Content Knowledge (CK): What teachers know about their teaching subject.

2. Pedagogical Knowledge (PK): How teachers teach and the methods they use.
3. Technological Knowledge (TK): Understanding how to use technology tools effectively.

TPACK emphasizes that effective technology integration in teaching requires understanding the interplay between these three components.

1.5.1. Definitions of TPACK:

TPACK is the understanding that emerges from the interaction of content, pedagogy, and technology knowledge. Effective teaching with technology requires understanding how these areas interact (Mishra & Koehler, 2006).

TPACK is a framework for teacher knowledge for technology integration, highlighting the complex interplay between technological, pedagogical, and content knowledge (Koehler & Mishra, 2009).

TPACK is the knowledge teachers need to integrate technology in a meaningful way into teaching specific content (Niess,2005)

TPACK represents teachers' understanding of how to teach specific content using appropriate pedagogical methods and technologies (Chai, Koh & Tsai ,2013).

1.5.2. NEP 2020 and TPACK:

The NEP 2020 advocates for the inclusion of technology in education to initiate a more effective and accessible system aligned with the Technological, Pedagogical, and Content Knowledge (TPACK) framework. TPACK emphasizes the intersection of technology, pedagogy, and content knowledge to improve the quality of educational experiences.

Regarding teacher training and professional development, NEP 2020 highlights the significance of integrating technology throughout the educational spectrum to improve student and educator outcomes. Continuous professional development is essential for teachers to achieve digital proficiency. Educators can enrich classroom experiences and boost student engagement by utilizing digital tools.

Supporting educational equity is another priority of NEP 2020, particularly for students from rural or underserved backgrounds. The TPACK framework enables teachers to employ technology in contextually relevant ways, promoting equitable access to quality education for all. The policy also advocates for technology-driven formative assessments, which bring a clearer perspective on students' progress. TPACK aids educators in aligning assessments with instructional strategies, thereby improving student learning experiences.

1.5.3. TPACK Framework:

The TPACK framework, which stands for Technological, Pedagogical, and Content Knowledge, serves as a guideline for educators in effectively merging subject matter expertise, pedagogical strategies, and technology to support and advance teaching and learning methods outcomes (Mishra and Koehler, 2006). Building upon Shulman’s model of Pedagogical and Content Knowledge (PCK), TPACK underscores the significance of integrating both technological and pedagogical competencies in educational practice.

“Developed as a roadmap for incorporating technology into teaching, the TPACK approach highlights the necessity for educators to analyze how technology intersects with content and instructional methodologies. TPACK enables educators to make thoughtful, evidence-based decisions about utilizing technology to improve student learning outcomes” (Mishra and Koehler, 2006).

TPACK Framework Overview:

The Technological Pedagogical Content Knowledge (TPACK) framework is essential in enhancing educators’ skills by serving as a guideline for the unification of Information and Communication Technology (ICT) into the learning environment. Despite its importance, research focusing on

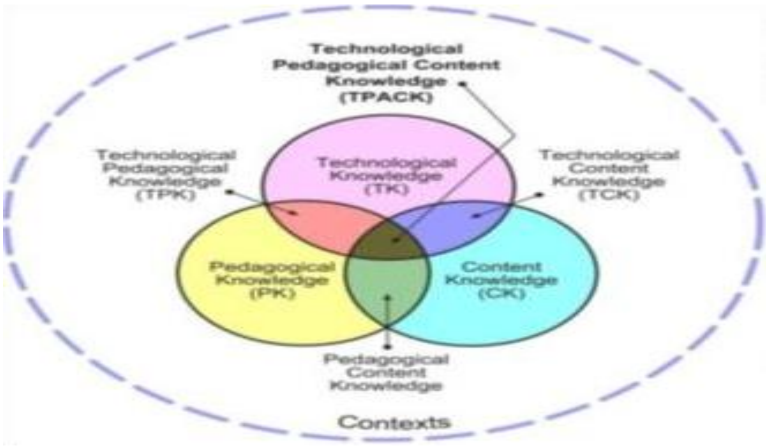
TPACK in India is limited. This scarcity may stem from a lack of understanding about the TPACK framework or insufficient application of its principles within educational settings, even in the presence of a foundational understanding among educators.

Dimensions /Components of TPACK:

The dimensions of the TPACK Scale, as identified by Hemant Lata and Leena Sharma (2017), are elaborated as follows:

1. **Content Knowledge (CK):** CK represents the teacher's understanding of the subject matter they teach. It is vital and includes an in-depth comprehension of theories, concepts, established practices, and current advancements within the discipline.
2. **Pedagogical Knowledge (PK):** PK involves teachers' insights into instructional strategies and methodologies. This encompasses knowledge of teaching techniques, student learning processes, classroom management, assessment strategies, and communication skills.

Figure 1. The Technological Pedagogical Content Knowledge (TPACK) Framework



(Source: TPACK.org. (n.d.). The official resource site for the TPACK framework. https://www.tpack.org.) The TPACK Model (Mishra and Koehler, 2006) represents technology integration in teaching.

3. **Technological Knowledge (TK):** TK is ever-evolving and pertains to the ability to utilize digital tools effectively. This includes evaluating the suitability of various technologies for specific educational purposes and understanding when these tools can either support or hinder the learning process.
4. **Pedagogical Content Knowledge (PCK):** PCK combines content mastery with pedagogical understanding. This enables educators to identify and apply the most effective teaching strategies related to their subject matter.
5. **Technological Content Knowledge (TCK):** TCK focuses on how technology can enhance content delivery. Educators must identify the technologies that can effectively present their subject matter and facilitate its digital adaptation.
6. **Technological Pedagogical Knowledge (TPK):** TPK refers to the ability to choose the right technological tools for specific educational activities. Educators should be adept at identifying the technology that corresponds with their instructional approaches.
7. **Technological, Pedagogical, and Content Knowledge (TPACK):** This represents the convergence of these knowledge domains that are necessary for effective digital pedagogy. It highlights the expertise needed by educators to integrate technology harmoniously into their subject areas. Teachers who understand the connection between essential content knowledge and pedagogical strategies can effectively employ technology to enhance learning.

1.5.4. Importance of TPACK in the Classroom:

With the growing integration focusing on technology in education, the relevance of TPACK is increasingly evident. Simply using technology does not inherently improve teaching and learning outcomes (Mishra and Koehler, 2006). Here are some points to consider for TPACK essentials:

1. **Effective Technology Integration:** TPACK guides educators in efficiently implementing technology into their teaching methods. It emphasizes the careful selection and integration of technology applications that match educational goals, thereby improving the delivery of content. TPACK

empowers teachers to engage students actively, encourage experiential learning, and foster critical thinking.

2. **Enhancing Instructional Approaches:** Technology provides innovative options for teaching methods. Without a solid pedagogical foundation, educators may find it challenging to use technology effectively. TPACK equips teachers with the skills to adapt their instructional strategies to include technology, creating diverse, collaborative, and personalized learning experiences.
3. **Addressing Diverse Learning Styles and Needs:** Students have varied learning preferences and needs. TPACK allows educators to utilize technology to accommodate these differences, enabling personalized instruction. It promotes the utilization of tools that support diverse learning styles and ensures support for students with specific learning challenges, thus fostering inclusivity.
4. **Facilitating Dynamic Learning Experiences:** Technology enables students to participate in active and authentic learning experiences. TPACK assists educators in designing activities that integrate technological resources, enhancing creativity, collaboration, and problem-solving skills. Combining technology with project-based learning and real-world simulations leads to engaging educational experiences.
5. **Promoting 21st Century Skills:** In today's digital landscape, developing 21st-century skills and digital competencies is crucial for students' future success. TPACK equips educators with the knowledge and strategies to cultivate these competencies, including digital literacy and ethical technology use. By embedding technology in their teaching, educators prepare students with the essential skills needed for academic and professional success.
6. **Ongoing Professional Development:** TPACK highlights the importance of continuous professional growth for educators. As educational technologies evolve, teachers enhance their TPACK to keep pace with new resources and instructional strategies. Professional development initiatives related to TPACK facilitate peer collaboration, experimentation with modern technologies, and reflection on teaching practices.

In summary, TPACK is fundamental to the classroom by successfully integrating technology, improving instructional strategies, addressing diverse student needs, encouraging active learning, fostering essential skills, and supporting educators. By enhancing their TPACK, teachers can leverage technology to create engaging and inclusive learning environments, empowering students for success in the digital age.

1.5.5. Need and Importance of TPACK for Educators and Learners

The TPACK framework is fundamental for both educators and students in today's educational landscape.

For Educators:

1. **Skill Development:** TPACK provides educators with the necessary skills to efficiently implement technology into their teaching practices, enabling them to choose suitable tools and resources that support educational objectives.
2. **Innovative Teaching Strategies:** By incorporating technology, TPACK motivates educators to create interactive lessons and learner-centered educational experiences. This framework supports continuous professional development, helping teachers remain knowledgeable about emerging tools and trends vital for successful technology integration.
3. **Accommodating Student Diversity:** TPACK equips educators to meet the varied requirements of their students through personalized instruction and several forms of learning tools, establishing equal chances for all individual learners.
4. **Preparing for a Technology-Driven Future:** TPACK helps educators guide students in preparing for careers in a technology-centric world. By blending technology into teaching, educators enable students to acquire essential digital skills and competencies for multiple professional domains. (Voogt & Roblin, 2012)

For Students:

1. **Engaging Learning Experiences:** TPACK fosters the creation of interactive learning opportunities. By leveraging technology, students actively engage in their education, explore complex concepts, and collaborate with their peers.
2. **Personalized Learning:** TPACK enables educators to tailor learning experiences, allowing students to access customized materials, receive adaptive feedback, and progress at their own pace, which caters to individual learning styles.
3. **Improved Academic Performance:** Research indicates that technology integration in education can lead to better academic outcomes. The TPACK framework helps educators effectively use technology to deepen student understanding and enhance success. (Mishra & Koehler, 2006; TPACK.org, n.d.)

In essence, TPACK is critical for teachers and students. It supports effective teaching, enriches educational experiences, and equips students for success in a technology-driven world. By intertwining technology with pedagogy and content knowledge, teachers can promote active and inspiring educational settings that enable student growth to excel academically and professionally.

1.5.6. Advantages of TPACK:

The TPACK framework provides numerous benefits for educators, instructional designers, and students. By combining three essential knowledge domains- technology, pedagogy, and content - TPACK offers a holistic approach to education. This synergy ensures that technology is applied purposefully to improve teaching objectives and facilitate a better knowledge of the content. (Koehler & Mishra,2009)

1. **Flexibility and Customization:** TPACK is adaptable and can be customized for various educational settings, disciplines, and proficiency levels. Educators

can apply this framework across different environments, including traditional classrooms as well as online and blended learning spaces.

2. **Emphasis on Teaching Practices:** The TPACK framework highlights the role of pedagogy in the effective integration of technology. It encourages educators to explore methods by which technology can enhance their teaching strategies, engage students in meaningful learning, and deepen their comprehension of the curriculum. Developing TPACK equips educators with the necessary skills to make well-informed decisions about technology in their teaching methods.
3. **Enhanced Student Engagement and Learning Outcomes:** Effective use of technology allows teachers to design interactive and captivating learning experiences that improve student participation and promote a deeper understanding. TPACK advocates for the employment of technology to meet the needs of different learning approaches, interests, and preferences, leading to improved educational results.
4. **Collaboration and Continuous Professional Development:** TPACK fosters collaboration among educators and encourages ongoing professional growth. It provides opportunities for educators to connect with colleagues to share best practices, resources, and experiences regarding technology integration. Moreover, TPACK promotes a culture of continual learning and reflection, enhancing teaching approaches.
5. **Acquire 21st-century Skills:** Through TPACK, students acquire critical 21st-century skills such as analytical thinking, creativity, communication, collaboration, and digital literacy, that are required for their future success. Engaging in technology-enhanced learning environments enables students to proficiently utilize digital tools, solve complex problems, and work collaboratively with peers.
6. **Research-Based Practices:** The TPACK framework is grounded in empirical research and evidence-based practices related to educational technology. Educators can draw on research findings and theoretical models to guide their application of TPACK and evaluate its effectiveness within the educational process. (Niess, 2005)

In summary, TPACK provides a well-rounded method for including technology in education, promoting effective teaching practices, enhancing student engagement, and preparing learners for success in a technology-driven world. Utilizing TPACK, educators can craft engaging and purposeful educational experiences that encourage students' academic and personal growth.

1.5.7. Integrating ICT in Teacher Education:

Integrating Information and Communication Technology (ICT) into teacher education is vital for preparing future educators to efficiently integrate technology into their pedagogical practices.

The key strategies and approaches are as follows:

1. **Embedding Technology in Teacher Preparation Programmes:** Teacher Education programmes must consist of courses that focus on ICT combination in pedagogical practices. These courses should cover essential topics like digital literacy, online collaboration tools, and effective educational technology utilization in classrooms (Mishra and Koehler,2006).
2. **Providing Hands-on Technology Experiences:** Teacher candidates should have to ability to connect with various technologies in authentic classroom settings. Practicum experiences should involve using digital tools for lesson planning, assessment, and communication with students and parents. (Voogt and Roblin, 2010)
3. **Encouraging Collaborative Learning among Teacher Candidates:** Fostering collaboration among teacher candidates to explore and share technology-enhanced instructional strategies can cultivate a community of practice. Collaborative projects can help build confidence and proficiency in effective technology use. (Hammond, 2010)
4. **Providing Practical Technology Training:** Offering hands-on training opportunities allows pre-service teachers to gain practical experience with various technological tools and platforms. This method builds confidence in their ability to use technology and fosters creativity in designing technology-enhanced learning experiences (Roblyer, 2016).

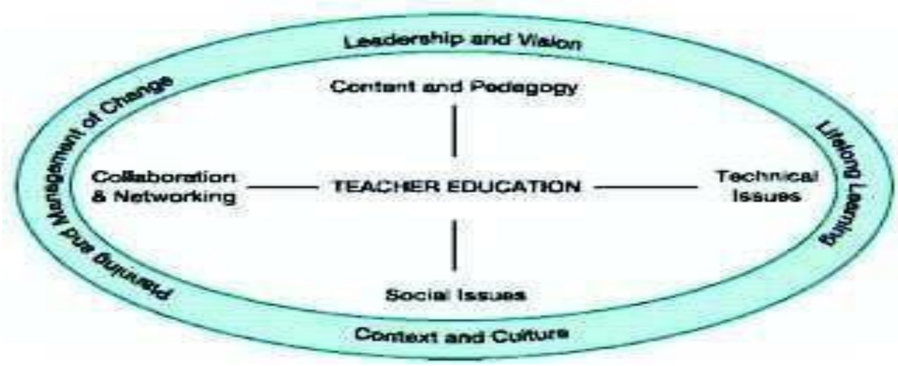
5. **Demonstrating Effective Technology Integration:** Teacher educators should model effective technology integration in their teaching to showcase best practices to pre-service teachers. By observing technology use in real contexts, future educators can improve their understanding of how to incorporate technology into their own instruction (Koehler, 2008).
6. **Encouraging Reflective Practice:** Fostering reflective practice helps pre-service teachers critically evaluate their use of technology in pedagogy and learning. Reflective activities, such as journaling and peer discussions, enable them to identify strengths, challenges, and areas for improvement in their technology integration efforts (Shulman, 1987).
7. **Establishing Collaborative Learning Communities:** Creating collaborative learning communities provides pre-service teachers with a platform to share ideas, resources, and experiences related to technology integration. Collaborative activities, such as joint projects or online discussions, promote peer learning and help establish a professional learning network (Mishra, 2016).
8. Integrating technology into teacher education programs should align with relevant standards and frameworks, such as the ISTE Standards for Educators and the TPACK framework. Ensuring that technology integration efforts are aligned with these guidelines guarantees that pre-service teachers acquire the knowledge and skills necessary to meet professional standards (International Society for Technology in Education, 2017).
9. **Continuous Professional Development for Educators:** In-service teachers should possess professional development opportunities focused on enhancing their technological competencies and providing up-to-date knowledge about emerging educational technologies. (Ertmer, 2010)

By combining ICT as part of the teacher education, future teachers will be more equipped to design creative and engaging learning environments, equipping students for success in a rapidly evolving digital landscape.

1.5.8. UNESCO's Framework for Information and Communication Technology in Teacher Education

The UNESCO ICT Competency Framework for Teachers (ICT-CFT), first established in 2008, has been revised over the years to reflect technological advancements and changes in instructional practices. This framework outlines the essential competencies that educators need to incorporate technology into their instructional methodologies.

Figure 2: UNESCO's Framework on TPACK



(Source: UNESCO's Framework for ICT Integration in Teacher Education)

Figure 2 depicts the framework, with the surrounding oval emphasizing the necessity of a comprehensive knowledge of the framework. This curriculum framework consists of four competence clusters supported by four thematic elements. It allows each educator to adapt the framework according to their specific subject area or content discipline, serving as a substitute for the technology itself.

1. **Visionary Leadership:** Educators are expected to lead the effective implementation of ICT in education, advocating for policies and practices that facilitate technology integration while fostering a culture of innovation and collaboration.

2. **Digital Citizenship:** Educators should demonstrate the ethical and responsible

application of ICT, promoting competencies related to digital citizenship, such as online safety, privacy protection, and respectful interaction in digital environments.

3. **Content Knowledge:** Educators must have a deep understanding of their subject matter and the pedagogical strategies required for effective teaching using information and communication technology (ICT). They need to be capable of selecting and adapting digital resources and technologies to support learning objectives.

4. **Pedagogical Knowledge:** Teachers are required to possess the knowledge and skills necessary to create engaging and interactive learning experiences that incorporate ICT. They should apply a variety of teaching strategies, assessment techniques, and classroom management methods that effectively integrate technology.

5. **ICT Competencies:** Educators must demonstrate competence in using various ICT tools, applications, and resources for teaching. They should be adept at navigating digital environments, creating multimedia content, engaging effectively online, and resolving technical issues as they arise.

6. **Evaluation:** Educators should effectively use ICT to assess student learning, gather data, provide feedback, and make thoughtful decisions regarding instructional planning and intervention strategies. They should understand how to leverage assessment data to monitor student progress and adjust instructional approaches accordingly.

7. **Collaboration:** Educators should collaborate with colleagues, students, parents, and other stakeholders to enhance teaching and learning through ICT. They are encouraged to participate in professional learning communities, share best practices, and help build a supportive and collaborative learning environment.

8. **Professional Development:** Educators must engage in ongoing professional

development to refine their ICT skills and stay updated on new technologies and pedagogical advancements. They should take advantage of training opportunities, mentoring, and self-directed learning to enhance their expertise. (UNESCO,2018)

The UNESCO ICT Competency Framework for Teachers (ICT-CFT) guides teacher education institutions, policymakers, and other stakeholders to develop and implement effective professional development programs that support teachers in acquiring the skills needed to implement ICT into their educational methods. Aligning teacher education programs with the UNESCO ICT-CFT ensures that the pre-service and in-service teachers are well-prepared to utilize technology to improve educational outcomes.

1.5.9. TPACK in Teacher Education and Training:

The TPACK framework significantly influences teacher education and training by guiding educators on the effective utilization of technology with their teaching methods. The essential components are:

1. **Curriculum Design and Development:** Teacher Education programmes should integrate TPACK principles into curriculum design, emphasizing the association among content, pedagogy, and technology.

2. **Hands-on Learning Experiences:** Offering teacher candidates practical experiences in technology integration is integral for developing TPACK. Educators should participate in real-world uses of technology in lesson planning, assessment, and instruction. (Wilson, 2002)

3. **Mentorship and Support:** Introducing mentorship programmes that link knowledgeable educators with those just starting their careers and guide novice teachers in integrating TPACK into their practices can provide essential support and encouragement. (Ingersoll, 2003)

4. **Ongoing Professional Development:** Continuous professional development

focused on TPACK will help educators refine their skills and be aware of new technologies and their implications for teaching strategies. (Phelps, 2002)

Incorporating TPACK into teacher education and training empowers educators to establish interactive learning settings that enhance student participation and educational outcomes.

1.5.10. TPACK Competencies in Teacher Education:

A primary goal of teacher education is to develop educators' ability to effectively blend technology with pedagogical and content knowledge. Teachers are trained to recognize and apply technological tools and resources that align with educational objectives, thereby enhancing student learning.

1. **Technology Knowledge (TK):** Educators, whether pre-service or in-service, acquire a diverse array of technology skills. They learn to navigate digital platforms, utilize learning management systems, create digital content, and resolve technological issues effectively.
2. **Pedagogical Knowledge (PK):** It focuses on developing pedagogical approaches that integrate technology to support teaching and learning. Educators are equipped to create engaging learning experiences, tailor instruction, promote collaboration, and provide immediate feedback through technology.
3. **Content Knowledge (CK):** An in-depth knowledge of the subject is enriched by the capability to convey content via technology. Educators learn to take advantage of digital resources, multimedia presentations, simulations, and other tech-enhanced materials to improve student comprehension and engagement.
4. **Technological Pedagogical Knowledge (TPK):** Educators gain insights into how to combine technology with their teaching strategies effectively. They become adept at employing technologies and tools to enrich instructional

methods, manage classroom interactions, and motivate students.

5. **Technological Content Knowledge (TCK):** Successful integration of technology requires educators to proficiently deliver content through technological means that enhance comprehension. They learn to select, adapt, and seamlessly implement digital tools into their pedagogical strategies.

6. **Pedagogical Content Knowledge (PCK):** Teacher education programmes emphasize instructional strategies tailored to specific content areas. Educators learn to synchronize teaching methods with learning objectives, assess student comprehension, and address misunderstandings using technology-based tools and resources.

7. **Reflective Practice:** Continuous reflection is vital for enhancing educators' TPACK competencies. Teachers regularly assess the contribution of technology to enhancing student learning outcomes, identify growth opportunities, and modify their instructional practices as needed.

8. **Collaboration and Ongoing Professional Development:** Collaborative learning environments and ongoing professional development are the keys to strengthening educators' TPACK skills. By engaging in collaborative communities, teachers can communicate their most effective methods and discover innovative approaches to technology integration. (Archambault & Crippen,2009)

In summary, teacher education programs aim to foster a comprehensive set of TPACK competencies among pre-service and in-service educators, facilitating their expertise in implementing technology in their educational practices and enhancing student learning outcomes in today's digital age.

1.5.11. Impact of TPACK on Teaching and Learning:

The Technological, Pedagogical, and Content Knowledge (TPACK) framework has significantly enhanced instructional practices. Mishra and Koehler (2006) demonstrated that TPACK facilitates the strategic combination of technology with pedagogical and content knowledge, ensuring that technology effectively supports learning objectives. Roblyer (2016) emphasized TPACK's role in promoting innovative and engaging teaching strategies that address diverse student needs.

1. **Increased Student Engagement:** Educators' skills in TPACK are better equipped to develop interactive learning opportunities that capture students ' interest and motivation. Koehler and Mishra (2009) noted that classes enriched by technology and organized around TPACK principles tend to promote higher engagement levels, leading to increased participation and deeper connections with the material.

Mishra and Henriksen (2016) highlighted TPACK's impact on student engagement through multimedia elements and collaborative activities, allowing educators to design personalized learning experiences that address the specific needs of the students. Koehler and Mishra (2008) established the TPACK framework, stressing the integration of technology in pedagogical practices to facilitate differentiated instruction and encourage active learning. By utilizing technological resources, educators can adjust their instruction to cater to various learning methods and abilities.

The integration of TPACK in educational contexts also fosters the advancement of essential 21st-century skills among students. The International Society for Technology in Education (ISTE) standards (2017) highlight TPACK's significance in nurturing competencies like critical thinking, creative problem-solving, teamwork, effective communication, and digital literacy.

Voogt et al. (2013) emphasized the relevance of technology-enhanced learning experiences informed by TPACK in enabling students to excel in a technology-driven world.

2. **Broader Access to Resources and Information:** TPACK enhances students' access to educational resources and information. Tondeur et al. (2012) examined how TPACK enables educators to utilize digital resources, online databases, and multimedia content to enrich student learning outcomes. By granting access to different digital materials, educators can establish a dynamic learning environment that promotes inquiry-based exploration.

3. **Enhanced Assessment and Feedback:** TPACK empowers educators to make use of technology for both formative and summative assessments, delivering timely and individual responses to students. Sang et al. (2010) explored the connection between student teachers' cognitive processes, TPACK integration, and their anticipated teaching behaviours regarding educational technology. Utilizing tools such as online quizzes and digital portfolios enables educators to assess student advancement, recognize knowledge gaps, and deliver specific interventions.

4. **Career Preparation:** Students engaged in technology-enhanced learning experiences guided by TPACK are better suited for upcoming challenges and employment in a technology-centric landscape. Martin and Ertzberger (2013) conducted an experimental study examining the adoption of mobile learning tools in education, demonstrating its potential to equip students for modern workforce demands. By cultivating digital skills and excelling in various professional environments.

5. **Collaboration and Professional Growth for Educators:** TPACK encourages collaboration among educators, allowing them to share best practices, resources, and experiences in technology integration. Tondeur et al. (2012) noted that teacher collaboration fosters a supportive atmosphere for professional growth and the exploration of innovative teaching methods. By working together, educators can build a shared knowledge base, participate in joint professional development initiatives, and enhance their collective TPACK expertise. This collaborative approach helps educators stay updated on technological advancements and adapt their teaching methods accordingly.

1.5.12. Features of TPACK:

1. **Integration of Knowledge Domain:** TPACK merges three critical areas of knowledge: Technological Knowledge (TK), Pedagogical Knowledge (PK), and Content Knowledge (CK).

2. **Emphasis on Interconnectedness:** The TPACK framework underscores the intersection of technology, pedagogy, and content, highlighting the importance of understanding these relationships in educational contexts.

3. **Adaptive and Context-Driven:** TPACK is adaptable and contextually relevant, acknowledging that effective technology use must align with the specific needs, goals, and constraints of various teaching environments. It guides educators in effortlessly incorporating technology into their instruction, ensuring coherence between technological tools, pedagogical strategies, and educational content.

4. **Empowerment of Educators:** This framework equips teachers to make strategic decisions on technology use, providing them with the competencies and awareness necessary to select, adapt, and implement technological resources effectively.

5. **Preparation for Modern Teaching:** TPACK prepares educators to manage the intricacies of 21st-century teaching by enhancing their capacity to utilize technology to enrich instruction, foster student engagement, and cultivate essential skills for contemporary learners.

6. **Foundation in Research:** Rooted in empirical research and theoretical insights, TPACK serves as a comprehensive model that supports effective technology integration in educational practices. (Mishra & Koehler, 2009)

1.5.13. Issues and Challenges in Equipping Educators and Learners with TPACK Competencies:

Preparing both teachers and students in TPACK capabilities involves addressing various issues and challenges. Here's a breakdown of how educators and students can be equipped with TPACK skills, together with the associated issues and challenges:(Koehler & Mishra, 2009; Voogt et al., 2013).

1. **Training Educators:** Teacher education curricula should enable comprehensive training in TPACK. However, limited time and resources often hinder the successful incorporation of TPACK into existing curricula.
2. **Fostering Collaborative Learning Communication:** Promoting collaboration among educators can enhance knowledge sharing and peer insights. Yet, access to a supportive professional network may be limited. (Harris, 2009)
3. **Guiding Technology Integration:** Offering actionable guidelines for incorporating technology into teaching is crucial. Educators frequently struggle with customizing these frameworks to fit their specific teaching contexts.
4. **Continuous Professional Development:** Providing ongoing mentorship and support is essential to help educators improve their TPACK skills over time, although the availability of ongoing training opportunities can be restricted.
5. **Encouraging Reflective Practice:** Motivating educators to get involved in self-reflection is vital for evaluating and utilizing technology for classroom instruction. However, time constraints or reduced motivation may hinder reflective practices.
6. **Creating Technology-Rich Learning Environments:** Establishing learning spaces provided with various digital resources is important. A key issue remains the unequal and limited access to technology for students, resulting in a “digital divide”. (Norris & Soloway ,2011)
7. **Fostering Digital Literacy:** It is fundamental to teach students fundamental digital literacy abilities for effectively navigating and utilizing digital

information. Variations in students; digital literacy knowledge can pose barriers.

8. **Implementing Student-Centric Learning:** Employing student-centered teaching techniques that support exploration and collaboration through technology is vital, though there may be resistance from learners and educators who favour traditional approaches.
9. **Differentiating Instruction:** Tailoring instructional approaches to cater to different student learning needs through technology poses challenges in adequately addressing individual learning requirements.
10. **Promoting Ethical Technology Use:** It is crucial to instruct students on responsible technology use, encompassing aspects like digital citizenship and online safety. Adjusting to changing ethical considerations regarding technology in education is still a major challenge. (Koehler & Mishra, 2009; Voogt et al., 2013).

To resolve these challenges effectively, a collective effort from all educational stakeholders – including policymakers, administrators, teacher educators, and classroom practitioners – is essential. By prioritizing the evolution of TPACK for both educators and students and by actively confronting these challenges, educational institutions can strengthen individuals' preparedness for success in technology-driven learning environments.

1.6. Self-Confidence: Meaning

Self-confidence implies a strong assurance in one's talents, significance, and judgment, grounded in an inner conviction of one's capacity to confront challenges and achieve personal aspirations. It differs from seeking external validations; instead, it is founded on a deep acceptance and awareness of oneself. People with high self-confidence prove resilient when facing obstacles, maintaining a positive outlook and the determination to persevere. (Bandura, 1997)

This confidence is evident in various aspects of life, influencing social interaction, problem-solving approaches, and the readiness to embrace opportunities. It empowers individuals to assert themselves, articulate their thoughts, and take calculated risks without the paralyzing fear of failure. Building self-confidence involves cultivating a healthy self-image, acknowledging one's strengths and weaknesses, setting realistic goals, and continually striving for improvement. This attribute is crucial for personal growth, enabling individuals to work toward their dreams with dedication and composure. (Wood,2009)

1.6.1. Definitions of Self-Confidence:

Self-confidence encompasses a deeply rooted belief in one's skills, value, and potential for success across different aspects of life, involving trust in one's abilities and judgments and the capability to overcome challenges. Typically, this confidence arises from a positive self-assessment that recognizes both strengths and areas needing improvement while fostering a resilient mindset. Self-confidence plays an essential role in psychological health and personal development, significantly influencing behaviour, performance, and overall satisfaction with life. (Zeigler, 2015)

Generally, self-assured individuals demonstrate assertiveness, sharing their opinions while being receptive to feedback. Ultimately, self-confidence helps individuals to pursue their ambitions with conviction, acknowledging their potential to conquer barriers and achieve success.

1.6.2. Self-Confidence Theories:

1. Albert Bandura's Self-Efficacy Theory (1977): Bandura's Self-Efficacy Theory explains self-confidence as a person's belief in their ability to succeed in specific tasks. He stated that people gain self-confidence through four main sources: personal success, watching others succeed, receiving encouragement, and managing emotions like stress. When B.Ed. students feel capable and supported, they are more likely to take on challenges in teaching and use new

methods like technology. This belief in their ability helps them become more confident and effective in the classroom (Bandura, 1977).

2. Carl Rogers' Self-Concept Theory (1951): Carl Rogers believed that self-confidence depends on how people see themselves. He explained that when there is a match between who a person is and who they want to be, they feel confident and secure. Rogers also said that people need acceptance and support from others to develop a strong self-image. For B.Ed. students, when their efforts are valued and they feel understood, their self-confidence grows. This helps them teach better and handle classroom situations with ease (Rogers, 1951).

1.6.3. Effective Strategies for Enhancing Self-Confidence:

1. **Formulate Realistic Goals:** Begin by establishing fundamental aims that are both practical and achievable. Divide key aims into structured, actionable steps and more manageable tasks, allowing us to concentrate on them step by step. Every small achievement builds an appreciation for success and can improve our confidence. (Bandura, 1997)
2. **Address Negative Thinking:** Reflect on our inner dialogue and question any negative assumptions we make about ourselves. Replace self-criticism with positive affirmation and self-compassion. Gradually, nurturing a more supportive internal dialogue can improve our self-confidence. (Burns, 1980; Beck, 1979)
3. **Embrace Self-Compassion:** Treat ourselves kindly, especially during moments of challenges or mistakes. Recognize that errors are a natural part of learning; instead of being tough on ourselves, practice self-compassion and grant ourselves the same kindness we would show to a friend facing similar challenges. (Neff, 2011)
4. **Develop Competencies:** Dedicate time to enhancing our skills and knowledge in the areas that we prioritize. By learning new skills, pursuing education, or

refining existing talents, we can enhance our competence, thereby increasing our self-confidence. (Bandura, 1997)

5. **Associate with Positivity:** Interact with those who encourage us and recognize our strengths. Identify supportive friends, family members, mentors, or colleagues and maintain regular contact with them. An effective support system can give essential encouragement and validation that bolsters our self-confidence. (Dweck, 2006; Deci & Ryan, 2000).
6. **Embrace New Experiences:** Challenge ourselves by exploring new activities and stepping out of our safe zones. Facing unfamiliar situations, taking on leadership roles, or overcoming fears can facilitate personal growth and improve our resilience in facing new challenges. By implementing these strategies in our regular activities, we can gradually enhance our self-confidence and develop a stronger, more adaptable mindset. Developing self-confidence is a progressive development that takes time and effort; however, through hard work and persistence, we can achieve stronger self-assuredness. (Csikszentmihalyi, 1990)

1.6.4. Recognizing the Baseline Self-Confidence:

1. **Basic Self-confidence Awareness:** At its essence, self-confidence is about believing in oneself and recognizing personal worth. Even amidst occasional doubts, individuals are conscious of their capabilities to manage everyday tasks. In difficult circumstances, they demonstrate persistence and resilience. Acknowledging that perfection is not realistic for everyone, including themselves, they remain ready to pursue assistance. An essential level of self-confidence fosters an awareness of value and capability in daily life. (Bandura, 1997; Neff, 2011)
2. **Indicators of Low Self-confidence:** A deficit in self-confidence indicates a reduced belief in one’s abilities. Individuals with low self-confidence often leads individuals to feel inadequate or ineffective, causing continuous self-doubt and negative views of their skills. This mindset can prevent them from trying new things, resulting from fears of failure or being judged. Such

individuals might shy away from social interactions or experience discomfort in group settings, anxious about being judged or rejected, which can hinder personal growth and reduce overall enjoyment in life. (Beck, 1979; Dweck, 2006)

3. **Self-Confidence Traits in Educators:** Teachers' self-confidence plays an essential role in their effectiveness and their influence on students. (Tschannen-Moran & Hoy, 2001) Traits typically associated with confident educators include.
4. **Belief in Teaching Competence:** They confidently recognize their teaching skills and familiarity with the subject matter and classroom management.
5. **Positive Self-Perception:** These educators maintain a strong sense of self-worth, believing in their ability to positively affect their students.
6. **Resilience through Challenges:** Confident teachers demonstrate resilience and resolve in dealing with obstacles, perceiving setbacks as opportunities for development.
7. **Adaptability:** They are flexible and eager to explore multiple teaching techniques to cater to the varied needs of students.
8. **Efficient communication skills:** They communicate information understandably and assertively, developing mutual trust and collaboration.
9. **High Aspirations:** Confident instructors set challenging goals for their personal growth and their students, convinced of each student's potential to thrive and offering the necessary resources to attain those objectives.
10. **Self-Reflection and Growth:** They regularly evaluate their practices and seek ongoing training, accepting feedback to elevate their teaching techniques.

1.6.5. Self-Confidence in Teaching and Pedagogical Perspective:

Self-confidence significantly influences educators' perspectives on their profession, impacting their effectiveness, job satisfaction, and commitment. The inter-relationships among self-confidence, attitudes, and teaching effectiveness include:

1. **Self-confidence and Teaching Effectiveness:** Research has identified a strong positive correlation between a teacher's self-confidence and their effectiveness, along with improved student outcomes. For example, Tschannen-Moran and Woolfolk Hoy (2001) concluded that educators who believe in their influence on student learning tend to demonstrate greater effectiveness in their teaching methods.
2. **Teacher Attitudes and Job Satisfaction:** An educator's attitude towards their profession is crucial for job satisfaction and retention rates. According to Skaalvik and Skaalvik (2017), those with a positive outlook on the teaching experience have greater job satisfaction and reduced burnout. Furthermore, self-confidence is essential for effective classroom management, enabling educators to promote a supportive learning environment.
3. **Influence on Classroom Management:** Research by Yucel and Demirtas (2014) suggests that teachers possessing higher self-confidence are better at managing classrooms, leading to improved student behaviour and engagement. A teacher's self-confidence also affects their perspective on professional growth and lifelong learning.
4. **Perceived Support and Self-Confidence:** The support educators receive from peers, administrators, and the broader educational community can significantly enhance their self-confidence and professional attitudes. Research suggests that the perceived support from the organization improves teachers' self-confidence and commitment to their profession. These insights underscore the importance of fostering self-confidence and positive attitudes among educators to enhance their effectiveness and job satisfaction. (Ingersoll & Strong, 2011)

1.6.6. Fostering Self-Confidence in Students:

Enhancing self-confidence in students is vital for their success and well-being throughout different aspects of life. Students who exude confidence are likelier to tackle challenges head-on, persist in adversity, and chase their aspirations with determination (Bandura, 1997; Pajares, 2006). This self-confidence encourages active participation in their learning experiences, empowering them to assertively voice their ideas and engage deeply in classroom discussions (Deci & Ryan, 2002). Moreover, self-assured students are better equipped to deal with stress, overcome obstacles, and recover from setbacks, leading to improved resilience and mental health. (Masten, 2001; Zimmerman, 2000)

Beyond academic performance, self-confidence affects students' social interactions, leadership potential, and future career paths, significantly influencing their life directions (Komarraju et al., 2009; Chemers et al., 2001). By developing self-confidence, educators not only empower students but also promote their self-esteem, contributing to their enduring success. Here are some impactful strategies for fostering self-confidence in students:

1. **Encouragement and Constructive Feedback:** Give targeted recognition and encouragement for students' endeavours, achievements, and growth. Celebrate all successes, big or small, to enhance their self-esteem. (Hattie & Timperley, 2007)
2. **Creating Feasible Expectations:** Support students in identifying achievable goals that reflect their strengths and interests. Segment larger objectives into manageable actions, ensuring guidance throughout the process. (Schunk, 1991)
3. **Facilitating Self-Assessment:** Guide students in identifying their strengths, interests, and growth areas. Inspire them to explore their passions and values for a more comprehensive self-understanding. (Black & Wiliam, 1998).
4. **Establishing a Supportive Environment:** Nurture an inclusive learning environment where students are encouraged to take risks, inquire, and contribute their ideas without the worry of being criticized. Promote a culture of belonging and acceptance while providing techniques for handling stress and self-doubt. (Wentzel, 1998)
5. **Facilitating Peer Support:** Create systems that promote peer mentoring and support, allowing students to inspire and learn from one another experiences thereby enhancing collaboration and accountability. (Vygotsky, 1978; Topping, 2005)
6. **Demonstrating Self-confidence:** Demonstrate confidence, resilience, and a growth mindset through our actions and attitude to serve as a role model. Show

students that mistakes are a normal and beneficial part of learning. (Dweck, 2006)

7. **Valuing Diversity:** Acknowledge and recognize each student, motivating them of each student, motivating them to recognize the importance of their roles in the classroom. Banks & Banks, 2004)

By implementing these strategies consistently, teachers can foster a supportive environment that enhances students' self-esteem, resilience, and confident self-perception.

1.6.7. Strategies for Enhancing Students' Self-Confidence:

Educators can take various actions to elevate students' self-confidence. Here are several effective methods:

i. **Identifying Skills:** Support students in discovering their strengths and achievements by compiling personal portfolios that highlight their successes. (Stiggins, 2005; Zimmerman & Schunk, 2011)

ii. **Setting Goals:** Help students define clear and achievable goals, guiding them to divide and simplify major tasks into smaller, more controllable steps and develop initiatives to achieve these goals. (Locke & Latham, 2002; Schunk, 1990)

iii. **Sharing Success Stories:** Present inspiring accounts of people who have faced struggles and emerged to reach success, discussing the traits that contributed to their achievements and how students can emulate these characteristics (Bandura, 1997; Pajares, 2001).

iv. **Role-Playing Exercises:** Use role-playing scenarios to help students develop assertive communication, problem-solving, and decision-making skills in age-appropriate contexts (Jones, 1982; Barrows, 1986).

v. **Public Speaking Opportunities:** Offer students the chance to present in front of their fellow students by participating in activities like presentations, debates, or storytelling sessions, and offering constructive feedback to improve their confidence in public speaking (Zare & Othman, 2015).

vi. **Team-Building Projects:** Organize group activities that require cooperation to accomplish a common goal, enhancing teamwork, communication, and leadership abilities while cultivating a sense of achievement (Slavin, 1995; Johnson & Johnson, 2009).

vii. **Creative Expression:** Incorporate creative mediums such as visual arts, music, theatre, or writing into the curriculum, allowing students to share their creativity and explore their interests (Eisner, 2002; Robinson, 2011).

viii. **Positive Affirmations:** Include day-to-day positive reminders or self-reflective exercises to help students recognize their talents and potential, fostering an environment where they overcome negative thoughts with positive affirmations (Burns, 1989; Seligman, 2011).

ix. **Peer Support Systems:** Establish peer support groups that enable students to mentor each other, pairing those with shared interests or supporting skills for mutual encouragement (Topping, 2005; Vygotsky, 1978).

x. **Reflection and feedback:** Encourage student to reflect on their growth and challenges. Give them positive feedback to guide them in understanding their growth (Hattie & Timperley, 2007; Boud, 2001).

By consistently utilizing these strategies in the classroom, educators can cultivate an environment that nurtures self-esteem, adaptability, and a constructive self-image in students.

1.6.8. Dimension-wise Self-confidence:

The different self-confidence factors related to different dimensions that make students confident and improve in their profession. The following are the dimensions of self-confidence of B.Ed. students, as identified by the investigator (2024), which are elaborated as follows:

i. **Physical and Psychological Confidence:** Integrated confidence is a holistic measure of well-being that blends physical and psychological aspects. It involves a positive body image, acceptance of unique physical traits, and belief in one's physical abilities. Paired with optimism and emotional self-efficacy, it reflects confidence in managing emotions and overcoming challenges. This concept is evident in strong posture and a composed presence, showcasing balance and resilience. Building integrated confidence requires healthy habits like regular exercise and self-care, fostering a sense of overall well-being that supports both mind and body (Akbari & Sahibzada, 2020; Burns, 1989).

ii. **Technological Confidence:** Technological confidence refers to an individual's self-assurance and skill in understanding and using various technologies. It includes comfort with digital devices, software, and online platforms, as well as the ability to adapt to new tools and solve digital challenges effectively. This confidence also reflects an awareness of cybersecurity and a responsible approach to technology use. Demonstrated in both professional and personal settings, technological confidence fosters innovation and ethical engagement, enabling individuals to navigate and contribute positively to the digital world (Akbari & Sahibzada, 2020; Bandura, 1997).

iii. **Social and Environmental Confidence:** Integrated social and environmental confidence refers to an individual's self-assurance in social interactions and adaptability to diverse settings. Social confidence involves ease in expressing oneself, initiating conversations, and navigating social situations with poise. Environmental confidence reflects the ability to adapt and feel comfortable in various surroundings, whether social, professional, or natural. Building this confidence requires positive self-perception, effective communication skills, and a mindset of adaptability. Together, these qualities empower individuals to thrive gracefully in both social and environmental contexts (Akbari & Sahibzada, 2020; Burns, 1989).

iv. **Professional Confidence:** Professional confidence refers to an individual's belief in their skills, expertise, and qualifications, reflected in their ability to perform tasks effectively and handle challenges with resilience. It involves maintaining composure during setbacks, adapting to change, and demonstrating strong problem-solving abilities. Effective communication is a key aspect, enabling clear and assertive expression of ideas while fostering collaboration in the workplace. Professional confidence also includes a proactive approach to growth, such as seeking learning opportunities, embracing new challenges, and enhancing skills. This evolving trait shapes how individuals perceive their roles and engage with others, combining competence, self-assurance, and a drive for development (Akbari & Sahibzada, 2020; Bandura, 1997).

1.6.9. Advantages of Self-confidence among Students:

Self-confidence plays an essential role in improving students' academic performance, personal development, and well-being. Some of the key benefits are as follows:

a) **Improved Academic Performance:** Students with confidence tend to engage more actively in their learning. They participate in discussions, tend to inquire more frequently, and ask for help when necessary. Their strong belief in their abilities helps them tackle academic challenges with resolve, resulting in higher levels of success (Bandura, 1997; Pajares, 1996).

b) **Positive Learning Attitude:** Students with confidence cultivate a positive outlook on learning and achievement, perceiving setbacks as stepping stones for individual progress instead of obstacles. This approach not only nurtures a genuine passion for learning but also inspires a lifelong commitment to continuous improvement and resilience in the face of challenges (Dweck, 2006; Zimmerman, 2000).

c) **Improved Communication Skills:** Confidence improves students' communication abilities, allowing them to articulate their thoughts clearly, assertively, and persuasively. Self-assured individuals are more common for individuals to get involved in classroom discussions and collaborate effectively with peers (Akbari & Sahibzada, 2020; Hamid, 2012).

d) **Strong Peer Relationships:** Self-confident students typically cultivate supportive bonds with their classmates. Their assertiveness and authenticity garner respect and admiration, leading to meaningful friendships (Burns, 1989).

e) **Leadership Potential:** Confidence is a fundamental quality for effective leadership. Students with self-assurance are more willing to take on leadership roles, inspiring their classmates to unite toward shared objectives. They demonstrate initiative, accountability, and resilience, all of which are essential traits of effective leaders (Chemers, Watson, & May, 2000).

f) **Resilience and Coping Strategies:** Students with confidence are more adept at managing stress, pressure, and challenges. Their faith in their abilities allows them to recover from setbacks with resolve (Bandura, 1997; Lazarus & Folkman, 1984).

g) **Career Readiness:** Confidence equips students for success in their professional futures, making them more likely to pursue internships, job opportunities, and extracurricular activities that reflect their interests. Confident individuals navigate professional challenges with grace (Stajkovic & Luthans, 1998).

h) **Overall Well-Being:** Self-confidence positively influences students' mental health and overall confidence, generally experiences reduced anxiety and self-doubt, promoting better emotional resilience and improved life satisfaction (Baumeister et al., 2003).

i) **Furnish Guidance and Support:** Be accessible to students dealing with low self-confidence. Take time to listen to their concerns, encourage them, and connect them with appropriate resources (Komarraju & Nadler, 2013).

Self-confidence is a key attribute for students, fostering academic success, positive relationships, and excellence in various life domains. Educators are key contributors in nurturing self-confidence, significantly contributing to students' development and future success.

1.6.10. Self-Confidence in Teaching

Self-confidence is a pivotal trait for teachers, influencing their ability to engage students effectively and manage classrooms proficiently. Confident educators are more likely to embrace innovative teaching strategies, including the integration of technology, which enhances both their professional competence and student outcomes (Tschannen-Moran & Hoy, 2001). Research highlights that self-assured teachers tend to create a positive learning environment, enabling students to feel more motivated and confident in their abilities (Bandura, 1997; Klassen & Chiu, 2010). The National Curriculum

Framework (NCF, 2023) further stresses building teachers' confidence through professional development programs that address pedagogical, content, and technological competencies.

1.6.11. Impact of Self-Confidence on Career Development:

Self-confidence is essential in advancing one's career, significantly affecting how individuals seek new opportunities, confront challenges, and attain success. A robust sense of self-confidence inspires individuals to aim for higher goals, take educated risks, approach challenges with resolve, and remain steadfast in difficult times (Stajkovic & Luthans, 1998; Judge & Bono, 2001).

Confident individuals are more motivated to engage in professional development, pursuing additional education, career advancements, or changes into new roles and sectors. Moreover, self-confidence improves performance at work by enhancing communication skills, enabling the advocacy of innovative ideas, and facilitating assertive management of professional relationships (Bandura, 1997; Chemers, Watson, & May, 2000).

Individuals who project confidence not only demonstrate professionalism but also exhibit leadership skills that command the respect and esteem of their fellow professionals, supervisors, and clients. Additionally, self-confidence fortifies resilience when faced with workplace challenges, such as job loss or criticism (Baumeister et al., 2003)

Those with a positive self-image and belief in their capabilities can bounce back more readily, overcome obstacles, adjust to new circumstances, and seek alternative paths to achieve their career aspirations. Ultimately, self-confidence is a vital factor in career success, instilling a sense of meaning, goals, and assurance in personal capabilities. By nurturing their self-confidence, individuals can discover their maximum capabilities, pursue their true interests, and gain greater satisfaction in their career endeavours (Luthans, Avolio, Avey, & Norman, 2007).

1.7. Meaning of Teaching Competency:

Teaching competency includes the fundamental knowledge, skills, and perspectives educators need to successfully promote student learning and growth. This includes various domains like instructional knowledge, teaching methodologies, classroom control, evaluation strategies, and communication skills. Competent teachers not only possess a thorough grasp of their mastery of the subject but also actively inspire and involve their students while committing to ongoing career development (Hammond, 2012).

1.7.1. Definitions of Teaching Competency

Teaching competency pertains to the synthesis of knowledge, skills, and attitudes that allow educators to successfully advance student learning (NBPTS). It encompasses mastery of the subject and the application of successful teaching practices, classroom leadership abilities, student progress evaluation, and the promotion of supportive relationships with both students and colleagues. (Stronge, 2018).

Additionally, teaching competency includes the ability to modify teaching methods to support the unique preferences of the students, proficiently use technology, and develop a supportive and inclusive learning atmosphere (Marzano, 2013). It encompasses employing various instructional techniques, engaging in reflective practices, collaborating with peers, and continuously pursuing training to improve teaching practices. (Hattie, 2012).

These definitions highlight the fundamental aspects of teaching competency, which represents a comprehensive set of skills, understanding, and attributes that educators must enhance to adeptly encourage student learning and growth in diverse learning environments. These features are important components, including pedagogical knowledge, instructional approaches, classroom management, evaluation techniques, and social skills. Capable educators display a comprehensive understanding of their subjects, apply effective teaching techniques tailored to various learner needs, and foster strong relationships with students and colleagues. Mastery of teaching competency is critical for establishing engaging and inclusive educational environments that boost academic performance and inspire a lifelong pursuit of knowledge.

1.7.2. The Significance of Teaching Competency:

Teaching competency significantly contributes to enhancing the efficiency of a classroom environment and is necessary for promoting student performance. Educators who possess strong competencies bring the fundamental knowledge, skills, and qualities needed to inspire students effectively, adjust their instruction aimed at supporting a set of learning needs, and foster student-centered classrooms that promote success for each learner (Stronge, 2018; Hattie, 2012). Competent teaching is marked by improved classroom management, individualized educational strategies, and appropriate evaluation techniques, enhancing the overall educational experience and equipping students for future achievements (Darling-Hammond, 2012).

1.7.3. NCF and Teaching Competency:

Teaching competency is the foundation of effective education, encompassing understanding, competencies, mindset, and the capacity to adapt to diverse classroom settings. Competent teachers not only deliver subject matter effectively but also inspire students to achieve their full potential. With the growing emphasis on technology, teaching competency now includes digital literacy and the capability to integrate technological tools into lessons. The NCF 2023 emphasizes the importance of aligning teacher preparation programs with 21st-century demands, ensuring educators are equipped with the required skills to foster holistic development in students.

1.7.4. Strategies for Improving Teaching Competency:

The psychosocial development theory proposed by Erik Erikson does not concentrate explicitly on the teaching process; it delineates the psychological phases that individuals encounter during their lives, emphasizing the tasks and challenges of each phase. Though it may not directly connect to teaching proficiency, it includes students' developmental needs, aiding educators in facilitating their progress and quality of life (Erikson, 1963).

The theory proposed by Erikson encompasses eight unique stages of psychosocial development, where each stage highlights a specific challenge or crisis that individuals must address to encourage psychological growth and maturity. These developmental stages consist of trust vs. mistrust, autonomy vs. shame and doubt, initiative vs. guilt, industry vs. inferiority, identity vs. role confusion, intimacy vs. isolation, generativity vs. stagnation, and integrity vs. despair.

Teachers can implement Erikson's framework by being aware of the unique developmental challenges students encounter throughout their lives. By adapting their teaching techniques, classroom atmosphere, and support systems, they can improve student learning and well-being to accommodate these varied developmental needs, and educators can promote positive growth among their students.

Children aged 6 to 11 enter the industry versus inferiority stage, which centres on developing competence in academic and social contexts. Educators can assist this development by providing skill-building opportunities, acknowledging academic achievements, encouraging participation in extracurricular activities, and offering positive reinforcement (McLeod, 2018).

1.7.5. Essential Features of Teaching Competency:

Saxena et al. (2009) in Teacher Education highlighted that competent teachers are expected to possess essential qualities as follows:

1. **Subject Knowledge Expertise**: Competent teachers have extensive knowledge of the subject they teach. Their mastery of key concepts and

principles enables them to create enriching and meaningful learning experiences tailored to their students' needs.

2. **Effective Communication Skills**: Skilled educators are capable of presenting information concisely and captivatingly. They use a range of communication methods, such as verbal instructions, visual resources, and dynamic discussions, to involve students and facilitate better understanding.

3. **Pedagogical Knowledge**: Proficient teachers are well-versed in and employ a range of instructional methods designed to cater to the particular needs of each learner. They apply pedagogical theories to design engaging lessons that promote student involvement and progress.

4. **Classroom Management Skills**: Competent educators are skilled in establishing a supportive educational setting. They set clear expectations, develop routines, and effectively guide student action, promptly addressing disruptions to optimize learning time.

5. **Differentiation and Individualization**: Skilled educators recognize they adjust their approaches to adapt to the diverse learning preferences, skills, and backgrounds of their students. They employ diverse teaching techniques to personalize their instruction, assisting those who struggle while effectively challenging high-achieving learners.

6. **Assessment and Feedback**: Competent educators implement varied assessment tools to measure student advancement, recognize learning requirements, and assess results. They offer prompt and helpful feedback to assist students in their academic growth.

7. **Reflective Practice**: Effective educators routinely evaluate their classroom practices, student achievements, and ongoing professional training. They critically analyze their methods, obtain suggestions from peers and students, and consistently aim to refine their teaching skills.

8. **Fostering Cultural Awareness:** Effective educators appreciate and respect the diverse cultural perspectives of their students, supporting inclusive classrooms that celebrate differences. They integrate varied insights into the curriculum and establish positive connections with learners from various backgrounds, addressing biases and challenging stereotypes.

9. **Teamwork and Professional Integrity:** Proficient educators engage in collaboration with colleagues, parents, and stakeholders to support student learning and well-being. They exhibit professional ethics, honesty, and integrity in their relationships with students, peers, and the wider school community.

10. **Commitment to Lifelong Learning**: Effective educators embrace a perspective oriented toward development and are committed to continuous learning opportunities. They enthusiastically pursue learning opportunities, engage by participating in professional development programs, and remain knowledgeable about the most recent research and effective teaching strategies.

These qualities collectively strengthen teaching competency, enabling educators to design vibrant, supportive, and meaningful learning atmospheres that contribute to student success and health.

National Council for Teacher Education (NCTE, 1998), ten remarkable interrelated categories of competencies were identified. Ten key competency areas were recognized, which include the following:

1. Contextual Competencies: Understanding the socio-cultural, political, and economic environment of education.
2. Conceptual Competencies: Having a strong grasp of subject matter and educational theories.

3. Curricular and Content Competencies: Knowledge of curriculum design, development, and content selection.
4. Transaction and Methodology: Effective use of teaching methods, strategies, and pedagogical techniques.
5. Experiential Learning and Use of Educational Technology: Utilizing technology and hands-on experiences for teaching.
6. Evaluation and Assessment: Designing and implementing assessment tools to evaluate student learning.
7. Management and Organization Competencies: Classroom management and organization of learning resources.
8. Parental Contact and Community Competencies: engaging with parents and the community for holistic education.
9. Teacher's Professional Identity and Ethical Competencies: Upholding professional ethics and continuous self-improvement.
10. Motivation and Attitudinal Competencies: Encouraging student engagement, motivation, and positive attitudes toward learning.

These competencies aim to develop well-rounded and effective teachers, ensuring quality education.

1.7.6. NCERT's Model of Teacher Competency:

The NCERT's model of teacher competency outlines the essential attributes and skills that teachers in the Indian education system should possess to be effective educators. It emphasizes content mastery, where teachers are expected to have a strong understanding of the subjects they teach. Pedagogical skills are also highlighted, focusing on the application of appropriate teaching methodologies that cater to different learning needs. The model values learner-centered approaches, promoting active participation, inclusivity, and a focus on individual student growth.

Additionally, the integration of technology in teaching is considered vital, encouraging the use of digital tools and resources to enhance classroom engagement and effectiveness. The model includes assessment and evaluation skills as necessary components for measuring student progress and providing constructive feedback. Classroom management is also emphasized to maintain a disciplined and supportive learning environment. Lastly, the model advocates for professional ethics and lifelong learning, underscoring the importance of continuous professional development and a reflective teaching practice.

The National Council of Educational Research and Training (NCERT) significantly contributes to enhancing teachers' teaching competency. Aggarwal (2014), in his book Essentials of Educational Technology, highlighted the teaching skills identified by NCERT in its publication Core Teaching Skills (1982), which include:

1. Writing Instructional Objectives: Clearly defining what students are required to learn.
2. Organizing Content: Structuring subject matter in a coherent and accessible manner.
3. Creating a set for introducing the Lesson: Preparing students' minds for new learning by connecting to prior knowledge.
4. Structuring Classroom Questions: Designing questions that promote critical thinking and understanding.
5. Question Delivery and Distribution: Effectively posing questions and ensuring all students are engaged.
6. Response Management: Handling students' answers in a way that encourages participation and learning.
7. Explaining: Clarifying concepts in an understandable manner.
8. Illustrating with Examples: Using relevant examples to reinforce understanding.
9. Using Teaching Aids: Incorporating tools and materials to enhance learning.
10. Stimulus Variation: Varying teaching approaches to maintain student interests.
11. Pacing of the Lesson: Managing the speed of instruction to suit learning needs.
12. Promoting Pupil Participation: Encouraging active involvement from all students.

13. Use of Blackboard: Effectively utilizing the blackboard for instruction.
14. Achieving Closure of the Lesson: Summarizing and concluding lessons effectively.
15. Giving Assignments: Providing tasks that reinforce learning.
16. Evaluating Pupil's Progress: Assessing student learning and understanding.
17. Diagnosing Pupil Learning Difficulties and Taking Remedial Measures: Identifying and addressing learning challenges.
18. Management of the Class: Maintaining an organized and conducive learning environment.

1.7.7. Dimension-wise Teaching Competency:

Various teaching competencies are associated with different dimensions that contribute to the proficiency and effectiveness of both teachers and students in their profession. According to Jeya S.K. & Denisia S.P. (2016), the dimensions of teaching competency for pre-service teachers are outlined as follows:

i. Subject Competency: A teacher should possess a strong command of their subject to deliver accurate, in-depth knowledge. This ensures that students receive clear explanations, fostering a deep understanding of concepts.

ii. Content Organization and Presentation: Well-structured lessons and engaging delivery help students grasp complex ideas more easily. Effective content organization ensures logical progression, making learning more efficient.

iii. Interactive Competency: Encouraging student participation through discussions, questioning, and collaborative learning enhances engagement. This competency helps create an interactive and dynamic classroom environment.

iv. Instructional Strategies: Using diverse teaching methods, such as lectures, group activities, and technology-based learning, caters to different learning styles. A flexible approach ensures that all students can effectively absorb and retain knowledge.

v. Classroom Management: Maintaining discipline, ensuring smooth transitions between activities, and fostering a positive learning atmosphere are crucial for a productive classroom. Effective management allows teachers to focus on instruction while keeping students engaged and motivated.

These dimensions collectively contribute to the overall effectiveness of a teacher, ensuring quality education and better learning outcomes.

1.7.8. Levels of Teaching Competency:

Teaching competency is a complex construct that spans a continuum from foundational understanding to expert-level capabilities. The distinct levels of teaching proficiency are as follows:

1. **Foundational Level**: In this initial phase, educators hold a primary insight into educational concepts, subject content, and instructional techniques. In this level are typically newcomers to the profession or possess limited practical experience.
2. **Proficient Level**: In this level, teachers display advanced instructional techniques, expertise in pedagogical strategies, and the skills to actively involve students in learning. They handle classroom management with ease and conduct assessments with accuracy and insight.

3. **Advanced Level**: Teachers within this level possess a high standard of expertise in their teaching methods. They are committed to ongoing professional development, exploring innovative practices, and consistently attaining positive learning outcomes for their students.

4. **Expert Level**: Educators within this level are esteemed as experts and leaders within their fields. They possess extensive experience, profound knowledge of their subjects, and an extensive knowledge of successful instructional strategies. They frequently mentor other teachers, engage in study, and participate significantly in the progress of the field of education.

Teaching competency is a continuously evolving notion that improves as time progresses through experience, professional growth, and reflective practices. Educators could advance through these phases as they refine their skills, increase their knowledge, and increase their proficiency in instructional practices. Competency levels can change according to the context, subject area, and the unique strengths and weaknesses of each educator (Danielson, 2011; Stronge, 2018).

1.7.9. Teaching Competencies for the Modern Era:

In the dynamic and fast-paced world of education today, teaching competencies comprise a diverse set of skills necessary for getting students ready for their future success (Darling-Hammond, 2020; Voogt & Roblin, 2012). Important competencies for 21st-century education include:

1. **Digital Proficiency**: Educators should be skilled in merging technology with educational strategies, prioritizing the effective application of learning software, web-based resources, and multimedia tools to design stimulating and participatory educational experiences.

2. **Analytical Thinking and Problem-Solving**: Teachers should motivate the students to develop analytical skills, fostering critical assessment of information, evidence examination, and complex problem-solving. This entails formulating challenging questions, scrutinizing assumptions, and advocating for an inquiry-based learning approach.

3. **Effective Communication and Collaboration**: Effective communication skills are essential for educators to deliver information addressing students, parents, and teaching staff. Furthermore, they should foster collaboration between students, promoting teamwork, collective engagement, and effective communication in group activities.

4. **Creativity and Innovation**: Teachers are encouraged to stimulate originality and promote imaginative thinking, motivating them to discover different

perspectives and find innovative solutions. This may consist of presenting platforms for imaginative expression and solution-finding.

5. **Adaptability and Open-Mindedness**: Teachers must remain flexible in their teaching styles to effectively meet the varied preferences of students and navigate the changing educational landscape. This requires an openness to novel perspectives, altering teaching techniques focused on student responses to integrating technologies into their educational practices.

6. **Cultural Awareness and Global Perspective**: Teachers are encouraged to develop cultural awareness and understanding of global awareness, helping students respect diversity and be aware of international issues. This requires incorporating diverse viewpoints within the curriculum and nurturing kindness and esteem for others.

7. **Social and Emotional Development**: Educators are pivotal in promoting the social and emotional needs of the student's growth by instilling self-awareness, self-regulation, social abilities, and the capacity for responsible decision-making. This requires creating an inclusive classroom setting, providing explicit instruction on social-emotional competencies, and reflective positive behaviours.

8. **Commitment to Lifelong Learning**: Educators should reflect a perspective of continuous growth, motivating students to participate in ongoing learning and inspiring them to confront challenges while learning from their failures. This involves establishing a classroom culture that prioritizes curiosity, exploration, and ongoing progress.

1.7.10 Essential Teaching Competencies in Educator Preparation:

In recent years, NCERT has expanded its focus to include competencies that align with contemporary educational demands, as outlined in the NCF (2023), This framework emphasizes:

To effectively equip future teachers for the challenges of modern education, teacher education programs need to instill essential 21st-century competencies. These competencies are integrated within teacher education curricula in several ways:

1. **Curricular Integration**: Pre-service teacher programs are structured to ensure that aspiring educators attain crucial competencies; examples include digital literacy, critical thinking, collaboration, creativity, and cultural awareness. The courses combine theoretical knowledge with practical techniques to meaningfully blend these skills within their teaching approaches (Darling-Hammond & Bransford, 2005).

2. **Teaching Methodologies**: Teacher education programmes highlight the necessity of pedagogical strategies are foster 21st-century capability among students. This involves endorsing inquiry-based learning through projects and critical thinking in problem-solving experiences and team-based activities. Future educators receive training to create and execute teaching methods that promote reasoning abilities, creative skills, communication proficiency, and collaborative teamwork.

3. T**echnology Integration**: Teacher education programmes provide essential training on utilizing technology effectively within the classroom environment. Aspiring teachers are taught to integrate digital tools and resources into their lesson plans to boost student engagement, personalize learning opportunities, and build digital literacy. They also explore how to utilize the technology for assessments, feedback, and making data-informed decisions (Voogt & Knezek,2018).

4. **Practical Experience and Internships**: Pre-service teachers acquire essential practical experience through teacher education programs in genuine classroom environments. During their internships and field experiences, future educators implement 21st-century teaching competencies under the mentorship of experienced educators. They obtain effective teaching strategies, gather

evaluations of their teaching approaches, and assess their experiences to develop their skills**.**

5. **Ongoing Professional Development**: This emphasizes the impact of continuous educational and career advancement. Aspiring teachers are motivated to participate in a variety of professional development activities to promote their 21st-century teaching competencies. These activities may include workshops, conferences, and webinars that focus on areas like digital literacy, innovative teaching practices, cultural awareness, social awareness, and emotional growth.

6. **Assessment and Evaluation**: Evaluate the capabilities of aspiring educators for 21st-century competencies through various evaluation techniques, including assessment of performance, portfolio analyses, classroom observations, and reflective journals. These assessments provide a comprehensive knowledge of pre-service teachers' strengths and developmental needs, supporting their pedagogical training and teaching preparedness.

1.8. Relationships Among TPACK, Self-Confidence, and Teaching Competency:

The relationships among TPACK (Technological Pedagogical Content Knowledge), self-confidence, and teaching competency have been extensively examined in academic literature. The following points highlight these relationships:

1. **TPACK and Teaching Competency**: TPACK provides a comprehensive framework that merges technology, pedagogy, and content knowledge to improve educational performance. Studies reveal that educators who possess a strong TPACK foundation have a better ability to provide subject matter using contemporary teaching tools and strategies. This competency consists of more than just understanding content but also engaging students through effective pedagogical practices supported by technology. The TPACK model was

developed by Mishra and Koehler (2006) and emphasizes combining technology with pedagogy and content knowledge to improve teaching outcomes. Those possessing expert-level skills with advanced TPACK skills exhibit a greater ability to adjust to diverse teaching scenarios.

2. **Self-Confidence and Teaching Competency**: A teacher's self-confidence relates to their belief in their skills to successfully impart knowledge and manage classroom dynamics and is significantly influenced by educators' self-confidence. Research reveals that teachers who possess higher self-confidence often demonstrate greater teaching competency. Confident educators are more likely to experiment with different instructional methods and technologies, thereby improving their overall effectiveness (Bandura, 1997). Additionally, Canrinus et al. (2012) revealed that teachers who have higher levels of self-confidence are more successful in delivering instruction and engaging students, both of which are the criteria for teaching competence.
3. **TPACK and Self-Confidence Relationship**: Self-confidence significantly influences educators' skills to successfully utilize the TPACK model. Teachers with higher self-esteem are more likely to integrate technology into their teaching practices, leading to improved effectiveness. (Koh et al., 2013). Teachers are more adept at using technological tools, and their TPACK capabilities refine and contribute to more impactful instructional approaches. Albion, Jamieson-Proctor, and Finger (2010) found that a high level of self-assurance in utilizing technology positively affects educators' skills in integrating technological resources, ultimately enriching their TPACK skills and their quality of teaching.
4. **Interrelationship Among TPACK, Self-Confidence, and Teaching Competency**: The relationship between TPACK, self-confidence, and teaching competency is necessary for shaping effective educational practices. Educators who exhibit strong self-confidence in their ability with technology allow for the effective blending of technology with their teaching approaches (Graham et al., 2009). This coordination, grounded within the TPACK framework, not only improves their teaching effectiveness but also fosters the creation of

dynamic and interactive learning environments. Moreover, confident educators are more open to experimenting with new technologies and pedagogical approaches, resulting in the continuous development of their teaching practices and significantly better outcomes for their students (Abbitt, 2011).

The dynamic coordination between TPACK, self-confidence, and teaching competency creates a supportive cycle of growth for educators. As teachers competently adopt technology into their lessons, they gain recognition for their effective practices, which boosts their self-confidence. This increased confidence motivates them to continue refining their TPACK, leading to further improvements in their teaching competency. In turn, as students participate more in their lesson activities and achieve better results, teachers experience a perception of fulfilment and effectiveness. This confidence and competency not only enhance the professional development of educators but also significantly enriches the educational experiences for students, preparing them for achievement in an increasingly digital world.

In summary, TPACK, self-confidence, and teaching competency are intricately connected. Educators who have a solid understanding of the TPACK and those who believe in their technological capabilities are more apt to excel in their instructional methods, thereby improving their overall teaching competency.

1.9. Teacher Education:

Higher education plays a crucial role in shaping individuals for professional and personal growth, contributing to the intellectual and economic development of a nation. It includes universities, colleges, and specialized institutions that offer undergraduate, postgraduate, and doctoral programmes across various disciplines. In the context of teacher education, higher education institutions are responsible for preparing competent educators capable of adapting to the changing needs of teaching and learning.

A Bachelor of Education (B.Ed.) programme is a professional teacher training course designed to equip aspiring educators with pedagogical skills, subject expertise, and an understanding of child psychology. The programme focuses on both theoretical knowledge and practical teaching experiences, ensuring that future teachers can effectively engage with students and foster meaningful learning. It covers areas such a educational psychology, teaching methodologies, assessment techniques, and the integration of technology in education. The B.Ed. programme is a mandatory qualification for teaching at the secondary and higher secondary levels in all schools (NCERT, 2023; Sharma, 2017).

1.9.1. NEP (2020) Recommendations for Teacher Education:

The National Educational Policy (NEP,2020) provides essential guidelines for improving teacher education and ensuring quality learning experiences in schools. Some key recommendations for teacher education include:

i. Integrated Teacher Education: The NEP (2020) emphasizes a four-year integrated B.Ed. programme to provide a well-rounded preparation for teachers, blending subject knowledge with pedagogical skills from an early stage.

ii. Experiential Learning: Teacher training should focus on hands-on learning, including internships, practice teaching, and real classroom exposure to help future educators develop practical skills.

iii. Multidisciplinary Approach: Teachers should acquire knowledge in multiple subjects and interdisciplinary methods to enhance holistic learning rather than being limited to a single discipline.

iv. Technology Integration: The use of digital tools and educational technology should be a core part of teacher education, ensuring that future educators are prepared for blended and online learning environments.

v. Continuous Professional Development: The NEP (2020) highlights the significance of ongoing teacher training programmes, refresher courses, and professional learning communities to keep educators updated with modern teaching trends and innovations.

vi. Assessment Reforms: The focus should shift from rote learning to competency-based assessments, where teachers learn to evaluate students through projects, critical thinking tasks, and application-based tests.

vii. Inclusive and Equitable Education: Teacher Education must incorporate training in inclusive education, equipping teachers to handle diverse classrooms with students from different socio-economic and learning backgrounds.

These recommendations aim to transform teacher education, ensuring that educators are well-prepared to handle modern teaching challenges while fostering innovation, creativity, and lifelong learning among students.

1.9.2. Need and Significance of Teacher Education:

Teacher Education is the foundation of a strong and effective education system. It prepares aspiring educators with the necessary knowledge, skills, and attitudes to guide students toward academic and personal growth. Well-trained teachers are crucial in shaping young minds, fostering critical thinking, and nurturing future generations (Cochran-Smith & Zeichner, 2005; UNESCO, 2015; NCERT, 2023)

Need for Teacher Education:

i. **Professional Development:** Teaching is not just about subject knowledge; it requires training in pedagogy, classroom management, and student engagement.

ii. **Effective Teaching Strategies:** Teachers must be equipped with modern instructional techniques to cater to diverse learning needs.

iii. **Understanding Child Psychology:** Knowledge of student behaviour, learning styles, and emotional needs helps teachers create supportive learning environments.

iv. **Adaptation of Educational Changes:** Teacher education helps educators stay updated with new policies, technologies, and teaching methodologies.

v. **Ethical and Moral Development:** Teachers serve as role models, and proper training ensures they uphold ethical values and professionalism in the classroom.

Significance of Teacher Education:

i. **Quality Education:** Well-trained teachers ensure high academic standards, leading to better student outcomes.

ii. **Nation-Building:** Educated and skilled teachers contribute to a knowledgeable and responsible society.

iii. **Promoting Inclusive Education:** Teacher education prepares educators to handle diverse classrooms, including students with special needs.

iv. **Enhancing Creativity and Innovation:** A strong teacher education system encourages educators to develop creative and engaging learning experiences.

In summary, teacher education is essential for ensuring well-prepared, knowledgeable, and ethical educators who can positively impact students and society collectively.

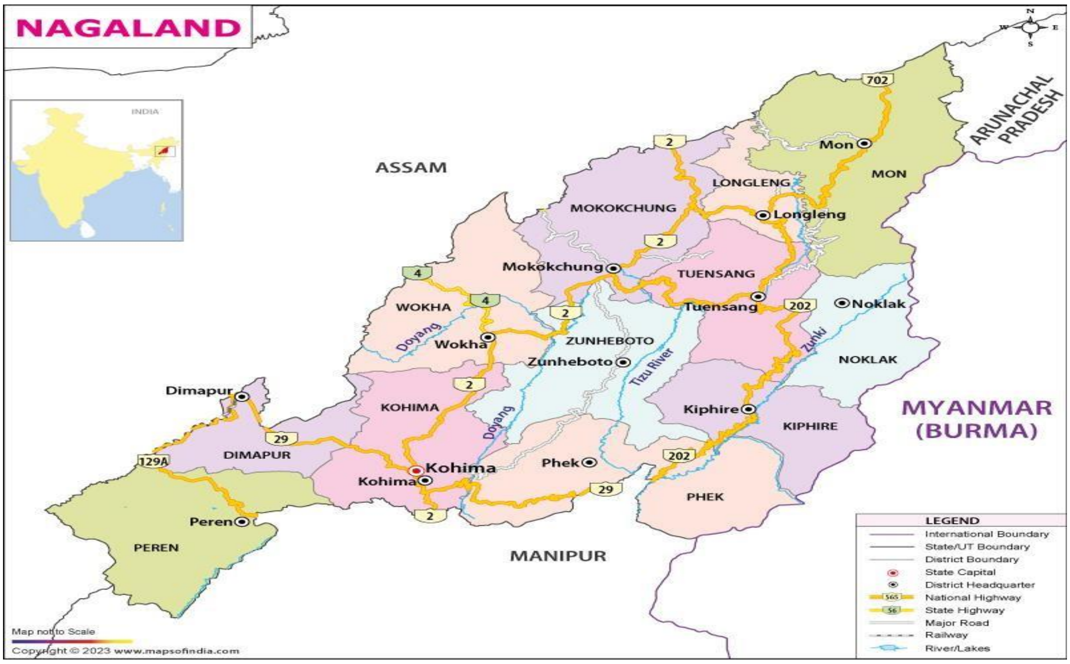
1.10. A Brief Overview of Nagaland:

Nagaland became the 16th state to officially join the Indian Union and was formally inaugurated on December 1, 1963. Nagaland is bordered by Assam to the west, north of Arunachal Pradesh, south of Manipur, and east of Myanmar. With the establishment of four additional districts on December 18 and January 19, 2022, Nagaland is divided into 16 districts, such as Kohima, Dimapur, Mokokchung, Tuensang, Wokha, Peren, Longleng, Kiphire, Noklak,Tseminyu, Shamator, Niuland, Phek,Mon, Chumukedimaand Zunheboto.

Every tribe in Nagaland has its distinct customs, traditions, language, and style of dress. The Indigenous people of this scenic hilly state are renowned for their brightly coloured and intricately designed attire, along with the exquisite jewellery and ornaments they wear. Known as the 'Land of Festivals,' Nagaland hosts numerous tribal celebrations, each marked by a vivid display of colours, lively music, and cultural festivities.

Figure 3

A Geographical Overview of Nagaland



1.10.1. Physical Features and Climate of Nagaland:

Located in northeastern India, Nagaland spans about 16,579 km² and sits between latitudes 25.6° N to 27.4° N and longitudes 93.2° E to 95.2° E. Famous for its mountainous regions, Nagaland's capital, Kohima, is located in the south. From the Brahmaputra Valley, the Naga Hills ascend steeply, reaching approximately 2,000 feet (610 meters) before rising beyond 6,000 feet (1,830 meters) in the southeast. The highest peak in the state, Mount Saramati, stands at 12,552 feet above sea level, marking the convergence of the Patkai Range in Myanmar and the Naga Hills. Several rivers have been carved through the landscape, including the Dihiku and Doyang in the north, the

Barak River in the southwest, and the Chindwin River, which extends into the southeastern part of the state from Myanmar.

Nagaland has a monsoonal climate with high humidity. The state receives around 70-100 inches (1,800-2,500 mm) of rainfall annually, mostly during the southwest monsoon from May to September. Temperatures range from 70°F to 104°F, while winters remain mild, rarely dropping below 40°F. However, frost is common in higher elevations.

1.10.2. Population and Density:

According to the 2011 Census of India, Nagaland had a population of 1,024,649 males and 953,853 females, with a population density of 119 people per square kilometre. The district-wise distribution of area, population, and density is presented in Table 1 based on the 2011 Census data.

Table 1. District-wise Area, Population, and Density of Population of Nagaland according to the 2011 Census of India

Sl. No	State/District	Area in Sq.km	Population	Density per sq. km	Percentage share of total Geographical Area (%)
1.	Nagaland	16579	1978502	119	100
2.	Kohima	1463	267988	183	8.82
3.	Peren	1651	95219	58	9.95
4.	Dimapur	927	378811	409	5.59
5.	Phek	2026	163418	81	12.22
6.	Mokokchung	1615	194622	121	9.74
7.	Zunheboto	1255	140757	112	7.56

8.	Wokha	1628	166343	102	9.81
9.	Tuensang	2536	196596	78	15.29
10.	Kiphire	1130	74004	65	6.81
11.	Longleng	562	50484	90	3.38
12.	Mon	1786	250260	140	10.77

Source: Directorate of Economics & Statistics, Government of Nagaland (2022), Nagaland Statistical Handbook, 2022.

1.10.3. Literacy in Nagaland:

As per the 2011 census, Nagaland has a literacy rate of 79.55%. The literacy rate for males is 82.75%, while the rate for females is 76.11%. The following Table 2 shows the district-wise literacy rate for Nagaland as per the 2011 Indian census.

Table 2

District-wise Population and Literacy Rate for Nagaland as per the 2011 Indian Census

Sl.No	**State/District**	**Literacy Rate (%)**		
		Person	**Males**	**Females**
1.	Nagaland	79.55	82.75	76.11
2.	Kohima	85.23	88.69	81.48
3.	Dimapur	84.79	87.54	81.77
4.	Phek	78.05	83.66	72.21
5.	Mokokchung	91.62	92.18	91.01

6.	Wokha	87.69	90.81	84.48
7.	Zunheboto	85.26	87.85	82.62
8.	Tuensang	73.08	76.31	69.59
9.	Mon	56.99	60.94	52.58
10.	Peren	77.95	82.84	72.58
11.	Kiphire	69.54	74.88	63.97
12.	Longleng	72.17	74.48	69.63

Source: Directorate of Economics & Statistics, Government of Nagaland (2022), Nagaland Statistical Handbook, 2022.

1.10.4. A Brief History of Education in Nagaland:

Education in Nagaland has evolved significantly over time. Traditionally, the Morung served as the primary educational institution, functioning as a communal dormitory where young Naga men received instruction in cultural practices, social norms, and vocational skills essential for their community roles. This system emphasized the oral transmission of knowledge, including folklore, history, and craftsmanship. (Chuba and Liegise, 2017)

The introduction of formal education is credited to the American Baptist Missionaries in the late 19th century. In 1872, Dr. Edward Winter Clark established the first mission school in Molungkimong village, focusing on literacy and religious education. This initiative marked the beginning of structured education in the region. (Temjenkaba, 1993)

The early 20th century saw the establishment of more schools, often spearheaded by missionary efforts. However, the mid-20th century was tumultuous due to political unrest related to the Naga independence movement. During this period, many schools were closed, and educational progress was hindered.

Before Nagaland gained statehood, it remained educationally underdeveloped as part of Assam. However, after becoming a state in 1963, Nagaland began making serious efforts toward advancing education. Statehood provided a significant boost to educational growth. Both the state government and private institutions took the initiative to establish various schools and colleges, aiming to provide formal education to everyone. Over time, there has been a notable expansion of schools and colleges, contributing to significant educational development in the state. Since attaining statehood, Nagaland has experienced remarkable progress in the education sector, marked by the establishment of numerous educational institutions, including schools, colleges, and universities. Emphasis was placed on improving infrastructure, curriculum development, and teacher training. As a result, the state achieved a literacy rate of 79.55% by 2011, surpassing the national average.

Today, Nagaland boasts numerous primary and secondary schools, as well as higher education institutions, including Nagaland University. The state's education system continues to evolve, striving to balance traditional knowledge with modern educational practices. Nagaland's educational journey reflects a transition from indigenous learning methods to formal education systems shaped by missionary influences, political challenges, and ongoing development efforts.

1.10.5. Teacher Education in Nagaland:

Teacher Education in Nagaland is facilitated through various institutions dedicated to preparing competent educators for the region's unique educational landscape. These institutions offer programmes such as the Bachelor of Education (B.Ed.) and Master of Education (M.Ed.) to equip aspiring teachers with the necessary pedagogical skills and knowledge.

The State College of Teacher Education (SCTE) in Kohima, Nagaland, was established in 1975, making it the first teacher education institution in the state. It was initially known as the Nagaland College of Teacher Education; it has played a pivotal role in shaping the teacher education landscape in Nagaland. Over the years, SCTE has evolved to adapt to the changing demands of the education sector, offering both undergraduate (B.Ed.) and postgraduate (M.Ed.) programmes. The college was recognized by the National Council for Teacher Education (NCTE) and is affiliated with Nagaland University. Its commitment to quality education is evident from its accreditation by the National Assessment and Accreditation Council (NAAC)for Teacher Education with a 'B' grade in 2011 (Nagaland State Higher Education Report, 2019).

Apart from SCTE, various institutions have been established to further teacher education, which has significantly expanded in Nagaland over the years. For example, the Mokokchung College of Teacher Education (MCTE) was established on February 22, 2012, as the state's second secondary teacher education institution. It is situated in Yimyu, Mokokchung. MCTE offers a two-year B.Ed. programmes and is recognized under section 2 (f) of the UGC Act, 1956. These institutions have been essential in developing qualified educators, thereby enhancing educational standards in Nagaland (Nagaland Higher Education Department, 2018).

The combined total of the government and private teacher education colleges providing teacher training to the state, as reported by the Nagaland Government's Department of Higher Education (2024), is presented in Table 3.

Table 3.

District-wise total number of Government and Private Teacher Education Colleges in Nagaland affiliated with the Nagaland University.

Sl. No	**Name of the Institute**	**District**	**Course**
1.	Bosco College of Teacher Education	Dimapur	B.Ed.
2.	Modern Institute of Teacher Education	Kohima	B.Ed.
3.	Mokokchung College of Teacher Education	Mokokchung	B.Ed.
4.	Mount Mary College	Chumukedima	B.Ed.
5.	Salt Christian College of Teacher Education	Dimapur	B.Ed.
6.	Sazolie College of Teacher Education	Jotsoma, Kohima	B.Ed.
7.	State College of Teacher Education	Kohima	B.Ed.
8.	Unity College	Dimapur	B.Ed.
	Total	8	

Source: Nagaland Government, Department of Higher Education, Kohima. (2024).

The above table indicates the 8 government and private colleges offering teacher education in Nagaland affiliated with the University of Nagaland.

1.11. Significance of the Study:

The study on the relationship between Technological Pedagogical Content Knowledge (TPACK), Self-confidence, and Teaching Competency among B.Ed. Students in Nagaland hold significant value in multiple aspects, particularly in the context of teacher education and professional development.

1. **Enhancing Teaching Competency through TPACK:** In today's digital era, technology plays an integral role in education. The development of TPACK among B.Ed. students, enabling them to blend technology with pedagogy and content knowledge, which is essential for delivering effective instruction. By integrating digital tools, student-teachers can:

- Design interactive and engaging lessons.
- Use technology to enhance concept clarity and student participation.
- Align instructional strategies with 21st-century learning needs.

2. **Building Self-Confidence in Technology Integration:** Self-confidence is a key factor that influences a teacher's ability to integrate technology effectively in the classroom. Teachers who lack confidence in using digital tools and technology-driven teaching methods may struggle with adopting innovative pedagogies (Shulman,1986). Through this research, the relationship between self-confidence and teaching competency will be explored, providing:

- Strategies to enhance student teachers' confidence in using technology.
- Understanding of how confidence levels affect lesson delivery and engagement.
- Practical approaches to overcome digital apprehension in the classroom (Mishra and Koehler, 2006).

3. **Improving Student Learning Outcomes:** The integration of TPACK and self-confidence in teaching has a direct impact on student learning. When student-teachers develop strong teaching competencies, they can:

- Foster active learning environments.

- Use technology to personalize instruction and address diverse learning needs.
- Enhance critical thinking, problem-solving, and collaboration skills among students. (Abbitt, 2011)

This study helps in identifying the key areas where student-teachers in Nagaland can improve their competencies to ensure better academic outcomes for school students. (Sahin, 2011)

4. **Contextual Relevance:** The need for TPACK in Nagaland: Nagaland, with its unique geographical and socio-cultural landscape, presents both opportunities and challenges in teacher education. The study will provide valuable insights into the current status of TPACK adoption among B.Ed. students in the region and highlight:

- The extent to which digital tools are incorporated in teacher training programmes.
- Challenges student-teachers face in integrating technology-driven pedagogy.
- The effectiveness of the current B.Ed. curriculum in fostering technological competency. (Kumar and Kumar,2020)

5. **Professional Growth and Future Readiness:** This study will also be significant for teacher training institutions in Nagaland by helping them:

- Developing training programmes that enhance technology integration skills.
- Encourage reflective practices that improve self-confidence in teaching.
- Prepare future educators who can effectively navigate modern classrooms. (Nagaland University, 2022)

By understanding the relationship between TPACK, self-confidence, and teaching competency, policymakers and teacher educators can design evidence-based interventions to support B.Ed. students' growth and success in the teaching profession. (Chai et al. 2013)

1.12. Statement of the Problem:

In this digital era, everyone is willing to use technology for education, entertainment, e-commerce, and communication, and to do their work with less effort and with more accuracy and speed. The present study aims to study the relationship among the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students, which is mandatory at this juncture. The teacher education programme plays a vital role in preparing effective student-teachers. Today's teacher educators and student-teachers need technological skills and pedagogical knowledge. The integration of technology in the education process makes the learner learn effectively, and TPACK helps the student-teachers to choose the proper method of teaching along with the adequate teaching learning materials, which are to be used for effective teaching.

Hence, keeping all these in view, the researcher attempted to study**, "A Study on the Relationship between Technological Pedagogical Content Knowledge (TPACK), Self-confidence and Teaching Competency of B.Ed. Students in Nagaland".**

1.13. Operational Definition of the Terms Used:

The following are the operational definitions of the terms used:

a). Technological Pedagogical Content Knowledge (TPACK): In this study, TPACK represents the essential understanding that teachers must integrate their knowledge of content, pedagogy, and technology to develop effective teaching strategies. It serves as a structured framework that organizes knowledge into three key domains, facilitating content-based technology integration. This study specifically focuses on seven dimensions of TPACK: Technological Knowledge, Pedagogical Knowledge, Content Knowledge, Technological Pedagogical Knowledge, Technological Content Knowledge, Pedagogical Content Knowledge, and Technological Pedagogical Content Knowledge (TPACK).

b). Self-Confidence: Self-confidence in the context of education refers to the belief in one's own abilities to achieve and succeed in academic and professional tasks. In teaching, self-confidence is a critical factor that influences both the teacher’s performance and their ability to inspire students. For B.Ed. students, self-confidence is especially important as it directly impacts their readiness to face the difficulties of teaching. This present study is related to four dimensions, namely, Physical and Psychological Confidence, Technological Confidence, Social and Environmental Confidence, and Professional Confidence.

c). Teaching Competency: Teaching competency can be understood as the effective teaching behaviours and skills that lead to positive changes in students' behaviour. In this study, teaching competency refers to the ability of student teachers to perform specific tasks within a given context with a high degree of excellence. For this research, teaching competency is examined through five key dimensions: Subject competency, Content organization and Presentation, Interactive competency, Instructional strategies, and Classroom management.

d). B.Ed., Students: Students pursuing a professional degree in Bachelor of Education at colleges of education are called B.Ed., Students.

1.14. Objectives of the Study:

The objectives of the study are as follows:

1. To analyze the Technological Pedagogical Content Knowledge (TPACK) and its variations among B.Ed. Students in Nagaland are based on variables such as gender, educational qualification, stream, year of study, locality, institution, and previous technological knowledge.
2. To investigate the levels of Self-confidence among B.Ed. Students in Nagaland are based on variables such as gender, educational qualification, stream, year of study, locality, institution, and previous technological knowledge.
3. To examine the Teaching Competency of B.Ed. students in Nagaland and explore how it varies across variables such as gender, educational

qualification, stream, year of study, locality, institution, and previous technological knowledge.

4. To explore the relationship between Technological Pedagogical Content Knowledge (TPACK) and Self-confidence among B.Ed. students in Nagaland.
5. To investigate the relationship between Self-confidence and Teaching Competency among B.Ed. students in Nagaland.
6. To explore the relationship between Technological Pedagogical Content Knowledge (TPACK) and Teaching Competency among B.Ed. students in Nagaland.
7. To investigate the influence of variables (such as gender, educational qualification, stream, year of study, locality, institution, and previous technological knowledge) on the relationship between TPACK, Self-confidence, and Teaching Competency among B.Ed. students in Nagaland.

1.15. Hypotheses of the Study:

$H_0$1. There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students based on variables.

1.1 There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students with respect to gender (Male/Female).

1.2 There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students with respect to educational qualifications (UG/PG).

1.3. There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students with respect to stream (Arts/Science/Commerce).

1.4. There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students with respect to year of study (I/II).

1.5. There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students with respect to locality (Rural/Urban).

1.6. There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students with respect to institutions (Government/Private).

1.7. There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students with respect to previous technological knowledge (Yes/No).

$H_0$2. There is no significant difference in the Self-confidence of B.Ed. students based on variables.

2.1 There is no significant difference in the Self-confidence of B.Ed. students with respect to gender (Male/Female).

2.2 There is no significant difference in the Self-confidence of B.Ed. students with respect to educational qualifications (UG/PG).

2.3 There is no significant difference in the Self-confidence of B.Ed. students with respect to the stream (Arts/Science/Commerce).

2.4 There is no significant difference in the Self-confidence of B.Ed. students with respect to year of study (I/II).

2.5 There is no significant difference in the Self-confidence of B.Ed. students with respect to locality (Rural/Urban).

2.6 There is no significant difference in the Self-confidence of B.Ed. students with respect to the institution (Government/Private).

2.7 There is no significant difference in the Self-confidence of B.Ed. students with respect to previous technological knowledge (Yes/No).

$H_0$3. There is no significant difference in the Teaching Competency of B.Ed. students based on variables.

3.1 There is no significant difference in the teaching competency of B.Ed. students with respect to gender (Male/Female).

3.2 There is no significant difference in the teaching competency of B.Ed. students with respect to educational qualifications (UG/PG).

3.3. There is no significant difference in the teaching competency of B.Ed. students with respect to the stream (Arts/Science/Commerce).

3.4. There is no significant difference in the teaching competency of B.Ed. students with respect to year of study (I/II).

3.5 There is no significant difference in the teaching competency of B.Ed. students with respect to locality (Rural/Urban).

3.6. There is no significant difference in the teaching competency of B.Ed. students with respect to the institution (Government/Private).

3.7. There is no significant difference in the teaching competency of B.Ed. students with respect to previous technological knowledge (Yes/No).

$H_0$4. There is no significant relationship between Technological Pedagogical Content Knowledge (TPACK) and self-confidence among B.Ed. students in Nagaland.

$H_0$5. There is no significant association between Self-confidence and teaching competency among B.Ed. students in Nagaland.

$H_0$6. There is no significant relationship between TPACK and Teaching Competency among B.Ed. students in Nagaland.

$H_0$7. There is no significant relationship among TPACK, Self-Confidence, and Teaching Competency of B.Ed. students in Nagaland, as influenced by variables such as gender, educational qualification, stream, year of study, locality, institution, and previous technological knowledge.

1.16. Delimitations of the Study:

i. The study is restricted to the four districts of Nagaland only. (Kohima, Dimapur, Chumukedima, and Mokokchung)

ii. The study is delimited to B.Ed. students only.

iii. The study is delimited to TPACK, Self-confidence, and Teaching Competency of Nagaland.

1.17. Variables of the Study:

The variables of the study are Technological Pedagogical Content Knowledge (TPACK), Self-confidence (Independent variables), and Teaching Competency (Dependent variable). These variables are studied with respect to gender, educational qualification, stream, year of study, locality, institution, and previous technological knowledge. (Sub-variables)

1.18. Chapter Summary:

The next chapter describes the review of literature related to Technological Pedagogical Content Knowledge (TPACK), Self-confidence, and Teaching Competency among B.Ed. students.

CHAPTER – II

REVIEW OF LITERATURE

2.1 Introduction:

A review of related literature allows researchers to understand the progress and developments in their areas of interest, enabling them to appreciate the significance of their research work. This chapter presents a review of studies relevant to the focus of the research. Familiarizing oneself with earlier studies is crucial before undertaking any research. Such a survey ensures the researcher avoids repeating previous work and aids in the selection of a meaningful topic and methodology. By identifying gaps in earlier research, the study can address overlooked aspects. The chapter highlights key literature that informs the current research.

2.2. Need and Importance of Review of Literature:

Researchers typically explore a broad range of literature, though not all of its features to find a place in the final study. This is a result of the relevance of literature varies, with only some being closely tied to the research objectives. Certain studies serve as foundational material, offering background context, while others inspire hypotheses or methodologies crucial to the research.

A literature review provides clarity on prior work and expert perspectives, helping to identify gaps, refine the study's focus, and frame its contribution to the field. This process also aids in operationalizing terms, choosing appropriate analytical techniques, and interpreting results effectively.

2.2.1. Objectives of the Literature Review:

The objectives related to literature reviews are as follows:

1. To acquire comprehensive insight into the research area.
2. To understand the relationships between concepts and formulate hypotheses.
3. To identify the more reliable research methodologies.
4. To design the framework for the research report.
5. It enhances the investigator's insight and saves valuable time.
6. It is essential to narrow down and clearly define the research problem.
7. It alerts researchers to overlooked opportunities or gaps in existing research.
8. It offers valuable insights into other researchers' tools, participation, and approaches.

This study's literature review focuses on examining themes and issues surrounding the TPACK, self-confidence, and teaching competency of B.Ed. students. Resources such as books, journals, websites, articles, dissertations, and Ph.D. theses were consulted.

2.3. Classification of the Related Literature Reviewed:

The reviewed research works are classified into four main headings, including Indian and Abroad Studies.

2.3.1. Studies related to Technological Pedagogical Content Knowledge (TPACK).

2.3.2. Studies related to Self-confidence.

2.3.3. Studies related to the Teaching Competency.

2.3.4. Studies related to the Technological Pedagogical Content Knowledge (TPACK), Self-confidence, and Teaching Competency.

2.3.1. Studies related to the Technological Pedagogical Content Knowledge (TPACK):

Studies conducted in India:

Sharma and Singh (2015) explored the gender and TPACK development among B.Ed. students at Delhi University. Involving 150 participants, the study examined whether gender affects TPACK proficiency. Using an independent samples t-test, the analysis found significant gender-based differences in TPACK levels, with a t-value of 2.87 ($p < 0.05$). The study suggested addressing gender disparities in TPACK training through gender-specific strategies to improve training outcomes.

Verma and Rathi (2016) explored the impact of gender and regional factors on TPACK levels among B.Ed. students in Lucknow University. The study, which included 170 participants, used a Two-way ANOVA analysis of the data and discovered a significant difference between gender and region ($F = 6.32$, $p < 0.01$). The results showed that both gender and regional context significantly influence TPACK development, with regional differences being particularly significant. The study recommended that TPACK training programs be adapted to account for these demographic and geographical factors to make teacher education more effective and inclusive.

Chaudhary and Kaur (2017) examined the influence of gender and educational stream on TPACK levels among B.Ed. students in Punjab. The study involved 120 participants, and found that male students exhibited higher technological knowledge compared to female students. Stream also played a role with students from the science stream showing stronger TPACK skills. The study emphasized tailoring teacher education programmes to address these differences and promote equal technology integration skills among future teachers.

Jeyaraj and Ramnath (2018) conducted a study to assess Technological Pedagogical and Content Knowledge (TPACK) among B.Ed. Student-Teachers in the Puducherry Region. The study involved 200 B.Ed.

student-teachers, selected through a purposive sampling method. A standardized Likert-type scale developed by Ismail Sahin, comprising 47 items with five response options, was used as the primary research tool. The findings indicated that B.Ed. student-teachers exhibited a moderate level of TPACK. Significant variations were observed in TPACK levels based on educational qualifications, access to e-content, and the frequency of technology use in teaching and learning.

Rathore and Sharma (2018) investigated how locality (urban vs. rural) affects TPACK levels among B.Ed. students in Madhya Pradesh. The study, which involved 140 participants, found that students from urban areas had better access to digital resources, which translated to stronger technological knowledge and overall TPACK skills. The study recommended that rural institutions enhance their technological infrastructure to level the playing field for all students.

Kaur and Gill (2019) studied the influence of educational qualification on TPACK development among B.Ed. students in Punjab. The research included 110 participants, and the results found that students with higher qualifications (such as Postgraduate education) demonstrated greater TPACK proficiency. The study recommends that the B.Ed. programmes consider the varying educational backgrounds of their students when designing curricula.

Singh and Joshi (2019) investigated the relationship between computer knowledge and TPACK among B.Ed. students at the Hyderabad University. The study, which included 150 participants, hypothesized that stronger computer literacy would lead to higher TPACK levels. Regression analysis revealed a strong positive correlation (coefficient = 0.58, $p < 0.01$) between computer knowledge and TPACK development. The study emphasizes the importance of computer literacy in enhancing TPACK and suggests that B.Ed. curricula should include computer skills training to support the growth of TPACK among students.

Singh and Sharma (2019) examined the gender and computer knowledge on TPACK among B.Ed. students from the University of Jodhpur. The study involved 145 participants and hypothesized that both gender and computer knowledge would affect TPACK levels. Regression analysis revealed a strong connection between these factors ($\beta = 0.54$, $p < 0.01$). The study highlights the need for gender-sensitive technology training programs and advocates for incorporating gender considerations into computer education to ensure equitable TPACK development for all students.

Verma and Gupta (2019) investigated the role of previous technological knowledge in shaping TPACK among B.Ed. students in Rajasthan. The study, conducted with 150 participants, found that students with prior exposure to technology scored significantly higher in TPACK assessments. These findings suggest that prior technological training positively influences future teachers' ability to integrate technology effectively in their pedagogy and content areas.

Desai and Patel (2020) explored how institutional factors like teaching methods and access to technological resources influence TPACK among B.Ed. students in Gujarat. The study revealed that students from private institutions with better technological infrastructure scored higher in all TPACK domains. The study emphasized the B.Ed. institutions to introduce the modern teaching tools and resources to better prepare teachers for the digital classroom.

Singh and Yadav (2020) examined gender-based differences in TPACK development among B.Ed. students in Haryana. The study included 130 students and found that female students scored higher in Pedagogical Knowledge (PK), whereas male students showed superior Technological Knowledge (TK). The study suggested that gender-sensitive training programmes should be designed to ensure equal development of all dimensions of TPACK across both genders.

Chopra and Verma (2021) examined how gender and previous technological knowledge influence TPACK among B.Ed. students in Rajasthan. The study showed that female students with prior technological knowledge had higher TPACK scores regarding gender. The findings emphasize the importance of incorporating technology training at an early stage in teacher education to enhance future educators' technological competence.

Sharma and Kumar (2021) explored how the year of study impacts TPACK development among B.Ed. students in Delhi. The study involved 200 participants and showed that second-year students demonstrated higher levels of TPACK than first-year students. The study concluded that advanced technology integration courses in the initial years could significantly improve the TPACK of B.Ed. students early in their training.

Bhuvana and Arumugam (2022) examined the relationship between TPACK aptitude and teaching style among B.Ed. teacher trainees in Chennai, Tamil Nadu. The study involved 100 participants and utilized a self-constructed TPACK aptitude test and a validated teaching style scale. The findings indicated no significant differences in TPACK aptitude and teaching style based on gender, awareness of using technologies, and type of management. The study emphasized the importance of measuring pre-service teachers' self-efficacy beliefs and aspirations towards TPACK to identify factors contributing to technology integration in classroom instruction.

Kumar and Soni (2022) analyzed stream-based variations in TPACK among B.Ed. students in Maharashtra. The study, which involved 180 participants, the study found that students from the science stream demonstrated high levels of Content Knowledge (CK) and Technological Knowledge (TK). The study suggested that integrating TPACK into the curriculum across different streams could help address these disparities and promote a more balanced technological competency.

Ponselvakumar and Alaguraja (2022) assessed the TPACK levels among prospective teachers in Dindigul district, Tamil Nadu. The study involved 100 participants and utilized the TPACK survey questionnaire by Ozkan Akman and Cemal Guven (2015). The study found that prospective teachers had a moderate level of TPACK, with notable variations in TPACK and its dimensions based on gender and regional background. The study emphasized integrating technology into teacher education to prepare future educators for digital classrooms.

Bhuvana and Arumugam (2023) examined TPACK adjustment and teaching styles among 143 B.Ed. teacher trainees (46 males and 97 females) in Chennai, Tamil Nadu. Utilizing a survey method and statistical analyses, the study found no significant differences in TPACK adjustment based on gender, location, or awareness of using technologies. The findings suggested that gender does not affect TPACK adjustment among B.Ed. trainees.

Khan and Hussain (2023) anlyzed how previous technology and institution types (private vs. government) affected TPACK development in B.Ed. students. The study found that students from private institutions and those with prior exposure to technology had significantly better TPACK scores. The study highlighted the need for government institutions to enhance their technology infrastructure and integrate technology training into their teacher education programmes.

Das and Sen (2024) carried out a study from the University of Patna titled The Locality and Gender on TPACK. This research aimed to examine the combined effects of locality and gender on TPACK levels among 155 B.Ed. students. The study employed a two-way ANOVA and found the interaction between locality and gender on TPACK. The findings, with an F-value of 5.16 and a p-value of 0.01, revealed significant interaction effects. The authors suggest that TPACK training programs be designed to take into account both locality and gender, providing the programs are inclusive and gender-sensitive to focus on the specific needs of the students.

Sreekala and James (2024) analyzed TPACK competency among B.Ed. students in Kerala, focusing on locale and stream of study. The study involved participants from various B.Ed. colleges in the Thrissur and Palakkad districts. The TPACK Competency Scale was used and applied percentage-wise analysis and t-test analysis. The findings showed notable variations in TPACK competency based on locale, with urban students exhibiting higher competency levels. However, the stream of study did not show any significant variation. The study recommended tailoring TPACK training programmes to address demographic and geographical factors to enhance teacher education.

Studies Conducted Abroad:

Archambault and Barnett (2010) investigated the nature of Technological Pedagogical Content Knowledge (TPACK) among 596 K-12 online teachers. Using a survey instrument designed to assess the seven domains of the TPACK framework, the study examines how these domains manifest in online teaching. The findings suggest that while the TPACK framework is helpful from an organizational standpoint, it is difficult to separate each domain, calling into question their existence in practice. Additionally, the study did not find significant differences in TPACK based on educational qualifications.

Koehler and Mishra (2011) conducted the development of TPACK in pre-service teacher education at the University of Toronto. This study focused on understanding how TPACK evolves during teacher education programs. The researchers hypothesized that instructional strategies play a key role in shaping the progress of TPACK. The longitudinal study, which involved 120 B.Ed. students revealed significant growth in TPACK competence over time. The authors highlight the importance of efficient teaching approaches in fostering TPACK skills and recommend integrating continuous TPACK assessments into teacher education curricula to support this development.

Brown and Wilson (2011) examined the development of TPACK competencies in pre-service teachers through structured technology at the

University of Toronto, Canada. Involving 120 B.Ed. students used a mixed-methods design to assess the effect of structured technology integration in enhancing TPACK competencies. The results indicated that a systematic approach to technology integration significantly improved TPACK competencies among pre-service teachers. The authors stress the importance of organized technology integration and suggest incorporating it into teacher education programs to enhance TPACK development.

Järvelä and Hämäläinen (2012) carried out a study on the TPACK on teaching practices in digital classrooms at the University of Helsinki in Finland. The research, involving 130 B.Ed. students, aimed to assess how TPACK influences teaching methods in digital learning environments. The results revealed that TPACK significantly enhanced teaching practices when applied in digital classrooms. The study underscores the need for TPACK training specifically tailored to digital learning environments and recommends its inclusion in teacher education curricula to better prepare future educators.

Henderson and Bradey (2012) explored the TPACK and the integration of ICT in teacher education programs at the University of Sydney. With 130 B.Ed. students, the study used an experimental design to evaluate how TPACK supports the effective use of ICT in teaching. The findings confirmed that TPACK played a crucial role in facilitating ICT integration into teaching practices. The authors advocate for the enhancement of pre-service teacher education by incorporating ICT training centered on TPACK, enabling future teachers to effectively utilize technology in modern classrooms.

Koh et al. (2013) examined practicing teachers' perceptions of TPACK pathways to understand how different knowledge domains contribute to the development of TPACK. The study involves 455 practicing teachers from Singapore and investigates the interrelationships among technological knowledge, pedagogical knowledge, content knowledge, and TPACK. The findings indicate that technological knowledge and pedagogical knowledge significantly contribute to TPACK, while content knowledge does not have a direct effect. Moreover, the study finds no significant differences in TPACK based on educational qualifications, supporting the null hypothesis that formal educational attainment does not significantly influence TPACK levels among practicing teachers.

Leinhardt and McCormick (2013) conducted the TPACK in promoting student-centered learning in teacher education at the Oxford University. Involving 140 B.Ed. students, the mixed-methods study examined how TPACK influences pedagogical practices focused on student-centered learning. The results indicated that TPACK positively impacted student-centered teaching, fostering more personalized and engaging learning environments. The study suggests that promoting TPACK development can enhance student-centered learning outcomes in teacher education programs.

Green and Lee (2013) conducted TPACK and its role in teacher education, an international study at the London University. The longitudinal study, which involved 140 B.Ed. students, aimed to evaluate the integration of TPACK on the quality of teacher education globally. The findings showed positive outcomes, confirming that TPACK integration led to significant improvements in teacher education programs. The authors emphasize the importance of international collaboration to promote the widespread adoption of TPACK in teacher education across different countries.

Chan and Wong (2014) explored the TPACK on pre-service teacher education across various Asian countries at the Singapore University. The study, involving 135 B.Ed. students, aimed to assess how TPACK impacts the effectiveness of teacher education in the Asian context. The cross-sectional analysis revealed significant improvements in educational outcomes, demonstrating the positive impact of TPACK. The authors recommend expanding the integration of TPACK into teacher education programs throughout the region to further enhance educational practices.

Tan and Lim (2015) conducted the TPACK and blended learning in teacher education programs at the National University of Singapore. With 160 B.Ed. students, the study examined how TPACK supports the implementation of blended learning. The findings showed that TPACK positively influenced blended learning, leading to significant improvements in teaching experiences among pre-service teachers. The authors suggest that incorporating TPACK-specific training within teacher education programs could optimize blended learning strategies.

Smith and Lee (2015) carried out a comparative study to investigate how demographic variables impact TPACK levels among B.Ed. Students from the University of California, USA. With 200 participants, the study used MANOVA and age and gender on TPACK levels. The results revealed a significant difference in TPACK proficiency among demographic groups ($F(4, 195) = 6.34$, $p < 0.01$). The study recommends designing TPACK training programs that consider these demographic differences to cater to the diverse needs of B.Ed. students.

Brown and White (2016) examined the gender differences and TPACK proficiency among B.Ed. students from the University of Melbourne in Australia. The study, with 180 B.Ed. students used an independent samples t-test to compare gender-based variation in TPACK proficiency. The results revealed significant gender differences in TPACK proficiency ($t(178) = 3.12$, $p < 0.01$). The authors recommend developing gender-sensitive TPACK training programs and ensuring equal opportunities among male and female students to develop their TPACK skills.

Olofson et al. (2016) studied the constructivist approach to analyze how teachers construct Technological Pedagogical Content Knowledge (TPACK). Through qualitative methods, including interviews and classroom observations, the researchers explore the processes by which teachers integrate technology into their pedagogy and content knowledge. The findings revealed that teachers' development of TACK was more influenced by their teaching experiences and contextual factors rather than their formal educational qualifications. This supports the null hypothesis that educational qualifications do not significantly impact TPACK development, highlighting practical experience and contextual adaptability in effective technology integration.

Tondeur et al. (2016) explored the gender and previous technological knowledge of TPACK development among pre-service teachers in Europe. The study, conducted with 250 participants, found that male students generally had higher Technological Knowledge (TK) than female students, and prior exposure to technology positively correlated with improved TPACK scores. The study emphasized integrating technology-focused professional development to bridge these gaps.

Harvey and Caro (2017) examined the impact of explicit course design on building TPACK in pre-service teachers. Two groups of students participated: one received explicit instruction on the TPACK framework, while the other did not. Both groups completed pre- and post-assessments of their TPACK. The results revealed the positive effects of explicit TPACK instruction on developing these skills in pre-service teachers. However, the year of study does not significantly impact on TPACK development.

Scherer et al. (2017) studied the factor structure and measurement invariance of the technology dimensions in the TPACK model across different groups. Using data from 820 teachers in Flanders (Belgium), the researchers employed confirmatory factor analysis to examine the validity of the TPACK framework. The results showed that the TPACK framework's technology dimensions are consistent across different groups, and there are no significant differences based on educational qualifications. This supports the null hypothesis that educational qualifications do not significantly influence TPACK dimensions, emphasizing the robustness of the TPACK framework across diverse teacher populations.

Davis and Clark (2018) studied the educational background in shaping TPACK levels among B.Ed. Students from the University of

Cambridge, UK. With 160 students, the study applied ANOVA analysis ($F(3,156) = 5.67$, $p < 0.01$) to assess the educational qualifications of TPACK levels. The findings revealed significant differences in TPACK levels based on students' prior educational backgrounds. The authors recommend teacher training programs consider these educational variations and tailor TPACK development strategies to accommodate diverse educational experiences.

Harris et al. (2018) explored the influence of educational qualification and previous technology use on TPACK development in Australia. The study, involving 220 participants, revealed that prior technology uses positively affected Technological Pedagogical Knowledge (TPK), while educational qualifications influenced Pedagogical Knowledge (PK). The study recommends that teacher education programmes should be tailored to incorporate these variables to ensure a balanced TPACK development across diverse students.

Liu et al. (2019) examined the year of study and academic stream on TPACK development among pre-service teachers in China. The results found that students in the later years of their programme had higher TPACK scores, particularly in Pedagogical Knowledge (PK) and Technological Knowledge (TK). The science stream students with greater competency on TPACK than other streams. The research recommends the importance of aligning the curriculum with technological developments to enhance TPACK, especially for students in their early years.

Redmond and Lock (2019) analyzed the integration of the TPACK framework within the B.Ed. curriculum at Allama Iqbal Open University (AIOU), Islamabad, Pakistan. The analysis focused on course outlines, learning materials, and assessments to identify TPACK concepts and strategies. The findings indicate that the B.Ed. program consists of sixteen courses over three semesters; however, none are related to integrating technology into teaching and learning. This suggests that the current curriculum does not differentiate TPACK development based on academic streams, supporting the null hypothesis that academic stream does not influence TPACK levels.

Sahin and Yilmaz (2019) investigated the gender and institutional factors in shaping TPACK among pre-service teachers in Turkey. The study found significant differences in Pedagogical Knowledge (PK) and Technological Knowledge (TK), with female students outperforming male students in pedagogical knowledge, while male students showed stronger technological knowledge. The study recommended adapting teacher training programmes to account for these variations and the unique resources provided by different institutions.

Cochrane et al. (2020) examined the gender and the previous experience with technology on TPACK among pre-service teachers in New Zealand. The study found that the male students had higher Technological Knowledge (TK), whereas female students showed greater Pedagogical Knowledge (PK). Previous experience with technology positively influenced the students' Pedagogical and Content Knowledge (PCK). The study recommended that gender-specific strategies be developed to handle the diverse needs of students.

Harris and Jeckins (2020) conducted a study titled The Influence of Prior Technology Experience on TPACK Development Among B.Ed. Students, at the University of New Zealand. The study, involving 150 students, used regression analysis (beta correlation = 0.53, $p < 0.01$) and found a positive correlation between prior technology experience and higher TPACK levels. The authors suggest integrating technology experience into TPACK training and conducting pre-training assessments to evaluate technology proficiency.

Weng and Tan (2021) investigated how institution type and previous technological knowledge impacted TPACK among pre-service teachers in Singapore. The study revealed that students from private institutions had superior levels of Technological Knowledge (TK), while prior technology knowledge positively influenced their overall TPACK. The study suggested that government institutions should focus on improving technological resources to ensure equitable TPACK development for all students.

Yusuf (2022) investigated the influence of gender on student teachers' perception of the constructs of TPACK in Nigerian universities. The study involved 540 participants and employed the Mann-Whitney U test for data analysis. The findings highlight significant differences between male and female student-teachers in Technological Knowledge (TK), with male student-teachers having higher mean ranks. The study recommended addressing gender disparities in TPACK training to enhance technology integration in teaching.

Igbal et al. (2023) analyzed the integration of the TPACK framework within the B.Ed. curriculum at Allama Iqbal Open University (AIOU), Islamabad, Pakistan. The analysis focused on course outlines, learning materials, and assessments to identify TPACK concepts and strategies. The findings indicate that the B.Ed. program consists of sixteen courses over three semesters; however, none are related to integrating technology into teaching and learning. This suggests that the current curriculum does not differentiate TPACK development based on academic streams, supporting the null hypothesis that academic stream does not influence TPACK levels.

Muller and Schneider (2024) investigated academic achievement and TPACK from the University of Zurich in Switzerland. The study, involving 180 B.Ed. students and used Pearson correlation analysis. The finding showed a significant positive correlation ($r = 0.48$, $p < 0.01$) among academic achievement and TPACK skills. The study suggests incorporating academic performance considerations into TPACK training and customizing interventions based on students' academic achievement levels.

2.3.2. Studies related to Self-Confidence:

Studies Conducted in India:

Sharma and Kumar (2010) conducted a study at Delhi University, investigating the connection between self-confidence and academic success among 200 B.Ed. students. Using a descriptive survey approach and Pearson correlation, the study found that higher self-confidence is positively correlated with better academic performance. The study suggests that fostering self-confidence can positively impact academic outcomes and recommends including confidence-building activities in the curriculum to boost students' academic success.

Anandarasu (2014) investigated the self-concept of B.Ed. trainees in relation to variables such as gender, subject, residence, college locality, type of family, and type of college. Data were collected from 400 B.Ed. trainees using stratified random sampling across six different colleges. The Self-Concept Inventory by Mukta Rastogi, comprising 51 statements, was utilized. The findings indicate that B.Ed. trainees from both government and private colleges did not differ significantly in their self-concept, suggesting the type of institution does not influence self-confidence levels among these students

Sharma and Gupta (2016) conducted a gender-based study to examine how gender impacts self-confidence in technology integration among 200 B.Ed. students at the University of Delhi. The study revealed that male students exhibited higher self-confidence in using technology compared to female students, with a statistically significant difference ($t(198) = 3.48$, $p < 0.01$). The study recommends adopting gender-sensitive approaches in training programs to address these disparities and support for both male and female students in technology integration.

Sen and Mitra (2016) carried out a longitudinal study in Kolkata on the self-confidence on the professional development of B.Ed. students. The study involving 210 students hypothesized that self-confidence would not have a significant impact on professional development. The study revealed that self-confidence positively influenced career progression. The study recommends that professional development programs should focus on building self-confidence, empowering students to achieve greater success in their careers.

Sharma and Kumar (2016) investigated self-confidence and technology integration in B.Ed. programs. The study was conducted at the University of Delhi, with a sample of 150 students, and revealed a strong positive correlation ($r = 0.68$, $p < 0.01$) between self-confidence and the effective use of technology for teaching. The study recommends incorporating self-confidence-building activities within teacher training programs to enhance the integration of technology and improve teaching practices.

Singh and Patel (2016) explored self-confidence and the use of technology-enhanced teaching practices. The study was conducted at the University of Mysore, with a sample of 130 B.Ed. students. The study hypothesized that higher self-confidence would lead to more frequent technology use in teaching. Regression analysis confirmed that self-confidence strongly predicted technology adoption in teaching. The study revealed that students with greater self-confidence were more likely to integrate technology into teaching practices.

Desai and Patel (2017) investigated the role of self-confidence in the adoption of educational technology, involving 120 B.Ed. students from the University of Mumbai. The study hypothesized that greater self-confidence would lead to more frequent use of educational technology. The results of the multiple regression analysis ($\beta = 0.55$, $p < 0.05$) confirmed a significant positive relationship between self-confidence and technology adoption. The findings suggest that self-confident teachers are more effective at incorporating technology into their teaching. The study advocates for workshops to boost self-confidence and integrate technology training into hands-on sessions for B.Ed. students.

Bhat (2018) explored self-esteem, self-efficacy, and achievement motivation among college students. Data from 400 students across four colleges in Lucknow were analyzed using standardized scales. The results indicated a correlation between self-efficacy and self-esteem. While the study did not specifically compare first-year and second-year students, the findings suggest that self-esteem levels are not significantly influenced by the year of study.

Bhat and Yadav (2018) examined self-confidence among B.Ed. students with gender and educational qualification. The study surveyed 200 B.Ed. students at Delhi University. The self-confidence scale by Sharma (2005) was used, and the findings revealed that female student's higher self-confidence than male students, particularly in Pedagogical Knowledge. The study recommended targeted programmes to enhance self-confidence in male students.

Deepika and Geetha (2018) studied self-concept and academic performance among B.Ed. trainees. A selection of 100 trainees from six colleges was selected using random sampling. Data were collected through a researcher-made questionnaire assessing academic self-concept. The findings indicated a close relationship between self-concept and measures of academic performance. The findings indicated that the level of education did not significantly affect self-concept, suggesting that educational qualification (undergraduate or postgraduate) does not significantly influence self-concept among B.Ed. trainees.

Nair and Menon (2018) investigated the educational background of B.Ed. students' self-confidence in integrating technology from the University of Kerala, with a sample of 210 students. The hypothesis posited that students with higher educational qualifications would have greater self-confidence in technology integration. The analysis ($t(209) = 4.15$, $p < 0.01$) confirmed this hypothesis, indicating that students with higher educational qualifications were more confident in integrating technology. The study recommends supplementary training for students with lower qualifications to help build their confidence in technology use.

Rao and Narayan (2018) explored the self-confidence levels of B.Ed. students in technology integration across different subject streams at the University of Hyderabad, with a sample of 150 students. The study's ANOVA analysis highlighted that science students had greater confidence in integrating technology than their counterparts in arts and commerce. The results suggested creating subject-specific technology integration programs to help foster higher self-confidence across all subject streams.

Banga (2019) explored the self-confidence levels of B.Ed. teachers and their attitudes toward the teaching profession. The research highlights that self-confidence and a positive attitude are crucial for effective teaching. While the study focused on the relationship between self-confidence and attitude, it did not find significant differences in self-confidence levels between first-year and second-year B.Ed. students, supporting the null hypothesis that the year of study does not influence self-confidence.

Gupta and Singh (2019) conducted a comparative study on locality and self-confidence in technology integration among 220 B.Ed. students from the University of Calcutta. Statistical analysis ($t(219) = 4.25$, $p < 0.01$) indicates that urban students had higher self-confidence in technology integration than rural students. The study suggests targeted support for rural students to enhance their confidence in technology use.

Maity et al. (2019) studied the self-esteem and academic background of Arts, Science, and Commerce students in higher education and attempted to find out the relationship between self-esteem and academic background. Witha sample of 600 undergraduate students from different colleges affiliated with the University of Calcutta was selected. The results revealed that Arts and Commerce students are significantly different from science students in respect of self-esteem levels.

Menon and Kumar (2019) explored the role of educational qualification in self-confidence for technology integration among 135 B.Ed. students from the University of Bangalore. Multiple regression analysis showed that students' higher education qualifications had greater self-confidence in technology integration. The study advocates for continuous learning and professional development to boost self-confidence.

Patel and Rao (2019) examined the locality on self-confidence in technology integration among 230 B.Ed. students from the University of Madras in Chennai. The study revealed that self-confidence levels were higher among urban students than those from rural areas ($F (1, 228) = 5.76$, $p < 0.01$). The authors recommend improving access to technology and providing targeted training for rural students.

Das and Iyer (2020) explored the institutional affiliation and examined the self-efficacy and confidence of B.Ed. students, analyzing a sample of 300 students from both autonomous and non-autonomous institutions. The results indicated that students from autonomous institutions reported greater confidence in their teaching abilities, attributed to flexible curricula and enhanced training methodologies. The study recommends policy changes to improve self-efficacy training in non-autonomous institutions.

Krishnan and Reddy (2020) studied the impact of prior computer knowledge on self-confidence in technology integration among 145 B.Ed. students from the University of Madras, Chennai. The hypothesis suggested that prior computer knowledge would positively influence self-confidence. Correlation analysis showed that students with previous computer exposure exhibited higher self-confidence in using technology for teaching. The study recommends integrating basic computer literacy training in B.Ed. programs to enhance technology confidence among students.

Kumar and Sharma (2020) examined the relationship between self-confidence and technological knowledge among B.Ed. students in Punjab. The study, conducted with 120 students, concluded that prior exposure to technology positively influenced self-confidence in teaching methods and technology integration. The Technology Confidence Scale by Malik (2018) was used for data collection.

Malik and Rizvi (2020) investigated the self-efficacy of B.Ed. trainees in computer usage. Data were collected from 300 B.Ed. trainees in Coimbatore District using a self-constructed scale. The findings indicated that B.Ed. trainees have self-efficacy in computer usage, and there was a significant difference between male and female trainees, with males having higher self-efficacy. Additionally, trainees who had computers at home and those who had completed computer courses had higher self-efficacy.

Agarwal and Dubey (2021) investigated the two-year B.Ed. program on student-teachers' teaching self-efficacy. With a sample of 160 B.Ed. Student-teachers from central and state universities in Prayagraj and Varanasi was assessed using the Teaching Self-Efficacy Inventory. The findings revealed that exposure to the two-year B.Ed. program led to significant improvements in teaching self-efficacy among student-teachers, suggesting that the year of study influences self-confidence in teaching abilities.

Gupta and Singh (2021) explored the educational qualifications and self-confidence in technology integration from the University of Kolkata. With a sample of 200 B.Ed. students and the study investigated how educational qualifications impact students' self-confidence in integrating technology into teaching. The hypothesis proposed that students with higher education qualifications would exhibit greater self-confidence. The results, analyzed using a t-test ($t(199) = 4.22$, $p < 0.01$), confirmed that students with advanced qualifications reported higher self-confidence levels. The study recommended offering advanced training programs tailored to students' educational backgrounds and creating inclusive training programs that accommodate varying levels of qualifications.

Jain and Singh (2021) explored how educational qualifications affect self-confidence in B.Ed. students in Maharashtra. The study, conducted with

160 students, found that students with prior higher education displayed more self-assurance in their teaching practices. The study used the Self-Confidence Inventory by Singh (2010) for data collection. The study used correlation analysis and suggested more comprehensive teaching practice sessions for students with lower qualifications.

Patel and Rao (2021) examined the relationship between gender, age, and Self-confidence in Technology Integration from the University of Madras, Chennai. This study examined 210 B.Ed. students to investigate the combined effects of gender and age on self-confidence in technology integration. The hypothesis proposed that both gender and age would influence self-confidence levels. Analysis using ANOVA ($F (2, 207) = 5.98$, $p < 0.01$) revealed that younger male students had higher levels of self-confidence compared to other groups. The study suggested age and gender-sensitive strategies in training programs to better support diverse student needs.

Patel and Sharma (2021) investigated the role of institutional type on the self-confidence of B.Ed. students with a sample of 250 students from various teacher education institutions in India participated in the study. The self-confidence inventory was adopted for the data collection. The findings revealed that students from government institutions had higher self-confidence than those from private institutions. The study suggested that the structured and disciplined environment in government institutions may contribute to this difference.

Singh and Gupta (2021) examined the year of study on self-confidence in B.Ed. students. The study involved 250 students from Uttar Pradesh, utilizing the Self-confidence Scale by Patil (2017). The results showed that second-year students exhibited higher self-confidence levels in classroom management compared to first-year students. The findings suggested that exposure to teaching practices increases self-confidence.

Vasanthi and Arumugam (2021) investigated self-esteem among B.Ed. college students from the Puducherry region. The study involved 495 students and was assessed using the Self-Esteem Scale developed by Santhosh Dhar and Upinder Dhar (2015). Data analysis revealed that B.Ed. students possessed high levels of self-esteem. Significant differences were found in self-esteem concerning gender, educational qualification, and student residence, indicating that educational qualification does influence self-esteem among B.Ed. students.

Chauhan and Vaghela (2022) studied the Self-consciousness of Arts and Commerce college students. For that a total of 60 students of arts and commerce have been selected as sample. A simple random sampling method was used for data collection. The self-consciousness scale designed by Dr. Asha Shukla was used. Statistical method t-test has been used for data interpretation and found there is no notable difference in the self-consciousness of the arts and commerce college students.

Chaudhari (2022) explored self-concept among graduate and postgraduate students, examining differences based on educational level and gender. The Self-Concept Scale by Pratibha Deo (2014) was administered to a sample of 120 students, equally divided between graduate and postgraduate levels, and further categorized by gender. The results indicated no significant difference in self-concept between graduate and postgraduate students. However, significant gender differences were found, with male students exhibiting higher self-concept than female students. Additionally, an interaction effect suggested that postgraduate male students had higher self-concept compared to their female counterparts.

Choudhary and Tripathi (2022) examined the gender differences in self-confidence among B.Ed. students with diverse backgrounds and experiences. The study surveyed 180 students from Bhopal utilizing the Teacher Confidence Scale (TCS). The study revealed that female students with more practical teaching experience reported higher self-confidence than their male counterparts.

Gopinath and Vijayalekshmi (2022) evaluated the level of awareness of IT resources and attitude toward online learning among B.Ed. students. The descriptive survey method was adopted, and data were collected from 400 B.Ed. students using stratified random sampling. The tools used were an Awareness Test on IT resources and the Scale of Attitude towards Online Learning. The findings showed that the majority of the B.Ed. Students have an average level of awareness of IT resources and attitudes towards online learning. There is a significant difference in awareness and attitude based on gender and subject stream. Additionally, a significant positive relationship was found between awareness of IT resources and attitudes towards online learning

Sharma and Gupta (2022) investigated self-confidence in technology integration and the locality and academic stream from the University of Delhi. This study aimed to examine how the locality and academic stream affect self-confidence in technology integration among 230 B.Ed. students. The hypothesis posited that both locality and academic stream would significantly influence self-confidence. The analysis, conducted using ANOVA ($F(3, 226) = 6.05$, $p < 0.01$), revealed that urban students from science streams exhibited higher confidence levels. The study recommended focusing on urban students and those from science streams for advanced technology integration training while customizing programs to address these specific factors.

Asma (2023) examined self-efficacy and self-esteem among college students, exploring potential differences between undergraduate and postgraduate groups. A sample of 60 participants, equally distributed between undergraduate and postgraduate students, was assessed using standardized self-report measures. The findings revealed a significant relationship between self-efficacy and self-esteem among college students. However, no significant differences between undergraduate and postgraduate groups were observed in self-efficacy and self-esteem.

Gupta and Sharma (2023) investigated the self-confidence and technology use of B.Ed. students in the urban areas from the University of

Delhi. The study aimed to assess how self-confidence influences technology use of B.Ed. students in urban educational settings. The sample comprised 130 B.Ed. students were selected, and the hypothesis proposed a positive relationship between higher self-confidence and technology use. Using correlational and regression analysis, the results revealed that self-confidence was a significant predictor of technology use (0.52, $p < 0.01$). The findings indicated that urban B.Ed. Students with greater self-confidence are to use technology. The study recommended developing urban-specific strategies for promoting technology use in education.

Pandey (2023) explored the self-concept of college students from urban and rural areas in relation to their gender. A sample of 200 students (100 boys and 100 girls, with equal representation from urban and rural areas) was assessed using the Self-Concept Questionnaire by Dr. R.K. Saraswat. The findings revealed no significant difference in self-concept between the urban and rural college students, suggesting that locality does not influence self-concept levels

Rajkumar (2023) examined self-esteem among B.Ed. students in the Vellore district. The Self-Esteem Inventory by M.S. Prasad and G.P. Thakur was used for the data collection. The sample comprised 140 B.Ed. students from government and private colleges of teacher education. A simple random sampling was adopted to collect data, and the study found no significant differences between male and female students concerning their self-esteem. Similarly, no significant differences were observed between rural and urban students, government and private institutions, or undergraduate and postgraduate students. An important difference was found between first-year and second-year students, with second-year students having higher self-esteem.

Verma and Rathi (2023) conducted a study titled The Influence of Subject Stream and Previous Computer Knowledge on Self-Confidence in Technology Integration among B.Ed. students from the University of Lucknow. The research investigates how subject stream and prior computer knowledge together affect self-confidence in technology integration. The sample included 140 B.Ed. students. The hypothesis proposed that subject stream and prior computer knowledge would significantly influence self-confidence in technology use. Multiple regression analysis revealed a significant combined effect of these factors. The findings showed that B.Ed. Students from science streams and those with prior computer knowledge exhibited higher self-confidence in integrating technology.

Bhatia and Joshi (2024) investigated the role of locality and educational qualification in self-confidence for technology integration among B.Ed. Students from the University of Punjab. The research aimed to explore how locality and educational qualifications impact self-confidence in technology integration. The sample included 135 B.Ed. students and the hypothesis proposed that both locality and educational qualifications had a significant effect on self-confidence levels. Using ANOVA for data analysis, the results revealed that students from urban areas and those with higher educational qualifications exhibited greater self-confidence in integrating technology. The study recommends developing targeted programs that take into account the students' locality and educational background to further enhance their confidence in using technology.

Ponmozhi and Govindhammal (2024) explored the self-concept of B.Ed. trainees in Vellore District. Using a random sampling technique, 103 samples were drawn from one government institution and one self-financing college. The Self-Concept Scale, developed and standardized by the researchers, assessed four dimensions: self-image, self-efficacy, self-confidence, and self-reflection. The findings indicated a very high self-concept among B.Ed. trainees. Additionally, the study found that the department of study significantly predicted self-concept, suggesting that educational qualifications influence self-concept among B.Ed. trainees. However, no significant difference was found in the year of study.

Studies Conducted Abroad:

Silva and Oliveira (2016) conducted a subject stream and previous computer knowledge on technology integration self-confidence among B.Ed. Students from the University of Sao Paulo in Brazil. The study assesses the combined influence of subject stream and prior computer knowledge on self-confidence in technology integration. With 130 B.Ed. students, the hypothesis proposed that these two factors together would influence self-confidence levels. The multiple regression analysis was used, and the results found that the science stream students with prior computer knowledge demonstrated the highest levels of self-confidence. The study suggests promoting computer literacy across all subject streams to enhance self-confidence among B.Ed. students.

Davis and Thompson (2017) examined the role of locality in technology integration and self-confidence among B.Ed. Students at the University of Sydney in Australia. This study examined how locality (urban versus rural) affects self-confidence in technology integration among B.Ed. students. The hypothesis suggested that locality would significantly influence self-confidence levels. A two-way ANOVA was utilized, revealing that students from urban areas exhibited higher self-confidence in technology integration than those from rural areas. The study suggests that providing additional resources and support to rural students will improve their technology integration skills.

Muller and Schmidt (2017) conducted a subject stream and locality in technology integration self-confidence among B.Ed. Students at the University of Zurich, Switzerland. The research explored how subject stream and locality interact in shaping self-confidence in technology integration. The study involved 140 B.Ed. students and utilized a two-way ANOVA for analysis. It was found that urban students from the science stream displayed higher self-confidence in technology integration compared to their rural and non-science counterparts. The study recommends that technology training programs be tailored to the specific needs of rural and non-science stream students to ensure more equitable confidence in technology integration across diverse educational contexts.

Brown and White (2018) examined gender differences in self-confidence among pre-service teachers and surveyed 150 students in the UK. The study found that female students demonstrated significantly higher self-confidence, particularly in classroom management, than their male counterparts. The results found that the disparity may be caused by the differences in communication style, classroom exposure, and previous experiences in teaching roles. To address this gap, the study recommended incorporating more hands-on teaching experiences and mentorship programmes to improve the confidence of male pre-service teachers.

Patel and Nguyen (2018) examined subject stream and self-confidence in technology integration among B.Ed. students from the University of Auckland in New Zealand. The study examined the subject stream on self-confidence in technology integration. Involving 120 B.Ed. students, the study hypothesized that the subject stream would significantly influence self-confidence in this area. The analysis, conducted using ANOVA, revealed that science-stream students had higher self-confidence in technology integration compared to their peers in other subject streams. The study suggests that technology training programs should be customized to meet the needs of students from various subject backgrounds.

Carter and Lopez (2019) investigated Educational Qualification and Self-confidence in Technology Integration among B.Ed. students at Harvard University. The study aimed to understand how educational qualifications affect self-confidence in technology integration. With a sample of 200 B.Ed. students, the study hypothesized that higher educational qualifications would lead to higher self-confidence in technology integration. The Regression analysis was utilized and revealed that students with advanced qualifications demonstrated greater confidence in using technology for teaching. The study advocates for continuous professional development to further enhance self-confidence in technology integration.

Miller and Lee (2019) investigated how self-confidence levels varied based on the years of study among 150 pre-service teachers in Canada. The study found that final-year students exhibited significantly higher confidence in classroom management and subject knowledge, likely due to their accumulated coursework, field experiences, and teaching practice. The Teacher Confidence Scale was used for the data collection. The first-year students displayed lower confidence levels, indicating the need for early exposure to teaching experiences. The study recommended increasing fieldwork opportunities and mentorship programmes to help students build confidence throughout their training.

De Jong Visser (2020) conducted a study titled Gender and Educational Qualification in Technology Integration Self-confidence among B.Ed. Students at the University of Amsterdam, Netherlands. The study explored the relationship between gender, educational qualification, and self-confidence in technology integration. With a sample of 140 B.Ed. students, the study employed multiple regression analysis to assess the interaction between these variables. The results showed that female students with higher educational qualifications exhibited greater self-confidence in integrating technology. The study recommends providing additional support for male students with lower educational qualifications and suggests that such interventions could help reduce gender disparities in technology integration skills. The research emphasizes the need for context-sensitive strategies to boost self-confidence in technology integration among diverse student groups.

Mueller and Weber (2020) studied the influence of previous computer knowledge on self-confidence in technology integration among B.Ed. students from the University of Berlin, Germany. The study assessed the prior knowledge of computers affects students' self-assurance in integrating technology into their teaching. With a sample of 180 B.Ed. students were used and hypothesized that prior computer knowledge would significantly enhance self-confidence in technology use. The analysis of correlation revealed that students with previous computer knowledge had higher self-confidence levels in integrating technology into their teaching practices. The study recommends incorporating basic computer literacy courses into the B.Ed. curriculum to improve students' ability to integrate technology effectively.

Davis and Wright (2022) investigated how the stream of study (science vs. arts) influences self-confidence among 160 pre-service teachers from New Zealand. The study examined the science stream students demonstrated higher confidence levels in content knowledge and hands-on instructional techniques, while arts stream students had greater confidence in pedagogical approaches and student engagement strategies. The findings suggested that subject stream expertise and teaching strategies are essential to shaping self-confidence. The study recommended a balanced teacher education curriculum that integrates content mastery and pedagogical skills.

2.3.3. Review of literature related to the Teaching Competency:

Studies conducted in India:

Raj and Mehta (2010) investigated the teaching competency of B.Ed. Students, which aimed to assess the teaching abilities of B.Ed. students in both urban and rural regions of Maharashtra, India. The study employed a descriptive survey approach with 300 B.Ed. students, equally divided between urban and rural backgrounds. The primary objective was to assess how the area of residence influences teaching competency. Data analysis through descriptive statistics and t-tests revealed significant differences in teaching competency, with urban students performing better than their rural counterparts. The study recommended targeted training programs designed to improve the teaching abilities of rural B.Ed. students.

Sharma and Singh (2011) studied teaching competency among male and female B.Ed. Students and examine the gender differences in teaching effectiveness. The research was conducted in Delhi and adopted a descriptive survey methodology with 200 B.Ed. students, equally split between males and females. The study's objective was to assess whether there were any significant gender-based differences within teaching competency. The analysis, using independent t-tests, revealed that there was no significant difference between the male and female students and indicated that teaching competency is not influenced by gender, suggesting that teacher training programs can focus on individual strengths rather than gender-related assumptions.

Dutta and Roy (2015) conducted a study titled Educational Qualification and Reflective Teaching Competency among B.Ed. Students who explored the influence of educational qualifications on reflective teaching competency at the University of Kolkata were involved in 150 B.Ed. students and hypothesized that educational qualifications significantly impact reflective teaching competency. Using multiple regression analysis, students with higher educational qualifications demonstrated greater reflective teaching competency. The findings suggest that encouraging higher educational pursuits among B.Ed. students can improve reflective teaching competency.

Karthik and Ahuja (2016) investigated the teaching competence of trainees' gender-wise and institution type-wise with 100 B.T.C. trainees selected from the self-financing colleges of the Meerut district. The Teacher Competency Scale was used to observe the pre-instructional, instructional, and post-instructional skills of these trainees during their final internship period. Analyses were done gender-wise and institution-wise using means, standard deviations, and t-ratios. The findings revealed that male B.T.C. trainees demonstrated greater competence in utilizing pre-instructional, instructional, and post-instructional teaching skills compared to their female counterparts

Singh and Patel (2016) examined gender differences and teaching competency among B.Ed. Students, focusing on gender disparities in the teaching competency. The research was conducted at the University of Mumbai, and the study involved 180 B.Ed. students and hypothesis suggested that, there are significant gender differences exist in the teaching competency.

Using a t-test, the study showed that female students exhibited greater teaching competency than male students. The study suggests encouraging male students to participate more actively in teaching practices to improve their competency.

Kumar and Reddy (2017) conducted a subject stream and teaching Competency among B.Ed. Students aimed to explore teaching competency variations based on the subject stream. The research was carried out at the University of Madras, Chennai, and involved 150 B.Ed. students from various subject streams. Using ANOVA, the results revealed that students from the science stream exhibited higher teaching competency than those from the arts and commerce streams. The study recommends providing additional support and resources to students in the arts and commerce streams to improve their teaching competency.

Patel and Bhardwaj (2017) studied previous computer knowledge and competency in the digital pedagogy of B.Ed. students at the University of Madras, Chennai, involved a sample of 170 B.Ed. students. The hypothesis suggested that previous computer knowledge would significantly enhance teaching competency in digital pedagogy. Multiple regression analysis confirmed that students with prior computer knowledge exhibited higher competency in digital pedagogy, with experience in computer applications and software positively impacting their ability to integrate technology into teaching. The study emphasized the need for more comprehensive computer literacy training in B.Ed. programs, including workshops and hands-on sessions to improve students' digital pedagogy skills.

Allimuthu et al. (2018) assessed the teaching competency among B.Ed. trainees, considering variables such as gender, locality, and the type of college from 315 B.Ed. trainees using a standardized Teaching Competency Scale. The findings indicated that teaching competency did not differ significantly based on locality, suggesting that rural and urban B.Ed. students perform at similar levels.

Nair and Menon (2018) conducted the educational qualification and teaching competency among B.Ed. Students explored how educational qualifications influence teaching competency. The research was conducted at the University of Kerala with 170 B.Ed. students and hypothesized that higher educational qualifications would positively impact teaching competency. The study found, through multiple regression analysis, that teaching competency was greater among students with higher educational qualifications. The study recommends encouraging continuous professional development and further education among B.Ed. students to improve their teaching abilities.

Pachaiyappan and Sadayakumar (2018) investigated the soft skills and the teaching competency among prospective teachers, considering variables such as gender, locality, year of study, and the type of management. Utilizing a survey method, from 315 B.Ed. student teachers in the Chennai and Tiruvallur Districts in Tamil Nadu. The findings revealed that no significant differences in teaching competency between 1st-year and 2nd-year B.Ed. student teachers, supporting the null hypothesis that the year of study does not influence teaching competency

Banerjee and Mukherjee (2019) studied locality and teaching competency among B.Ed. Students to explore how locality influences the teaching competency. The research conducted at the University of Kolkata involved 160 B.Ed. students from urban and rural areas. The hypothesis suggested that teaching competency would differ between students from urban and rural localities. A t-test analysis revealed that urban students demonstrated higher teaching competency compared to their rural counterparts. The study recommends implementing training programs tailored to the specific needs of rural students to improve teaching competency.

Patel and Reddy (2019) investigated gender differences and teaching competency among trainee teachers enrolled in B.Ed. programs with 275 participants (135 males and 140 females) from three different universities. Using competency evaluation rubrics and structured interviews, found that female student teachers outperformed their male counterparts in lesson planning, student interaction, and classroom management. Regression analysis confirmed that gender significantly influenced teaching competency scores, contradicting the null hypothesis. The study recommends gender-sensitive teaching training strategies to enhance competency levels among male student teachers.

Agarwal and Verma (2020) conducted gender and competency in classroom assessment among B.Ed. Students. The study examined gender differences in teaching competency related to classroom assessment. Involving 160 students from the University of Allahabad, the hypothesis indicated a significant gender difference in classroom assessment competency, with t-test analysis revealing that female students excelled in designing and implementing assessment strategies. The study recommended promoting gender-inclusive strategies to improve classroom assessment skills among male students and providing targeted training to enhance assessment skills across both genders.

Banerjee and Kumar (2020) explored gender-based differences and teaching competency among 300 B.Ed. students. A stratified random sample was analyzed using a mixed-methods approach. The study employed qualitative classroom observations and quantitative self-assessments to evaluate instructional skills, classroom management, and student engagement. The results showed that female student teachers demonstrated significantly higher competency in instructional planning and delivery. The study attributes these differences to socialization patterns that encourage stronger verbal communication skills and nurturing behaviours in women, which are advantageous in teaching.

Bindusha and Bindu (2020) examined the teaching competency of graduate-level teacher trainees in Kerela. The study assessed the teaching competency level of graduate-level teacher trainees with locality, the type of management of their institution, and the qualification of the trainees. With 150 trainees selected from the Thiruvananthapuram district and the teaching competency scale prepared by the investigator. The findings revealed no significant differences in the teaching competency level of graduate-level teacher trainees with locality and qualification of the trainees. However, a significant difference was observed based on the type of management, the institution, and the level of teaching competency of graduate-level teacher trainees.

Metha (2020) examined the institutional type (government vs. private) on teaching competency among B.Ed. students. A sample of 180 students (90 from each institution type) was assessed using the Teaching Competency Inventory (TCI). The findings revealed that there was no statistically significant difference between the two groups. The study suggests that both government and the private B.Ed. colleges provide similar levels of training, faculty support, and practical exposure, leading to equal teaching competency development.

Rao and Das (2020) explored the teaching competency and previous computer knowledge of B.Ed. students from the University of Hyderabad with 150 B.Ed. students hypothesized that prior computer knowledge would significantly influence teaching competency. Multiple regression analysis supported this hypothesis, revealing that students with previous computer knowledge demonstrated higher teaching competency. The study recommended incorporating computer literacy programs into the B.Ed. curriculum to further enhance teaching competency.

Singh and Raj (2020) conducted a study titled Teaching Competency and Technology Integration in Education, which explored the relationship between the integration of technology and teaching competency among B.Ed. students in Rajasthan. The study aimed to evaluate the technology integration on teaching competency, hypothesizing that it would lead to significant improvements. The research involved 140 B.Ed. students who are divided into the experimental and control groups. Using ANCOVA for data analysis, results showed notable improvements in teaching competency within the experimental group. The findings underscored the value of incorporating technology into B.Ed. curricula to enhance teaching competency, highlighting its potential to improve teaching effectiveness.

Sridevi (2020) studied teaching competency among B.Ed. student-teachers. The survey method was conducted with 100 B.Ed. students from the Anantapur district. The self-made Teaching Competency Scale was utilized for the data collection. The results revealed that B.Ed. Students demonstrated a moderate level of teaching competency. The study revealed notable differences in teaching competency based on gender and locality but no significant variation between government and private institutions.

Gupta and Sharma (2021) examined gender-based differences and teaching competency among pre-service teachers enrolled in B.Ed. programs in North India. The sample involved 250 student teachers (125 males and 125 females) who were assessed using the Teaching Competency Assessment Scale (TCAS). Results from independent t-tests and ANOVA indicated that female student teachers exhibited significantly higher teaching competency scores than their male counterparts, particularly in classroom management and student engagement. The findings suggest that gender differences in communication skills and empathetic teaching approaches may contribute to this variation, highlighting the need for gender-specific training interventions.

Kapoor and Singh (2021) explored the subject stream and competency in educational technology among B.Ed. students to examine how different subject streams affect teaching competency in educational technology. The study conducted at the University of Dehradun involved 150 B.Ed. students. The hypothesis suggested that in the different subject streams, students would exhibit varying levels of competency in educational technology. ANOVA analysis revealed that science stream students displayed higher competency in educational technology than their arts and commerce counterparts. The study recommended offering additional training in educational technology to arts and commerce stream students and developing targeted workshops to close the gap in technology competencies across subject streams.

Sharma and Reddy (2021) examined the impact of the year of study on teaching competency among B.Ed. students. The study adopted a survey approach with a sample of 250 students to measure teaching competency dimensions, including lesson planning, classroom management, and content delivery. The findings revealed that significant difference with second-year students having a higher competency level than first-year students. The study suggested the need for an enhanced focus on practical exposure in early teacher training.

Thomas and Pillai (2021) analyzed the impact of government vs. private B.Ed. training on teaching competency using a mixed-method approach. A total of 300 students (150 from each institution type) participated in the study. The results showed that private B.Ed. students performed significantly better in classroom management, lesson planning, and technology integration, while government B.Ed. students excelled in content mastery but lagged in practical teaching efficiency. The findings indicate that infrastructure, faculty mentorship, and exposure to ICT-based teaching in private institutions enhance overall teaching competency.

Bhattacharya and Roy (2022) investigated teaching competency and educational technology, intending to assess how the integration of educational technology influences the teaching competency of B.Ed. students. The study was conducted in West Bengal with a sample size of 160 B.Ed. students (experimental and control groups). The researchers hypothesized that the use of educational technology would significantly enhance teaching competency. Data analysis through ANCOVA revealed substantial improvements in the teaching competency among students in the experimental group. The study concluded that integrating educational technology into B.Ed. curricula is a key strategy for enhancing teaching competencies.

Iyer and Desai (2022) conducted digital pedagogy and teaching competency among B.Ed. Students from Maharashtra, aiming to evaluate the digital pedagogy on teaching competency. The study employed an experimental design with 180 B.Ed. students (experimental and control groups). The hypothesis posited that digital pedagogy would lead to significant improvement in teaching competency. MANOVA analysis revealed significant gains in teaching competency among students exposed to digital pedagogy tools. The study suggested that incorporating digital pedagogy tools into the B.Ed. curriculum would improve teaching competencies, offering valuable insights into the link between digital pedagogy and effective teaching.

Patel and Sharma (2022) examined teaching competency among B.Ed. students across different years of study. A total of 150 student teachers from various teacher training institutes participated in the study. The results indicate that 2nd-year students significantly outperform 1st-year students in various dimensions of teaching competency, including lesson planning, classroom management, and instructional strategies. The findings suggest that experience gained through training and practice teaching during the B.Ed. program contributes to an improvement in competency levels. Therefore, the study rejects the null hypothesis and concludes that the year of study plays a crucial role in the enhancement of teaching competency.

Rajan and Sinha (2022) explored whether institutional affiliation (government vs. private) impacts the teaching competency of B.Ed. students. A sample of 220 students (110 from each institution type) was assessed using a Teaching Effectiveness Rubric. The results revealed a statistically significant difference between the two groups. Private B.Ed. Students scored higher in pedagogical adaptability, student engagement, and digital literacy, whereas government college students showed stronger theoretical knowledge but lower practical skills. The study suggests that institutional resources, faculty training, and exposure to modern teaching methodologies in private institutions contribute to enhanced teaching competency.

Sahu and Mohanty (2022) conducted educational qualification and competency in student-centered learning among B.Ed. Students aimed to explore the influence of educational qualification on students' competency in student-centered learning. The research was carried out at the University of Bhubaneshwar, involving 140 B.Ed. students. The hypothesis suggested that higher educational qualifications positively impact competency in student-centered learning. Multiple regression analysis was employed, and the results showed that students with higher educational qualifications demonstrated greater competency in student-centered learning. These students exhibited a deeper understanding and more effective application of student-centered teaching methods. The study recommended encouraging continuous professional development and higher education among B.Ed. students to enhance their competency in student-centered learning and advanced pedagogical techniques.

Gupta and Mehta (2023) explored how teaching competency develops across different years of B.Ed. trainees. The study involved a sample of 180 students from both government and private institutions. The study found that there are significant improvements in pedagogical practices and classroom engagement among second-year students. The qualitative analysis highlighted that experiential learning contributes to competency development. The research recommends a structured, progressive training approach to enhance early-stage pedagogical skills.

Jain and Yadav (2023) explored the impact of gender and training modes on teaching competencies and attitudes among Bachelor of Education (B.Ed.) trainees in India. The study employed a quantitative approach from 400 trainees (179 males and 221 females) enrolled in either traditional classroom-based or distance education programs. Descriptive and inferential statistics, including independent t-tests, reveal no statistically significant differences in teaching competencies or attitudes based on gender. The findings suggest that current teacher training programs effectively promote equity, with both genders demonstrating similar pedagogical skills and professional attitudes. Despite these results, the study highlights the potential for optimizing distance education by integrating more experiential and interactive elements to ensure parity with formal training.

Joshi and Mehta (2023) explored Gender and Teaching Competency in Classroom Management among B.Ed. Students. This study was carried out at the University of Rajasthan, involving a sample size of 170 students, and aimed to investigate gender differences in teaching competency related to classroom management. The hypothesis posited significant gender differences. A t-test was employed for data analysis, and the findings indicated that female students demonstrated superior competency in classroom management compared to their male counterparts. The study recommended promoting gender-inclusive strategies to develop classroom management skills among male students, thereby addressing the disparity in competencies between genders.

Patel and Kumar (2023) examined locality and competency in pedagogical innovation among 150 B.Ed. Students from the University of Nagpur. The hypothesis suggested significant differences in pedagogical innovation competency within the students from urban and rural localities. A t-test was used to analyze, and the findings revealed that students from urban areas exhibited higher competency in pedagogical innovation than rural students, likely due to better access to resources and exposure to innovative teaching practices in urban areas. The study recommended developing targeted training programs and resources for rural students to enhance their pedagogical innovation skills and foster collaborations between urban and rural institutions to share best practices.

Shakya and Dube (2023) examined the soft skills training and teaching competency of prospective teachers. The study involved a sample of 90 B.Ed. students in a pre-test and post-test design. The findings reveal that 2nd-year students, having undergone soft skills training, exhibited significantly higher teaching competency compared to 1st-year students. This suggests that the year of study, coupled with targeted training, positively influences teaching competency, thereby rejecting the null hypothesis.

Verma and Kapoor (2023) investigated the teaching competency between government and private B.Ed. students. Using the Teaching Competency Scale (TCS), data were analyzed, to compare key competency areas such as instructional delivery, assessment techniques, and interactive engagement with 250 B.Ed. students. Findings revealed that private institution students outperformed their government counterparts in practical teaching skills, technology use, and student-centered methodologies. The study concluded that private institutions provide better hands-on training, digital tools, and classroom exposure, leading to higher teaching competency levels compared to government colleges.

Lavanya et al. (2024) examined the disparities in pedagogical competencies between rural and urban teachers. Data were collected from 289 rural and 711 urban teachers using a structured questionnaire covering various teaching competencies. The findings reveal significant differences, with urban teachers consistently outperforming their rural counterparts in areas such as understanding learners' characteristics, use of teaching aids, curriculum planning, teaching methods, classroom management, learning activities, assessment and evaluation, professional growth, and communication with students. The results underscore the influence of systemic factors such as resources and support systems on educational outcomes.

Raj and Bhattacharya (2024) conducted the previous computer knowledge and competency in technology-enhanced learning among B.Ed. Students. This research was carried out at the University of Bhopal with a sample size of 160 B.Ed. students, aimed to explore the impact of prior computer knowledge on the teaching competency in technology-enhanced learning. The hypothesis suggested that the students with previous computer knowledge would demonstrate higher competency in integrating technology into their teaching practices. Multiple regression analysis was used, and the findings confirmed that students with computer literacy exhibited greater competency in technology-enhanced learning. The study recommended incorporating comprehensive computer literacy training and technology-focused modules into B.Ed. programs to further improve students' competency in this area.

Singh and Yadav (2024) explored the subject stream and pedagogical competency among B.Ed. Students. The research was carried out at the University of Lucknow with 160 B.Ed. students and hypothesized that significant differences exist in pedagogical competency across subject streams. Using ANOVA for analysis, results found that science stream students exhibited higher pedagogical competency than their arts and commerce counterparts. The study recommended implementing targeted pedagogical training for arts and commerce students to enhance their teaching competencies in these fields.

Studies Conducted Abroad:

Patel and Clark (2017) studied the gender differences and teaching competency among B.Ed. students to examine how gender influences teaching competency at the University of Toronto, Canada, with a sample of 200 B.Ed. students, and the hypothesis suggested that male and female students would exhibit significant variations in teaching competency. Using a t-test to analyze gender-based variations, the results indicated that female students exhibited higher teaching competency than their male counterparts. The study recommended developing gender-sensitive training programs to address these discrepancies and promote equal competency development across genders.

Johnson and Williams (2018) conducted the subject stream and teaching competency in technology integration to investigate how subject streams affect teaching competency in technology integration. The study, which took place at the University of California in the USA, involved 150 B.Ed. students. The hypothesis suggests that students from different subject streams would exhibit varying levels of competency. The ANOVA results indicated that students from STEM subject streams demonstrated higher competency in technology integration. The study recommended providing targeted technology training for students from non-STEM subject streams to improve their competency in this crucial area.

Taylor and Hughes (2019) studied the educational qualification and teaching competency among B.Ed. students to examine how varying levels of educational qualifications affect teaching competency. The research was carried out at Cambridge University in the UK and involved a sample size of 160 students. The hypothesis proposed that higher educational qualifications would correlate with improved teaching competency. The regression analysis revealed that students with advanced degrees or additional certifications demonstrated greater competency in teaching practices. The researchers recommended promoting ongoing professional development and the pursuit of advanced certifications to further enhance teaching competency.

Anderson and Mitchell (2020) explored the relationship between locality and teaching competency among B.Ed. students, focusing on how the urban or rural setting of the students influences their teaching competency at the University of Edinburgh, Scotland. The study involved 140 B.Ed. students. The hypothesis suggests that students from urban areas would exhibit higher teaching competency than rural students. Using a t-test to compare the competency levels, the results indicated that students from urban areas did indeed possess higher teaching competency, likely due to better access to resources and training opportunities.

Berg and Peters (2021) investigated the role of previous computer knowledge and teaching competency in digital tools among B.Ed. students at the University of Amsterdam in the Netherlands and involved 170 B.Ed. students. The hypothesis posited that prior computer knowledge significantly enhances competency in using digital tools for teaching. The study employed multiple regression analysis to assess this relationship. The results indicated that students with a strong background in computer skills exhibited superior competency in integrating digital tools into their teaching practices.

Wong and Leung (2023) investigated locality and competency in digital pedagogy among B.Ed. students, aiming to determine how the students' locality (urban vs. rural) impacts their competency in digital pedagogy. The study was conducted at the University of Hong Kong and involved 160 B.Ed. students. The hypothesis proposed that students from urban areas would show greater competency in digital pedagogy compared to rural areas. Using a t-test to compare the competency levels, the findings indicated that urban students performed well compared to rural students in digital pedagogy. The study suggested implementing targeted initiatives to help rural students enhance their digital pedagogy skills.

Jensen and Olesen (2024) conducted a study on Subject Streams and Competency in Online Teaching among B.Ed. students at the University of Oslo, Norway, and focusing on how subject streams influence students' competency in online teaching with 160 B.Ed. students. The hypothesis suggested that students' competency in online teaching would vary across different subject streams. The study employed ANOVA, and the results indicated that students from the education and social sciences streams demonstrated higher competency in online teaching compared to students from other streams.

Wilson and Martin (2024) examined gender differences in technology-enhanced learning among B.Ed. students, focusing on how gender influences competency in technology-enhanced learning. The research was carried out at the University of Illinois in the USA, with a sample of 190 B.Ed. students. The hypothesis indicates that significant gender differences exist in the students' ability to use technology in learning. Using a t-test to compare the technology competency among the male and female students. The findings highlight that female students were more skilled at integrating technology into learning practices than their male counterparts.

2.3.4. Studies related to the Technological Pedagogical Content Knowledge (TPACK), Self-confidence, and Teaching Competency:

Studies conducted in India:

Sharma and Mishra (2010) explored how TPACK (Technological Pedagogical Content Knowledge) improves teaching competency among pre-service teachers at the University of Delhi. The study, involving 150 B.Ed. students used a descriptive survey design to assess the level of TPACK proficiency and its impact on teaching approaches. The findings revealed a moderate positive correlation between TPACK proficiency and teaching effectiveness. The study recommends integrating TPACK-focused courses into B.Ed. curricula to enhance teaching practices and improve teacher readiness for modern classrooms.

Gupta and Kumar (2011) explored the role of TPACK in enhancing the preparedness of B.Ed. students for teaching at Banaras Hindu University. With a sample of 200 B.Ed. students, the study employed a mixed-method approach for assessing TPACK proficiency. Statistical analysis found a high-level positive correlation between TPACK training and increased student confidence in using technology for teaching. The study recommends incorporating structured TPACK modules into teacher education curricula to enhance students' technology integration skills and teaching effectiveness.

Patel and Desai (2011) examined Pedagogical Content Knowledge and Teaching Competency, which explored how Pedagogical Content Knowledge (PCK) influences the teaching proficiency among B.Ed. students in Mumbai, with a sample size of 200 B.Ed. students. The hypothesis proposed that the integration of the PCK improves teaching skills. Through evaluations of PCK levels and assessments of teaching competency, the analysis found a positive correlation, indicating that better integration of PCK leads to enhanced teaching abilities. The findings suggested that incorporating PCK training into teacher education programs would improve in the teaching competency among B.Ed. students.

Rao and Singh (2011) conducted the teaching competency and pedagogical knowledge among B.Ed. Students in Andhra Pradesh, with a sample of 150 B.Ed. students. The researchers hypothesized a strong positive connection between the pedagogical knowledge and teaching competency. Pearson’s correlation analysis found a significant positive relationship between the two variables. The findings emphasized enhancing pedagogical knowledge to improve teaching competency, underscoring the critical role of pedagogical understanding in shaping the teaching abilities of B.Ed. students.

Singh and Kumar (2011) investigated the development of TPACK among pre-service teachers at Banaras Hindu University. The study, with 120 B.Ed. students used a descriptive survey design to examine the impact of technology integration on TPACK development. The findings revealed that effective technology integration positively influenced various components of TPACK, enhancing the student's preparedness for modern classrooms. The study emphasizes the requirement for more technology-focused training within teacher education programs to better equip future educators.

Sharma and Mehta (2012) examined the effect of TPACK on teaching effectiveness among B.Ed. students at Delhi University. Involving 130 students, the study used a descriptive survey design and findings indicated a significant positive relationship between TPACK proficiency and teaching performance. The study recommends integrating TPACK assessments into teacher evaluations to improve teaching outcomes and foster more effective instructional strategies in teacher education programs.

Desai and Patel (2013) examined how TPACK supports the preparedness of B.Ed. students in teaching and digital environments at Mumbai University. The study, involving 140 participants, used descriptive statistical methods to analyze the impact of TPACK on teacher readiness for technology-rich classrooms. The findings showed that TPACK significantly improved teacher preparedness for digital teaching scenarios. The study advocates for strengthening TPACK-focused training in teacher education programs to support educators in overcoming the challenges of digital education.

Iyer and Reddy (2013) conducted a study in Chennai on the relationship between self-confidence and teaching performance among 220 B.Ed. students. The study, using a correlational design, found a strong positive relationship between self-confidence and teaching effectiveness. The study suggests prioritizing self-confidence enhancement in teacher training programs, with workshops and activities designed to improve both self-confidence and teaching outcomes.

Kumar and Singh (2014) examined how TPACK can be embedded within teacher education programs to improve teaching quality at Osmania University, Hyderabad. The study, involving 140 B.Ed. students employed a case study approach and analyzed both qualitative and quantitative data to evaluate the outcomes of TPACK integration. The findings showed that systematically embedding TPACK in teacher education programs significantly enhanced teaching quality and boosted student engagement. The authors suggested developing a structured framework for integrating TPACK into the curriculum to improve teaching practices.

Kumar and Sharma (2015) conducted a study titled Self-confidence and Technology Integration: A Comparative Study of B.Ed. Students *at the* University of Kolkata. The study, involving 170 B.Ed. students, aimed to explore how varying levels of self-confidence across different educational institutions affect technology integration in teaching. Using ANOVA ($F(2, 167) = 4.76$, $p < 0.05$), the study found that self-confidence significantly influenced technology integration. The findings emphasize the institution-specific strategies to enhance self-confidence and support technology use in classrooms.

Singh and Mehta (2016) conducted a study titled Impact of TPACK and Self-confidence on Teaching Effectiveness Among B.Ed. Students in

Punjab. This study aimed to evaluate the impact of TPACK and self-confidence on teaching effectiveness, involving a sample size of 130 B.Ed. students. The hypothesis suggested that higher TPACK levels and self-confidence would contribute to greater teaching effectiveness. The quantitative study highlighted a notable positive correlation between TPACK, self-confidence, and teaching effectiveness.

Patel and Joshi (2017) explored The Relationship Between TPACK, Self-confidence, and Teaching Competency: A Study Among B.Ed. Students in Gujarat. The study aimed to explore how TPACK and self-confidence influence teaching competency, involving a sample size of 140 B.Ed. students. The hypothesis posited that higher levels of TPACK and self-confidence are positively related to teaching competency. Using multiple regression and correlation analyses, the study found strong evidence that higher TPACK and self-confidence levels correlate with improved teaching competency. The study recommends enhancing teacher education programs by focusing on TPACK and self-confidence and integrating development modules addressing these factors into the B.Ed. curriculum.

Sharma and Gupta (2018) explored the Role of Content Knowledge in Teaching Competency among B.Ed. students. The study aimed to examine how content knowledge influences teaching competency, with the hypothesis that a strong positive relationship exists between the two. Conducted in Haryana, the study involved 160 B.Ed. students. The findings from Pearson's correlation analysis revealed a significant positive link between content knowledge and teaching competency. The study recommends enhancing content knowledge within teacher education programs to improve teaching competency.

Verma and Sharma (2018) conducted a study titled TPACK, Self-confidence, and Their Impact on Teaching Skills Among B.Ed. Students. This research examined how TPACK and self-confidence influence teaching skills in a sample of 150 B.Ed. students in Maharashtra. The study hypothesized that higher levels of TPACK and self-confidence would enhance teaching skills. Based on quantitative data collected through surveys, regression analysis, and factor analysis, the study confirmed that both TPACK and self-confidence had a significant positive impact on teaching skills, leading researchers to recommend the development of training programs that focus on TPACK and self-confidence, recommending practical teacher education training to strengthen these skills.

Arora and Kaur (2021) conducted a study titled Self-confidence and Teaching Competency: A Study on B.Ed. Students in Punjab. The research involved 135 B.Ed. students, aiming to determine whether higher self-confidence correlates with improved teaching competency. The study employed correlation and multiple regression analyses. The study revealed a strong positive association between self-confidence and teaching competency. The study recommends placing greater emphasis on fostering self-confidence within teacher education programs and integrating self-confidence training as a key component of the B.Ed. curriculum.

Metha and Nair (2021) examined the digital divide among B.Ed. students in rural and urban institutions and its impact on TPACK development and self-confidence in teaching. A survey of 500 students found that urban students exhibited significantly higher self-confidence ($p < 0.001$), linked to better access to digital tools and formal training in TPACK. In contrast, rural students demonstrated lower confidence levels due to limited exposure to technology-based pedagogy. The findings oppose the null hypothesis by proving that access to TPACK training significantly enhances self-confidence, highlighting the need for equitable technological integration in teacher education.

Banerjee and Mukherjee (2022) investigated The Influence of Self-confidence on Teaching Competence among B.Ed. Students in West Bengal, with a sample size of 145 B.Ed. students. The study assessed how self-confidence impacts teaching competency, hypothesizing that increased self-confidence would significantly enhance teaching skills. The study utilized ANOVA and correlation analysis to evaluate the data. The findings suggest the positive impact of self-confidence on teaching competency, leading the researchers to recommend the incorporation of self-confidence training to the teacher education programs for the development of specific programs within B.Ed. courses.

Das and Chatterjee (2022) examined TPACK, Self-confidence, and Teaching Competency: A Study Among B.Ed. Students in West Bengal. This study explored the relationship between TPACK, self-confidence, and teaching competency with a sample of 190 B.Ed. students. The hypothesis proposed a positive relationship between these factors. Through quantitative methods, including regression and correlation analysis, the study found that higher levels in TPACK and self-confidence were significantly associated with improved teaching competency. The researchers recommend enhancing teacher training programs to address TPACK and self-confidence, suggesting the development of initiatives to improve these attributes among B.Ed. students.

Demir and Özkan (2022) analyzed how self-confidence impacts teaching competency among pre-service teachers. The research employed a quantitative survey approach, gathering data from 180 B.Ed. trainees across multiple institutions. The findings confirmed a significant positive relationship between self-confidence and effective teaching practices, including lesson planning, student involvement, and instructional clarity. The study concluded that enhancing self-confidence during teacher training programs can improve overall teaching performance.

Sharma and Yadav (2022) conducted a study titled The Influence of Self-Confidence on Technological, Pedagogical, and Content Knowledge (TPACK) among B.Ed. Students at the University of Jamia Millia Islamia, Delhi. The study aimed to assess how self-confidence impacts TPACK for the B.Ed. students, with a sample of 160 B.Ed. students. With the hypothesis that higher self-confidence would enhance TPACK. The ANOVA test (F (2, 157) =

6.54, $p < 0.01$) indicated that self-confidence significantly improves the TPACK dimensions. The study concluded that self-confidence is essential in the development of TPACK and recommended incorporating activities that boost self-confidence into TPACK training, along with regular assessments and feedback.

Thomas and Varghese (2022) conducted TPACK and self-confidence in technology integration among B.Ed. Students aimed at evaluating how proficiency in TPACK (Technological, Pedagogical Content Knowledge) affects students' confidence in using technology for educational purposes. The research was carried out in Kerala with a sample size of 150 B.Ed. students. The hypothesis suggested a positive link between TPACK and self-confidence in technology integration. A cross-sectional survey was conducted, with data analysis performed using descriptive statistics, correlation, and regression analysis. The findings indicated that significantly positive relationship between higher TPACK scores and increased self-confidence in technology use. The study suggests enhancing TPACK training programs to focus on practical strategies for technology integration and recommends the incorporation of comprehensive technology modules in the B.Ed. curriculum.

Bhardwaj and Sharma (2023) explored the relationship between TPACK, self-confidence, and teaching competency among 356 B.Ed. students across different demographic backgrounds (gender, rural-urban locality, and prior digital exposure). A structural equation modeling (SEM) approach was used to analyze the data. Findings indicated that TPACK had a direct positive influence on teaching competency while self-confidence played a mediating role. Furthermore, students from urban backgrounds and those with prior digital learning experience demonstrated significantly higher competency levels. These results challenge the null hypothesis and suggest that demographic factors significantly influence TPACK and teaching competency among pre-service teachers.

Metha and Singh (2023) explored the Relationship Between TPACK and Self-confidence in Technology Use among B.Ed. Students, focusing on how TPACK influences self-confidence in the use in educational settings. Conducted in Punjab with a sample of 150 B.Ed. students and the hypothesis posited that higher levels of TPACK would correlate with greater self-confidence in technology use. Correlational and regression analyses were applied, revealing that increased TPACK levels significantly boost self-confidence. The findings indicate a strong positive relationship between TPACK proficiency and self-confidence. The study recommends expanding the focus on technology-related TPACK skills and enhancing technology training in B.Ed. programs to improve students' ability to use technology effectively in teaching.

Rao and Kumar (2023) conducted a study titled Self-Confidence and Its Relationship with Teaching Skills among B.Ed. Students in Karnataka. The research focused on understanding the relationship between self-confidence and teaching skills among 155 B.Ed. students, with the hypothesis that higher self-confidence is associated with teaching performance. Using inferential statistical methods, the study identified a significant positive correlation between self-confidence and teaching skills. The findings suggest that enhancing self-confidence is crucial for improving teaching skills and recommend the inclusion of self-confidence-building programs in the B.Ed. curriculum.

Reddy and Suresh (2023) conducted a study titled Impact of TPACK and Self-confidence on Teaching Performance Among B.Ed. Students. This study examines how TPACK and self-confidence influence the teaching performance of 200 B.Ed. students in Andhra Pradesh. The hypothesis suggested that higher TPACK levels and self-confidence would result in improved teaching performance. The research utilized regression and correlation analysis, and the findings revealed a significantly positive relationship between TPACK, self-confidence, and teaching performance. The study recommends integrating training programs aimed at enhancing TPACK and self-confidence into the B.Ed. curriculum.

Sharma and Kumar (2023) investigated the Impact of TPACK on the Self-confidence of B.Ed. Students in Integrating ICT in Teaching in Punjab, with a sample of 140 B.Ed. students. The study aimed to assess how TPACK influences self-confidence in integrating ICT into teaching practices. The hypothesis proposed that higher TPACK proficiency would lead to increased self-confidence in ICT integration. The data were analyzed using both descriptive and inferential techniques, which validated a significant relationship between TPACK and self-confidence. The study emphasizes ICT-focused TPACK training in B.Ed. programs to enhance students' confidence in ICT by integrating it into teaching practices.

Bora and Das (2024) conducted a study titled Self-Confidence and Its Impact on Teaching Performance among B.Ed. Students in Assam. This research investigates how self-confidence influences teaching performance among 120 B.Ed. students. The hypothesis suggests that increased self-confidence leads to improved teaching performance. The study used a cross-sectional design with survey data and employed correlation and ANOVA statistical analyses. The findings indicated a strong positive correlation between self-confidence and teaching performance, emphasizing the crucial role of self-confidence in enhancing teaching abilities.

Iyer and Menon (2024) examined the impact of self-confidence and TPACK on teaching competency among B.Ed. students, with a specific focus on the moderating effects of demographic variables such as gender, institutional type (government vs. private), and educational background (UG vs. PG). A sample of 412 B.Ed. students participated in the survey. Regression analysis revealed that both TPACK and self-confidence significantly predicted teaching competency, with stronger effects observed in female students and those from private institutions. These findings refute the null hypothesis and emphasize the need for targeted interventions to enhance TPACK and self-efficacy among B.Ed. students.

Kumar and Agarwal (2024) conducted a study titled The Role of TPACK in Developing Self-Confidence among B.Ed. Students in Digital Learning Environments at the University of Delhi, with a sample size of 145 B.Ed. students. The study aimed to examine how TPACK contributes to building self-confidence in digital learning environments. The hypothesis suggested that TPACK would significantly improve self-confidence in digital learning settings. Using an experimental design with pre-test and post-test measures, the study found that TPACK training significantly boosted students' self-confidence. The findings highlight the positive impact of TPACK on self-confidence in digital learning and recommend integrating digital learning components into TPACK training to foster greater digital learning practices within the B.Ed. curriculum.

Kumar and Sinha (2024) conducted TPACK and self-confidence in relation to the teaching competency among B.Ed. Students. This research explored the TPACK and self-confidence in teaching competency among 140 B.Ed. students in Bihar. The study hypothesized that there is a positive correlation between TPACK, self-confidence, and teaching competency. Using correlation and regression analysis, the findings indicated a significant positive relationship between these factors. The study suggests incorporating TPACK and self-confidence training into teacher education programs and recommends developing strategies to enhance these competencies.

Prasad and Rao (2024) examined self-confidence and teaching competency among B.Ed. Students: A Study in Andhra Pradesh. This study aimed to explore the influence of self-confidence on teaching competency among 150 B.Ed. students, hypothesizing that higher self-confidence positively influences teaching competency. Using quantitative research methods, the study employed correlation analysis and linear regression. The research showed a significant positive relationship between self-confidence and teaching competency, suggesting that strengthening self-confidence could lead to improved teaching competency. The study advocates for the integration of self-confidence training programs into the B.Ed. curriculum to support teacher development.

Sharma and Thakur (2024) conducted a study titled Assessing the Role of TPACK and Self-Confidence in Teaching Competency Among B.Ed. Students. The study, which involved 180 B.Ed. students from Himachal Pradesh aimed to evaluate the influence of TPACK and self-confidence on teaching competency. The hypothesis suggested a positive relationship between TPACK, self-confidence, and teaching competency. Quantitative research, including surveys and regression and correlation analysis, was conducted. The findings underscored the significant impact of TPACK and self-confidence on teaching competency. The study recommends enhancing these elements within teacher training programs and integrating TPACK and self-confidence development into the B.Ed. curriculum.

Studies Conducted Abroad:

Süzük and Akinci (2021) investigated pre-service teachers' self-confidence in technological pedagogical content knowledge (TPACK) concerning their gender, department, and owned digital technologies. The survey method was conducted as part of a quantitative method design. Participants consisted of 252 pre-service teachers from four different concentrations: physics, chemistry, biology, and German language teaching. The TPACK Self-Confidence Scale (TPACK-SCS) was used as the data collection tool. Since the data obtained did not show normal distribution, they were analyzed by Mann-Whitney U and Kruskal-Wallis H tests. According to the results, significant differences were found in the level of self-confidence and sub-dimensions of students' TPACK according to gender, department, and owned digital technologies for education.

Smith and Brown (2023) conducted TPACK, Self-Confidence, and Teaching Competency Among Teacher Candidates in the United States. This study explored the TPACK and self-confidence in the teaching competency of 250 B.Ed. students. The hypothesis suggested that higher levels of TPACK and self-confidence would enhance teaching competency. The research utilized quantitative methods and found a positive relationship between TPACK, self-confidence, and teaching competency. The study recommends integrating TPACK and self-confidence development into teacher preparation programs, along with comprehensive training modules to support these areas.

Davis and Clarke (2023) investigated The Role of TPACK and Self-Efficacy in Teaching Competency Among Pre-service Teachers in Australia. This study examines how TPACK and self-efficacy influence teaching competency among 180 pre-service teachers. The hypothesis posited that higher levels of TPACK and self-efficacy would result in better teaching competency. Using quantitative methods and survey data, the study found a positive relationship between TPACK, self-efficacy, and teaching competency. The study suggests incorporating TPACK and self-efficacy training into teacher education programs and recommends creating specific programs to enhance these competencies.

O'Reilly and Murphy (2023) conducted a study titled The Impact of TPACK and Self-confidence on Teaching Effectiveness Among Pre-service Teachers. This study explored how TPACK and self-confidence affect teaching effectiveness among 190 pre-service teachers. The research aimed to assess higher TPACK levels and self-confidence to enhance teaching effectiveness. Using quantitative methods, including multiple regression and factor analysis, the findings showed that increased levels of TPACK and self-confidence were positively associated with improved teaching effectiveness. The study recommends incorporating TPACK and self-confidence training into pre-service teacher education programs and developing educational initiatives to assess these qualities.

Wilson and Hughes (2024) examined Exploring the Relationship Between TPACK, Self-confidence, and Teaching Performance Among Pre-service Teachers in the UK. This study investigated the influence of TPACK and self-confidence on the teaching performance of 160 pre-service teachers. The hypothesis suggested that higher TPACK levels and self-confidence lead to better performance. The study used quantitative methods, including regression and correlation analysis, and found that TPACK and self-confidence significantly contributed to improved teaching performance. The study suggests that teacher education programs should integrate TPACK and self-confidence development and recommends designing training modules aimed at enhancing these attributes.

Nkosi and Moyo (2024) conducted a study titled Analysing TPACK and Self-confidence in relation to Teaching Competency Among Pre-Service Teachers. The study aimed to assess how TPACK and self-confidence influence teaching competency among 180 pre-service teachers in South Africa. The hypothesis suggested that higher TPACK levels of these factors would result in improved teaching competency. Using quantitative methods, regression analysis, and correlation tests, the results found a significantly positive relationship between TPACK, self-confidence, and teaching competency. The study recommends incorporating TPACK and self-confidence development into teacher education programs and suggests creating comprehensive training modules to further develop these qualities.

Tan and Ho (2024) conducted a study on The Effect of TPACK and Self-confidence on Teaching Effectiveness Among Teacher Education Students. The research focused on how TPACK and self-confidence influence the teaching effectiveness of 170 pre-service teachers in Singapore. The study hypothesized that higher levels of TPACK and self-confidence would enhance teaching performance. By applying quantitative methods such as multiple regression and correlation analysis, the results revealed significant positive impacts of these factors on teaching effectiveness. The researchers recommend integrating TPACK and self-confidence development into teacher education curricula and suggest developing targeted programs to enhance these attributes among pre-service teachers.

2.4. Summary of the Literature Reviewed:

The researcher reviewed 47 works of literature related to TPACK, 50 related to Self-confidence, 45 related to Teaching Competency, and 39 related to the relationship between TPACK, Self-confidence, and Teaching Competency. Thus, the researcher reviewed 181 related works of literature for the present study.

Table 2.1: Summary table of the Literature Reviewed

Sl.No	Variables	Indian Studies	Abroad Studies	Total
1.	TPACK	20	27	47
2.	Self-Confidence	40	10	50
3.	Teaching Competency	37	8	45
4.	Relationship between TPACK, Self-Confidence, and Teaching Competency	31	8	39
	Total	**128**	**53**	**181**

TPACK: The researcher reviewed 47 (20 Indian studies and 27 abroad studies) works of literature related to TPACK for the present study.

Researchers like Koehler and James (2011), Brown and Wilson (2011), Jarvela and Hamalainen (2012), Henderson and Bradey (2012), Lienhardt and McCormick (2013), Green and Lee (2013), Chan and Wong (2014), Tan and Lim (2015) and Koh et al. (2013) investigated the TPACK development in Teacher Education programmes, and Muller and Schneider (2024) found academic achievement and TPACK relationship among B.Ed. students. However, Sharma and Singh (2015), Verma and Rathi (2016), Singh and Yadav (2020), Smith and Lee (2015), Brown and White (2016), and Yusuf (2022) investigated the effect of gender on TPACK and showed substantial variation in TPACK.

Chaudhary and Kaur (2017) found significant differences in gender and stream on TPACK, while Tondeur et al. (2016), Singh and Sharma (2019), Chopra and Verma (2021), and Cochrane et al. (2020) investigated the gender and previous technological knowledge on TPACK and showed substantial variation in TPACK. However, Bhuvana and Arumugam (2023) found no significant differences in TPACK in relation to gender, institution, and previous technological knowledge. However, Ponselvakumar and Alaguraja (2022) found no significant differences in TPACK with gender and locality.

Jeyaraj and Ramanath (2018), Kaur and Gill (2019), and Davis and Clark (2016) found significant variations in TPACK with educational qualification. However, Archambault and Barnett (2010), Olofson et al. (2016), Scherer et al. (2017), and Harris et al. (2018) demonstrated a notable variation in TPACK with educational qualification and previous technological knowledge. Kumar and Soni (2022) and Sreekala and James (2024) investigated significant differences in TPACK with stream and Previous technological knowledge. However, Igbal et al. (2013) and Redmond and Lock (2019) discovered that the academic stream does not influence TPACK levels.

Sharma and Kumar (2021) and Lin et al. (2019) found that second-year students had higher TPACK skills than first-year students. Harvey and Caro (2017) found that the year of study did not impact the TPACK development.

Rathore and Sharma (2018), Das and Sen (2024), and Sreekala and James (2024) found significant differences in TPACK in relation to the locality of students.

Desai and Patel (2020), Khan and Hussian (2023), found significant differences in TPACK and institution type, and Ng and Tan (2021) investigated a positive correlation between TPACK in relation to institution and previous technological knowledge.

Singh and Joshi (2019), Verma and Gupta (2019), and Harris and Jeckins (2020) found that students with previous technological knowledge scored significantly higher in TPACK skills.

Self-Confidence: The researcher reviewed 50 (40 Indian studies and 10 abroad studies) works of literature related to Self-Confidence, for the present study.

Sharma and Kumar (2010), Sen and Mitra (2016), Sharma and Kumar (2016), Singh and Patel (2016), and Desai and Patel (2017) studied self-confidence, academic success, and the effective use of technology for teaching.

Sharma and Gupta (2016), Malik and Rizvi (2020) and Chaudhari (2022) found that those male students exhibited greater self-confidence compared to female students. Patel and Rao (2021), Choudhary and Tripathi (2022), and Brown and White (2018) demonstrated that female students exhibited higher self-confidence compared to male students.

Bhat and Yadav (2018) and Gopinath and Vijayalekshmi (2022) found that there was a significant difference in self-confidence concerning gender and educational qualification. Rajkumar (2013) and Anandarasu (2014) found no significant differences in self-confidence with gender, educational qualification, year of study, and locality. De Jong Visser (2020), Vasanthi and Arumugam (2020), and Ponmozhi and Govindhammal (2024) found there were significant differences in self-confidence with gender and educational qualification. However, Chaudhari (2022) and Asma (2023) found no significant difference in self-confidence with educational qualification.

Nair and Menon (2018), Menon and Kumar (2019), Gupta and Singh (2021), Jain and Singh (2021), and Carter and Lopez (2019) found that students who had higher educational qualifications exhibited greater self-confidence levels. Meanwhile, Bhatia and Joshi (2024) found there were significant differences in self-confidence with locality and educational qualification. Deepika and Geetha (2018) found no significant difference in educational qualifications. Pandey (2023) found there was no significant difference in self-confidence with gender and locality.

Rao and Narayan (2018), Menon and Kumar (2019), Patel and Nguyen (2018), and Davis and Wright (2022) found that Science stream students exhibited higher self-confidence in technology integration. Meanwhile, Muller and Schmidt (2017), Maity et al. (2019), and Sharma and Gupta (2022) found there were significant differences in subject stream and locality in self-confidence. Chauhan and Vaghela (2022) found no significant difference in self-confidence concerning the arts and commerce stream.

Silva and Oliveria (2016), Malik and Rizvi (2020), and Verma and Rathi (2023) investigated significant differences in self-confidence concerning stream and previous technological knowledge.

Miller and Lee (2019), Singh and Gupta (2021), and Agarwal and Dubey (2021) demonstrated that second-year students exhibited greater self-confidence than first-year students. However, Bhat (2018), Banga (2019), and Ponmozhi and Govindhammal (2024) found that self-confidence levels are not significantly influenced by the year of study.

Gupta and Singh (2019) and Patel and Rao (2019), Gupta and Sharma (2023), and Davis and Thompson (2017) found that urban students had higher self-confidence than rural area students.

Kumar and Banerjee (2019) found that deemed university students had higher self-confidence than private institutional students. However, Das and Iyer (2020) found that students from private institutions had higher self-confidence levels. Patel and Sharma (2021) found that government institution students had higher self-confidence than students from private institutions.

Krishnan and Reddy (2020), Kumar and Sharma (2020), and Muller and Webber (2022) investigated those students with prior technological knowledge who had greater self-confidence than students without technological knowledge.

Teaching Competency: The researcher reviewed 45 (37 Indian studies and 8 abroad studies) works of literature related to Teaching Competency, for the present study.

Singh and Raj (2020) and Iyer and Desai (2022) found a significant impact in teaching competency with digital pedagogical tools. Sharma and Singh (2011) and Karthik and Ahuja (2026) found there were no significant differences between male and female students in teaching competency. Singh and Patel (2016), Patel and Clark (2017), Patel and Reddy (2019), Agarwal and Verma (2020), Banerjee and Kumar (2020), Gupta and Sharma (2021), Jain and Yadav (2023), Joshi and Mehta (2023), and Wilson and Martin (2024) found significant gender differences, and female students demonstrated higher teaching competency compared to male students.

Sridevi (2021) found that there were significant differences between male and female students as well as rural and urban area students but no significant differences between government and private institutions in teaching competency. Pachaiyappan and Sadayakumar (2018) found no significant difference in teaching competency between gender, locality, year of study, and type of institution.

Dutta and Roy (2015), Nair and Menon (2018), Taylor and Hughes (2019), Sahu and Mohanty (2022), and Verma and Kapoor (2013) found that postgraduate students exhibited greater teaching competency. Alli Muthu (2018) and Bindushaand Bindu (2020) found there were no significant differences in the teaching competency of graduate-level teacher trainees in terms of educational qualification, locality, and institution type. Metha (2020) and Thomas and Pillai (2021) found there was no significant difference in teaching competency between government and private institutions.

Kumar and Reddy (2017), Kapoor and Singh (2021), Singh and Yadav (2024), and Johnson and Williams (2018) investigated science stream students who exhibited higher teaching competency than arts and commerce stream students. However, Jensen and Olesen (2024) found that education and social science students had higher teaching competency than other stream students.

Sharma and Reddy (2021), Patel and Sharma (2022), Gupta and Mehta (2023), and Shakya and Dube (2023) found that there were significant differences in teaching competency in terms of second-year students and first-year students.

Sharma and Mehta (2011), Banerjee and Mukerjee (2019), Patel and Kumar (2023), Anderson and Mitchell (2020), and Wong and Leung (2023), and Lavanya et al. (2024) demonstrated that urban students were more skilled at teaching competency in digital pedagogy than rural area students.

Patel and Bhardwaj (2017), Rao and Das (2020), Bhattacharya and Roy (2022), Raj and Bhattacharya (2024), and Berg and Peters (2021) found that there were significant differences in teaching competency with previous technological knowledge.

Relationship between TPACK, Self-Confidence, and Teaching Competency: The researcher reviewed 39 (31 Indian studies and 8 abroad studies) works of literature related to the relationship between TPACK, Self-Confidence, and Teaching Competency for the present study.

Kumar and Sharma (2015), Sharma and Yadav (2022) found that higher levels of self-confidence significantly influenced technology integration.

Metha and Nair (2021), Suzuk and Akinci (2021), Thomas and Varghese (2022), Metha and Singh (2023), Sharma and Kumar (2023), and Kumar and Agarwal (2024) found a significant relationship between TPACK and Self-confidence.

Sharma and Mishra (2010), Gupta and Kumar (2011), Patel and Desai (2011), Rao and Singh (2011), Singh and Kumar (2011), Sharma and Mehta (2012), Desai and Patel (2013), Kumar and Singh (2014), Sharma and Gupta

(2018) investigated significant positive relationship between TPACK and Teaching Competency.

Iyer and Reddy (2013), Arora and Kumar (2021), Banerjee and Mukerjee (2022), Demir and Ozkan (2022), Rao and Kumar (2023), Bora and Das (2024), and Prasad and Rao (2024) investigated a significant positive relationship between Self-confidence and Teaching competency.

Nkosi and Moyo (2024) found a significant positive relationship between TPACK and Self-confidence in relation to teaching competency.

Singh and Mehta (2016), Patel and Joshi (2017), Verma and Sharma (2018), Das and Chatterjee (2022), Bhardwaj and Sharma (2023), Reddy and Suresh (2023), Kumar and Sinha (2024), Sharma and Thakur (2024), Smith and Brown (2023), Davis and Clarke (2023), O'Reilly and Murphy (2023), Wilson and Hughes (2024), Tan and Ho (2024) investigated a significant positive relationship between TPACK and self-confidence on teaching competency.

2.5. Research Gaps:

1. Contextual Focus on Nagaland: Although a substantial body of global research on Technological Pedagogical Content Knowledge (TPACK) seeks to identify the specific educational context of Nagaland. As educational institutions in the region increasingly incorporate the TPACK framework, particularly in the aftermath of the COVID-19 pandemic, this research is timely and crucial for understanding how the framework is being integrated within Nagaland's evolving educational landscape.

2. Gap in Research on B.Ed. Students: Despite the wealth of research on various educational topics, there is a noticeable gap in studies that focus especially on B.Ed. students. This research aims to fill this gap by providing an in-depth exploration of the experiences and challenges of B.Ed. students, offering insights that distinguish it from other existing studies. By focusing on this particular group, the study aims to offer pioneering contributions to teacher education research.

3. Emphasis on Self-confidence: While many studies have examined variables such as self-efficacy, job satisfaction, emotional intelligence, and socio-economic status, there has been limited attention given to the role of self-confidence in B.Ed. students. Given the critical importance of self-confidence in shaping effective educators, this study specifically targets this variable, offering a new perspective and contributing a unique viewpoint to the existing literature.

4. Interrelationships of TPACK, Self-confidence, and Teaching Competency: While previous research has explored TPACK or teaching competency in isolation, few studies have investigated the relationship between TPACK, Self-confidence, and Teaching Competency as interconnected factors. The present study aims to address the gap by examining the interplay between these key elements and demographic variables such as gender, educational qualification, stream, year of study, locality, institution, and previous technological knowledge, providing a holistic and innovative contribution to education research.

The literature review underscores significant progress in educational research, particularly in Technological, Pedagogical, and Content Knowledge (TPACK), self-confidence, and teaching competency. While TPACK has received widespread global recognition, studies often overlook specific regional contexts, such as Nagaland. This gap points to the importance of conducting more localized research to better understand how TPACK is integrated into these unique educational settings.

Furthermore, there was a considerable body of research on variables like self-efficacy, job satisfaction, emotional intelligence, and socio-economic status. The role of self-confidence among student-teachers remains underexplored. This highlights the requirement for further investigation into how self-confidence can influence teaching effectiveness and student-teacher development. The review also reveals a lack of studies examining the combined impact of TPACK, self-confidence, and teaching competency. Exploring the interconnections between these factors could lead to a more comprehensive understanding of their influence on teaching practices and educational outcomes.

In conclusion, addressing these research gaps will provide valuable insights into how educational practices can be enhanced. The proposed study, focused on Nagaland, aims to contribute new perspectives by examining the relationships between TPACK, self-confidence, and teaching competency, thereby supporting the advancement of education in the region. Hence, the investigator took up the present study, entitled “A Study on the Relationship between Technological Pedagogical Content Knowledge (TPACK), Self-confidence, and Teaching Competency of B.Ed. Students in Nagaland”.

CHAPTER -III

RESEARCH METHODOLOGY

3.1 Introduction

The methodology is the structured approach a researcher takes to conduct and control educational research. This study aims to explore applying foundational scientific principles to solve academic problems. The usefulness of a study is often determined by how well-suited the chosen methods and resources are, and these techniques are aimed at obtaining and analyzing data.

The research methodology outlines the systematic steps utilized for conducting studies, including the specific techniques for gathering and examining data. By defining a systematic framework, the methodology ensures that the research process is structured, consistent, and comprehensive and can be replicated. Major factors of the methodology include selecting a research design, ways of collecting data, and deciding on data interpretation techniques. Each of these components directly influences the consistency and accuracy relating to the study's findings.

Creswell (2014) emphasizes the value of a well-defined methodology, indicating that it is fundamental for establishing the trustworthiness of research findings and helping researchers systematically approach the challenges inherent in the research process.

Different types of studies have different goals and approaches, and they often require varied methods at each stage. Common research methods consist of historical analysis, documentary study, surveys, descriptive research, and experimental research.

The study's reliability and external validity depend on multiple factors.

1. Selecting a sample that accurately represents the target population.
2. Using measurement of the tools that are reliable and valid.
3. Applying appropriate statistical methods to interpret and analyze data.

With a range of available methods and techniques, choosing a methodology that aligns with the study's goals is essential to ensuring meaningful and successful outcomes.

3.2 Research design

In its simplest terms, a design should be perceived as a blueprint—an organized outline that clarifies how different parts or components fit together. In research, this blueprint translates abstract ideas into a practical, manageable plan that can be effectively and efficiently implemented. The researcher after identifying the research problem and developing hypotheses, the next step is to decide on the methods that make it possible to conduct a thorough and objective investigation. These research designs provide the structure to the research design, serving as the base for the study.

A research design acts as a foundational element to the research methodology that defines the comprehensive approach to conducting the research. It consists of selecting the research type—whether qualitative, quantitative, or hybrid methods—and mapping out the procedure for gathering data and analysis. This design was required to answer the research questions and hypotheses in a structured manner.

Kothari (1985) describes research design as "The organized structure for gathering, evaluating, and interpreting data in which research takes place. Yin (2018) also emphasizes that a well-formulated research design enables the study aims to effectively tackle the research inquiry and fulfill its objectives, providing a structural framework that aids in generating valid and meaningful results.

A well-thought-out research design is necessary as it simplifies the research methodology, optimizing both resources and outcomes by minimizing the time, effort, and cost needed to gather significant insights. It allows researchers to organize their approach systematically, helping them identify and address potential weaknesses before beginning data collection. Mistakes at this early stage may affect the entire study, underscoring the importance of a carefully crafted design.

An effective research design should include several key components:

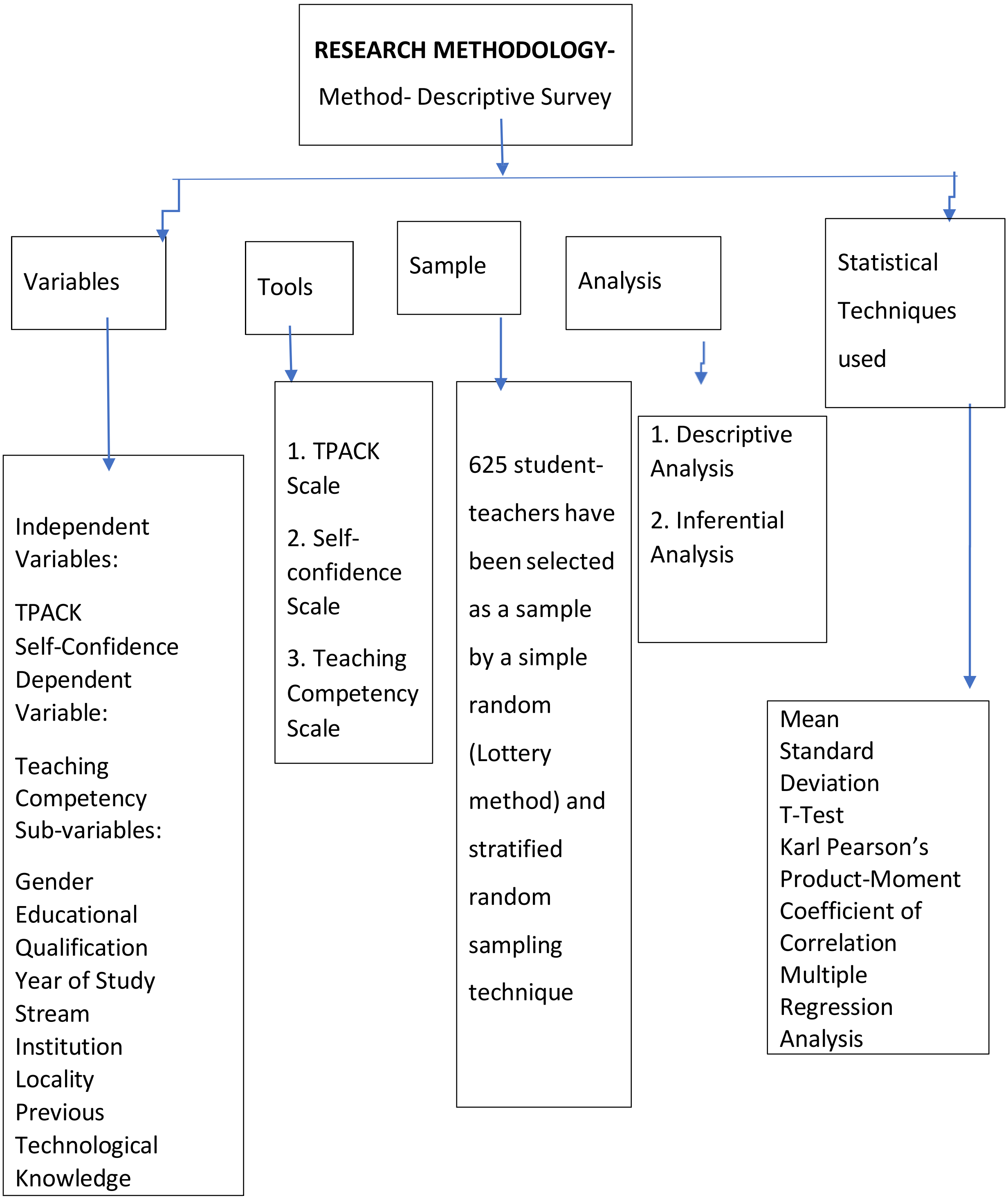
1. The variables being investigated,
2. The procedures and methods for collecting data,
3. The sampling strategy,
4. The techniques for data processing and analysis.

By thoughtfully planning each of these aspects, a solid research design lays the groundwork for a successful and insightful study.

This chapter presents the research methodology used to achieve the objectives of the present research that aimed to evaluate the relationship between Technological Pedagogical Content Knowledge (TPACK), Self-Confidence, and Teaching Competency of B.Ed. Students in Nagaland. This chapter explains the method, population, and sample size, description of the tools used, preparation and administration of the tools, data collection, statistical techniques used, and interpretation of the data.

The given diagram depicts the study's research design. Figure 3.a

Figure 3.a


RESEARCH METHODOLOGY-
Method- Descriptive Survey
Variables
Tools
Sample
Analysis
Statistical Techniques used
Independent Variables:
TPACK
Self-Confidence
Dependent Variable:
Teaching Competency
Sub-variables:
Gender
Educational Qualification
Year of Study
Stream
Institution
Locality
Previous Technological Knowledge
1. TPACK Scale
2. Self-confidence Scale
3. Teaching Competency Scale
625 student-teachers have been selected as a sample by a simple random (Lottery method) and stratified random sampling technique
1. Descriptive Analysis
2. Inferential Analysis
Mean
Standard Deviation
T-Test
Karl Pearson's Product-Moment Coefficient of Correlation
Multiple Regression Analysis

3.3 Method of Study

This research adopted the descriptive survey method to explore the Technological Pedagogical Content Knowledge (TPACK) levels, Self-confidence, and Teaching Competency of B.Ed. students in Nagaland. The descriptive survey approach allows gathering data from a large group of participants at a particular time, helping capture and modify the group's current conditions, trends, beliefs, and processes. Instead of focusing on individual characteristics, this approach highlights general patterns and statistical trends across the population, making it especially suitable for identifying broader insights (Koul,2020).

3.4. Population of the Study

The term population represents the whole group that shares certain key characteristics—in this case, all B.Ed. Students enrolled in teacher training institutions affiliated with the Nagaland University in Nagaland. Studying an entire population directly is often impractical, so researchers typically examine a smaller, carefully selected group, or "sample," which reflects the larger population. Here, the population comprises 1,250 B.Ed. student-teachers.

This research was conducted in the eight Teacher Education colleges within Nagaland, specifically in the districts of Kohima, Dimapur, Chumukedeima, and Mokokchung. All these colleges offer Bachelor of Education (B.Ed.) programs affiliated with Nagaland University.

Table 3.1

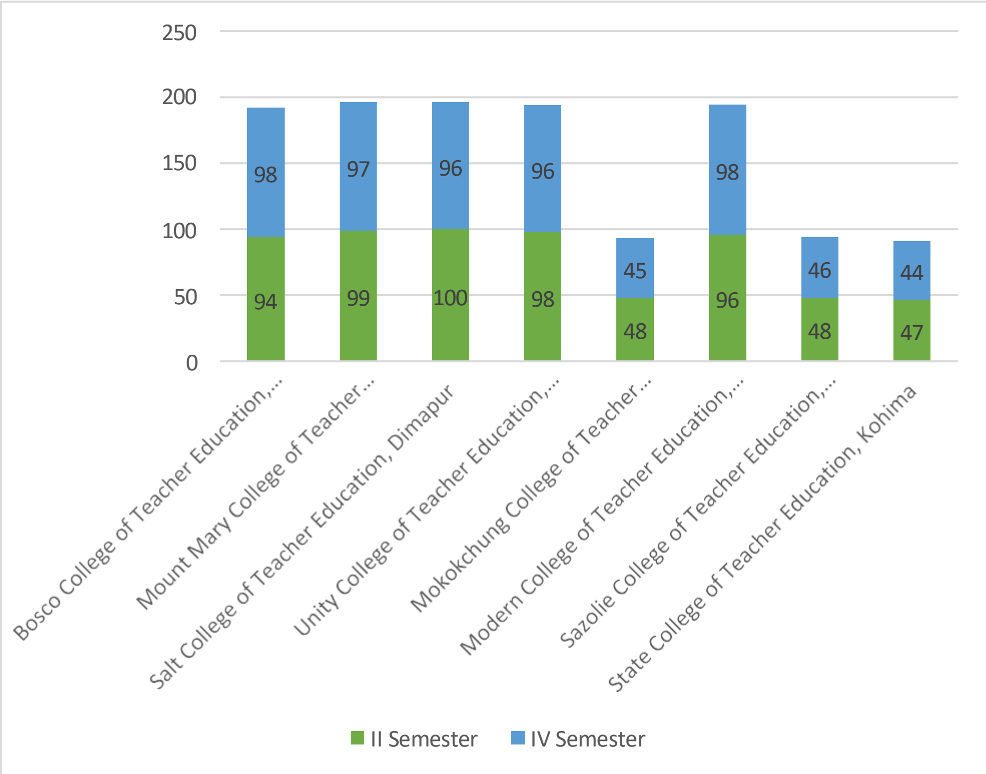
District-wise B.Ed. Colleges and students' enrolment in Nagaland, affiliated with the Nagaland University

Sl. No	Name of the B.Ed. Colleges/District	II Semester	IV Semester	Total
1.	Bosco College of Teacher Education, Dimapur	**94**	**98**	**192**

2.	Mount Mary College of Teacher Education, Dimapur	**99**	**97**	**196**
3.	Salt College of Teacher Education, Dimapur	**100**	**96**	**196**
4.	Unity College of Teacher Education, Dimapur	**98**	**96**	**194**
5.	Mokokchung College of Teacher Education, Mokukchung	**48**	**45**	**93**
6.	Modern College of Teacher Education, Kohima	**96**	**98**	**194**
7.	Sazolie College of Teacher Education, Kohima	**48**	**46**	**94**
8.	State College of Teacher Education, Kohima	**47**	**44**	**91**
	Total	**632**	**618**	**1250**

(Source: Nagaland Board of Higher Education, Kohima, 2024). Results Gazette provisional)

Figure 3.1 District-wise B.Ed. Colleges and students' enrolment in Nagaland, affiliated with the Nagaland University



3.5. Sample of the Study

In this research, participants were selected using a simple random sampling method (lottery) and a stratified random sampling method. This approach involved randomly selected students enrolled in the eight colleges affiliated with Nagaland University, confirming that the sample was representative and unbiased. A simple random sampling technique was employed in the present study to ensure that every individual in the population had an equal chance of being selected. Using the lottery method, 625 B.Ed. students were randomly chosen from eight teacher education colleges in Nagaland. In order to secure fair representation of sub-groups such as gender, locality, and year of study, stratified random sampling was also applied. Thus, the sampling process combined simple random and stratified techniques to achieve a representative and unbiased sample.

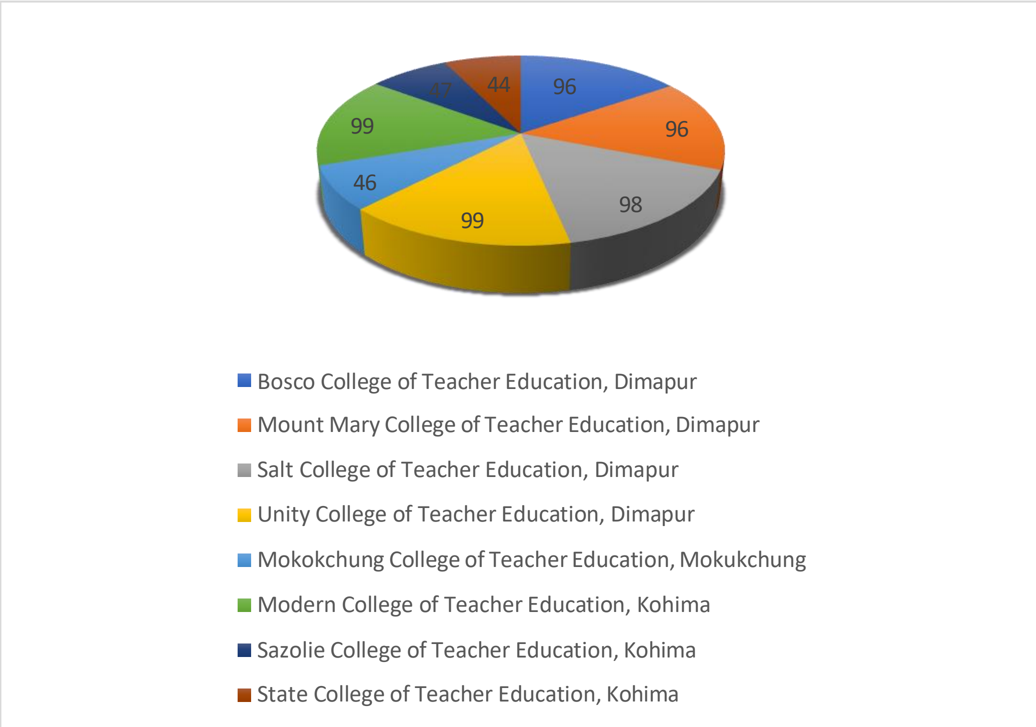
Table 3.2

List of B.Ed. College students selected for the sample

Sl. No	B.Ed. Colleges Name	Total Number of Students	Percentage
1.	Bosco College of Teacher Education, Dimapur	96	15.36
2.	Mount Mary College of Teacher Education, Dimapur	96	15.36
3.	Salt College of Teacher Education, Dimapur	98	15.68
4.	Unity College of Teacher Education, Dimapur	99	15.84
5.	Mokokchung College of Teacher Education, Mokukchung	46	7.36
6.	Modern College of Teacher Education, Kohima	99	15.84
7.	Sazolie College of Teacher Education, Kohima	47	7.52
8.	State College of Teacher Education, Kohima	44	7.04
	Total	**625**	**100 %**

Figure 3.2

List of B.Ed. College students selected for the sample



3.5.1. Selection of Sample

The present study, a sample of 625 B.Ed. students from eight B.Ed. colleges in three districts in Nagaland were selected randomly and proportionately. Thus, 625 B.Ed. students, including 121 males and 504 females from the II and IV semesters.

The sample was categorized based on several factors, like gender, educational qualifications, year of study, subject streams, locality, institution, and previous technological knowledge. The sample distribution is presented below.

Table 3.3

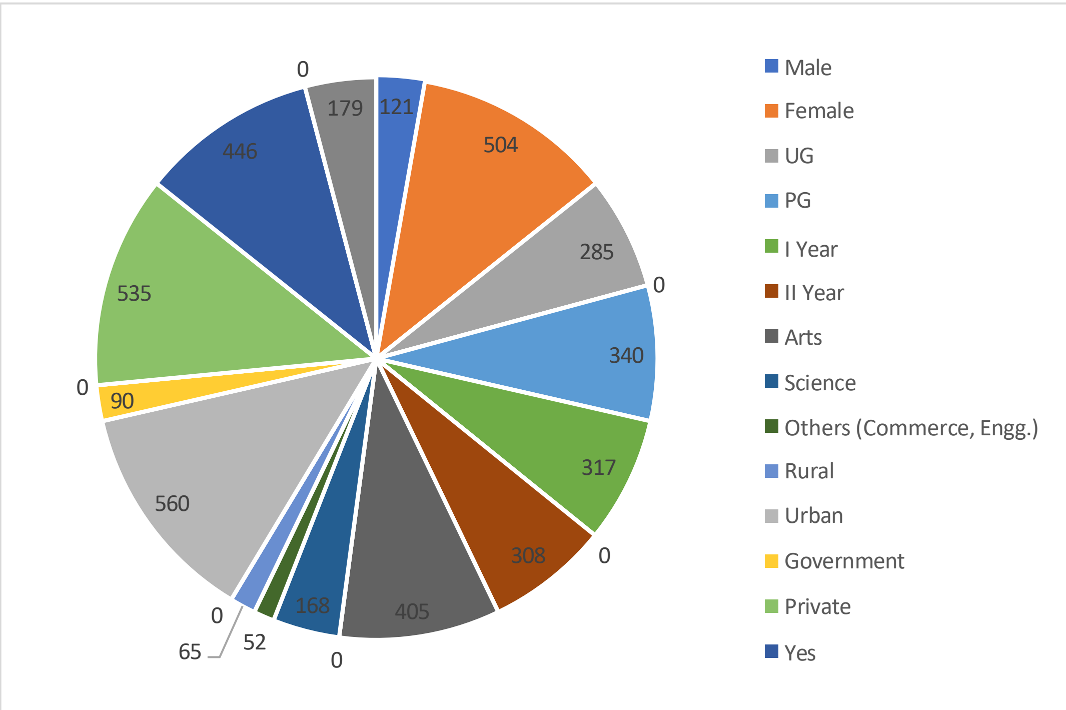
Distribution of the Sample across Different Variables

Sl. No	Category	Variables	Number of Samples	Grand Total
1.	Gender	Male	121	
		Female	504	**625**
2.	Educational	UG	285	**625**

	Qualification	PG	340	
3.	Stream	Arts	405	**625**
		Science	168	
		Commerce	52	
4.	Year of Study	I Year	317	**625**
		II Year	308	
5.	Locality	Rural	65	**625**
		Urban	560	
6.	Institution	Government	90	**625**
		Private	535	
7.	Previous technological Knowledge	Yes	446	**625**
		No	179	

Figure 3.3

Distribution of the Sample across different variables



3.6. Variables of the Present Study:

Global studies have observed that factors such as gender, age, year of study, and locality are related to Technological, Pedagogical, and Content Knowledge (TPACK), self-confidence, and teaching competency. In light of these findings, the researcher considered several sub-variables in this study, including factors such as gender, educational qualifications, year of study, subject stream, locality, institution, and prior technological knowledge.

This research aims to investigate these variables' impact on TPACK, self-confidence, and teaching competency among student-teachers.

1. Independent Variables: TPACK, Self-confidence of B.Ed. students
2. Dependent Variable: Teaching Competency of B.Ed. students
3. Sub-variables:

i.	Gender	-	Male / Female
ii.	Educational qualification	-	UG / PG
iii.	Stream	-	Arts/Science/Commerce
iv.	Year of Study	-	I/II
v.	Locality	-	Rural / Urban
vi.	Institution	-	Government / Private
vii.	Previous Technological Knowledge	-	Yes / No

3.7. Tools for data collection

The relevant variables for which the tools are used and the variables treated in the present study are presented in Table 3.4.

Table 3.4 Details of the Tools used for measurement

S. No.	Name of the Tool	Variables Measure
1.	B.Ed. Students' General Information.	Gender, Educational Qualification, Stream, Year of Study, Locality, Institution, and Previous Technological Knowledge

2.	Technological Pedagogical Content Knowledge (TPACK) was developed and standardized by Hemant Lata and Leena Sharma (2017).	1. Technological Knowledge 2. Pedagogical Knowledge 3. Content Knowledge 4. Technological Pedagogical Knowledge 5. Technological Content Knowledge 6. Pedagogical Content Knowledge 7. Technological Pedagogical Content Knowledge
3.	The Self-Confidence Scale was developed and standardized by the researcher. (2024)	1. Physical and Psychological Confidence 2. Technological Confidence 3. Social and Environmental Confidence 4. Professional Confidence
4.	The Teaching Competency Scale was developed and standardized by Jeya S.K. & Denisia S.P. (2016)	1. Subject Competency 2. Content Organization and Presentation 3. Interactive Competency 4. Instructional Strategies 5. Classroom Management

The data collection tools utilized for the present study are as follows.

1. To measure the TPACK levels among B.Ed. students, the investigator utilized the Technological Pedagogical Content Knowledge (TPACK) Scale, constructed and standardized by Hemant Lata and Leena Sharma (2017).
2. To examine the B.Ed. students' self-confidence levels, the investigator used a self-constructed tool: The Self-Confidence Scale for B.Ed. students

(2024).

3. To assess the B.Ed. students' teaching competency skills, the investigator used the Teaching Competency Scale, constructed and standardized by Jeya S.K.& Denisia S.P. (2016).

3.8. Description of the Tools:

3.8.1. General Information Proforma of the B.Ed. Students:

The tool is designed to collect general, selected, and academic details from the participants. It includes questions about the students' gender, educational background, year of study, subject streams, locality, institution, and previous technological knowledge. These responses provide a comprehensive overview of the participants, which is required for understanding the study's background. A complete collection of the students' general information is provided in the Appendix. (I)

3.8.2. Technological Pedagogical Content Knowledge (TPACK) Scale:

Description of the TPACK Scale:

The Technological Pedagogical Content Knowledge (TPACK) Scale, constructed and standardized by Hemant Lata and Leena Sharma (2017), was used to measure the Technological Pedagogical Content Knowledge (TPACK) among B.Ed. students in Nagaland. This scale has been designed to measure the TPACK levels of B.Ed. students.

TPACK is a blooming knowledge form covering all three core components (Content, Pedagogy, and Technology). TPACK is a comprehensive framework that blends Content, Pedagogy, and Technology. It is an expertise that evolves through the integration of Content, Pedagogy, and Technology Knowledge. TPACK is essential for technology-enhanced teaching, encompassing an understanding of concept representation via technology, pedagogical techniques that leverage technology for content delivery, and strategies to address learning difficulties through technological solutions.

Components of TPACK

I. **Technological Knowledge –** Technological Knowledge (TK) relates to the understanding and application of various technologies. It supports teachers in effectively delivering content to the student, supporting the dialog between the teacher and the student, or presenting the content to the students.

II. **Pedagogical Knowledge –** Pedagogical Knowledge (PK) refers to the expertise in managing classrooms, planning lessons, assessing students, and applying appropriate teaching methods. It involves understanding learning processes and adapting instruction to suit diverse learning styles.

III. **Content Knowledge** – Content Knowledge (CK) represents a teacher's understanding of the subject matter to be taught. It includes expertise in various academic disciplines and awareness of the specific ways of thinking and inquiry relevant to each subject, ensuring effective instruction.

IV. **Technological Pedagogical Knowledge –** Technological Pedagogical Knowledge (TPK) involves understanding how technology impacts instructional methods and learning experiences. It requires knowledge of the capabilities and constraints of different digital tools in designing pedagogically sound and subject-appropriate teaching strategies.

V. **Technological Pedagogical Knowledge** - Technological Pedagogical Knowledge (TPK) is an understanding of how teaching and learning change when particular technologies are used. This includes knowing the pedagogical affordances and constraints of a range of technological tools and resources as they relate to disciplinary and developmentally appropriate pedagogical designs and strategies.

VI. **Technological Content Knowledge** – Technological Content Knowledge (TCK) is the knowledge of the presentation of technology and subject matter. This knowledge provides for the flexibility of use of the appropriate technologies for educational purposes. Technological Content Knowledge (TCK) highlights the way technology affects content delivery and vice versa. Although content and technology are frequently considered in isolation during lesson planning, their integration leads to more engaging and meaningful instruction.

VII. **Pedagogical Content Knowledge –** Pedagogical Content Knowledge (PCK) includes the understanding that provides the learning of both tough and easy subjects. It refers to the knowledge of various teaching methods tailored to different subjects. It involves integrating pedagogy and content to effectively present specific subjects and dealing with the problems in education, the way of organizing, representing, and adapting different student interests and skills.

VIII. **Technological Pedagogical Content Knowledge –**Technological Pedagogical Content Knowledge (TPACK) is the knowledge of the use of technology in various subjects and practicing teaching methods. This knowledge makes the learning of the subject for the student easier with appropriate pedagogy and technology.

TPACK forms the basis of effective teaching with technology, involving knowledge of how to present concepts through digital tools, utilize pedagogical strategies that integrate technology seamlessly into instruction, and understand how the technology will be helpful for learning, the knowledge of the student's previous knowledge and the knowledge of epistemological theories, the knowledge of how to use technology in building new information onto existing knowledge and which also includes the development of new epistemologies, or strengthening the old ones.

a) Item Analysis

The initial draft of the Technological Pedagogical Content Knowledge (TPACK) scale, consisting of 61 items, was constituted. The scale items were designed based on the seven subscales, viz., Technological Knowledge, Pedagogical Knowledge, Content Knowledge, Technological Pedagogical Knowledge, Pedagogical Content Knowledge, Technological Content Knowledge, and Technological Pedagogical Content Knowledge.

The scale was given to 110 pre-service teachers, and randomly selected 30 pre-service teachers were interviewed to evaluate its appropriateness for pre-service teacher educators. As per Kelly, the upper and lower criterion groups contain 30 pre-service teacher educators in each group. To find out the discriminatory power of each item, a t-test was conducted to determine the significance of the difference between the upper and lower criterion groups of each item. It was found that six items did not exhibit significant differences between the upper and lower groups. Hence, only 55 items were retained, and the other 6 items were found to be either very easy or very difficult. The 6 items were excluded from the scale at this stage because their item-total correlation value was less than 0.05. The correlations for the items suggested that anything that could be measured through the whole scale could also be measured through each item in this scale.

The Exploratory Factor Analysis (EFA) of Technological Pedagogical Content Knowledge (TPACK) Scale

Factor analysis was performed to evaluate the construct validity of the questionnaire. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.967, indicating that the dataset was highly suitable for factor extraction. To further evaluate its appropriateness for EFA, Bartlett's test was performed, yielding a significant result ($X^2 = 16{,}098.568$; $p < 0.01$), confirming its suitability for exploratory factor analysis.

Principal axis factoring with Promax rotation (Kaiser Normalization) was conducted on all 55 items in the scale, and the final TPACK scale retained all 55 items and explained 52.904% of the total variance, suggesting that the variance accounted for in this study was sufficiently strong.

The TPACK scale is used to analyze the Technological Pedagogical Content Knowledge (TPACK) of the B.Ed. students. This scale comprises 55 items aimed at assessing the participants' knowledge at the intersection of technology, pedagogy, and content. Although there was no time limit for completing the scale, sufficient time was provided to ensure respondents could thoughtfully complete all items. Detailed instructions were provided at the beginning to guide participants in their responses. The scale is divided into different dimensions, each of which evaluates a specific aspect of TPACK. A summary of the distribution of these items along the various dimensions is presented in Table 3.5.

Table 3.5

Dimension-wise distribution of items in the TPACK Scale (Final draft)

S. No.	**TPACK Dimensions**	**Number of Statements**	**Number of items**
1.	Technological Knowledge (TK)	1-5	5
2.	Pedagogical Knowledge (PK)	6 to 13	8
3.	Content Knowledge (CK)	14 to 21	8
4.	Technological Pedagogical Knowledge (TPK)	22 to 32	11
5.	Technological Content Knowledge (TCK)	33 to 38	6
6.	Pedagogical Content Knowledge (PCK)	39 to 45	7
7.	Technological Pedagogical Content Knowledge (TPACK)	46 to 55	10
	Total		55

(Source: Hemant Lata and Leena Sharma (2017), TPACK Scale)

b) Scoring Procedure:

In this present study, a structured scoring system was implemented to provide consistency and fairness in evaluating responses. Each statement in the TPACK scale is associated with the five response options, each indicating the different levels of agreement or alignment with the respondent's Technological Pedagogical Content Knowledge (TPACK). The response options are rated on a 5-point scale, with 5 being the most favourable or the highest level of knowledge, and 1 representing the least favourable or the lowest level of understanding.

The scoring process follows a uniform approach for all items, irrespective of whether the item is worded positively or negatively. For each response, the assigned score corresponds directly to the participant's selection. The overall TPACK score for each respondent is derived by summing the scores across all 55 items, providing a total score that reflects the individual's proficiency in TPACK. This allows for a comprehensive evaluation of their ability to integrate technology, pedagogy, and content knowledge in a teaching context.

The utilization of a consistent scoring key confirms that all responses were treated equally, reducing bias and enhancing the reliability of the measurement. By calculating a cumulative score from the responses, the study offers an objective assessment of the participants' TPACK across different dimensions, providing a clear overview of their strengths and areas for development in the context of integrating technology into teaching practices.

Table 3.6 shows the scoring of the items of the Technological Pedagogical Content Knowledge (TPACK) Scale

Table. 3.6

Scoring procedure for the TPACK Scale

S. No.	Responses	Scores
1.	Strongly Agree	5
2.	Agree	4
3.	Undecided	3
4.	Disagree	2
5.	Strongly Disagree	1

(Source: Hemant Lata and Leena Sharma (2017), TPACK Scale)

The Technological Pedagogical Content Knowledge (TPACK) Scale is given in Appendix I.

c) Standardization, Reliability, and Validity of the TPACK Scale:

The TPACK scale, with 55 items, was administered to 400 pre-service teacher educators (202 female and 198 male). The analyses involved the identification of normality tests (Shapiro-Wilk Test, $n = 400$, $p > 0.05$), skewness (- 0.032), and kurtosis (-0.230) values for the scores in the scale, which were calculated based on the items in the scale, and for the mean scores in the items. The scale, which contained 55 items, had an overall Cronbach's alpha of 0.976, suggesting that the scale being developed was reliable.

d) Statistical Results

Based on the analysis of 400 responses, the statistical results are summarized in Table 3.7.

Table 3.7 Statistical Results

Sl. No	Dimensions	N	Mean	SD	Minimum-Maximum Range of Score
I.	Technological Knowledge	400	15.22	4.11	05 to 25
II.	Pedagogical Knowledge	400	23.20	6.87	08 to 40
III.	Content Knowledge	400	23.08	7.29	08 to 40
IV.	Technological Pedagogical Knowledge	400	35.03	9.96	11 to 55
V.	Technological Content Knowledge	400	19.10	5.37	06 to 30
VI.	Pedagogical Content Knowledge	400	22.43	6.65	07 to 35
VII.	Technological, Pedagogical and Content Knowledge	400	31.10	9.58	10 to 50
	Total	**400**	**169.10**	**49.83**	**55 to 275**

(Source: Hemant Lata and Leena Sharma (2017), TPACK Scale)

e) Norms

Based on the statistical results presented in Table 3.7, z-score Norms have been developed for the full scale, and the same have been presented in Table 3.8.

Table 3.8 shows the interpretation and classification of raw scores for the total TPACK.

Table 3.8

Interpretation and Classifications of raw Scores for total TPACK

Sl. No	TPACK Raw Score Range	z-Score Range	Grade	Level of TPACK
1.	270 & above	+ 2.01 & above	A	Extremely High
2.	232 to 269	+ 1.26 to + 2.00	B	High
3.	195 to 231	+ 0.51 to + 1.25	C	Above Average
4.	144 to 194	- 0.50 to +0.50	D	Average
5.	107 to 143	-1.25 to -0.51	E	Below Average
6.	69 to 66	-2.00 to -1.26	F	Low
7.	68 & below	-2.01 & below	G	Extremely Low

(Source: Hemant Lata and Leena Sharma (2017), TPACK Scale)

3.8.2.1. Pilot Study

A pilot study acts as a testing ground for research tools, helping researchers identify issues and make necessary adjustments before the primary study is conducted. The researcher carried out a preliminary study in this research to evaluate the Technological Pedagogical Content Knowledge (TPACK) levels of the B.Ed. students in Nagaland.

The pilot study aimed to:

- Verifying if there are any modifications in the terms of wording or format were needed to make the question clearer and more understandable.
- Identifying any of the questions that are too easy to answer or difficult to comprehend for the participants.
- Remove any statements that could be considered unclear or ambiguous.
- Ensuring the selected items effectively differentiated responses from the top 27% and bottom 27% of the B.Ed. students.

The pilot study provided the researcher with the opportunity to adjust the research tool, ensuring it was clear, effective, and ready for the actual study.

a) Procedure of the Pilot Study for TPACK:

To prepare for the final study, the researcher carried out a pilot study to check the reliability and effectiveness of the TPACK tool's practicality and relevance within the Indian context. Originally, the TPACK tool was developed by Kohler and Mishra in 2009.

The tool was administered to 60 student-teachers from two teacher education colleges in the Dimapur district, Nagaland, for testing.

To validate the tool further, it was also shared with 20 teacher educators, who gave their feedback by using a five-point scale. After reviewing and summarizing the feedback, the researcher made necessary adjustments to modify the tool's clarity and effectiveness, ensuring its reliability and validity for the main study.

b) Reliability:

Reliability represents how consistently a test assesses a concept when repeated under the same or similar situations (Koul, 1984). A test to achieve reliability should produce stable results over time. There are multiple ways to measure reliability, including methods like test-retest, parallel forms, split-half, rational equivalence, and Cronbach's alpha. In essence, reliability measures the consistency of a test that can assess what it is designed to measure.

In this present study, the TPACK scale's reliability was evaluated by using Cronbach's alpha, which returned a coefficient of 0.88. Table 3.9 presents the Cronbach's alpha values of the different TPACK subscales, confirming the scale's strong reliability.

Table 3.9

Cronbach's Reliability Coefficient of the TPACK Scale

S. No.	TPACK questionnaire and its Sub Scales	Cronbach's Alpha Based on Standardized Items
1.	Technological Knowledge (TK)	0.84
2.	Pedagogical Knowledge (PK)	0.86
3.	Content Knowledge (CK)	0.82
4.	Technological Pedagogical Knowledge (TPK)	0.91
5.	Technological Content Knowledge (TCK)	0.84
6.	Pedagogical Content Knowledge (PCK)	0.86
7.	Technological Pedagogical Content Knowledge (TPACK)	0.88

c) Validity

Garret (1973) defines Validity as the level or extent to which a test accurately measures what is intended to assess. A test is considered valid when it serves its intended purpose well. A simple way to assess validity is through expert feedback, where knowledgeable individuals evaluate whether the test items seem to determine the correct aspects. While this helps establish initial validity, it could fail to provide for a deeper assessment.

To ensure content validity, the researcher sought guidance from three educators, who reviewed the scale and gave their views on whether it effectively captured the desired content.

3.9. Self-Confidence Scale for B.Ed. students

The investigator constructed and developed the Self-confidence scale for B.Ed. students. The scale was used to collect data to examine the Self-confidence levels of B.Ed. students in Nagaland**.**

a) Purpose of constructing the Self-confidence scale for B.Ed. students

The Self-Confidence Tool for B.Ed. students are designed to measure and enhance this vital trait. The tool is structured to assess various dimensions of self-confidence, such as decision-making, problem-solving, adaptability, and classroom management skills. It provides insights into the student's current levels of confidence, helping them identify strengths and areas for improvement.

This tool also includes activities and reflective exercises aimed at boosting self-assurance and overcoming barriers like fear of failure or self-doubt. By using this tool, B.Ed. Students can gain a deeper understanding of their inner potential and build the resilience needed for a successful teaching career.

Ultimately, the self-confidence tool supports the holistic development of teacher trainees, enabling them to approach their professional roles with greater competence, enthusiasm, and self-belief.

b) Steps towards preparing the Scale:

- Review of literature related to self-confidence, particularly among B.Ed. students' Self-confidence was looked into.
- Expert suggestions in the field of Psychology, Education, and Teacher Education.

Description of the Self-Confidence Scale: Dimension-wise Self-confidence:

1. **Physical and Psychological Confidence:** Integrated confidence is a holistic measure of well-being that blends physical and psychological aspects. The Physical Confidence of a student-teacher is about his/her positive outlook toward success or the result of an effort with respect to his/her physical ability. Psychological Confidence is the ability of the student-teacher to feel quite confident (e.g., in academics and athletics). Building integrated confidence requires healthy habits like regular exercise and self-care, fostering a sense of overall well-being that supports both mind and body.

2. **Technological confidence:** The 21st century is the age of technology, and the student-teacher has to have knowledge of the latest technological advancements and should be able to use this advanced technology effectively in classroom teaching, which helps them facilitate students' understanding of the subject matter easily and effectively. This confidence also reflects an awareness of cybersecurity and a responsible approach to technology use. Demonstrated in both professional and personal settings, technological confidence fosters innovation and ethical engagement, enabling individuals to navigate and contribute positively to the digital world.
3. **Social and Environmental Confidence:** Integrated social and environmental confidence refers to an individual's self-assurance in social interactions and adaptability to diverse settings. Social confidence involves ease in expressing oneself, initiating conversations, and navigating social situations with poise. Environmental confidence reflects the ability to adapt and feel comfortable in various surroundings, whether social, professional, or natural. Building this confidence requires positive self-perception, effective communication skills, and a mindset of adaptability. Together, these qualities empower individuals to thrive gracefully in both social and environmental contexts.
4. **Professional confidence:** It refers to an individual's belief in their skills, expertise, and qualifications, reflected in their ability to perform tasks effectively and handle challenges with resilience. It involves maintaining composure during setbacks, adapting to change, and demonstrating strong problem-solving abilities. Effective communication is a key aspect, enabling clear and assertive expression of ideas while fostering collaboration in the workplace. Professional confidence also includes a proactive approach to growth, such as seeking learning opportunities, embracing new challenges, and enhancing skills. This evolving trait shapes how individuals perceive their roles and engage with others, combining competence, self-assurance, and a drive for development.

c) Construction of Items:

Initially, 60 statements distributed in the 4dimensions were drafted and the same was given to 20 experts of the fields of Psychology, Education and Teacher Education, having vast experience in their respective fields were given the draft scale having 60 statements distributed in 4 dimensions for their opinions on the effectiveness of the statements, adaptability, language, etc. The dimension-wise distribution of 60 items in the preliminary draft is shown in Table 3.10.

Table 3.10

Dimension-wise distribution of items in the Self-Confidence Scale for B.Ed. students (Preliminary Draft)

Sl. No	Dimensions	No. of Items	Total No. of Items
1.	Physical and Psychological Confidence	1-20	20
2.	Technological Confidence	21-30	10
3.	Social and Environmental Confidence	31-50	20
4.	Professional Confidence	51-60	10
	Total	60	60

d) Validity:

The validity of the tool has been assessed using various methods. In the present study, the investigator established content validity. Experts from various universities like Pondicherry, Hyderabad, and Nagaland University were given the scale used to establish the content validity of the Self-confidence scale.

- **Content Validity:**

The self-confidence scale was reviewed and evaluated by experts in the field of psychology and education. The researcher made revisions based on the experts ' feedback regarding their comments, language, suitability, and relevance were considered. Thus, the overall validity of the scale was established through the content validity, which was found on the opinion of 20 professors of Psychology, Education and Teacher Education and the 80 % experts' agreement on each selected statement/item.

Based on the 80% experts' opinion/selection of statements, 10 statements were dropped, and 50 statements were retained in the final version of the scale.

e) Pilot Study:

A pilot study acts as a testing ground for research tools, helping researchers identify issues and make necessary adjustments before the primary study is conducted. The researcher conducted a preliminary study in this research to assess the Self-confidence levels among the B.Ed. students in Nagaland.

The self-confidence Scale for B.Ed. Students' first draft consisting of 60 items obtained after the expert's opinions was used for a pilot study. Each item on the scale was put on a 5-point scale: Strongly agree, agree, undecided, disagree, and strongly disagree. The scale was administered on a sample of 60 students of 2 B.Ed. Colleges in Dimapur district. After administering the scale, responses were collected and discussed with the supervisor. Changes were made in question items in the scale, new instructions were added wherever required, and other necessary changes were made. Then, scoring was done according to the scoring procedure.

f) Item analysis:

For item analysis, the statements were distributed to 60 student-teachers randomly selected from the College of Education in the Dimapur district. The responses were collected and scored by the investigator. The response sheets of the 60 students were then arranged in ascending order based on their total scores for all items. The highest 27% and lowest 27% formed the criterion group.

For calculating the Difficulty Value (D.V), the following formula was used

$$D.V = \frac{\mathrm{RU} + \mathrm{RL}}{\mathrm{N}}$$

RU – Number of Right Responses in the Upper Group

RL – Number of Right Responses in the Lower Group

N- Total Number of students in both groups

Discrimination index power, or the validity index of an item, refers to the extent to which a given item differentiates between respondents. To calculate the Discriminating Power (D.P.), the following formula was used:

$$D.P = \frac{\mathrm{RU} - \mathrm{RL}}{\mathrm{N}/2}$$

The difficulty value represents the percentage of test-takers who answered a particular item correctly, as noted by J.P. Guilford (1957). It is used to determine whether a question is too easy or too difficult. This value helps in selecting items that are appropriate for the test. Items with difficulty values below 0.40 or above 0.80 were discarded as they were considered either too difficult or too easy. Only items with difficulty values between 0.40 and 0.80 were retained as they were of moderate difficulty.

Similarly, discrimination index values ranging from 0.10 to 0.35 were rejected since these items were classified as fair. Items with discrimination index values above 0.35 were accepted. As a result, 48 items were chosen for the final version from the initial set of 60 items.

Each statement underwent individual analysis using statistical methods, specifically the t-test, conducted through SPSS V.28. A one-sample t-test was applied to assess each statement at a 0.01 significance level. Items with a t-value exceeding 2.69 were included in the final selection. Consequently, out of 60 items, 48 were retained, while 12 were eliminated based on the significance level. The one-sample t-test results for the selected and rejected self-confidence items among B.Ed. students are presented in Table 3.11.

Table 3.11

One-Sample t-test for Self-Confidence Scale for B.Ed. students

Sl. No	Mean	Standard Deviation	Standard Error Mean	t-value	Remarks
1.	1.22	0.79	0.11	10.92	Selected
2.	1.62	0.60	0.09	19.02	Selected
3.	1.58	0.73	0.10	15.29	Selected
4.	0.22	0.80	0.15	1.33	Rejected
5.	1.56	0.73	0.10	15.05	Selected
6.	1.62	0.64	0.09	18.03	Selected
7.	1.84	0.37	0.05	35.13	Selected
8.	1.46	0.81	0.12	12.69	Selected
9.	1.16	0.87	0.12	9.48	Selected
10.	0.30	0.75	0.16	1.88	Rejected
11.	1.32	0.89	0.13	10.48	Selected
12.	1.50	0.74	0.10	14.42	Selected
13.	1.96	0.28	0.04	49.00	Selected
14.	1.78	0.51	0.07	24.84	Selected
15.	0.40	0.70	0.18	2.22	Rejected
6.	1.56	0.61	0.09	18.04	Selected
17.	1.88	0.39	0.05	34.49	Selected
18.	1.58	0.73	0.10	15.29	Selected
19.	1.36	0.69	0.10	13.88	Selected
20.	0.25	0.90	0.20	1.25	Rejected
21.	1.40	0.70	0.10	14.15	Selected
22.	1.38	0.83	0.12	11.75	Selected
23.	1.86	0.35	0.05	37.52	Selected
24.	1.72	0.61	0.09	20.02	Selected
25.	1.58	0.57	0.08	19.44	Selected
26.	1.52	0.71	0.10	15.21	Selected

27.	1.70	0.58	0.08	20.72	Selected
28.	1.70	0.61	0.09	19.56	Selected
29.	1.74	0.53	0.07	23.34	Selected
30.	1.44	0.81	0.11	12.54	Selected
31.	0.50	0.85	0.25	2.00	Rejected
32.	1.68	0.62	0.09	19.14	Selected
33.	1.68	0.47	0.07	25.21	Selected
34.	1.46	0.76	0.11	13.56	Selected
35.	1.80	0.53	0.08	23.81	Selected
36.	1.24	0.87	0.12	10.07	Selected
37.	0.35	0.78	0.19	1.84	Rejected
38.	1.36	0.88	0.12	10.99	Selected
39.	0.45	0.82	0.21	2.14	Rejected
40.	1.40	0.83	0.12	11.88	Selected
41.	1.28	0.70	0.10	12.91	Selected
42.	1.76	0.52	0.07	24.05	Selected
43.	0.38	0.76	0.20	1.90	Rejected
44.	1.80	0.45	0.06	28.17	Selected
45.	1.98	0.14	0.02	99.00	Selected
46.	0.33	0.70	0.22	1.50	Rejected
47.	1.72	0.57	0.08	21.23	Selected
48.	1.80	0.45	0.06	28.17	Selected
49.	0.28	0.74	0.24	1.17	Rejected
50.	1.12	0.72	0.10	11.03	Selected
51.	1.58	0.64	0.09	17.41	Selected
52.	1.66	0.59	0.08	19.80	Selected
53.	0.44	0.79	0.23	1.91	Rejected
54.	1.20	0.83	0.12	10.19	Selected
55.	1.68	0.65	0.09	18.20	Selected
56.	1.74	0.56	0.08	21.79	Selected

57.	1.80	0.49	0.07	25.72	Selected
58.	1.28	0.88	0.12	10.27	Selected
59.	1.22	0.79	0.11	10.92	Selected
60.	0.41	0.81	0.21	1.95	Rejected

g) Preparation of the final Draft Tool:

The researcher constructed the self-confidence scale to measure the Self-confidence of the student-teachers. The items in the self-confidence scale are designed to measure the Physical and Psychological confidence, Technological confidence, Social and Environmental confidence, and Professional confidence of the student-teachers. The total number of items on the scale is 48, presented in Table 3.12.

Table 3.12 Dimension-wise distribution of items in the Self-confidence Scale Final draft

S.No	**Self-Confidence Dimensions**	**Number of Items**	**Nature of Items**	**Total**
1.	Physical and Psychological Confidence	Positive – 7	1,2,4,6,7,8,10	13
		Negative – 6	3,5,9,11,12,13	
2.	Technological Confidence	Positive – 5	14,15,16,17,18	9
		Negative – 4	19,20,21,22	
3.	Social and Environmental Confidence	Positive-13	23,24,25,26,27,32,33,34,35,36,37,39,40	18
		Negative-5	28,29,30,31,38	
4.	Professional Confidence	Positive-3	43,44,46	8
		Negative-5	41,42,45,47,48	
	Positive Items = 28 **Negative Items= 20**		**Total Items**	**48**

h) Reliability:

The reliability of the Self-confidence scale was found by applying the Spearman-Brown Coefficient, Guttman Split-Half coefficient, and Cronbach's Alpha for inter-item correlation and items with total correlation. The 48 items were distributed to 60 student-teachers from a few colleges from teacher education in the Dimapur district. The reliability coefficient was found to be the Spearman-Brown Coefficient of relationship was determined to be 0.70, the Guttman Split-Half of connection was 0.72, and Cronbach's Alpha was 0.74, which is significant at a 0.01 significance level. These values are sufficiently acceptable to assume that the present Self-confidence Scale for B.Ed. Students is a highly reliable tool to measure the self-confidence of B.Ed. students, the reliability of the tool was established. The reliability value of the scale is presented in Table 3.13.

Table 3.13

Reliability of the Self-Confidence Scale for B.Ed. Students

	Spearman-Brown Coefficient	Guttman Split-Half Coefficient	Cronbach's Alpha Coefficient
Self-Confidence Scale for B.Ed. students	0.70	0.72	0.74

i) Scoring Procedure:

The scoring key plays a crucial role in the scoring procedure. Five different responses were used, ranging from most acceptable to least acceptable descriptions for the respondents' self-confidence. The scoring system for all alternatives or responses remained consistent (i.e., 5, 4, 3, 2, 1) regardless of whether the items were positive or negative, with five alternatives for each item. If a respondent provides 5, 4, 3, 2, or 1 for the 1st, 2nd, 3rd, 4th, and 5th alternatives, those corresponding scores will be assigned. The individual's self-confidence score will be the total of all 48 items. Table 3.14 shows the scoring of the items on the Self-Confidence Scale. The complete scale is available in Appendix II.

Table 3.14 Scoring Procedure for Self-Confidence Scale

S. No.	Responses	Scores
1.	Strongly Agree	5
2.	Agree	4
3.	Undecided	3
4.	Disagree	2
5.	Strongly Disagree	1

a) Statistical Results:

Statistical results are given in Table 3.15

Table 3.15 Statistical Results

N	Mean	SD
625	**169.04**	**16.19**

(Population of B.Ed. students in Nagaland- 1250)

b) Norms:

Based on the statistical results presented in Table 3, z-score norms have been developed for the full scale, and the same are presented in Table 3.16.

Table 3.16

Interpretation and classification of Raw Scores for total Self-confidence

Raw Scores	Interpretation
1 to 55	Low Level of Self-Confidence
56 to 175	Average Level of Self-Confidence
176 to 255	High Level of Self-confidence

3.10. Teaching Competency Scale for B.Ed. Students

For assessing the B.Ed. students teaching competency, the researcher has adopted the Teaching Competency Scale developed by Jeya S.K. and Denisia S.P.

(2016), which contains items that include subject knowledge, content organization, teaching methods, student interaction, and classroom management. The scale includes 50 items, and there is no time limit for completion. Participants were provided the time to respond to ensure they could answer each item thoughtfully, with clear instructions provided to guide the process.

Brief Descriptions of the Teaching Competency Scale

1. Subject Competency: It refers to the ability to understand and effectively teach the subject areas. It combines strong content knowledge with the application of teaching strategies tailored to diverse learner needs. This competency is essential for developing confident and capable educators who can inspire and engage students.

2. Content Organization and Presentation: Content organization and presentation refer to the structured arrangement and effective delivery of information to ensure clarity, coherence, and engagement. Organizing content involves logically sequencing ideas, grouping related points, and using headings or subheadings for easy navigation. Presentation focuses on how the content is delivered, using language, visuals, and tools to make it appealing and understandable.

3. Interactive competency: It refers to the ability to engage effectively with others through clear communication, active listening, and meaningful interaction. It involves fostering a collaborative environment, adapting to diverse perspectives, and building strong interpersonal connections.

4. Instructional Strategy: An instructional strategy is a planned approach or method used by educators to facilitate and achieve specific educational objectives. It involves selecting appropriate techniques, materials, and activities to engage students, address diverse learning needs, and enhance their understanding of the subject matter.

5. Classroom Management: Classroom Management refers to the techniques and strategies student-teachers use to create an organized, productive, and respectful learning environment. Effective classroom management ensures smooth instruction, minimizes disruptions, and fosters a positive atmosphere where students can thrive academically and socially.

a) Item Analysis

The first draft of 60 statements was distributed in the 5 dimensions as described above and the same was given to 25 experts of the level of Professors in the field of Psychology, Education, and Teacher Education, having vast experience in their respective fields were the draft scale having 60 statements distributed in 5 dimensions for their opinion on the effectiveness of the statements, adaptability, language, etc. it was decided that statements having 80 % experts selection will be retained. It was found that the subjects' responses for 10 statements did not show significant differences between the upper and lower groups. Hence, only 50 statements were retained.

b) Final draft of the Scale

After conducting an item analysis of the final draft, a total of 50 items were selected for the final draft of the General Teaching Competency Scale for pre-service teachers, and the remaining 10 items were excluded. The dimension-wise distribution of these 50 items in the final draft is shown below in the table.

Table 3.17.

Dimensions distribution of items in the Teaching Competency Scale

S. No.	Dimensions	Item Numbers
1.	Subject Competency	1-7
2.	Content Organization and Presentation	8-19
3.	Interactive Competency	20-29
4.	Instructional strategies	30-39
5.	Classroom Management	40-50

(Source: Jeya S.K. and Denisia S.P. (2016), Teaching Competency Scale)

c) Scoring Procedure

The scoring procedure is a key element of the evaluation process. The respondents are given five alternatives for each item, ranging from the most favourable to the least favourable description of their self-confidence. Each option is assigned a score: 5, 4, 3, 2, or 1, which remains the same regardless of the phrasing of the items (positive or negative).

The overall Teaching Competency scores are calculated by adding the individual responses from all 50 items. The complete scale is available in Appendix III.

Table 3.18. shows the scoring of the items on the Teaching Competency Scale.

Table 3.18.

Scoring Procedure of Teaching Competency Scale

S. No	**Type of Responses**	**Score for Positive Items**
1.	Strongly Agree	5
2.	Agree	4
3.	Undecided	3
4.	Disagree	2
5.	Strongly Disagree	1

(Source: Jeya S.K. and Denisia S.P. (2016), Teaching Competency Scale)

d) Reliability of the Scale

The reliability was found by Cronbach's alpha for inter-item correlation and the item with total correlation. The reliability coefficient was found to be 0.91, which is significant at a 0.01 level of significance.

e) Validity

The validity of the scale was established by Content validity, which was based on the opinion of 25 Professors of Psychology, Education, and Teacher Education, and the 80 % experts on each selected statement.

f) Standardization

The final draft of the Teaching Competency Scale with 50 items was administered to a randomly selected 1015 male and female pre-service teachers working in government and private colleges in Bangalore.

g) Statistical Results

Based on scores of 1015 student teachers, the following statistical results were found.

Table 3.19. Statistical Results

N	Mean	SD	Range of Scores
1015	95.50	14.60	50 -250

(Source: Jeya S.K. and Denisia S.P. (2016), Teaching Competency Scale)

h) Norms

On the basis of the statistical results, Norms for interpretation have been established. Table 3.20 shows the Interpretation and classification of Raw Scores for total Teaching Competency.

Table 3.20. Interpretation and Classification of Raw Scores for Total Teaching Competency

S. No	Raw Scores	Interpretation
1.	1to 50	Low Teaching Competency
2.	51 to 172	Average Teaching Competency
3.	173 to 250	High Teaching Competency

a) Pilot Study

The researcher chose to carry out a preliminary study to evaluate the practicality and appropriateness of the Teaching Competency scale, which was developed and standardized by Jeya S.K. and Denisia S.P. (2016). To adapt the tool to the Indian educational context, a pilot study was administered to 60 students from three B.Ed. colleges in the Dimapur district for testing the tool.

To validate the tool further, it was also shared with the 20 teacher educators, who gave their feedback by using a five-point scale. After reviewing and summarizing the feedback, the researcher made necessary adjustments to modify the tool's clarity and effectiveness, ensuring its reliability and validity for the main study.

b) Reliability:

Reliability can be assessed by using various techniques, including the test-retest, parallel forms, split-half, rational equivalence, and Cronbach's Alpha methods. The researcher chose Cronbach's alpha to calculate the Teaching Competency Scale's reliability. The result of a reliability coefficient of 0.94 confirms the scale's excellent reliability.

c) Validity:

To validate the tool, the researcher worked with experts to review the scale's items and determine whether they accurately aligned with the theoretical framework. The expert feedback was adopted to establish content validity for the scale.

d) Administration of the tools:

The researcher systematically planned and executed the data collection process to ensure its efficiency and effectiveness. Information regarding the B.Ed. colleges situated in four districts of Nagaland were collected for the present study with an adequate number of copies for the research tool (TPACK Scale, Self-confidence Scale, and Teaching Competency Scale) finalized thereafter.

The researcher established a good relationship with the teacher educators during their visits to the colleges. The aim of the research was shared with the teacher educators and students, informing them that their responses would remain confidential and encouraging them to provide sincere and candid answers.

The research instruments were given to the B.Ed. students in the Dimapur, Kohima, Chumukediema and Mokokchung districts. Instructions were provided, asking respondents to tick the relevant boxes corresponding to their answers. Afterward, the data collected were organized and analyzed with a statistical software package.

3.11. Statistical Techniques in the Study:

The statistical techniques utilized in this study are presented below.

i. Descriptive Analysis: Descriptive analysis was applied by applying measures of central tendency, like the mean, and variability measures like the standard deviation. These calculations are essential for understanding the features of different sub-samples. Mean and Standard Deviation were computed to ascertain the status of B.Ed. students for the variables of TPACK, Self-confidence, and Teaching Competency.

ii. Differential analysis: To examine the objectives related to TPACK, Self-confidence, and Teaching Competency of the B.Ed. students, significance tests were conducted. Each of the null hypotheses was tested at significance levels of 0.01 and 0.05, using t-tests and F-tests.

iii. Correlation and Multiple Regression Analysis: The relationships among the variables were examined through Karl Pearson's product-moment correlation Coefficient as follows:

- TPACK and Self-confidence
- Self-confidence and Teaching Competency
- TPACK and Teaching Competency
- TPACK, Self-confidence, and Teaching Competency

iv. T-test: A t-test was utilized to establish the differences in the TPACK, Self-confidence, and Teaching Competency of B.Ed. students concerning selected variables.

v. ANOVA: One-way ANOVA and Post-Hoc t-test of mean and standard deviation were employed to analyze the mean of more than two groups within the same variable, namely, Stream – Arts, Science, and Commerce.

Conclusion:

This chapter describes the research methodology, detailing the research design, methods, sample, and sampling procedures.

It also outlined the tools utilized for collecting data, along with the administration and scoring procedures. The data analysis techniques applied for analyzing the data are discussed in detail. The upcoming chapter will address the statistical analysis and the interpretation of the data.

CHAPTER – IV

ANALYSIS AND INTERPRETATION

4.1. Introduction

This chapter presents a comprehensive analysis and interpretation of data collected from a sample of 625 B.Ed. students in Nagaland. The structure of this chapter is organized around several distinct statistical analyses:

1. Descriptive Analysis – This analysis aims to explore the distribution and percentage levels of Technological Pedagogical Content Knowledge (TPACK), self-confidence, and teaching competency within the sample.

2. Differential Analysis – T-tests and Analysis of Variance (ANOVA) are employed to examine differences across variables, including gender, qualifications, and stream of study.

3. Correlation Analysis – Pearson's correlation coefficient is utilized to investigate the relationships between TPACK, self-confidence, and teaching competency, to identify any significant associations among these variables.

4. Regression Analysis – This analysis assesses the extent to which TPACK and self-confidence predict teaching competency among the participants.

Additionally, the chapter incorporates findings from prior studies to validate and compare the current results with established literature.

First, the mean and standard deviation are computed to summarize central tendencies and variability within the sample. Descriptive statistics are then used to represent the data. T-tests and ANOVA are applied to analyze differences in means across various groups. Further analysis delves into specific subgroups such as gender, educational background, years of study, stream, locality, institution, and prior technological knowledge. Pearson's correlation coefficient is employed to examine the relationships between TPACK, self-confidence, and teaching competency. The results of the significance tests are categorized under the relevant headings.

The interpretation of these results is then discussed in relation to previous research, offering a comparative understanding of the current results in the context of established trends in educational research. This comparative approach helps situate the findings within the broader framework of existing literature, thereby enriching the overall interpretation of the results.

4.2 Data Analysis:

The data analysis includes reviewing structured information from a variety of perspectives to identify key insights. It requires simplifying complex variables into understandable parts for easier interpretation. The analysis process continues throughout the research, from identifying the problem to choosing the methods, data interpretation, and conclusion development.

The quantitative data consists of selected factors such as gender, academic qualifications, stream, year of study, locality, institution, and prior technological knowledge. In addition, the collected data for the TPACK, self-confidence, and teaching competency scores were gathered for the analysis. The analysis is organized into the following categories:

- Descriptive Analysis
- Differential Analysis
- Correlational Analysis
- Multiple Regression Analysis

Level of Significance:

The significance level reflects the probability of a Type I error rejecting the null hypothesis. Researchers typically choose significance levels like 0.05 or 0.01. This threshold is necessary for assessing whether the null hypothesis can be accepted or rejected. This study set the significance level at 0.05 for all tests.

4.3. Percentage-wise levels of TPACK, Self-confidence, and Teaching Competency among B.Ed. students in Nagaland

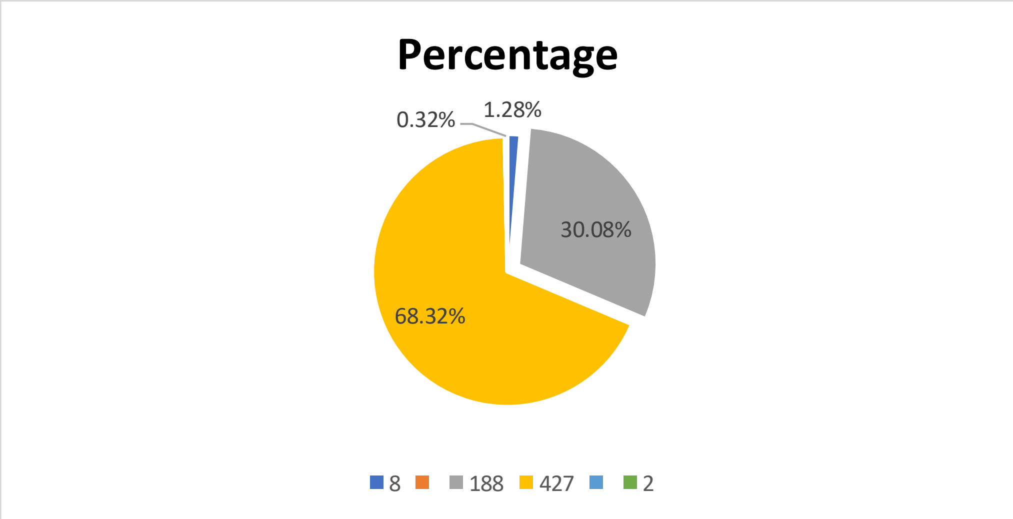
4.3.1. The Technological Pedagogical Content Knowledge (TPACK) skills level among B.Ed. students for the total sample and their z-scores. Table 4.1

Table 4.1. Percentage-wise of TPACK levels of B.Ed. Students

S.No	No. of Respondents	Percentage	TPACK Raw Scores Range	z-Scores Range	Grade	Level of TPACK
1.	8	1.28 %	232-269	+1.26 to +2.00	B	High
2.	188	30.08 %	195-231	+0.51 to +1.25	C	Above Average
3.	427	68.32 %	144-194	-0.50 to +0.50	D	Average
4.	2	0.32 %	107-143	-1.25 to -0.51	E	Below Average
Total	625	100 %				

As presented in Table and Figure 4.1, 68.32% of the B.Ed. students exhibit average TPACK skills, whereas 30.08% belong to the above-average category. Only a small group (1.28%) displays advanced TPACK proficiency, and a small percentage (0.32%) shows below-average performance. This reveals that although most students possess a foundational knowledge of technology in education, there is considerable potential for improvement.

Figure 4.1 Percentage-wise TPACK levels of B.Ed. Students



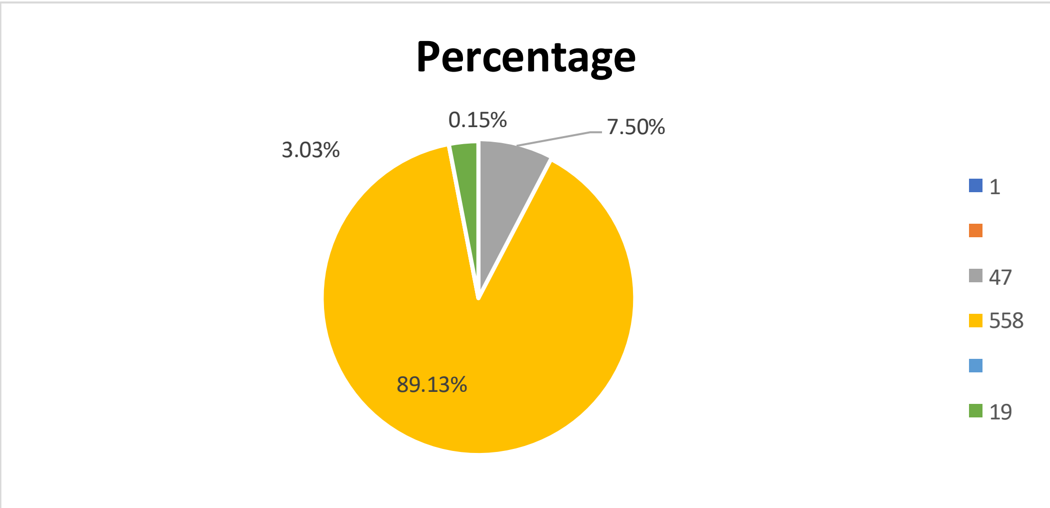
4.3.2. Percentage-wise, Self-Confidence levels of B.Ed. Students in Nagaland

Table 4.2. Percentage-wise, Self-Confidence levels among B.Ed. Students.

Sl.No	No. of Respondents	Percentage	Self-Confidence Raw Scores Range	z-Scores Range	Grade	Level of Self-Confidence
1.	1	0.15 %	232-269	+1.26 to +2.00	B	High
2.	47	7.50 %	195-231	+0.51 to +1.25	C	Above Average
3.	558	89.13 %	144-194	-0.50 to +0.50	D	Average
4.	19	3.03 %	107-143	-1.25 to -0.51	E	Below Average
Total	625	100 %				

According to Table 4.2, most of the students (89.13%) fall within the average self-confidence range, as revealed by z-scores between -0.50 and +0.50. A smaller proportion (7.50%) show above-average self-confidence, while a mere 0.15% demonstrate exceptional self-confidence. However, 3.03% of students in the below-average range may need additional resources or support to enhance their skills to build their self-esteem.

Figure 4.2 Percentage-wise B.Ed. students' levels of Self-Confidence.



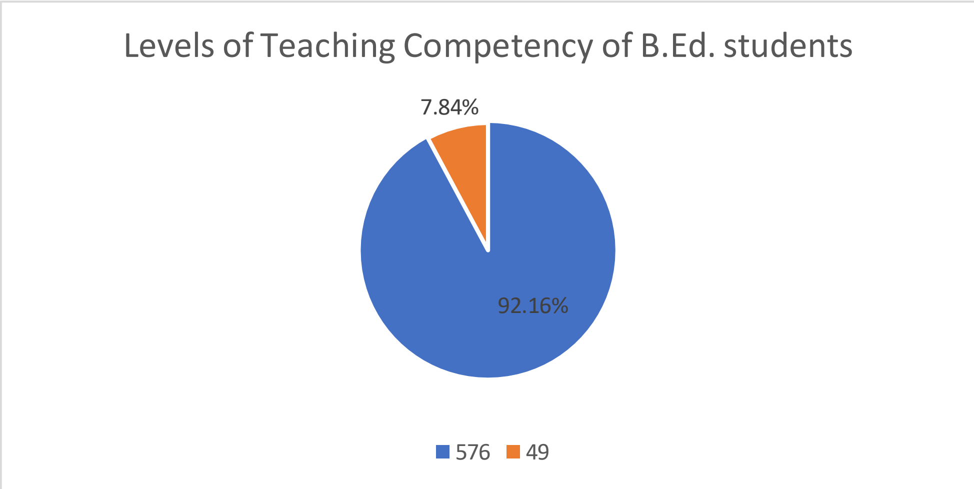
4.3.3 Percentage-wise, Teaching Competency levels among B.Ed. Students.

Table 4.3. Percentage-wise Teaching Competency levels among B.Ed. Students

S. No	No. of Respondents	Percentage	Teaching Competency Raw Scores Range	z-Scores Range	Grade	Level of Teaching Competency
1.	576	92.16 %	73-250	+1.26 to +2.00	B	High
2.	49	7.84 %	51-72	+0.51 to +1.25	C	Above Average
Total	625	100 %				

Table 4.3 shows that 92.16% of students demonstrate high teaching competency, with z-scores ranging from +1.26 to +2.00. This indicates that most of the students are competent in teaching and well-prepared for their careers. A smaller group (7.84%) falls within the above-average category (C grade), showing that these students have a solid foundation but could further enhance their skills.

Figure 4.3. Percentage-wise B.Ed. Students' Levels of Teaching Competency



4.4. Mean and Standard Deviation Scores of TPACK, Self-Confidence, and Teaching Competency

Table 4.4. Shows the Mean and Standard deviation scores of Technological Pedagogical Content Knowledge (TPACK), Self-confidence, and Teaching Competency

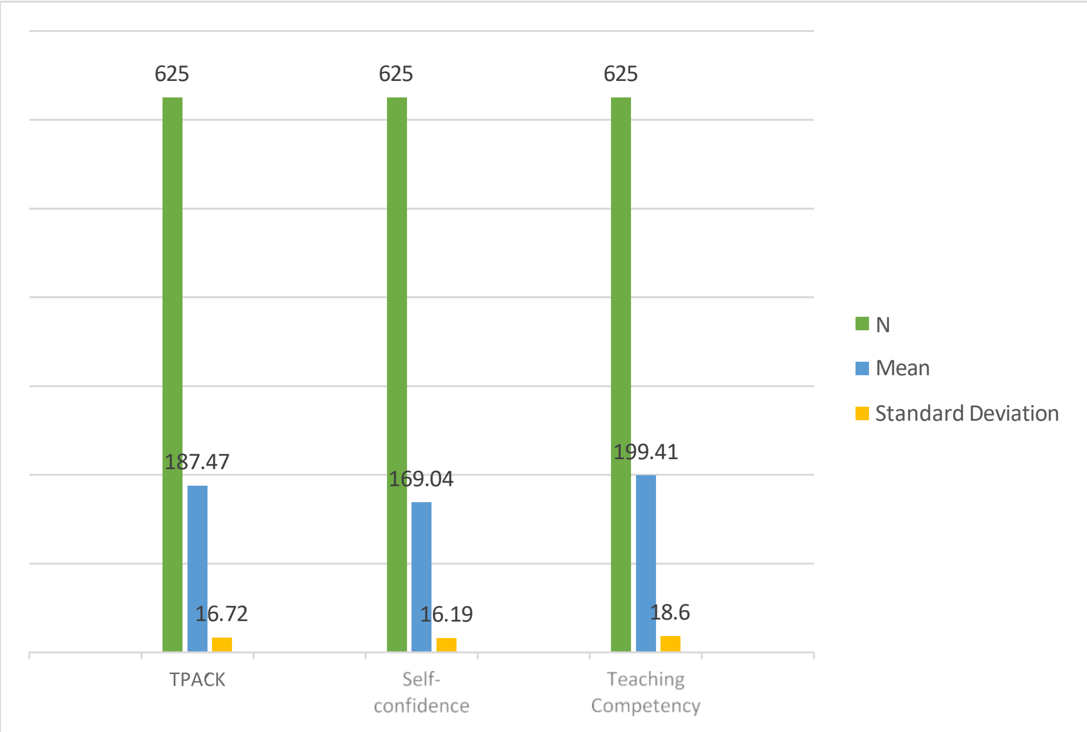
Table 4.4

Variables	N	Mean	Standard Deviation
Technological Pedagogical Content Knowledge (TPACK)	625	187.47	16.72
Self-confidence	625	169.04	16.19
Teaching Competency	625	199.41	18.60

Table 4.4 shows that the mean TPACK score of 187.4784 falls between 144 and 194, confirming that the B.Ed. students' TPACK levels are average. The mean self-confidence score of 169.04 falls within the 144-194 range, confirming that the B.Ed. students' self-confidence levels are average. The mean Teaching competency score of 199.4128 is within the 75-250 range and concludes that the B.Ed. Students' teaching competency levels in Nagaland are high.

Figure 4.4.

Mean and SD Scores of TPACK, Self-confidence, and Teaching Competency of B.Ed. students in Nagaland



4.5. Differential Analysis:

It is used to find the significant differences among the Means of different groups. It involves a t-test.

Objective – 1: To analyze the Technological Pedagogical Content Knowledge (TPACK) and its variations among B.Ed. students in Nagaland are based on variables such as gender, educational qualification, stream, year of study, locality, institution, and previous technological knowledge.

Hypothesis ($H_0$1): There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students are based on gender (Male/Female), educational qualification (UG/PG), Stream (Arts/Science/Commerce), year of study(I/II), locality (Rural/Urban), institution (Government/Private), and previous technological knowledge (Yes/No).

To analyze the Technological Pedagogical Content Knowledge (TPACK) and its variations among B.Ed. students in Nagaland are based on variables such as gender, educational qualification, stream, year of study, locality, institution, and previous technological knowledge were tested using a t-test.

$H_0$1.1: There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students based on Gender (Male/Female).

Table. 4.5

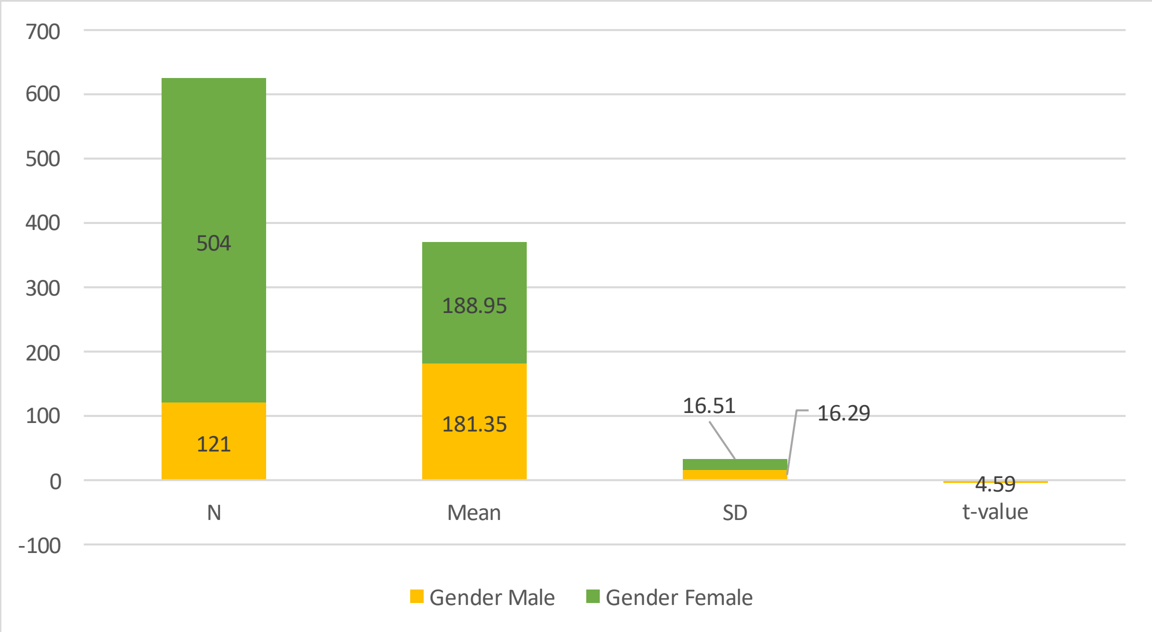
Comparison of mean, standard deviation, and t-test scores of TPACK of B.Ed. Students with respect to Gender

Variable	Sub group	N	Mean	SD	Df	t-value	Remarks (S/NS)
Gender	Male	121	181.35	16.29	623	4.59**	S
	Female	504	188.95	16.51			

****S – Significant level at 0.05.**

The analysis of Table and Figure 4.5. reveals that the female B.Ed. Students (M =188.95) have higher mean TPACK scores than their male students (M =181.35), with a t-value of 4.59 indicating a statistically significant difference at the 0.05 level of significance with df =623. As a result, the null hypothesis (1.1), formulated as "There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students based on gender (Male/Female)" was rejected, and the data shows that gender influences TPACK, with female students outperforming male students. Similar findings were reported by Sharma and Singh (2015), Verma and Rathi (2016), Singh and Yadav (2020), Smith and Lee (2015), Brown and White (2016), and Yusuf (2022).

Figure 4.5. Comparison of mean, standard deviation, and t-test scores of TPACK of B.Ed. Students with respect to Gender



$H_0$1.2: There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students based on Educational qualification

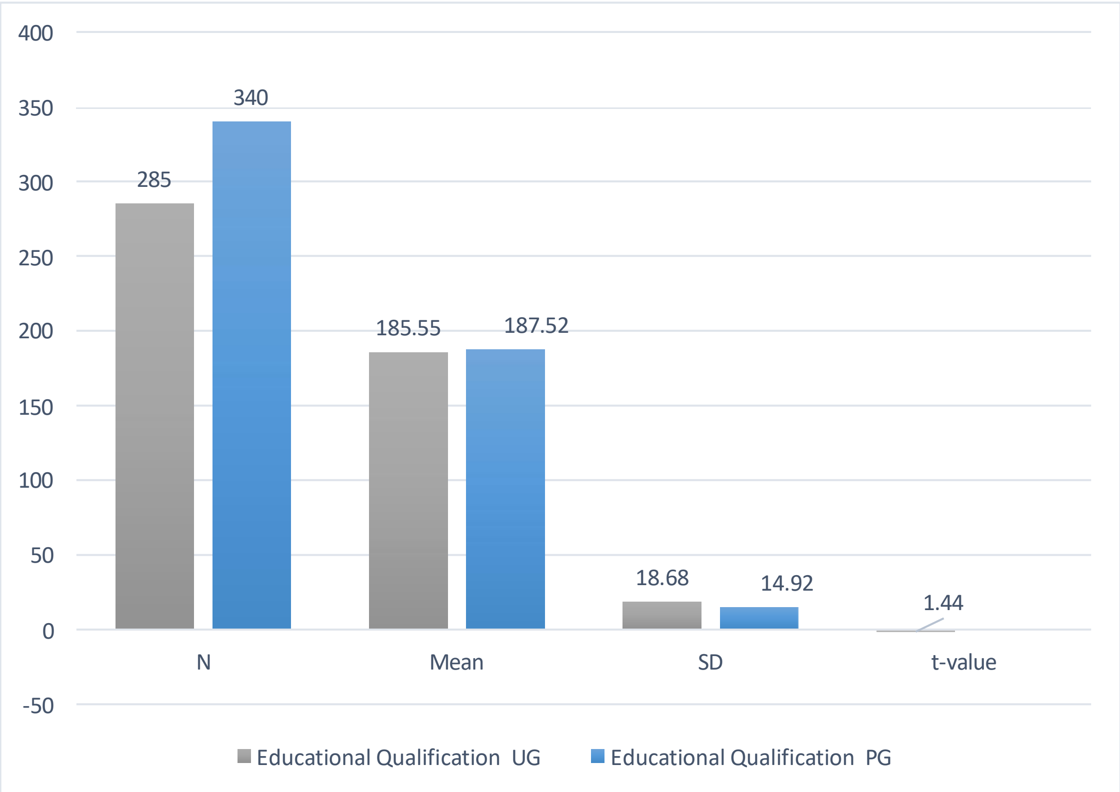
Table 4.6. Comparison of mean, standard deviation, and t-test scores of TPACK of B.Ed. Students with respect to Educational Qualification

Variable	**Sub Group**	**N**	**Mean**	**SD**	**Df**	**t-value**	**Remarks**
Educational Qualification	UG	285	185.55	18.68	623	1.44**	NS
	PG	340	187.52	14.92			

****NS - Not Significant Level at 0.05 level**

As presented in Table and Figure 4.6, the data do not indicate a significant difference in TPACK scores between B.Ed. students at the undergraduate (UG) and postgraduate (PG) levels. Although postgraduate (PG) students show a higher mean score (M = 187.52) than undergraduate (UG) B.Ed. students (M = 185.55), the t-value of 1.44 shows that the difference was not significant with df=623. This points to the fact, suggesting that educational qualification does not significantly impact B.Ed. students' TPACK. Therefore, the null hypothesis (1.2), formulated as "There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students based on Educational qualification," was not rejected. Thus, it may be concluded that there was no significant difference in the Technological Pedagogical Content Knowledge of B.Ed. students concerning educational qualifications. Similar results were documented by Archambault and Barnett (2010), Olofson et al. (2016), Scherer et al. (2017), Jeyaraj and Ramnath (2018), Kaur and Gill (2019), and Davis and Clark (2016).

Figure 4.6. Comparison of mean, standard deviation, and t-test scores of TPACK of B.Ed. Students with respect to Educational Qualification



$H_0$1.3: There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students based on the Stream.

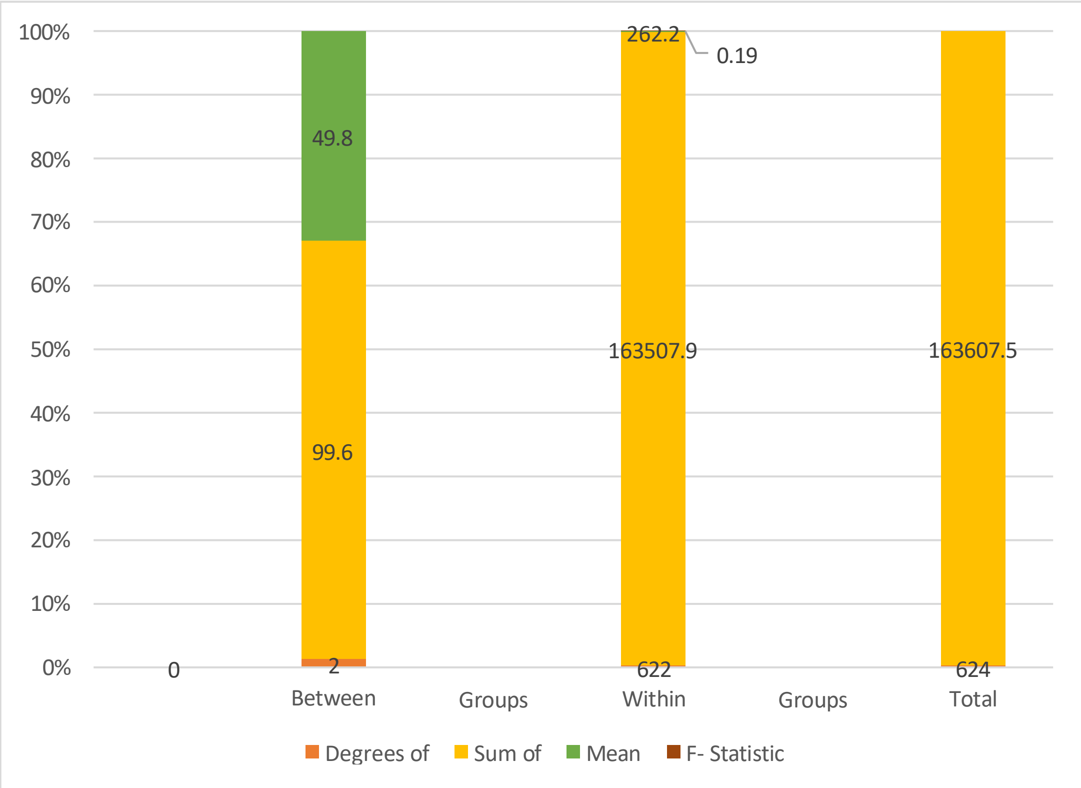
Table 4.7. Summary of ANOVA on TPACK of B.Ed. students with respect to Stream (Arts/ Science/Commerce)

Source of Variation	**Degrees of Freedom (df)**	**Sum of Squares (SS)**	**Mean Square (MS)**	**F-ratio**	**Remarks S/NS**
Between Groups	2	99.6	49.8	0.190**	NS
Within Groups	622	163507.9	262.2		
Total	624	163607.5			

****NS-Not Significant at 0.05 level.**

From Table 4.7, it was observed that the F-statistic value is 0.190, which is not significant at the 0.05 level of significance. It indicates that the mean scores of TPACK of B.Ed. students concerning stream do not differ significantly. Therefore, the null hypothesis (1.3), formulated as "There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students based on Stream," was not rejected, and there was no significant difference among mean scores of TPACK of B.Ed. students in the concerned stream are accepted. Hence, it is inferred that there was no significant difference among the mean scores of TPACK of B.Ed. students concerning the stream. In this case, since the F-statistic is relatively small (0.190), it suggests that the differences in means between the streams (Arts/Science/Commerce) are not statistically significant, indicating that the streams does not have a substantial effect on the variable. Similar results were found by Igbal et al. (2013), Redmond and Lock (2019), Kumar and Soni (2022), and Sreekala and James (2024).

Figure 4.7 Summary of ANOVA on TPACK of B.Ed. students with respect to Stream (Arts/ Science/Others)



$H_0$1.4: There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students based on Year of Study

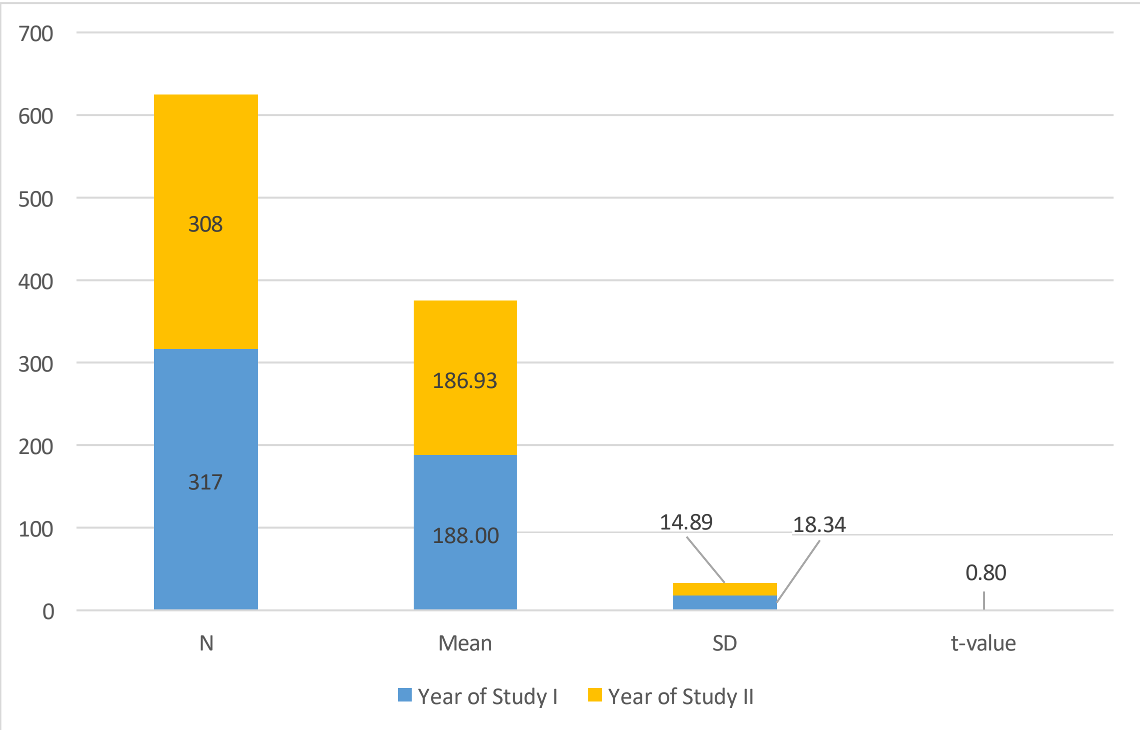
Table 4.8. Comparison of mean, standard deviation, and t-test scores of TPACK of B.Ed. students with respect to Year of Study

Variable	**Sub group**	**N**	**Mean**	**SD**	**Df**	**t-value**	**Remarks (S/NS)**
Year of Study	I	317	188.00	18.34	623	0.80**	NS
	II	308	186.93	14.89			

**** NS- Not Significant Level at 0.05 level**

Table and Figure 4.8, the years of study (whether the first or second year of B.Ed.) do not significantly affect TPACK. The first-year students have a modestly higher mean score (M = 188.00) than second-year students (M = 186.93), but the t-value of 0.80 shows that the difference was not significant with df =623, and therefore, the null hypothesis (1.4), formulated as “There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students based on Year of Study” was not rejected. Thus, it can be concluded that there was no significant difference in the TPACK of B.Ed. students concerning the year of study. Similar results were reported by Harvey and Caro (2017), Liu et al. (2019), and Sharma and Kumar (2021).

Figure 4.8. Comparison of mean, standard deviation, and t-test scores of TPACK of B.Ed. students with respect to Year of Study



$H_0$1.5: There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students based on Locality

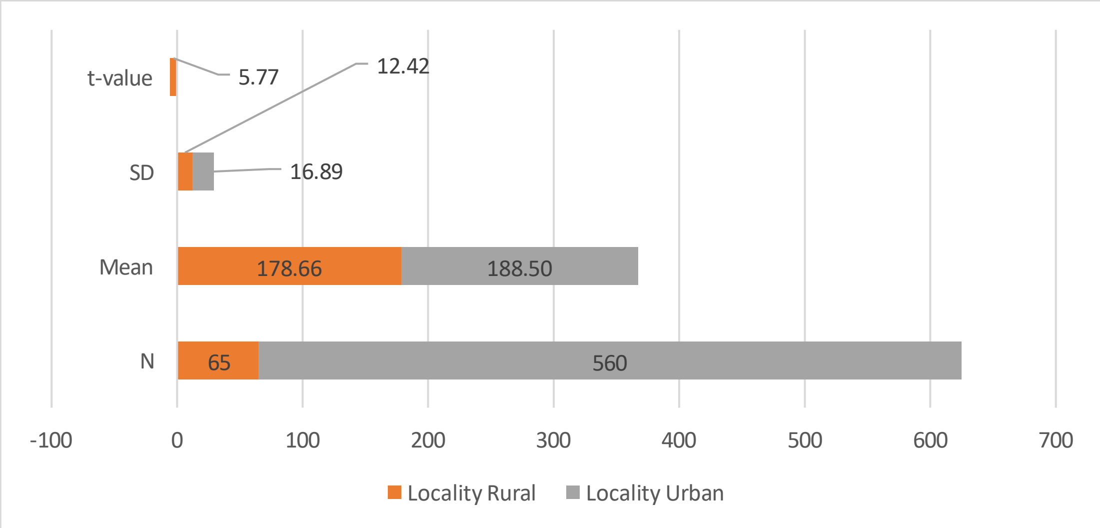
Table 4.9. Comparison of mean, standard deviation, and t-test scores of TPACK of B.Ed. Students with respect to Locality

Variable	**Subgroup**	**N**	**Mean**	**SD**	**Df**	**t-value**	**Remarks (S/NS)**
Locality	Rural	65	178.66	12.42	623	5.77**	S
	Urban	560	188.50	16.87			

****S - Significant at 0.05 level**

Table 4.9 highlights a significant difference in TPACK scores in relation to the students' locality, with students from urban areas scoring higher (M = 188.50) than rural students (M = 178.66). The t-value of 5.77 indicates that the difference was significant at the 0.05 level with df=623. Therefore, the null hypothesis (1.5), formulated as "There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students based on Locality," was rejected, suggesting that locality had a significant impact on TPACK. Thus, it can be concluded that there is a significant difference in the TPACK of B.Ed. students with respect to locality. Similar results were reported by Rathore and Sharma (2018), Das and Sen (2024), and Sreekala and James (2024).

Figure 4.9 Comparison of mean, standard deviation, and t-test scores of TPACK of B.Ed. students with respect to Locality



$H_0$1.6: There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students based on the Institution.

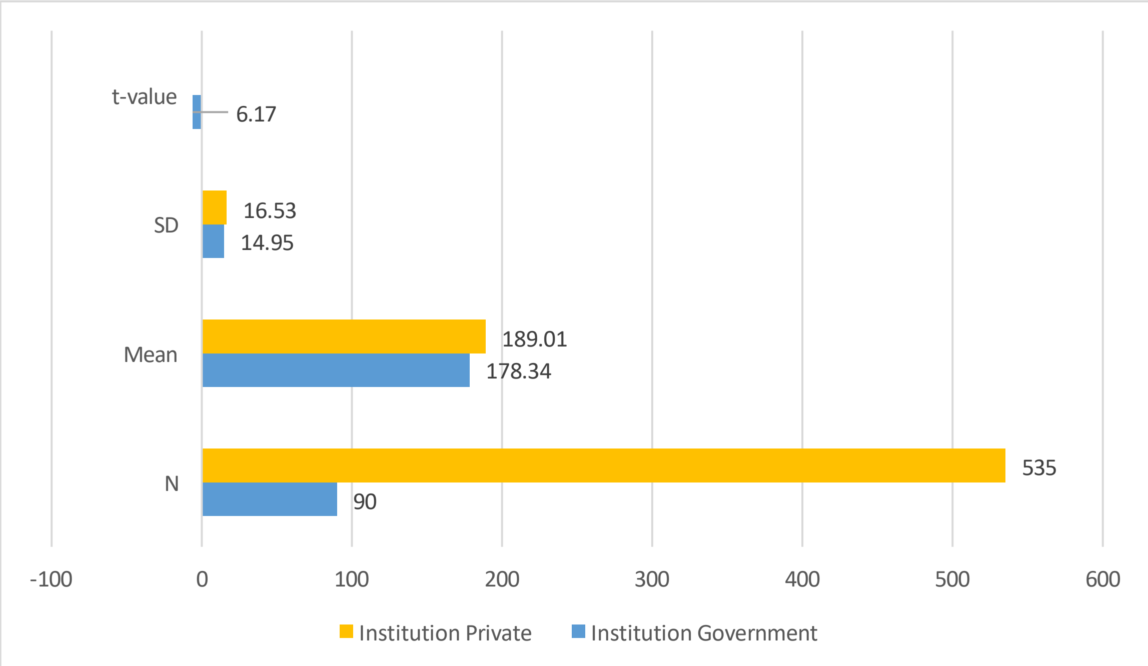
Table 4.10. Comparison of mean, standard deviation, and t-test scores of TPACK of B.Ed. students with respect to the Institution

Variable	Sub group	N	Mean	SD	Df	t-value	Remarks (S/NS)
Institution	Government	90	178.34	14.95	623	6.17**	S
	Private	535	189.01	16.53			

****S - Significant at 0.05 level**

In Table and Figure 4.10, there is a significant difference in TPACK scores between students from private and government institutions. Students from private institutions maintain a higher mean score (M = 189.01) compared to those from government institutions (M = 178.34). The t-value of 6.17 indicates that the difference was statistically significant with df=623; thus, the null hypothesis (1.6), formulated as “There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students based on Institution,” was rejected, suggesting the type of institution significantly influences TPACK. Similar findings were reported by Desai and Patel (2020), Khan and Hussain (2023), and Ng and Tan (2021).

Figure 4.10. Comparison of mean, standard deviation, and t-test scores of TPACK of B.Ed. students with respect to the Institution



$H_0$1.7: There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students based on Previous Technological Knowledge.

Table 4.11. Comparison of mean, standard deviation, and t-test scores of TPACK of B.Ed. Students with respect to Previous Technological Knowledge

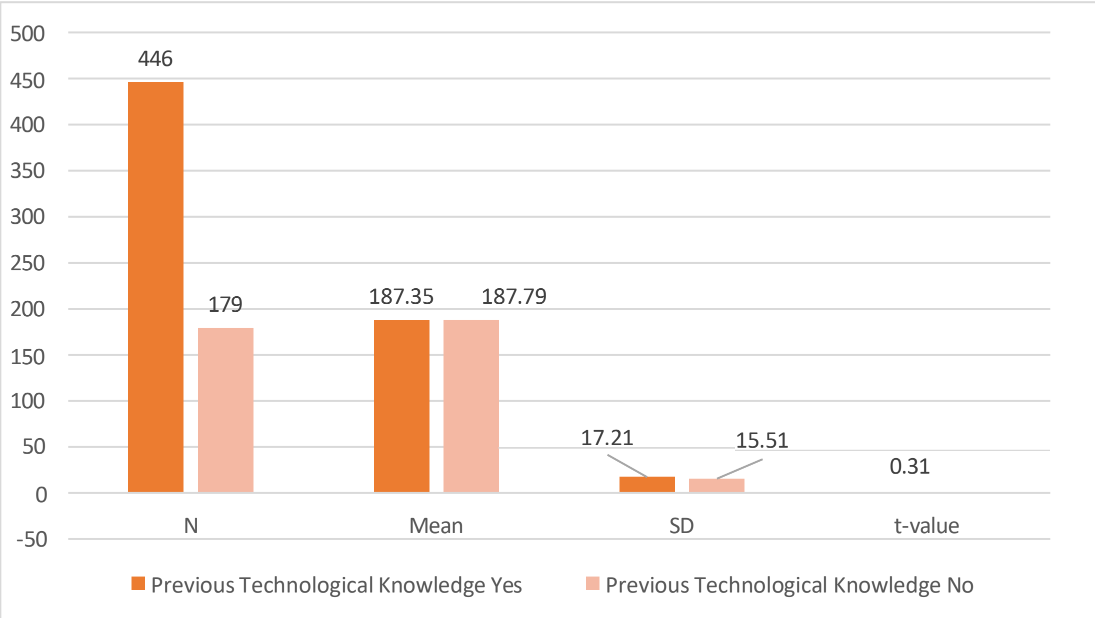
Variable	Sub group	N	Mean	SD	Df	t-value	Remarks (S/NS)
Previous Technological Knowledge	Yes	446	187.35	17.21	623	0.31**	NS
	No	179	187.79	15.51			

****NS - Not Significant Level at 0.05 level**

As presented in Table and Figure 4.11, no significant difference in TPACK scores was found between students with previous technological knowledge and those without. While students without prior technological knowledge (M = 187.79) show a marginally higher mean score than those with technological knowledge (M = 187.35), the t-value of 0.31 suggests that the difference was not statistically meaningful with df =623. Therefore, the null hypothesis (1.7), formulated as "There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students based on Previous Technological Knowledge," was accepted, indicating that prior technological knowledge does not have a significant effect on TPACK. Similar reports were found by Singh and Joshi (2019), Verma and Gupta (2019), Harris and Jeckins (2020), and Ng and Tan (2021).

In summary, significant differences in TPACK are observed based on gender, locality, and institution type, with females, urban students, and private institution students indicating higher competency. However, educational qualifications, Years of study, stream, and previous technological knowledge do not show significant differences in TPACK.

Figure 4.11. Comparison of mean, standard deviation, and t-test scores of TPACK of B.Ed. students with respect to Previous Technological Knowledge



Objective – 2: To investigate the levels of Self-confidence among B.Ed. Students in Nagaland are based on variables such as gender, educational qualification, stream, year of study, locality, institution, and previous technological knowledge.

To investigate the levels of Self-confidence of B.Ed. Students in Nagaland were analyzed based on variables, the t-test and ANOVA, and the Post-Hoc t-test was applied.

Hypothesis ($H_0$2): There is no significant difference in Self-confidence based on variables.

There is no significant difference in the self-confidence of B.Ed. students in Nagaland are based on gender (Male/Female), educational qualification (UG/PG), stream (Arts/Science/Commerce), year of study(I/II), locality (Rural/Urban), institution (Government/Private), and previous technological knowledge (Yes/No).

$H_0$2.1: There is no significant difference in the Self-confidence of B.Ed. Students Based on Gender

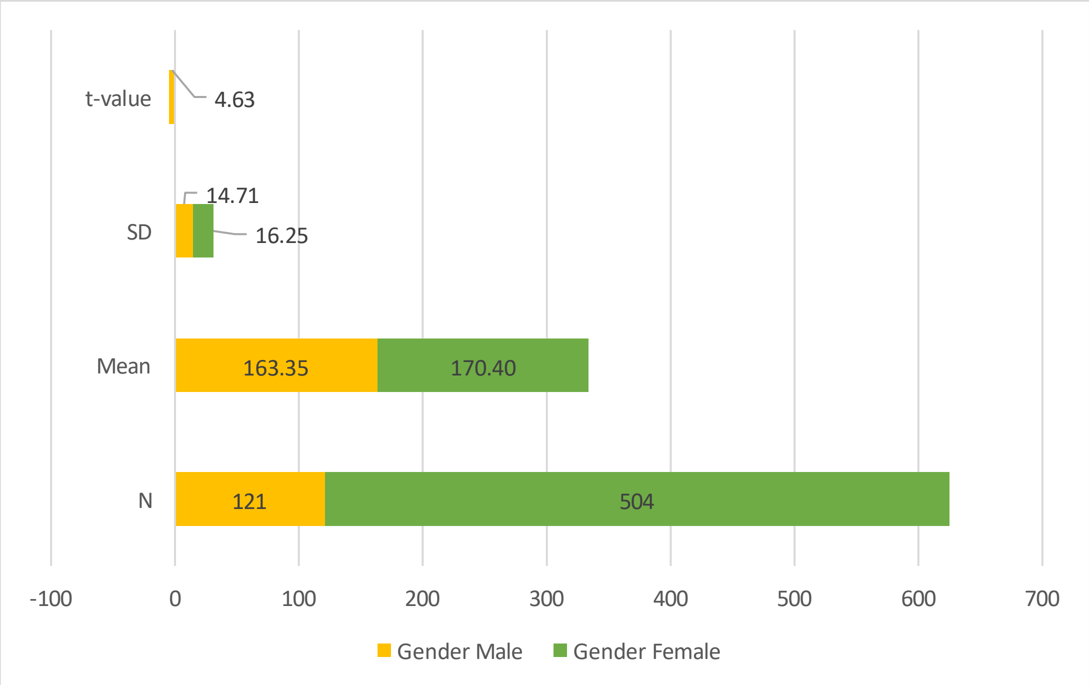
Table 4.12. Comparison of mean, standard deviation, and t-test scores of Self-confidence of B.Ed. Students with respect to Gender

Variable	Subgroup	N	Mean	SD	Df	t-value	Remarks (S/NS)
Gender	Male	121	163.35	14.71	623	4.63**	S
	Female	504	170.40	16.25			

****S - Significant at 0.05 level**

From Table and Figure 4.12, it is observed that there is a significant difference in self-confidence between male and female B.Ed. students. The female students show a higher mean score (M= 170.40) compared to male students (M= 163.35) and a t-value of 4.63, which is significant at the 0.05 level with df=623. This indicates that female students have better self-confidence than their male counterparts. Hence, the null hypothesis (2.1), formulated as “There is no significant difference in the Self-confidence of B.Ed. students based on Gender," was rejected. Thus, it can be concluded that there was a significant difference in the self-confidence of B.Ed. students with respect to gender. The results coincide with the findings of Patel and Rao (2021), Choudhary and Tripathi (2022), and Brown and White (2018).

Figure 4.12. Comparison of mean, standard deviation, and t-test scores of self-confidence of B.Ed. Students with respect to Gender



H$_0$2.2: There is no significant difference in the Self-confidence of B.Ed. students based on Educational Qualification.

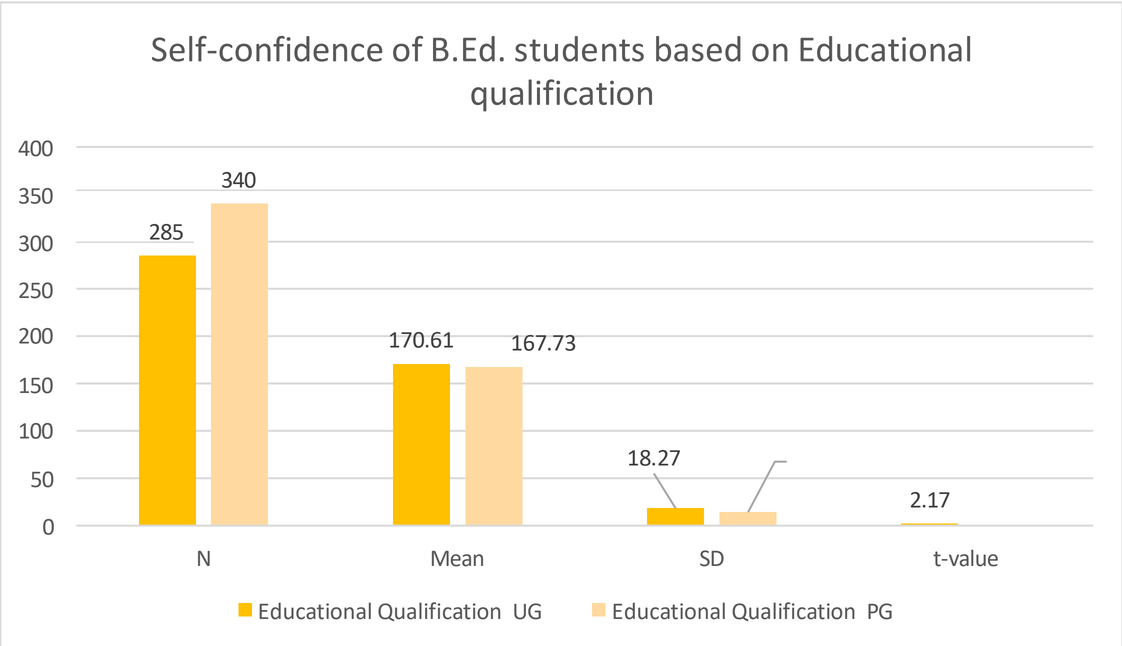
Table 4.13. Comparison of mean, standard deviation, and t-test scores of Self-Confidence of B.Ed. Students based on Educational Qualification

Variable	Subgroup	N	Mean	SD	Df	t-value	Remarks (S/NS)
Educational Qualification	UG	285	167.73	14.12	623	2.17**	S
	PG	340	170.61	18.27			

****S - Significant at 0.05 level**

From Table and Figure 4.13, it was observed that the t-value for educational qualification is 2.17, which is significant at the 0.05 level with df = 623. This implies that there was a significant difference in self-confidence based on whether students had an undergraduate (UG) or postgraduate (PG) qualification. The mean score of PG students (M= 170.60) is higher than that of UG students (M= 167.73), indicating that PG students have slightly better self-confidence scores compared to UG students. Hence, the null hypothesis (2.2), formulated as "There is no significant difference in the Self-confidence of B.Ed. students based on Educational Qualification," was rejected. It may be concluded that there was a significant difference in the self-confidence of B.Ed. students with respect to educational qualifications. Similar findings were reported by Bhat and Yadav (2018), Nair and Menon (2018), Carter and Lopez (2019), Menon and Kumar (2019), De Jong Visser (2020), Vasanthi and Arumugam (2020), Gupta and Singh (2021), Jain and Singh (2021), Bhatia and Joshi (2024), and Ponmozhi and Govindhammal (2024).

Figure 4.13. Comparison of mean, standard deviation, and t-test scores of Self-Confidence of B.Ed. Students with respect to Educational Qualification



$H_0$2.3: There is no significant difference in the mean scores of Self-confidence of B.Ed. students with respect to Stream (Arts/Science/Commerce).

Table 4.14-a Summary of ANOVA on Self-confidence of B.Ed. students with respect to Stream (Arts/Science/Commerce).

Self-confidence	**Source of Variation**	**Df**	**Sum of Squares (SS)**	**Mean Square (MS)**	**F-statistic**	**Remarks (S/NS)**
Stream (Arts/ Science/ Commerce)	Between Groups	2	2414.93	1207.46	4.26**	S
	Within Groups	622	176135.23	283.12		
	Total	624	178550.16			

**** Significant at 0.05 level**

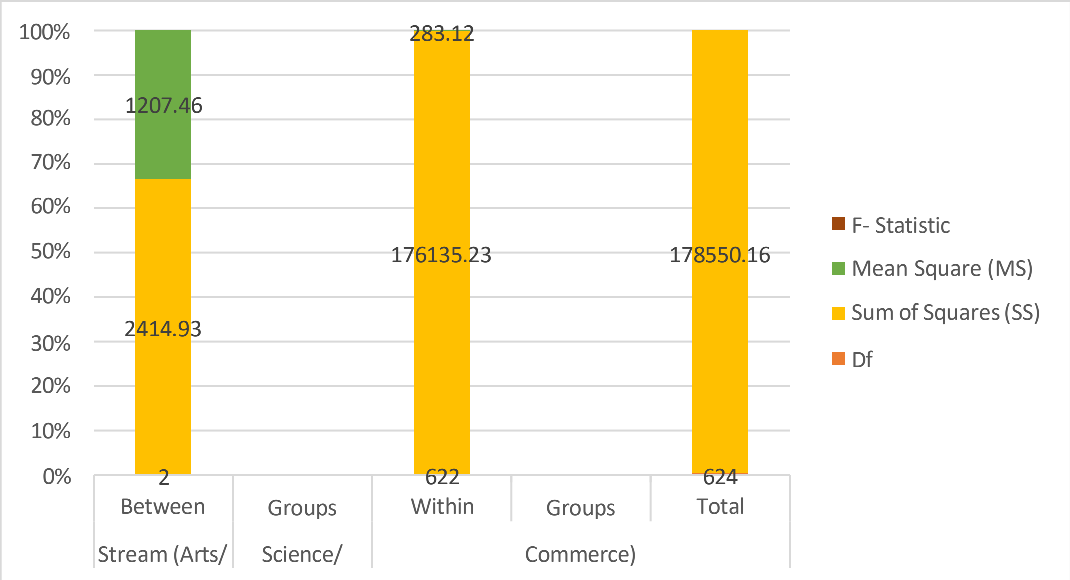
From Table 4.14.-a, it was observed that the F-statistic value is 4.26, which is significant at a 0.05 level of significance. It indicates that the mean scores of self-confidence of the B.Ed. students with respect to streamed differ significantly. Therefore, the null hypothesis (2.4), formulated as "There is no significant difference in the mean scores of Self-confidence of B.Ed. students with respect to Stream (Arts/Science/Commerce)" was rejected, and there is a significant difference among mean scores of Self-confidence of B.Ed. students with respect to the stream were rejected. Hence, it is inferred that there was a significant difference among the mean scores of Self-confidence of B.Ed. students with respect to the stream. Similar results were found by Muller and Schmidt (2017), Maity et al. (2019), Chauhan and Vaghela (2022), and Sharma and Gupta (2022).

- H_0: The means of the different groups (Arts, Science, Commerce) are equal. There is no significant difference in the mean scores among the three streams.
- Calculated F=4.26, Critical Value (approx.) =3.00. Since 4.26 > 3.00, the F-statistic is significant at the 0.05 level.

- Reject the Null Hypothesis: There was a statistically significant difference between the mean scores of at least some of the groups (Arts, Science, Commerce). This suggests that the mean score varies significantly across the different streams.

To know for which stream B.Ed. students' self-confidence differs significantly from the others; the data were further analyzed with the help of a post-hoc test. The researcher further applied a t-test to find out which of the two means differed significantly.

Figure 4.14-a Summary of ANOVA on Self-confidence of B.Ed. students with respect to Stream (Arts/Science/Commerce)



4.14-b post-hoc t-test of mean and standard deviation for Self-confidence of B.Ed. students with respect to Stream (Arts/Science/Commerce).

The post-hoc t-test of mean and standard deviation was used to examine the difference between the mean scores across different streams of B.Ed. students in Nagaland in relation to Self-confidence.

Table 4.14-b Results of post-hoc t-test on Self-confidence of B.Ed. students with respect to Stream Arts/Science/Commerce)

Stream	N	Mean	Standard Deviation	t-test value	Remarks
Arts	405	169.68	16.87	2.03**	**S**
Science	168	166.55	15.00		**P<0.05(Arts higher)**
Arts	405	169.68	16.87	0.99**	**NS**
Commerce	52	172.14	13.62		**P>0.05**
Science	168	166.55	15.00	2.09**	**S**
Commerce	52	172.14	13.62		**P<0.05(Others higher)**

****S–Significant level at 0.05. ** NS– Not Significant level at 0.05.**

The post-hoc t-test was conducted to further explore the differences in self-confidence scores between the three groups: Arts, Science, and Commerce.

Arts vs. Science: The result shows a statistically significant difference between the Arts and Science groups, with a t-value of 2.03 and a p-value of less than 0.05. This indicates that students in the Arts stream have significantly higher self-confidence scores compared to students in the Science stream. This suggests that, on average, Arts students perceive themselves with more confidence than their science counterparts.

Arts vs. Commerce: The comparison between the Arts and Commerce groups shows a t-value of 0.99 and a p-value greater than 0.05, indicating that there was no significant difference between these two groups. The results imply that the self-confidence levels of Arts students are similar to those in the Commerce category, with no notable distinction in their self-reported confidence.

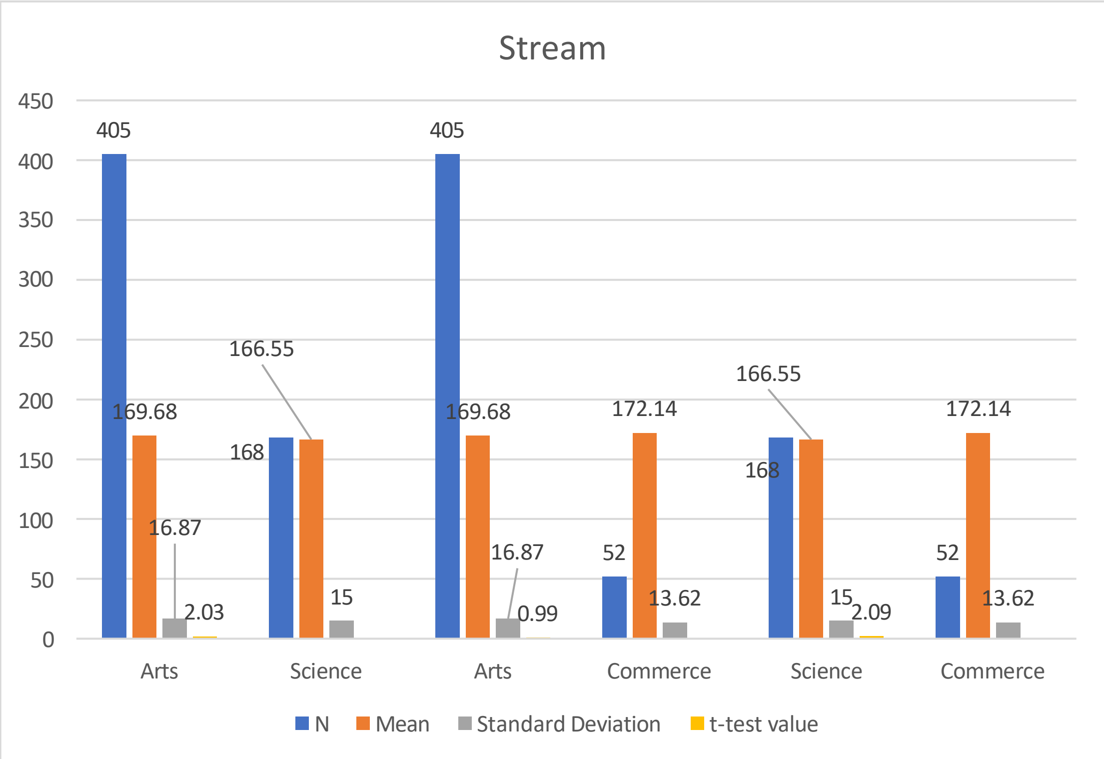
Science vs. Commerce: There was a significant difference between the Science and Commerce groups, with a t-value of 2.09 and a p-value of less than 0.05. The results suggest that students in the Commerce category have higher self-confidence than those in the Science stream. This finding indicates that, on average, students in the Commerce group feel more confident than those pursuing Science.

- Arts students have significantly higher self-confidence compared to science students.
- There was no significant difference in self-confidence between Arts students and those in the Commerce group.
- Science students have significantly lower self-confidence than students in the Commerce group.

The statistical analysis reveals that the Arts stream has a significantly higher performance compared to the Science stream. Additionally, the Commerce stream shows significantly higher performance compared to the Science stream. However, no significant difference was found between the Arts and Commerce streams. These results suggest that while both Arts and Commerce students perform better than Science students, there is no substantial performance gap between Arts and Commerce.

- The null hypothesis was rejected for Arts vs. Science and Science vs. Commerce, as the differences are statistically significant ($p < 0.05$).
- The null hypothesis was not rejected for Arts vs. Commerce, as the difference is not statistically significant ($p > 0.05$).

Figure 4.14-b Significance of difference in the mean scores of Self-Confidence of B.Ed. students with respect to Stream Arts/Science/Commerce.



H0 2.4: There is no significant difference in the Self-confidence of B.Ed. students based on Year of Study.

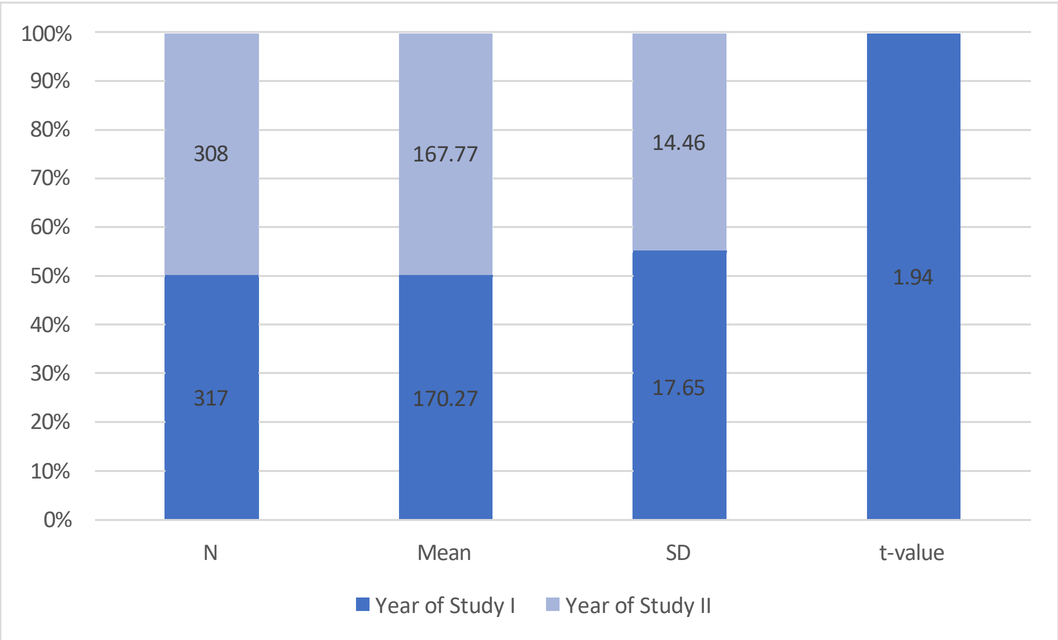
Table 4.15. Comparison of mean, standard deviation, and t-test scores of Self-Confidence of B.Ed. students with respect to Year of Study

Variable	Subgroup	N	Mean	SD	Df	t-value	Remarks (S/NS)
Year of Study	I	317	170.27	17.65	623	1.94**	NS
	II	308	167.77	14.46			

**** NS - Not Significant Level at 0.05 level**

From Table and Figure 4.15, it was observed that the t-value for the year of study is 1.94, which is not significant at the 0.05 level with df=623. This means there was no significant difference in self-confidence between first-year and second-year B.Ed. students. Both groups have similar mean scores (M= 170.27 for the first-year and M= 167.77 for the second-year students). This suggests that the year of study does not play a major role in determining self-confidence among B.Ed. students. Hence, the null hypothesis (2.3), formulated as "There is no significant difference in the Self-confidence of B.Ed. students based on Year of Study," was not rejected. It may be concluded that there was no significant difference in the self-confidence of B.Ed. students for a year of study. Similar results were found by Bhat (2018), Miller and Lee (2019), Banga (2019), Singh and Gupta (2021), and Ponmozhi and Govindhammal (2024).

Figure 4.15. Comparison of mean, standard deviation, and t-test scores of Self-confidence of B.Ed. students with respect to Year of Study



$H_0$2.5: There is no significant difference in the Self-confidence of B.Ed. students based on Locality.

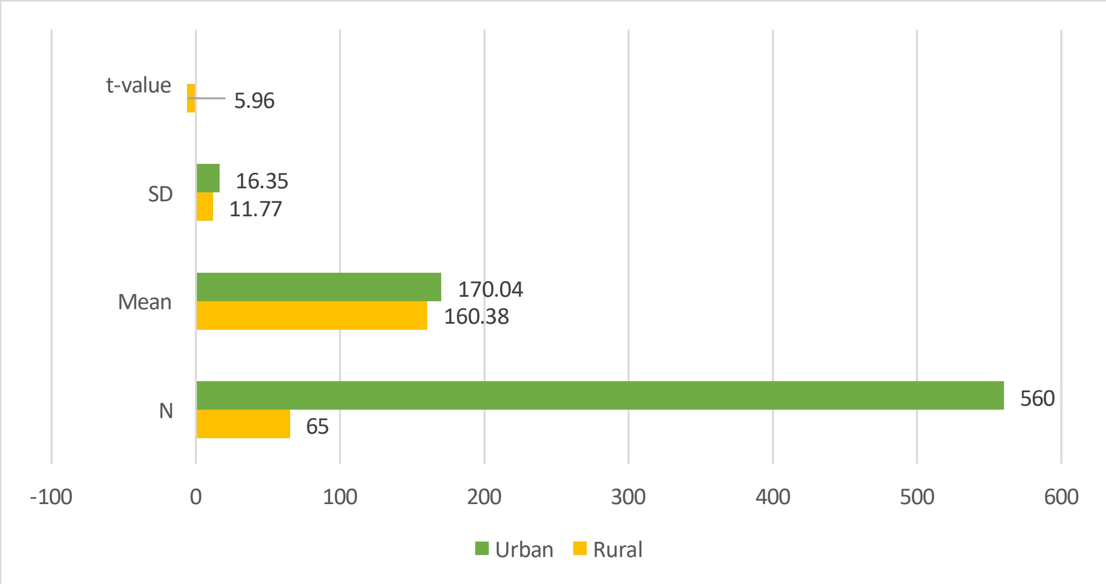
Table 4.16. Comparison of mean, standard deviation, and t-test scores of Self-confidence in B.Ed. Students with respect to Locality

Variable	Subgroup	N	Mean	SD	Df	t-value	Remarks (S/NS)
Locality	Rural	65	160.38	11.77	623	5.96**	S
	Urban	560	170.04	16.35			

****S - Significant at 0.05 level**

From Table and Figure 4.16, it was observed that the t- t-value for locality is 5.96, which was statistically significant at the 0.05 level with df=623. This indicates that there was a significant difference in Self-confidence based on whether students came from rural or urban areas. Urban area students have a much higher mean score (M= 170.04) compared to rural area students (M= 160.38), suggesting that urban students possess better self-confidence than rural area students. Hence, the null hypothesis (2.5), formulated as “There is no significant difference in the Self-confidence of B.Ed. students based on Locality,” was rejected. It may be concluded that there was a significant difference in self-confidence based on locality. Similar results were found by Gupta and Singh (2019), Patel and Rao (2019), Gupta and Sharma (2023), and Davis and Thompson (2017).

Figure 4.16. Comparison of mean, standard deviation, and t-test scores of Self-confidence of B.Ed. students with respect to locality



$H_0$2.6: There is no significant difference in the Self-confidence of B.Ed. students based on Institutions.

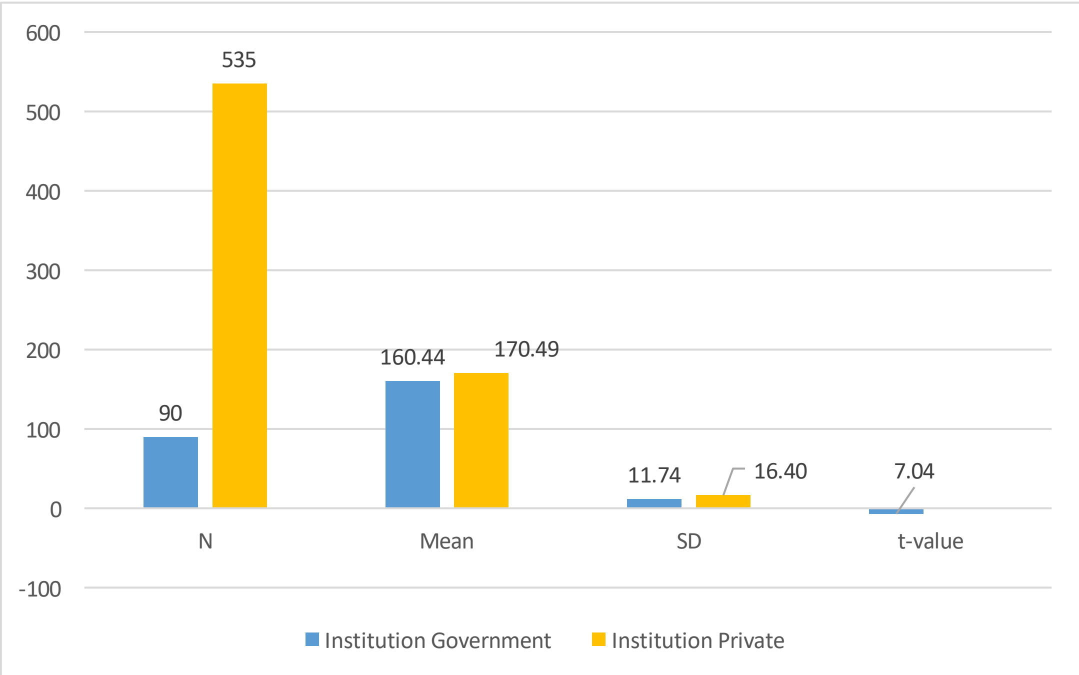
Table 4.17 Comparison of mean, standard deviation, and t-test scores of Self-Confidence of B.Ed. Students with respect to Institutions

Variable	Subgroup	N	Mean	SD	Df	t-value	Remarks (S/NS)
Institution	Government	90	160.44	11.74	623	7.04**	S
	Private	535	170.49	16.40			

****S - Significant at 0.05 level**

From Table and Figure 4.17, it was observed that the t-value for the type of institution is 7.04, which is significant at the 0.05 level with df=623. This indicates that there was a significant difference in self-confidence between students from government and private institutions. Students from private institutions have a higher mean score (M= 170.49) compared to those from government institutions (M= 160.44), suggesting that private institution students are better equipped with self-confidence. Hence, the null hypothesis (2.6), formulated as “There is no significant difference in the Self-confidence of B.Ed. students based on Institutions”, was rejected. It may be concluded that there was a significant difference in self-confidence in institutions. Similar findings were reported by Kumar and Banerjee (2019) and Das and Iyer (2020).

Figure 4.17. Comparison of mean, standard deviation, and t-test scores of Self-Confidence of B.Ed. students with respect to the Institutions



$H_0$2.7: There is no significant difference in the Self-confidence of B.Ed. Students based on Previous Technological Knowledge

Table 4.18. Comparison of mean, standard deviation, and t-test scores of Self-Confidence of B.Ed. Students with respect to the Previous Technological Knowledge

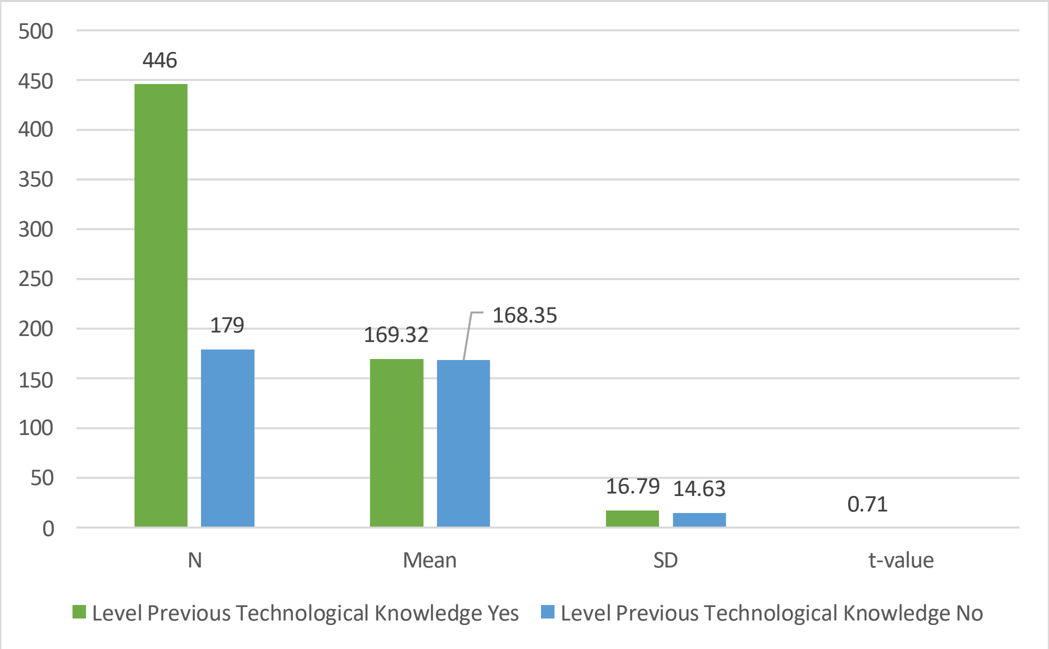
Variable	Subgroup	N	Mean	SD	Df	t-value	Remarks (S/NS)
Previous Technological Knowledge	Yes	446	169.32	16.79	623	0.71**	NS
	No	179	168.35	14.63			

** **NS - Not Significant Level at 0.05 level**

From Table and Figure 4.18, it was observed that the t-value for previous technological knowledge is 0.71, which is not statistically significant at the 0.05 level with df=623. This suggests that there was no significant difference in Self-confidence between students who have previous technological knowledge and those who do not. The mean scores of both groups are very close (M=169.32 for those with previous knowledge and M=168.35 for those without), indicating that previous exposure to technology does not significantly influence Self-confidence levels. Hence, the null hypothesis (2.7), formulated as "There is no significant difference in the Self-confidence of B.Ed. students based on Previous Technological Knowledge," was not rejected. It may be concluded that there was no significant difference in self-confidence in the B.Ed. students with respect to the institutions. Similar results were found by Krishnan and Reddy (2020), Kumar and Sharma (2020), and Muller and Webber (2022).

Figure 4.18.

Comparison of mean, standard deviation, and t-test scores of Self-confidence of B.Ed. students with respect to Previous Technological Knowledge



Objective-3: To examine the teaching competency of B.Ed. students in Nagaland and explore how it varies across variables such as gender, educational qualification, stream, year of study, locality, institution, and previous technological knowledge.

The t-test and ANOVA were applied to examine the teaching competency of B.Ed. students in Nagaland and explore how it varies across variables.

Hypothesis ($H_0$3): There is no significant difference in the Teaching competency of B.Ed. students based on variables.

There is no significant difference in the teaching competency of B.Ed. students based on gender (Male/Female), educational qualification (UG/PG), year of study(I/II), Stream (Arts/Science/Others), locality (Rural/Urban), institution (Government/Private), and previous technological knowledge (Yes/No).

$H_0$3.1: There is no significant difference in the Teaching competency of B.Ed. students based on gender.

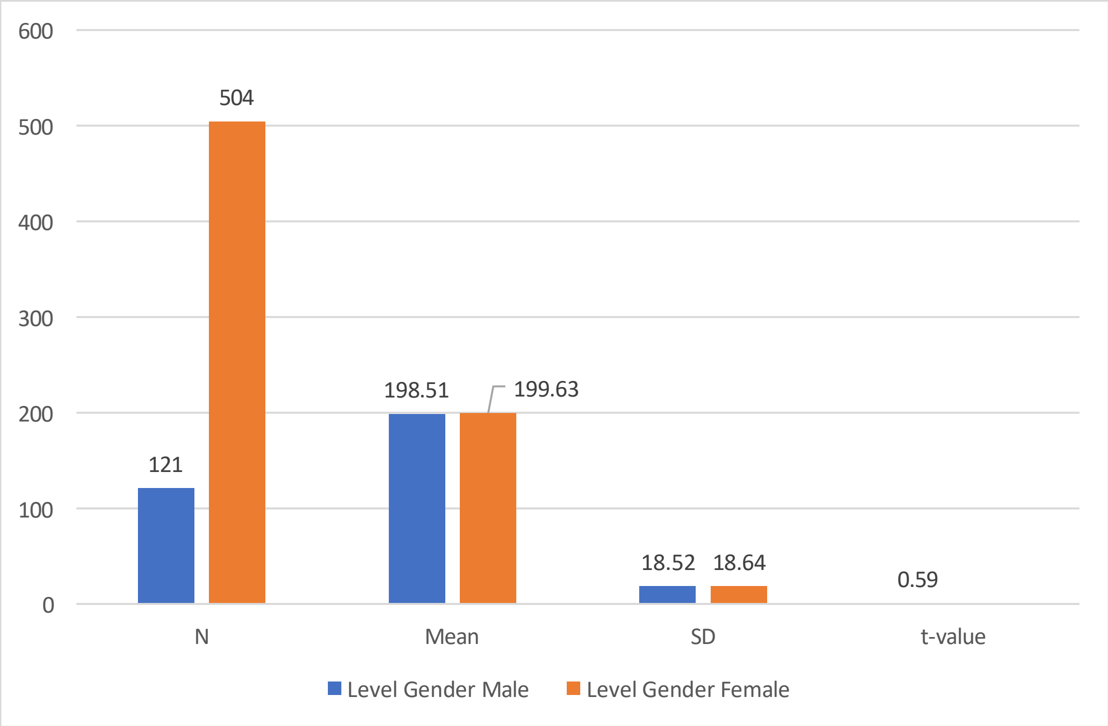
Table 4.19. Comparison of Mean, Standard Deviation, and T-test Scores of Teaching Competency of B.Ed. Students with respect to Gender

Variable	Subgroup	N	Mean	SD	Df	t-value	Remarks (S/NS)
Gender	Male	121	198.51	18.52	623	0.59**	NS
	Female	504	199.63	18.64			

**** NS - Not Significant Level at 0.05 level**

As presented in Table and Figure 4.19, the mean scores for male students (M = 198.51) and female students (M = 199.63) are nearly identical. The t-value of 0.59, which is well below the critical value of 1.96 with a significance level of 0.05 with df=623, indicates teaching competency was not significantly different between genders. Therefore, the null hypothesis (3.1), formulated as "There is no significant difference in the Teaching competency of B.Ed. students based on gender", was accepted, suggesting that gender does not significantly influence teaching competency scores. Similar reports were found by Sharma and Singh (2011), Singh and Patel (2016), Pachaiyappan and Sadayakumar (2018), Agarwal and Verma (2020), Joshi and Mehta (2023), Patel and Clark (2017), and Wilson and Martin (2024).

Figure 4.19. Comparison of Mean, Standard Deviation, and T-test scores of Teaching Competency of B.Ed. students with respect to Gender.



$H_0$3.2: There is no significant difference in the Teaching competency of B.Ed. Students based on Educational Qualification

Table 4.20.

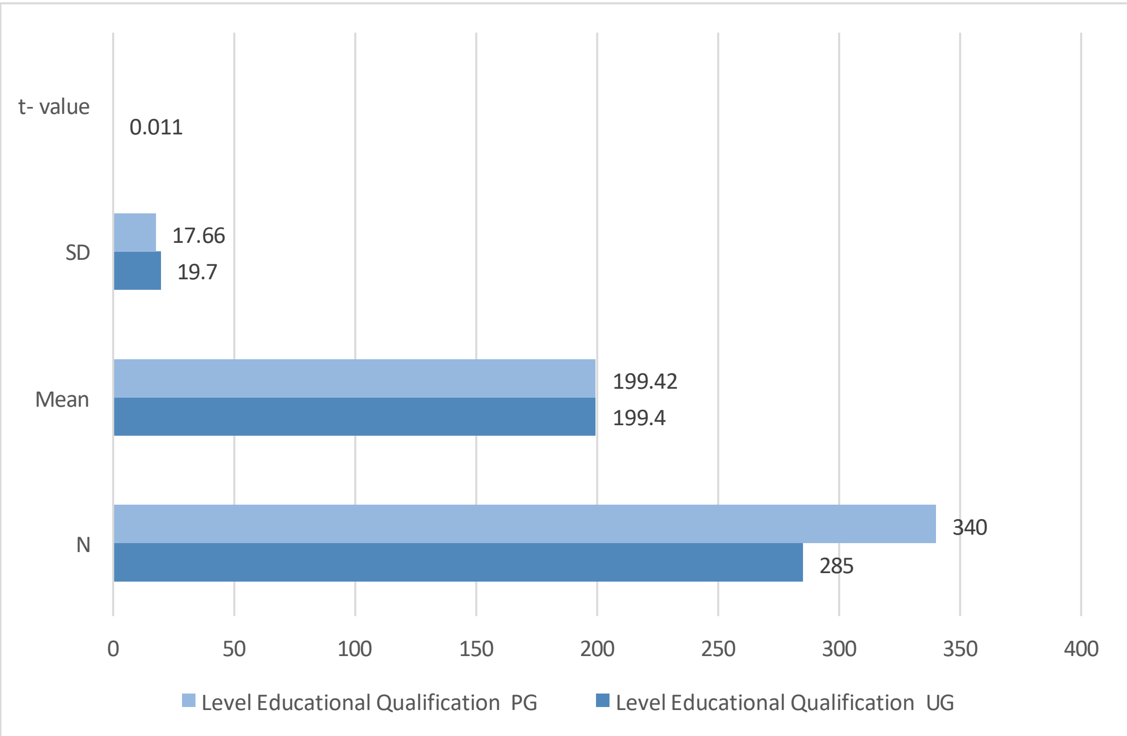
Comparison of Mean, Standard Deviation, and T-test Scores of Teaching Competency of B.Ed. students with respect to Educational Qualification

Variable	**Subgroup**	**N**	**Mean**	**SD**	**Df**	**t- value**	**Remarks (S/NS)**
Educational Qualification	UG	285	199.40	19.70	623	0.011**	NS
	PG	340	199.42	17.66			

**** NS - Not Significant Level at 0.05 level**

According to Table and Figure 4.20, the mean scores for teaching competency of undergraduate (UG) students (M = 199.40) and postgraduate (PG) students (M = 199.42) are virtually identical. A t-value of 0.011, well below the critical value of 1.96 with a significance level of 0.05 with df=623, indicates teaching competency was not significantly different between UG and PG students. Therefore, the null hypothesis (3.2), formulated as "There is no significant difference in the Teaching competency of B.Ed. students based on Educational qualification" was accepted, suggesting that educational qualification does not have a significant effect on teaching competency scores. Similar results were documented by Dutta and Roy (2015), Allimuthu (2018), Nair and Menon (2018), Taylor and Hughes (2019), Bindusha and Bindu (2020), and Sahu and Mohanty (2022).

Figure 4.20. Comparison of Mean, Standard Deviation, and T-test scores of Teaching Competency of B.Ed. Students with respect to Educational Qualification



$H_0$3.3: There is no significant difference in the Teaching competency of B.Ed. students based on Stream (Arts/Science/Others)

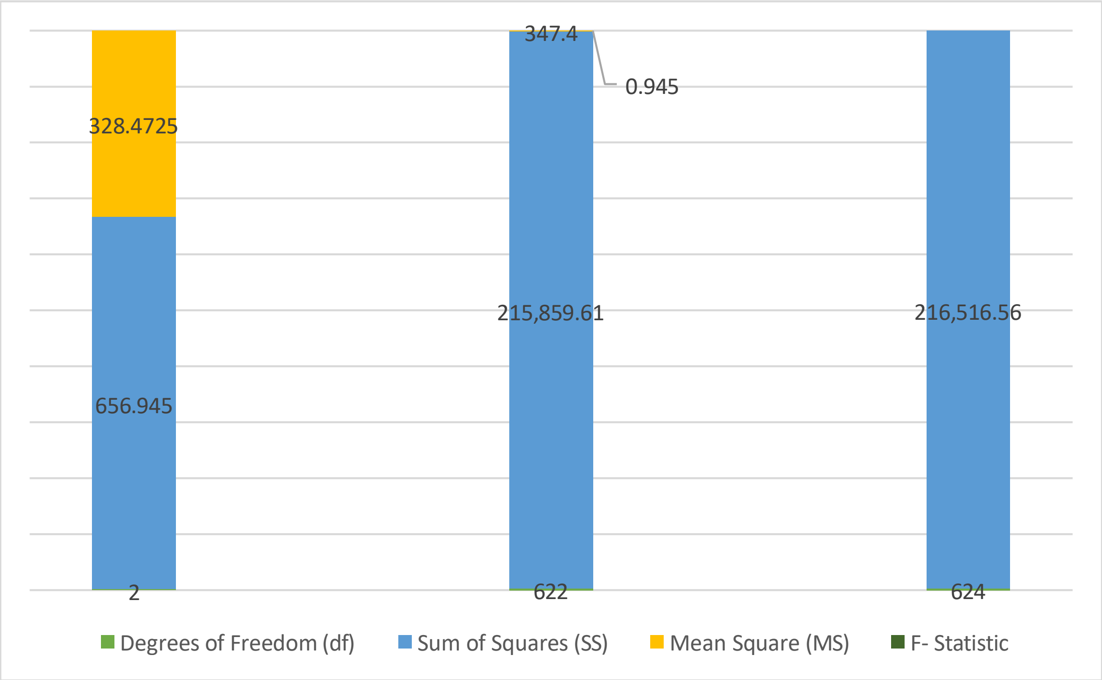
Table 4.21. Summary of ANOVA on Teaching Competency of B.Ed. students with respect to Stream (Arts/Science/Commerce).

Teaching Competency	Source of Variation	Degrees of Freedom (df)	Sum of Squares (SS)	Mean Square (MS)	F-ratio	Remarks (S/NS)
Stream (Arts/Science/ Commerce)	Between Groups	2	656.945	328.4725	0.945**	NS
	Within Groups	622	215,859.61	347.40		
	Total	624	216,516.555			

****NS–Not Significant at 0.05 level**

From Table 4.21, it was observed that the F-value of 0.945 is less than the critical table value of 3.00 at a 0.05 significance level. It indicates that the mean scores of Teaching Competency of B.Ed. Students do not differ significantly with respect to stream (Arts/Science/Commerce). Therefore, the null hypothesis (3.3), formulated as “There is no significant difference in the Teaching competency of B.Ed. students based on Stream,” was accepted. Hence, it is inferred that there was no significant difference in the mean scores of the three groups of streams of Teaching Competency of B.Ed. students with respect to the stream. Similar results were found by Jensen and Olesen (2024). Meanwhile, Kumar and Reddy (2017), Kapoor and Singh (2021), Singh and Yadav (2024), and Johnson and Williams (2018) investigated science stream students who had higher teaching competency than arts and commerce stream students.

Figure 4.21. Significance of difference in the mean scores of Teaching Competency of B.Ed. students with respect to Stream (Arts/Science/Commerce).



$H_0$3.4: There is no significant difference in the Teaching competency of B.Ed. students based on Year of Study

Table 4.22. Comparison of Mean, Standard Deviation, and T-test Scores of Teaching Competency of B.Ed. students with respect to Year of Study

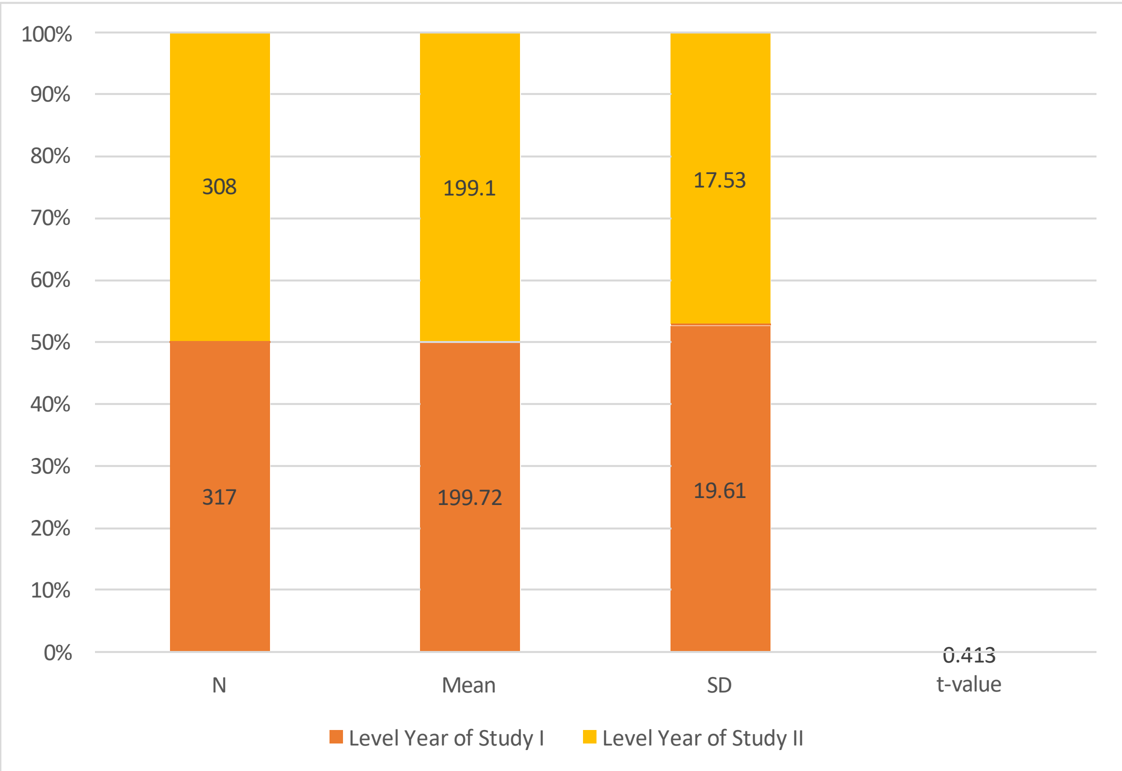
Variable	**Subgroup**	**N**	**Mean**	**SD**	**Df**	**t-value**	**Remarks (S/NS)**
Year of Study	I	317	199.72	19.61	623	0.413**	NS
	II	308	199.10	17.53			

**** NS- Not significant level at 0.05**

Table and Figure 4.22, the mean scores for first-year (M = 199.72) and second-year (M = 199.10) students are nearly identical. The calculated t-value of

0.413, smaller than the critical value of 1.96 at the 0.05 significance level with df=623, indicates that teaching competency was not significantly different between the two groups. Therefore, the null hypothesis (3.4), formulated as "There is no significant difference in the Teaching competency of B.Ed. students based on Year of Study" was accepted, indicating that the year of study does not significantly affect teaching competency scores for B.Ed. students. Similar results were found by Sharma and Reddy (2021), Gupta and Mehta (2023), and Shakya and Dube (2023).

Figure 4.22. Comparison of Mean, Standard Deviation, and T-test scores of Teaching Competency of B.Ed. students with respect to Year of Study



$H_0$3.5: There is no significant difference in the Teaching competency of B.Ed. students based on Locality

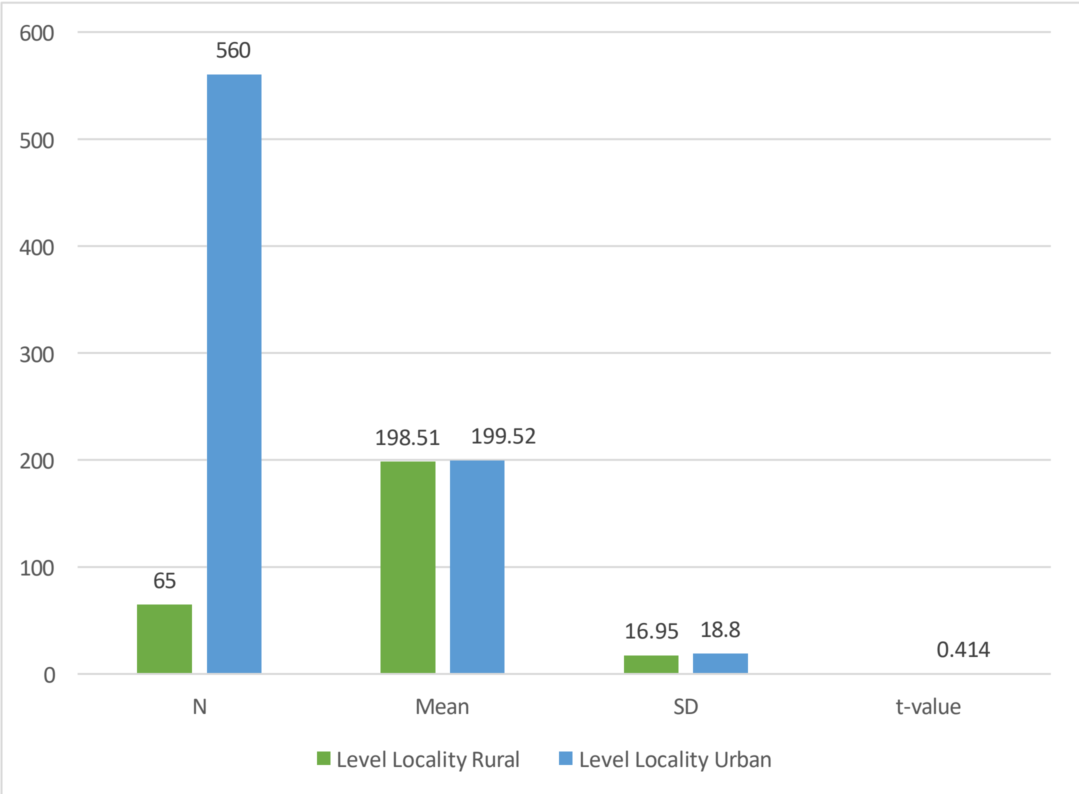
Table 4.23. Comparison of Mean, Standard Deviation, and T-test Scores of Teaching Competency of B.Ed. Students with respect to Locality

Variable	**Subgroup**	**N**	**Mean**	**SD**	**Df**	**t-value**	**Remarks (S/NS)**
Locality	Rural	65	198.51	16.95	623	0.414**	NS
	Urban	560	199.52	18.80			

**** NS - Not Significant Level at 0.05 level**

Table and Figure 4.23 present that the mean scores of teaching competency for rural (M = 198.52) and urban (M = 199.52) students are nearly identical. The t-value of 0.414, which is lower than the critical value of 1.96 at the significance level of 0.05 with df=623, confirms that teaching competency is not significantly different based on locality. Therefore, the null hypothesis (3.5), formulated as “There is no significant difference in the Teaching competency of B.Ed. students based on Locality,” was accepted, suggesting that locality does not affect teaching competency scores. Similar results were documented by Raj and Mehta (2011), Banerjee and Mukerjee (2019), Patel and Kumar (2023), Anderson and Mitchell (2020), Bindusha and Bindu (2020), Wong and Leung (2023), and Lavanya et al. (2024).

Figure 4.23. Comparison of Mean, Standard Deviation, and t-test scores of Teaching Competency of B.Ed. students with respect to Locality



$H_0$3.6: There is no significant difference in the Teaching competency of B.Ed. students based on the Institution

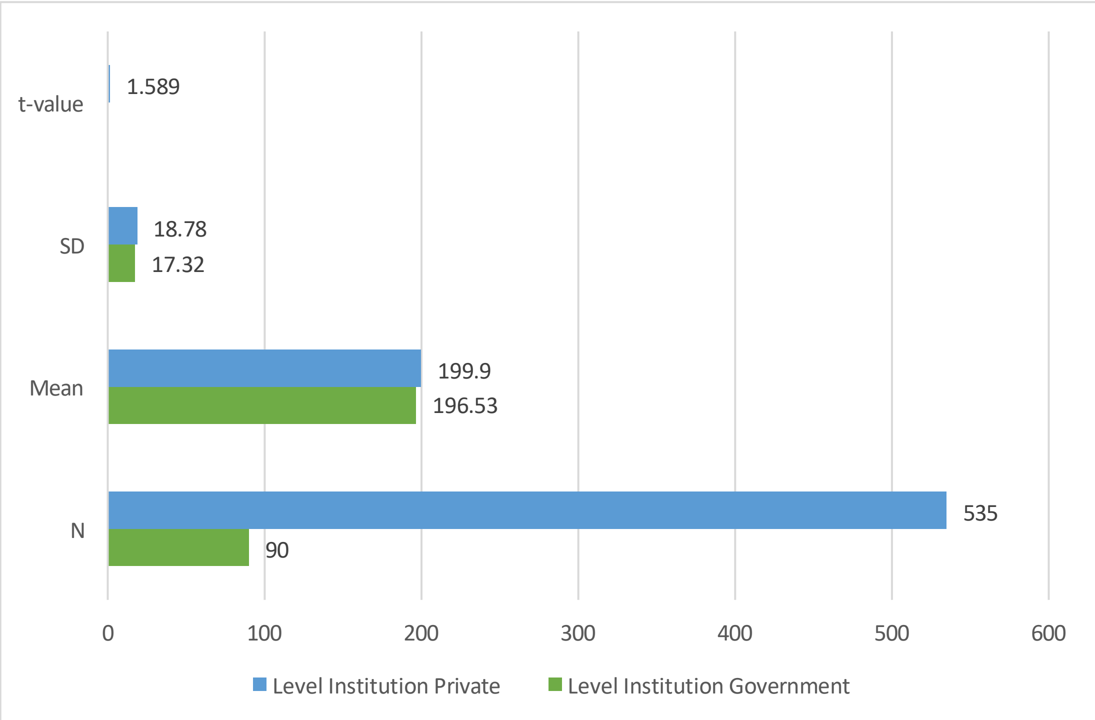
Table 4.24.Comparison of Mean, Standard Deviation, and T-test Scores of Teaching Competency of B.Ed. students with respect to the Institution

Variable	Subgroup	N	Mean	SD	Df	t-value	Remarks (S/NS)
Institution	Government	90	196.53	17.32	623	1.589**	NS
	Private	535	199.90	18.78			

**** NS - Not Significant Level at 0.05 level**

As shown in Table and Figure 4.24, the mean scores of teaching competency for government (M = 196.53) and private (M = 199.90) institution students are somewhat different. However, the t-value of 1.589 is the difference is lower than the critical value of 1.96 at a 0.05 significance level with df=623, suggesting that institutions do not have a significant effect on teaching competency. Thus, the null hypothesis (3.6), formulated as "There is no significant difference in the Teaching competency of B.Ed. students based on Institution," was accepted, confirming that the type of institution does not have a significant influence on teaching competency scores. Similar findings were reported by Bindusha and Bindu (2020), Metha (2020), Sridevi (2021), and Thomas and Pillai (2021).

Figure 4.24. Comparison of Mean, Standard Deviation, and t-test scores of Teaching Competency of B.Ed. students with respect to the Institution



$H_0$3.7: There is no significant difference in the Teaching competency of B.Ed. Students Based on Previous Technological Knowledge

Table 4.25. Comparison of Mean, Standard Deviation, and T-test Scores of Teaching Competency of B.Ed. Students with respect to Previous Technological Knowledge

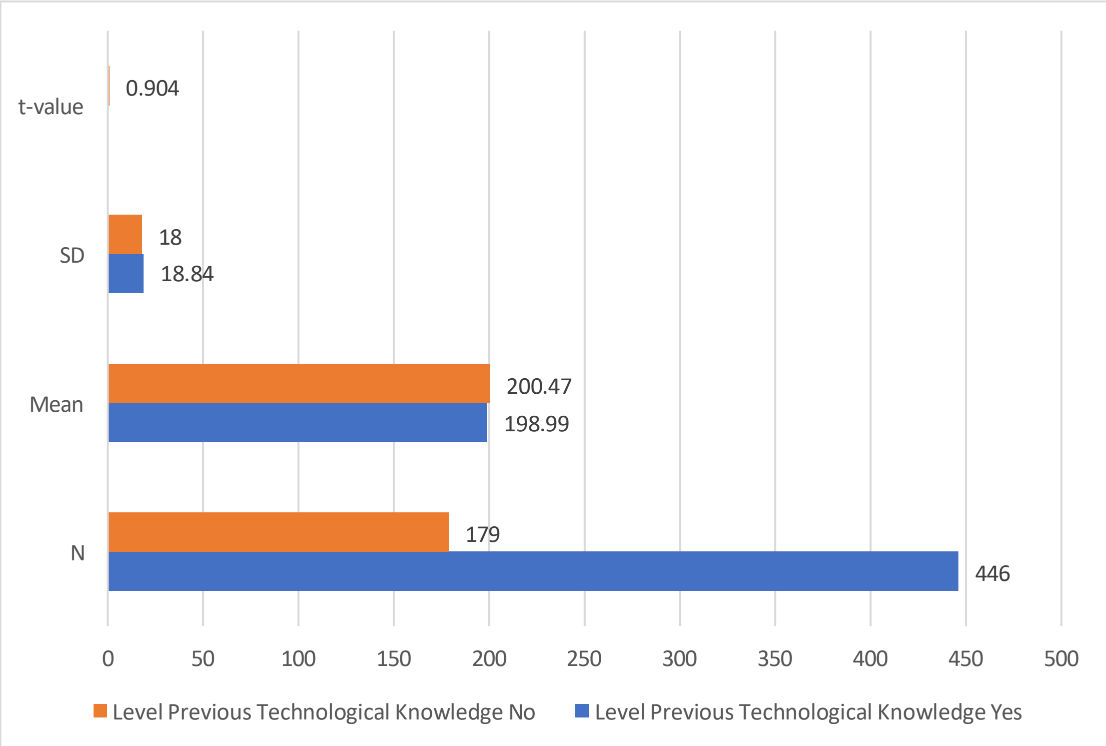
Variable	Subgroup	N	Mean	SD	Df	t-value	Remarks (S/NS)
Previous Technological Knowledge	Yes	446	198.99	18.84	623	0.904**	NS
	No	179	200.47	18.00			

**** NS - Not Significant Level at 0.05 level**

Table and Figure 4.25. show that the mean scores for teaching competency in students with prior technological knowledge (M = 198.99) and those without it (M = 200.47) are quite comparable. The t-value of 0.904, lower than the critical value of 1.96 with a 0.05 significance level with df=623, suggests that technological knowledge does not have a significant effect on teaching competency. Therefore, the null hypothesis (3.7), formulated as "There is no significant difference in the Teaching competency of B.Ed. students based on Previous Technological Knowledge," was accepted, indicating that technological background does not have a significant impact on teaching competency scores. Similar results were found by Patel and Bhardwaj (2017), Rao and Das (2020), Bhattacharya and Roy (2022), Raj and Bhattacharya (2024), and Berg and Peters (2021).

In summary, for each variable—gender, educational qualification, years of study, locality, institution type, and technological knowledge—the t-values with values less than 1.96 and p-values greater than 0.05, the null hypothesis is accepted, suggesting that there is no significant difference in teaching competency scores between these groups.

Figure 4.25. Comparison of Mean, Standard Deviation, and t-test scores of Teaching Competency of B.Ed. Students with respect to Previous Technological Knowledge



4.6. Correlation Analysis:

Correlation analysis provides a way to measure the relationship between two variables, focusing on the strength and direction of their linear association. This method helps researchers assess whether a change in one variable is related to changes in another, providing a clearer picture of their interconnection. In this study, the researcher seeks to explore how TPACK scores, Self-Confidence, and Teaching Competency are correlated in B.Ed. students. The aim is to understand if improvements in one of these factors, like TPACK, lead to better self-confidence and teaching competency or if the reverse is true. Correlation analysis is a statistical technique used to determine the strength and direction of the linear relationship between two variables. It is commonly used to measure how changes in one variable are associated with changes in another variable.

Objective -4: To explore the relationship between Technological Pedagogical Content Knowledge (TPACK) and Self-confidence among B.Ed. students in Nagaland.

The relationship between Technological Pedagogical Content Knowledge (TPACK) and Self-confidence among B.Ed. students in Nagaland were analyzed using Pearson's coefficient of Correlation. The value of correlation is presented in Table 4.8.

Hypothesis $H_0$4: There is no significant relationship between Technological Pedagogical Content Knowledge (TPACK) and self-confidence among B.Ed. students in Nagaland.

Table 4.26. Coefficient of Correlation between TPACK and Self-Confidence of B.Ed. students in Nagaland

Variance	N	r	Df	t-value	Remarks S/NS	Result
TPACK Self-Confidence	625	0.461**	623	12.96	S	Moderate Positive Correlation among the variables

****S- Correlation is significant at the 0.05 level.**

Table 4.26. shows a correlation coefficient of 0.461, statistically significant at the 0.05 level, and points to a moderate positive correlation between TPACK and Self-confidence among B.Ed. students. The degrees of freedom (df) associated with the test were 623. The calculated t-value of 12.96 was found to be greater than the critical t-value of 1.96 at the 0.05 level of significance (two-tailed). This indicates that the observed correlation is statistically significant.

This result led to the rejection of the null hypothesis (4), formulated as, "There is no significant relationship between Technological Pedagogical Content Knowledge

(TPACK) and self-confidence among B.Ed. students in Nagaland." The rejection of this hypothesis confirms a statistically significant relationship between the variables. The findings suggest that students with stronger TPACK skills generally exhibit higher self-confidence, implying that improving TPACK could strengthen students' trust in their teaching abilities. Similar results were found by Iyer and Reddy (2013), Kumar and Sharma (2015), Metha and Nair (2021), Suzuk and Akinci (2021), Sharma and Yadav (2022), Thomas and Varghese (2022), Metha and Singh (2023), Sharma and Kumar (2023), and Nkosi and Moyo (2024).

Objective -5: To investigate the relationship between Self-confidence and Teaching Competency among B.Ed. students in Nagaland.

The relationship between Self-confidence and Teaching Competency among B.Ed. students in Nagaland were analyzed using Pearson's Coefficient of Correlation. The value of correlation is presented in Table 4.9.

Hypothesis H_05: There is no significant association between self-confidence and teaching competency among B.Ed. students in Nagaland.

Table 4.27. Correlation between Self-Confidence and Teaching Competency of B.Ed. students

Variance	N	r	Df	t-value	Remarks S/NS	Results
Self-Confidence	625	0.296**	623	7.74	S	Moderate Positive Correlation among the variables
Teaching Competency						

****S- Correlation is significant at the 0.05 level.**

In Table 4.27, a correlation coefficient of 0.296 suggests a moderate positive relationship between Self-confidence and Teaching Competency. This shows that teaching competency tends to increase as self-confidence improves. The correlation coefficient (r = 0.296) between self-confidence and teaching competency among B.Ed. students were tested for significance with a sample size of 625 (df = 623). The calculated t-value was 7.74, which is greater than the critical value of 1.96 at the 0.05 significance level, indicating that the correlation is statistically significant. This suggests a moderate positive relationship between self-confidence and teaching competency among B.Ed. students, meaning that as one variable increases, the other tends to increase as well.

Consequently, the null hypothesis (5), formulated as "There is no significant association between self-confidence and teaching competency among B.Ed. students in Nagaland," was rejected. This indicates that higher self-confidence is significantly associated with higher teaching competency among B.Ed. students in Nagaland. Similar results were reported by Singh and Mehta (2016), Patel and Joshi (2017), Verma and Sharma (2018), Arora and Kaur (2021), Banerjee and Mukerjee (2022), Das and Chatterjee (2022), Demir and Ozkan (2022), Rao and Kumar (2023), Reddy and Suresh (2023), Bora and Das (2024), Kumar and Sinha (2024) and Prasad and Rao (2024).

Objective 6: To explore the relationship between Technological Pedagogical Content Knowledge (TPACK) and Teaching Competency among B.Ed. Students in Nagaland.

Hypothesis ($H_0$6): There is no significant relationship between TPACK and Teaching Competency among B.Ed. students in Nagaland

Table 4.28. Coefficient of Correlation between TPACK and Teaching Competency of B.Ed. students

Variance	N	r	Df	t-value	Remarks S/NS	Result
TPACK Teaching Competency	625	0.402**	623	10.96	S	Moderate Positive Correlation among the variables

****S- Correlation is significant at the 0.05 level.**

In Table 4.28, a correlation coefficient of 0.402, significant at the 0.05 level, indicates a moderate positive association between Technological Pedagogical Content Knowledge (TPACK) and Teaching Competency among B.Ed. students. This suggests that as TPACK scores increase, teaching competency also tends to increase. The significance of this correlation was tested with a sample size of 625 (df = 623). The calculated t-value of 10.96 exceeds the critical value of 1.96 at the 0.05 significance level, confirming that the correlation is statistically significant.

Therefore, the null hypothesis (6), which stated, "There is no significant relationship between TPACK and Teaching Competency among B.Ed. students in Nagaland," was rejected. This confirms a positive relationship between TPACK and teaching competency among B.Ed. students in Nagaland. Similar findings were reported by Sharma and Mishra (2010), Gupta and Kumar (2011), Patel and Desai (2011), Rao and Singh (2011), Singh and Kumar (2011), Sharma and Mehta (2012), Desai and Patel (2013), Kumar and Singh (2014), and Sharma and Gupta (2018).

4.7. Multiple Regression Analysis:

Objective -7: To investigate the influence of variables (such as gender, educational qualification, stream, year of study, locality, institution, and previous technological knowledge) on the relationship between TPACK, Self-confidence, and Teaching Competency among B.Ed. students in Nagaland.

Multiple regression analysis, a key statistical technique to study the relationships and make predictions, was applied in this study to examine how TPACK and Self-confidence affect Teaching Competency. Teaching Competency was set as the dependent variable, with TPACK, Self-confidence, and other variables serving as independent variables. The study findings are as follows:

Hypothesis ($H_0$7): There is no significant relationship among TPACK, Self-Confidence, and Teaching Competency of B.Ed. students in Nagaland, as influenced by variables such as gender, educational qualification, stream, year of study, locality, institution, and previous technological knowledge.

Table 4.29-a

Summary Results of ANOVA of TPACK, Self-confidence, and Teaching Competency of B.Ed. students in Nagaland

Regression Statistics						
R Square	0.190939944					
Adjusted R Square	0.179100041					
Standard Error	16.85539662					
Observations	625					
ANOVA Results						
	Df	**SS**	**MS**	**F**	**Significance F**	**Sig F**
Regression	9	41235.29	4581.699	16.12682	7.26435E-24	0.000
Residual	615	174724.2	284.1044			
Total	624	215959.5				

Table 4.29- b

Summary Results of Multiple Regression of TPACK, Self-confidence, and Teaching Competency of B.Ed. students in Nagaland

Predictor	**Coefficient**	**Standard Error**	**t-Statistic**	**P-Value**	**Lower 95 %**	**Upper 95 %**
Intercept	104.25	9.31	11.19	<0.001	85.96	122.54
Gender	-4.60	3.09	-1.49	0.317	-10.66	1.47
Educational Qualification	2.83	3.20	0.88	0.377	-3.45	9.10
Stream	-1.89	3.34	-0.57	0.571	-8.45	4.67
Year of Study	0.15	2.10	0.07	0.944	-3.98	4.27
Locality	5.00	4.39	1.14	0.256	-3.63	13.62
Institution	-6.73	3.97	-1.70	0.090	14.52	1.06
Previous Technological Knowledge	2.02	2.82	0.72	0.475	-3.52	7.55
TPACK	0.39	0.05	8.34	<0.001	0.30	0.48
Self-confidence	0.18	0.05	3.67	0.0003	0.08	0.27

1. Model Significance:

The ANOVA table provides the F-statistic (16.13) and the significance F value (7.26 x 10^{-24}). This indicates that the overall model was statistically significant, as the p-value is far below the common significance level of 0.05. The results of the multiple regression analysis conducted to examine the relationship between TPACK, self-confidence, and various demographic variables with teaching competency among B.Ed. students in Nagaland reveal that the overall model is statistically significant. The F-statistic value is 16.13, and the significance value is less than 0.001. This indicates that the regression model explains a meaningful portion of the variance in teaching competency. The very low p-value confirms that the observed relationship is not due to chance, and therefore, the null hypothesis stating that there is no relationship between the predictors and teaching competency is rejected.

2. Individual Predictors:

Influence of TPACK: Among all the predictors, TPACK was found to be the most significant factor affecting teaching competency. The coefficient for TPACK is 0.39, and the associated p-value is less than 0.001, confirming its strong significance. This means that as TPACK scores increase, there is a corresponding increase in teaching competency among B.Ed. students. The 95% confidence interval ranges from 0.30 to 0.48, which does not include zero, further validating the significance of this predictor. These findings suggest that better integration of technology, pedagogy, and content knowledge leads to improved teaching effectiveness.

Influence of Self-confidence: Self-confidence also emerged as a significant predictor of teaching competency, though with slightly lesser impact compared to TPACK. The coefficient for self-confidence is 0.18, and the p-value is 0.0003, which is well below the accepted threshold of 0.05. The 95% confidence interval ranges from 0.08 to 0.27, indicating that the variable is a consistent and reliable predictor. This shows that students with higher self-confidence tend to perform better in their teaching roles. The positive association highlights the importance of building confidence among pre-service teachers as part of their professional development.

1. Variables: Gender ($p = 0.317$), Educational Qualification ($p = 0.377$), Year of Study ($p = 0.944$), Stream ($p = 0.571$), Locality ($p = 0.256$), Institution ($p = 0.090$) and Previous Technological Knowledge ($p = 0.475$) have p- values greater than 0.05, indicating that there was no significant effect on teaching competency. These variables do not contribute significantly to the prediction of teaching competency.

2. Null Hypothesis: Null hypothesis for TPACK and Self-confidence: Rejected (because both predictors are significant).

The null hypothesis for selected variables: Not rejected (because none of the selected variables are significant predictors of teaching competency).

Model Fit and Variance Explained: The R^2 value of the model is 0.1909, which means that around 19.09% of the variance in teaching competency is explained by the predictors in the model. While this reflects a moderate explanatory power, it also indicates that about 80.91% of the variance remains unexplained. This suggests that there may be other influencing factors not captured in this study that also affect teaching competency. Future research could include additional variables such as classroom experience, mentoring, or training opportunities to provide a more comprehensive understanding.

The regression analysis confirms that TPACK and Self-confidence jointly account for 19.09% of the variability among Teaching Competency. The predictors have a positive effect, with TPACK having a slightly stronger impact, suggesting both play valuable roles in improving teaching effectiveness.

The regression analysis revealed that both TPACK and self-confidence scores are positively correlated with the dependent variable (e.g., teaching competency), and both predictors have a statistically significant impact and the overall model is also significant, with TPACK contributing more strongly to the prediction than self-confidence. This suggests that enhancing both TPACK knowledge and self-confidence could positively affect the dependent variable, but TPACK appears to be the more influential factor.

The P-values for both TPACK scores and self-confidence scores are below the significance threshold of 0.05. Therefore, the null hypothesis is for both variables, meaning both TPACK and self-confidence scores have a significant impact on teaching competency.

Interpretation and Hypothesis Testing Based on the regression results, it is evident that both TPACK and self-confidence have a significant and positive impact on teaching competency. The null hypotheses related to these two predictors are therefore rejected. On the other hand, the demographic variables do not show any significant relationship with teaching competency, and their respective null hypotheses are accepted. Therefore, the null hypothesis (7), formulated as “There is no significant relationship among TPACK, Self-Confidence, and Teaching Competency of B.Ed. students in Nagaland, as influenced by variables such as gender, educational qualification, stream, year of study, locality, institution, and previous technological knowledge,” was accepted. Similar results were documented by Singh and Mehta (2016), Patel and Joshi (2017), Verma and Sharma (2018), Das and Chatterjee (2022), Bhardwaj and Sharma (2023), Reddy and Suresh (2023), Kumar and Sinha (2024), Sharma and Thakur (2024), Smith and Brown (2023), Davis and Clarke (2023), O’Reilly and Murphy (2023), Wilson and Hughes (2024), Tan and Ho (2024).s

In summary, TPACK and self-confidence had a significant and positive impact on teaching competency among B.Ed. students, with TPACK showing a slightly stronger effect. The null hypotheses for TPACK and self-confidence were rejected, indicating their significant contribution. However, the null hypotheses for other variables like gender, stream, qualification, and institution were not rejected, as they did not significantly affect teaching competency.

The upcoming chapter V will address the findings, conclusion and summary of the study.

CHAPTER – V

MAJOR FINDINGS, DISCUSSIONS, EDUCATIONAL IMPLICATIONS, CONCLUSION, AND SUGGESTIONS FOR FUTURE RESEARCH

5.1. Introduction

After completing the data analysis, the researcher must present the findings and interpretations, as these are crucial steps in the research process. The value of the research depends on how well the findings are interpreted. Additionally, recommendations should be provided to resolve the highlighted challenge, and future investigations should be proposed that may replicate or develop the study. This chapter summarizes the findings, interpretation, recommendations, and suggestions according to the research and educational implications.

5.2. Levels, Mean, and SD Scores of TPACK, Self-confidence, and Teaching Competency:

1. Levels of Technological, Pedagogical and Content Knowledge (TPACK), Self-confidence and Teaching Competency:

- Level of TPACK: the majority of the B.Ed. students (68.32 %) possess average TPACK skills, while 30.08 % achieve above average levels. A very small percentage (1.28 %) demonstrates high TPACK skills, indicating a need for improvement among many students.
- Level of Self-Confidence: The majority of the B.Ed. students (89.13 %) exhibit average self-confidence. Only 0.15 % show high self-confidence levels, suggesting that a small number of students may require additional support.
- Level of Teaching Competency: A significant 92.16 % of the B.Ed. Students demonstrate high teaching competency, indicating that they are well-prepared for instructional roles. The remaining 7.84 % show an average competency, suggesting a solid foundation in teaching skills.

2. Mean and Standard Deviation Scores of TPACK, Self-confidence, and Teaching Competency of B.Ed. students in Nagaland.

- TPACK mean score: The TPACK mean score is 187.4748, falling within the average range, indicating the overall TPACK level of B.Ed. students are at an average level.
- Self-confidence mean score: The Self-confidence mean score is 169.04, classified as an average, indicating that the B.Ed. Students generally possess a moderate level of Self-confidence.
- Teaching Competency mean score: The Teaching Competency mean score is 199.4128, indicating a high level of competency among B.Ed. students, suggesting that most students possess strong teaching skills.

5.3. Major Findings of the Study:

The major findings of the study are summarized objectively, and hypotheses are presented as follows:

Objective 1: To analyze the Technological Pedagogical Content Knowledge (TPACK) and its variations among B.Ed. students in Nagaland are based on variables such as gender, educational qualification, stream, year of study, locality, institution, and previous technological knowledge.

$H_0$1: There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students in Nagaland are based on gender (Male/Female), educational qualification (UG/PG), Stream (Arts/Science/Others), year of study(I/II), locality (Rural/Urban), institution (Government/Private), and previous technological knowledge (Yes/No).

a) Gender: Female B.Ed. students have a higher mean TPACK score (M=188.9484) compared to the male students (M=181.3554). The difference is significant and suggests that gender influences TPACK competency.
b) Educational Qualification: Postgraduate (PG) students have a higher mean TPACK score (M=187.5206) compared to Undergraduate (UG) students (M=185.5514). There are no significant differences in TPACK scores between educational

qualifications, suggesting that educational qualifications do not substantially affect TPACK levels.

c) Stream: The F-statistic is relatively small (0.190), which suggests that the differences in means between the streams (Arts/Science/Commerce) are not statistically significant, meaning the stream may not have a substantial effect on the variable.

d) Year of Study: First-year students (M=188.0032) TPACK score is higher than the second-year students (M=186.9383), but this difference is not statistically significant. Thus, the year of study does not significantly impact TPACK.

e) Locality: Urban students score significantly higher (M=188.5018) than rural students(M=178.6615) in TPACK, suggesting that urban area students tend to have better TPACK competencies.

f) Institution: Students from private institutions (M=189.015) outperform those from government institutions (M=178.3444) in TPACK scores. The significant differences indicate that institution type affects TPACK competency.

g) Previous Technological Knowledge: Students with previous technological knowledge had a TPACK score (M=187.352), and those without previous technological knowledge were significantly the same (M=187.7933), suggesting that the previous technological knowledge does not influence TPACK levels.

In Summary, a significant difference in the levels of TPACK is observed based on gender, locality, and institution type, with females, urban students, and students from private institutions showing higher competency. This indicates that no significant differences were found in the educational qualifications, stream, year of study, and previous technological knowledge.

Objective – 2: To investigate the levels of Self-confidence among B.Ed. Students in Nagaland are based on variables such as gender, educational qualification, stream, year of study, locality, institution, and previous technological knowledge.

Hypothesis (H_o2): There is no significant difference in the self-confidence of B.Ed. students in Nagaland are based on gender (Male/Female), educational

qualification (UG/PG), stream (Arts/Science/Commerce), year of study(I/II), locality (Rural/Urban), institution (Government/Private), and previous technological knowledge (Yes/No).

a) Gender: The female students scored a higher mean score (M=170.4048) compared to males (M=163.3554), indicating that the female students possess greater self-confidence competencies, resulting in a significant difference in self-confidence between male and female B.Ed. students.

b) Educational Qualification: The postgraduate students demonstrate higher mean scores (M=170.607) than undergraduate students (M=167.7265), suggesting that postgraduates exhibit slightly better self-confidence levels. The result indicates a significant difference in self-confidence based on educational qualifications.

c) Stream: The F-statistic value is 4.26, which is significant at 0.05 level. It indicates that the mean scores of self-confidence of B.Ed. students with respect to stream differ significantly. The Arts stream has a significantly higher performance compared to the Science stream. Additionally, the commerce stream shows significantly higher performance compared to the Science stream. However, no significant difference was found between the Arts and Commerce streams. These results suggest that while both Arts and Commerce students perform better than Science students, there was no substantial performance gap between Arts and Commerce.

d) Year of Study: The first-year B.Ed. students demonstrate higher mean scores (M=170.2744) than second-year (M=167.7695) B.Ed. students, suggesting that the year of study in B.Ed. students does not significantly influence self-confidence levels.

e) Locality: Urban students score significantly higher (M=170.0446) than rural students (M=160.3846) in Self-confidence mean scores, suggesting that urban students possess better self-confidence than rural area students. This indicates that there was a significant difference in Self-confidence based on whether students come from rural or urban areas.

f) Institution: The private institution students report higher mean scores (M=170.486) than those from government institutions (M=160.4444), suggesting better self-confidence among private institution students. There is a significant difference in Self-confidence based on Institutions.

g) Previous Technological Knowledge: There is no significant difference in Self-confidence between students with (M=169.3161) and without (M=168.352) previous technological knowledge does not impact the self-confidence levels.

In Summary, Self-confidence levels among B.Ed. Students showed significant differences based on gender, educational qualifications, stream, locality, and type of institution. However, no significant differences were observed based on the year of study and previous technological knowledge.

Objective-3: To examine the teaching competency of B.Ed. students in Nagaland and explore how it varies across variables such as gender, educational qualification, stream, year of study, locality, institution, and previous technological knowledge.

H_o3: There is no significant difference in the teaching competency of B.Ed. students in Nagaland are based on gender (Male/Female), educational qualification (UG/PG), Stream (Arts/Science/Commerce), year of study(I/II), locality (Rural/Urban), institution (Government/Private), and previous technological knowledge (Yes/No).

a) Gender: The mean scores of Teaching Competency between males (M=198.5124) and females (M=199.629) B.Ed. students do not impact the teaching competency levels, suggesting that gender does not influence B.Ed. students teaching Competency.

b) Educational Qualification: The mean scores of undergraduate (M=199.4035) and postgraduate (M=199.4206) students are nearly identical, suggesting that educational qualifications do not affect teaching competency.

c) Stream: The F-value of 0.945 is less than the table value 3.00 at a 0.05 significant level. It indicates that the mean scores of teaching competency of B.Ed. Students do not differ significantly with respect to Stream (Arts/Science/Commerce).

d) Year of Study: The first-year (M=199.7161) and second-year (M=199.1006) students have similar mean scores, indicating that the year of study does not impact B.Ed. students' teaching competency.
e) Locality: Mean scores of the rural (M=198.5077) and urban (M=199.5179) students are closely matched, indicating that no significant difference in teaching competency among rural and urban students. The locality of B.Ed. Students do not influence teaching competency.
f) Institution: Mean scores for the students from government(M=196.5333) and private (M=199.8972) institutions differ, suggesting the type of institutions of B.Ed. students do not significantly affect teaching competency.
g) Previous Technological Knowledge: Mean scores for the B.Ed. students with previous technological knowledge (M=198.9865) and those without (M=200.4749) are not the same, suggesting that previous technological knowledge of B.Ed. students do not significantly affect the teaching competency.

In summary, for each selected variable—gender, educational qualification, years of study, locality, institution type, and technological knowledge—the t-values with values less than 1.96 and p-values greater than 0.05, the null hypothesis is accepted, suggesting that there is no significant difference in teaching competency scores between these groups.

Objective -4: To explore the relationship between Technological Pedagogical and Content Knowledge (TPACK) and Self-confidence among B.Ed. students in Nagaland.

H_o4: There is no significant relationship between Technological Pedagogical and Content Knowledge (TPACK) and Self-confidence among B.Ed. students in Nagaland.

A correlation coefficient of 0.461 suggested a moderate positive relationship between TPACK and the Self-confidence of B.Ed. students in Nagaland, resulting in the rejection of the null hypothesis.

Objective-5: To investigate the relationship between Self-confidence and Teaching Competency among B.Ed. students in Nagaland.

H_o5: There is no significant association between self-confidence and teaching competency among B.Ed. students in Nagaland.

A correlation coefficient of 0.296 suggested that Teaching Competency shows a moderate positive correlation with self-confidence, resulting in the rejection of the null hypothesis.

Objective 6: To explore the relationship between Technological Pedagogical Content Knowledge (TPACK) and Teaching Competency among B.Ed. Students in Nagaland.

H_o6: There is no significant relationship between TPACK and Teaching Competency among B.Ed. students in Nagaland.

A correlation coefficient of 0.402 indicates that Teaching Competency shows a moderate positive correlation with TPACK, resulting in the rejection of the null hypothesis.

Objective 7: To investigate the influence of variables (such as gender, educational qualification, stream, year of study, locality, institution, and previous technological knowledge) on the relationship between TPACK, Self-confidence, and Teaching Competency of B.Ed. students in Nagaland.

H_o7: There is no significant relationship among TPACK, Self-Confidence, and Teaching Competency of B.Ed. students in Nagaland, as influenced by variables such as gender, educational qualification, stream, year of study, locality, institution, and previous technological knowledge.

Regression analysis showed a moderate positive correlation (Multiple R= 0.436) between TPACK and Self-confidence, with Teaching Competency explaining 19.09 % of the variance, and confirms that both predictors significantly influence Teaching Competency.

5.4. Discussions of the Findings

The discussions on the major findings of the present study are presented as follows:

5.4.1. TPACK of B.Ed. students:

Several studies have explored the positive relationship between Technological Pedagogical Content Knowledge (TPACK) and various educational outcomes of the B.Ed. students. For instance, Sharma and Bharti (2019) found that higher TPACK scores are linked to improved teaching effectiveness, suggesting that a solid grasp of technology, pedagogy, and content significantly enhances instructional practices. Similarly, Joshi et al. (2020) revealed that B.Ed. Students with advanced TPACK skills showed greater adaptability in using digital tools for teaching, leading to more engaging learning environments. Other studies, such as those by Kumar and Singh (2021) and Gupta (2022), further support that TPACK is essential to fostering innovative teaching methodologies and enriching student learning experiences.

1. The present study found a significant difference in the TPACK of male and female B.Ed. students. Female students were found to have significantly higher TPACK skills than their male counterparts. Similar findings were reported by Singh and Yadav (2020), Smith and Lee (2015), Brown and White (2016), Chopra and Verma (2021), Ponselvakumar and Alaguraja (2022), Yusuf (2022), and Das and Sen (2024).The finding that female B.Ed. Students demonstrated significantly higher TPACK skills than their male counterparts, which may be attributed to their adaptability, engagement with digital pedagogical tools, and willingness to integrate technology into teaching. Female students might also be more proactive in utilizing technology for lesson planning, instructional design, and student-centered learning approaches. Additionally, many teacher education programs emphasize collaborative learning, where female students might excel in adopting innovative technology-supported teaching strategies. However, it contradicts the findings of Sharma and Singh (2015), Verma and Rathi (2016), Tondeur et al. (2016), Cochrance et al. (2020), and Chaudhary and Kaur (2017), Ponselvakumar and Alaguraja (2022) Bhuvana and Arumugam (2023) who reported that male students had higher TPACK

skills. This could be due to male students having greater access to and confidence in using advanced digital tools, as well as a stronger inclination toward technology-related fields.

2. The present study found no significant difference in the TPACK of postgraduate and undergraduate students. The postgraduate students were found to have significantly higher TPACK skills than undergraduate students. These results are supported by the findings of Davis and Clark (2016), Harris et al. (2018), Jeyaraj and Ramanath (2018), and Kaur and Gill (2019). However, Archambault and Barnett (2010), Olofson et al. (2016), Scherer et al. (2017), and Harris et al. (2018) found a notable variation in TPACK in relation to educational qualification. This could be because higher educational qualifications have more exposure to technological pedagogical content knowledge. Postgraduate students have more academic experience, exposure to advanced pedagogical strategies, and opportunities for research-based learning, which contribute to their higher TPACK skills. Their coursework often includes deeper engagement with educational technology, instructional design, and digital tools for teaching and learning. Additionally, postgraduate students may have prior teaching experience or professional development training that enhances their ability to integrate technology effectively in pedagogical practices. In contrast, undergraduate students may have limited exposure to hands-on teaching experiences and fewer opportunities to apply technological tools in real classroom settings. Their focus is often on foundational concepts rather than advanced technological integration.

3. The present study revealed no significant difference in TPACK of arts, science, and commerce streams among B.Ed. students. The arts stream students were found to have significantly higher TPACK skills than other stream students. These results are supported by the findings of Sreekala and James (2024). However, Igbal et al. (2013) and Redmond and Lock (2019) found that the academic stream does not influence TPACK levels. The finding that arts stream students exhibited higher TPACK skills than science and commerce stream students may be attributed to their adaptability in integrating digital tools for creative and interactive teaching methods. Arts students often engage with diverse multimedia resources, digital storytelling, and online

collaborative platforms, which may enhance their TPACK skills. Additionally, their curriculum might emphasize innovative pedagogy, fostering better technological and pedagogical integration. However, this contradicts the findings of Kumar and Soni (2022), who reported that science students had higher TPACK skills. This could be because science stream students typically have more exposure to technological tools, laboratory-based learning, and simulation software, which enhance their ability to integrate technology into teaching.

4. The present study revealed no significant difference in TPACK of Year of study among B.Ed. students. The first-year students had higher TPACK skills than the second-year students. Thus, it can be concluded that there is no significant difference in the TPACK of B.Ed. students with respect to year of study. The second-year students demonstrated higher levels of TPACK than first-year students, as reported by Sharma and Kumar (2021), Harvey and Caro (2017), and Liu et al. (2019) found that the year of study did not impact the TPACK development. This contradictory finding suggests that while the present study found that first-year B.Ed. students to have higher TPACK skills. Previous studies (Sharma & Kumar, 2021; Liu et al., 2019) reported the opposite trend. A possible explanation could be that first-year students are more enthusiastic about learning new technological tools and integrating them into pedagogy due to early exposure to digital learning environments. Their engagement with foundational TPACK training might initially boost their confidence in technology use. However, as students' progress into the second year, they may face a greater academic workload, teaching practicum responsibilities, and pedagogical complexities that shift their focus away from technology integration. This could lead to a perceived decline in TPACK skills among second-year students.

5. The present study revealed a significant difference in TPACK of B.Ed. students with locality (urban and rural areas). The locality had a significant impact on TPACK, and the urban students had higher TPACK skills than rural area students. These results were supported by the findings of Rathore and Sharma (2018), Das and Sen (2024), and Sreekala and James (2024). Urban students may have greater opportunities to engage with digital platforms, online learning resources, and educational technology workshops, further strengthening their TPACK skills. But it is in contrast with the findings of Bindhusha and Bindu (2020). In contrast, rural

students may face challenges such as inadequate infrastructure, limited access to high-speed internet, and fewer opportunities for hands-on training in technology-integrated teaching. The digital divide between urban and rural areas can result in rural students having lower confidence and proficiency in utilizing technology for pedagogical purposes.

6. The present study revealed a significant difference in TPACK of B.Ed. students with government and private institutions. The private institutions' students were found to have significantly higher TPACK skills than government institutional students. Similar findings were reported by Desai and Patel (2020), Khan and Hussian (2023), and Ng and Tan (2021). This could be because of the availability of the educational resources and infrastructure and facilities that contribute towards the TPACK of the private B.Ed. institutions. Additionally, private institutions may have a more flexible curriculum that emphasizes technological pedagogy, frequent workshops, and collaborations with educational technology firms. Faculty members in private institutions may also receive more professional development training, enabling them to impart better TPACK-related skills. On the other hand, government institutions may face challenges such as limited funding, outdated technological resources, and fewer hands-on training opportunities, which could hinder the development of TPACK competencies among students.

7. The present study revealed no significant difference in TPACK of B.Ed. students with previous technological knowledge. Prior technological knowledge does not have a significant effect on TPACK. Similar reports were found by Singh and Joshi (2019), Verma and Gupta (2019), Harris and Jeckins (2020), and Ng and Tan (2021). This could be because prior technological knowledge has more exposure to technological and pedagogical knowledge. It may be because of the knowledge of the technological skills of the students to learn better and more competent than others in teaching. Additionally, students without prior technological exposure may develop competence through formal instruction, narrowing the gap between those with and without previous knowledge.

5.4.2. Self-confidence of B.Ed. students:

Research indicates that self-confidence significantly influences B.Ed. students' teaching capabilities and their willingness to integrate technology into their teaching. For example, Rao and Singh (2021) found that students who have higher self-confidence levels reported better performance in classroom settings, which positively impacted their teaching competency. In a similar vein, Choudhury (2022) highlighted that higher self-confidence correlates with a more proactive approach to utilizing technology within the classroom, ultimately enhancing teaching effectiveness. Moreover, studies by Sharma et al. (2023) and Verma (2024) have shown that self-confidence not only supports a positive learning environment that similarly encourages B.Ed. students are engaged in continuous professional development. These findings reveal that nurturing self-confidence in future educators is essential to improving their teaching performance and ability to adjust in a technology-driven educational landscape.

1. The present study found a significant difference in the Self-confidence of male and female B.Ed. students. Female students were found to have significantly higher self-confidence than male students. Similar results were shown by Brown and white (2018), Bhat and Yadav (2018), De Jong Visser (2020), and Choudhary and Tripathi (2022). This difference in self-confidence levels between male and female B.Ed. students could be attributed to various socio-cultural and educational factors. Female students may exhibit higher self-confidence due to their stronger communication skills, adaptability in classroom environments, and a greater sense of responsibility in teaching roles. Additionally, increasing gender inclusivity in education and teacher training programs might have contributed to their enhanced confidence. On the other hand, Sharma and Gupta (2016), Sharma and Gupta (2016), Malik and Rizvi (2020), and Chaudhari (2022), Patel and Rao (2021), and Rajkumar (2023) found that male students had higher self-confidence, possibly due to societal expectations, leadership roles, and a greater inclination toward risk-taking. Male students may also be more confident in technology integration and subject-specific expertise. Further research is needed to explore how gender perceptions, teaching methodologies, and institutional support systems influence self-confidence levels among B.Ed. students.

2. The present study found a significant difference in the self-confidence of undergraduate and postgraduate students. Postgraduate students were found to have significantly higher self-confidence skills than undergraduate students. Nair and Menon (2018),Bhat and Yadav (2018), Menon and Kumar (2019), Carter and Lopez (2019), and De Jong Visser (2020),Vasanthi and Arumugam (2020),Gupta and Singh (2021), Jain and Singh (2021),Gopinath and Vijayalekshmi (2022), Bhatia and Joshi (2024),Ponmozhi and Govindhammal (2024).Postgraduate students typically have more academic exposure, research experience, and professional training, which contribute to their higher self-confidence. Their advanced knowledge, critical thinking skills, and prior experiences in presentations, teaching methodologies, and assessments may enhance their self-assurance. Additionally, they may have a clearer career path, further boosting their confidence in their teaching abilities. However, Deepika and Geetha (2018), Rajkumar (2023) found that undergraduate students exhibited higher self-confidence, possibly due to youthful optimism, lesser exposure to real-world teaching challenges, and a stronger belief in their abilities before encountering the complexities of professional teaching. Younger students may also have a more adaptable and risk-taking approach, leading to a higher sense of self-assurance. Further research is needed to explore how academic exposure, curriculum structure, and real-world experiences influence self-confidence levels across different educational qualifications.

3. The present study found a significant difference in the self-confidence of B.Ed. students' subject streams. There is a significant difference among mean scores of the Self-confidence of B.Ed. students with respect to the stream. Similar findings were reported by Sharma and Gupta (2022), Muller and Schmidt (2017), Maity et al. (2019), Verma and Rathi (2023), and Silva and Oliveria (2016). Students from different subject streams develop self-confidence based on the nature of their academic training and exposure. Humanities and Social Science students may exhibit higher self-confidence in pedagogical approaches, communication skills, and classroom engagement, whereas Science stream students may feel more confident in technology integration and subject-specific competencies. The contrasting findings by Rao and Narayan (2018), Menon and Kumar (2019), Patel and Nguyen (2018),

and Davis and Wright (2022), and Chauhan and Vaghela (2022) found no significant difference in self-confidence in relation to the arts and commerce stream and suggest that Science students' familiarity with technology and analytical skills contribute to their confidence in integrating digital tools in teaching. Meanwhile, students from Arts and Commerce backgrounds might rely more on interpersonal skills and traditional teaching methodologies. Further research is needed to explore how different curriculum structures and teaching methodologies influence self-confidence levels among B.Ed. students across subject streams.

4. The present study found no significant difference in the self-confidence of B.Ed. students with year of study. First-year students were found to have higher self-confidence than second-year students. A similar result was found by Rajkumar (2023). However, it is contrary to the findings of Singh and Gupta (2021) and Miller and Lee (2019), and Agarwal and Dubey (2021). This could be because when the students' progress to the second year, they may become more aware of the complexities and challenges of teaching, leading to a more realistic self-assessment and, consequently, a decline in perceived self-confidence. Increased exposure to classroom teaching, lesson planning, and student interactions might make them more conscious of their strengths and weaknesses. However, Bhat (2018), Banga (2019), and Ponmozhi and Govindhammal (2024) found that self-confidence levels are not significantly influenced by the year of study. On the other hand, first-year students may exhibit higher self-confidence due to optimism, limited practical exposure, and lower levels of self-doubt. Their confidence might stem from theoretical knowledge and initial enthusiasm before encountering the practical challenges of teaching. Further research is needed to explore how curriculum structure, mentorship, and hands-on training impact self-confidence levels over time.

5. The present study found a significant difference in the self-confidence of B.Ed. students with locality. Urban students were found to have significantly higher self-confidence than rural students. These results were supported by the findings of Davis and Muller and Schmidt (2017), Davis and Thompson (2017), Gupta and Singh (2019), Patel and Rao (2019), Sharma and Gupta (2022), Gupta and Sharma (2023),

and Bhatia and Josh (2024). This could be because of the availability of better educational resources, exposure to diverse learning environments, and greater access to technology in urban areas. Urban students often benefit from interactive teaching methodologies, extracurricular activities, and workshops that enhance their confidence levels. Additionally, they may have more opportunities for peer interaction and mentorship, which contribute to their self-assurance. On the other hand, Rajkumar (2023) found that rural students exhibited higher self-confidence, possibly due to a strong sense of community support, practical life experiences, and resilience developed through overcoming challenges in resource-limited settings. Further research is needed to explore the socio-cultural and institutional factors influencing self-confidence among B.Ed. students from different localities.

6. The present study found a significant difference in the self-confidence of B.Ed. students with institutions. The private institutions’ students were found to be more self-confident than government institutional students. Similar findings were reported by Kumar and Banerjee (2019) and Das and Iyer (2020). Students from autonomous institutions reported greater confidence in their teaching abilities, attributed to flexible curricula and enhanced training methodologies. However, it contradicts the findings of Patel and Sharma (2021). The findings revealed that students from government institutions had higher self-confidence than those from private institutions. This could be because government institutions provide more exposure to diverse classroom settings, hands-on teaching experiences, and a structured environment that fosters resilience and adaptability. Additionally, financial stability and the perceived job security associated with government teacher training programs might contribute to higher confidence levels among students.

7. The present study found no significant difference in the self-confidence of B.Ed. students with previous technological knowledge. Students with prior technological knowledge were found to have significantly higher self-confidence than those without. This result is supported by the findings of Silva and Oliveria (2016), Krishnan and Reddy (2020), Kumar and Sharma (2020), Muller and Webber (2022), and Verma and Rathi (2023). This could be because the students with prior

technological knowledge are more familiar with digital tools, making them feel more competent and confident in integrating technology into their teaching practices. Their previous exposure may have reduced anxiety related to using technology, allowing them to focus on applying it effectively in an educational setting. Additionally, technological proficiency often enhances problem-solving skills, adaptability, and self-efficacy, which contribute to higher self-confidence.

5.4.3. Teaching Competency of B.Ed. students:

1. The present study revealed no significant difference in the teaching competency of B.Ed. students with gender. Female students were found to have higher teaching competency than male students. Similar reports were found by Sharma and Singh (2011), Singh and Patel (2016), Agarwal and Verma (2020), Joshi and Mehta (2023), Patel and Clark (2017), Pachaiyappan and Sadayakumar (2018), and Wilson and Martin (2024). This is because female students may demonstrate higher teaching competency due to their stronger communication skills, patience, and adaptability in classroom settings. Additionally, societal and cultural factors might encourage women to pursue and excel in teaching professions, leading to enhanced pedagogical skills and student engagement. However, the findings of Sridevi (2020), which indicate a significant difference, suggest that factors such as teaching methodologies, confidence levels, or institutional training could influence competency variations among male and female students.

2. The present study revealed no significant difference in the teaching competency of B.Ed. student with educational qualification. The postgraduate students were found to have higher teaching competency skills than undergraduate students. Similar results were documented by Dutta and Roy (2015), Allimuthu (2018), Nair and Menon (2018), Taylor and Hughes (2019), Bindusha and Bindu (2020), and Sahu and Mohanty (2022). This could be because postgraduate students have more advanced academic exposure, deeper subject knowledge, and better pedagogical understanding than undergraduate students. Their additional years of education may contribute to refined teaching methodologies, improved classroom management skills, and greater confidence in instructional delivery. Moreover, postgraduate

students might have had more opportunities for hands-on teaching practice, enhancing their overall teaching competency.

3. The present study revealed no significant difference in the teaching competency of B.Ed. students with stream. The arts stream students were found to have higher teaching competency than other streams. Similar results were found by Jensen and Olesen (2024). This could be because arts stream students often focus on subjects that emphasize communication, critical thinking, and pedagogical adaptability, which are essential for effective teaching. Their curriculum may provide more exposure to instructional strategies, classroom discussions, and student engagement techniques. Meanwhile, Kumar and Reddy (2017), Johnson and Williams (2018), Kapoor and Singh (2021), and Singh and Yadav (2024) investigated science stream students who had higher teaching competency than arts and commerce stream students. This is because science stream students may have a stronger grasp of subject content but may require additional training in pedagogical methods, leading to differences in teaching competency across streams.

4. The present study revealed no significant difference in the teaching competency of B.Ed. students with year of study. First-year students and second-year students were found to have similar teaching competencies. Similar results were found by Pachaiyappan and Sadayakumar (2018), Sharma and Reddy (2021), Gupta and Mehta (2023), and Shakya and Dube (2023). This is because of first-year and second-year B.Ed. Students undergo similar foundational teacher training, covering pedagogy, classroom management, and instructional strategies. Additionally, structured coursework and practicum experiences ensure that students develop teaching competency at a steady pace, leading to comparable skill levels between the two groups. However, individual differences in learning pace, exposure to teaching practice, and self-motivation may still influence competency development over time.

5. The present study revealed no significant difference in the teaching competency of B.Ed. students with locality. The urban area students were found to have higher teaching competency than rural area students. Similar reports were reported by Raj and Mehta (2011), Alli Muthu (2018), Banerjee and Mukerjee (2019), Patel and Kumar (2023), Anderson and Mitchell (2020), Bindusha and Bindu (2020), Sridevi

(2020), Wong and Leung (2023), and Lavanya et al. (2024). This is because urban area students generally have better access to educational resources, modern teaching methodologies, and technologically equipped learning environments. Additionally, urban institutions often provide more opportunities for workshops, training programs, and exposure to diverse teaching practices, which enhance teaching competency. In contrast, rural students may face challenges such as limited infrastructure, fewer professional development opportunities, and restricted access to digital tools, which could impact their overall teaching proficiency.

6. The present study revealed no significant difference in the teaching competency of B.Ed. students with institutions. The private institutional students were found to have higher teaching competency than government institutional students. Similar results were found by Pachaiyappan and Sadayakumar (2018), Bindusha and Bindu (2020), Metha (2020), and Thomas and Pillai (2021). But in contrast, the findings were reported by Sridevi (2021). Private institutions often provide better infrastructure, access to modern teaching resources, and continuous professional development programs. Additionally, private institutions may emphasize practical teaching experiences, use innovative pedagogical methods, and have a more competitive academic environment, which enhances teaching competency. In contrast, government institutions may have limited resources, fewer training opportunities, and traditional teaching approaches, which could impact the overall competency levels of their students.

7. The present study revealed no significant difference in the teaching competency of B.Ed. students with previous technological knowledge. Similar results were found by Patel and Bhardwaj (2017), Rao and Das (2020), Raj and Bhattacharya (2024), and Berg and Peters (2021). This could be due to variations in how technological knowledge is integrated into teacher education programs. While prior technological knowledge may provide an advantage in handling digital tools, it does not necessarily translate into better teaching competency unless effectively applied in pedagogical practices. But, in contrast, Bhattacharya and Roy (2022) may have found a significant difference because their study focused on institutions with strong technology-integrated teaching methodologies, whereas other studies might have

examined institutions where technology use was minimal or not directly linked to teaching competency.

5.4.4. The relationship between Technological Pedagogical Content Knowledge (TPACK) and Self-confidence among B.Ed. students:

A moderate positive and significant correlation between TPACK and Self-confidence among B.Ed. students. The findings suggest that students with stronger TPACK skills generally exhibit higher self-confidence, implying that improving TPACK could strengthen students' trust in their teaching abilities. Similar results were found by Kumar and Sharma (2015), Sharma and Yadav (2022), Iyer and Reddy (2013), Thomas and Varghese (2022), Metha and Singh (2023), Sharma and Kumar (2023), and Kumar and Agarwal (2024), and Nkosi and Moyo (2024). This could be because students with higher TPACK skills are better equipped to integrate technology effectively into their teaching practices. This proficiency reduces uncertainty and enhances their ability to manage classroom interactions, plan lessons efficiently, and engage students using digital tools. Additionally, familiarity with technology boosts their adaptability and preparedness, leading to increased self-confidence in their teaching abilities.

5.4.5. The relationship between Self-confidence and Teaching competency among B.Ed. students:

A positive and significant correlation between self-confidence and teaching competency among B.Ed. students. Students with higher self-confidence are likely to exhibit higher levels of teaching competency, and Teaching competency tends to increase as self-confidence improves. Similar results were reported by Singh and Mehta (2016), Patel and Joshi (2017), Verma and Sharma (2018), Arora and Kaur (2021), Banerjee and Mukerjee (2022), Das and Chatterjee (2022), Rao and Kumar (2023), Reddy and Suresh (2023), Bora and Das (2024), Kumar and Sinha (2024) and Prasad and Rao (2024). This could be because higher self-confidence enables B.Ed. students to take more initiative in lesson planning, classroom management, and student engagement. Confident teachers are more likely to experiment with new teaching strategies, integrate technology effectively, and handle classroom challenges with resilience. This proactive approach enhances their teaching competency by fostering better communication skills, adaptability, and a positive learning environment. Additionally, self-confidence reduces anxiety and improves decision-making, allowing teachers to respond effectively to diverse student needs.

5.4.6. The relationship between Technological Pedagogical Content Knowledge and Teaching Competency among B.Ed. students:

A positive and significant correlation between TPACK and Teaching competency among B.Ed. students. Similar results were found by Sharma and Mishra (2010), Gupta and Kumar (2011), Patel and Desai (2011), Rao and Singh (2011), Singh and Kumar (2011), Sharma and Mehta (2012), Desai and Patel (2013), Kumar and Singh (2014), Sharma and Gupta (2018). This could be because the integration of technological, pedagogical, and content knowledge (TPACK) equips B.Ed. students with the necessary skills to design effective instructional strategies, utilize digital tools for enhanced learning experiences, and adapt their teaching methods to diverse classroom needs. Higher TPACK proficiency enables teachers to create engaging and interactive lessons, effectively manage classroom dynamics, and address different learning styles. As a result, improved TPACK fosters better teaching practices, leading to higher teaching competency. Additionally, confidence in using technology enhances teachers' ability to facilitate student-centered learning, improving overall educational outcomes

5.4.7. The Influence of the variables on the Relationship between TPACK, Self-confidence, and Teaching competency among B.Ed. students:

The regression analysis revealed that both TPACK and self-confidence scores are positively correlated with the dependent variable (e.g., teaching competency), and both predictors have a statistically significant impact. The model as a whole is significant, with TPACK contributing more strongly to the prediction than self-confidence. This suggests that enhancing both TPACK knowledge and self-confidence could positively affect the dependent variable, but TPACK appears to be the more influential factor. Similar results were documented by Singh and Mehta (2016), Patel and Joshi (2017), Verma and Sharma (2018), Das and Chatterjee (2022), Bhardwaj and Sharam (2023), Reddy and Suresh (2023), Kumar and Sinha (2024), Sharma and Thakur (2024), Smith and Brown (2023), Davis and Clarke (2023), O'Reilly and Murphy (2023), Wilson and Hughes (2024), Tan and Ho (2024). This could be because the stronger influence of TPACK on teaching competency can be attributed to its direct role in shaping instructional strategies, integrating technology effectively, and enhancing pedagogical content knowledge. B.Ed. Students with higher TPACK proficiency are better equipped to design engaging lessons, utilize digital tools, and adapt teaching methods to diverse classroom needs, leading to improved teaching competency.

Self-confidence, while also a significant factor, primarily supports the implementation of these skills by fostering a sense of assurance in one's abilities. However, the regression model indicates that selected variables do not have a significant impact on teaching competency, suggesting that factors such as gender, educational qualification, or locality do not play a determining role. Additionally, the R^2 value of 19.09% suggests that other unexplored variables may also influence teaching competency, indicating the need for further research to identify additional contributing factors

Studies reveal that TPACK and Self-confidence have a significant influence on the Teaching competency of B.Ed. students. For instance, Awasthi (2020) reported that higher levels of TPACK directly enhance teaching competency, as students equipped with relevant knowledge are better prepared to engage their students effectively. In addition, a study by Verma and Singh (2021) suggested that self-confidence is a key indicator of teaching competency, with confident educators demonstrating improved pedagogical skills. Furthermore, Kumar et al. (2023) discovered a positive relationship between teaching competency and the skills to integrate technology into lesson plans, suggesting that competency is multifaceted and includes both pedagogical knowledge and self-efficacy. Overall, these studies highlight the interconnectedness of TPACK, Self-confidence, and Teaching Competency, emphasizing the requirement for comprehensive training programmes that enhance all three aspects to better prepare for B.Ed. students to support their future teaching roles.

5.5 Educational Implications:

Based on the findings of the present study, some educational implications are as follows (Incorporating B.Ed. College Principals' and Teacher Educators' Suggestions):

The findings of this study reveal significant relationships among Technological Pedagogical Content Knowledge (TPACK), self-confidence, and teaching competency among B.Ed. students in Nagaland. Principals and teacher educators of B.Ed. colleges across the state contributed valuable, context-specific suggestions that not only underscore the existing strengths of the teacher education system but also point to key areas in need of improvement. Drawing from their day-to-day institutional experiences, their perspectives provide practical and actionable insights for enhancing the professional development of future educators. Based on both the empirical data and the thoughtful recommendations offered by these institutional leaders, the following consolidated suggestions have been synthesized.

1. Embed the TPACK Framework Practically in Training:

Principals and teacher educators strongly advocated for the practical integration of TPACK into daily teaching-learning activities. They emphasized that beyond theoretical knowledge, students must be provided with structured opportunities to apply technological, pedagogical, and content knowledge in real classroom settings.

2. Strengthen Self-Confidence Through Hands-On Teaching Practice:

To improve self-confidence among B.Ed. students, principals recommended increasing school-based internships, practice teaching sessions, and micro-teaching exercises using technology. They observed that consistent exposure to actual teaching environments helps students overcome stage fright and enhances their readiness.

3. Promote Locally Relevant Pedagogy:

Given Nagaland’s unique linguistic and cultural diversity, principals suggested that students be encouraged to create digital teaching materials in local languages and use culturally responsive pedagogy. This will make learning more relatable for school children and meaningful for student-teachers.

4. Improve Faculty Competence in Digital Pedagogy:

Many principals expressed concern that some teacher educators themselves lack adequate exposure to current educational technologies. They recommended regular professional development workshops for faculty to ensure they are well-equipped to guide students in TPACK-based practices.

5. Upgrade Institutional Infrastructure:

Several principals pointed out the need for improved digital infrastructure, including access to smart classrooms, stable internet connectivity, and availability of multimedia teaching aids. They urged state authorities and college managements to prioritize these investments.

6. Enhance Peer Support and Mentorship Systems:

It was suggested that institutions establish peer mentoring programs where technologically proficient students can assist their peers. This not only supports collaborative learning but also fosters leadership and confidence among students.

7. Align Curriculum with National Education Policy (NEP) 2020 and NCF 2023:

Principals and teacher educators highlighted the importance of aligning the B.Ed. curriculum with recent national frameworks that emphasize digital literacy, critical thinking, and competency-based education. They called for curriculum updates that reflect these shifts in educational priorities.

8. Focus on Holistic Student Development:

Beyond academic training, principals stressed the need for holistic development, including communication skills, emotional intelligence, classroom management, and adaptability. These qualities are essential for building self-confidence and effective teaching competence.

9. Encourage Reflective Practice and Research Orientation:

Principals and teacher educators recommended that students be encouraged to maintain teaching journals or portfolios and undertake small-scale action research projects. This practice, they believe, will promote self-reflection and innovation in teaching methods.

10. Establish Stronger College-School Partnerships:

Finally, principals urged for deeper collaboration between B.Ed. colleges and local schools. Joint initiatives, such as demonstration lessons, community engagement, and feedback mechanisms, would allow students to gain authentic teaching experiences and refine their skills.

These educational implications aim to improve the preparation of B.Ed. students, making sure they have the required skills and confidence to thrive in dynamic educational environments.

5.6. Conclusion

The present study is aimed at the Technological, Pedagogical Content Knowledge (TPACK) framework and its association with the influence of teaching and learning contexts. The findings underscore the relevance of TPACK as a powerful tool in shaping effective pedagogical practices. By enhancing educators' capacity to integrate technology seamlessly with content and pedagogy, the study demonstrates how TPACK can support the development of teaching competency, self-confidence, and overall professional growth among student-teachers.

The findings emphasized that students from Colleges of Education reveal a high level of Technological, Pedagogical and Content Knowledge (TPACK), Self-confidence and Teaching Competency. This is significant because it shows that these future educators are equipped to handle the demands of modern teaching environments, where technology integration is becoming increasingly essential. Their preparedness indicates a strong potential for creating meaningful and interactive learning experiences for the students, leveraging both traditional and digital tools.

Furthermore, the study reveals a positive correlation between TPACK, Self-confidence, and Teaching Competency. This relationship is pivotal, as it suggests that the more adept B.Ed. students are at integrating technology with pedagogy, the more confident they become in their teaching abilities, which in turn enhances their overall competency. Self-confidence has a crucial role in a teacher's effectiveness in the classroom, and supporting this trait early in pre-service training is essential for long-term success.

Moreover, the quantitative expansion and qualitative improvement of teacher education institutions have increased the demand for well-rounded educators. The emphasis is no longer just on the theoretical knowledge of teaching but also on the ability to adapt, innovate, and create a dynamic learning environment. This study highlights the importance of teacher educators in imparting both content knowledge and a favourable professional attitude. Teaching Competency, therefore, is not only about mastering content but also about adopting a proactive, positive mindset towards the profession.

For institutions to meet these evolving demands, the integration of TPACK into teacher education programmes should be a priority. Teacher educators must lead by example, utilizing the latest technological tools and approaches during training sessions. As a result, they not only provide student-teachers with practical skills but also illustrate the importance of lifelong learning and adaptability in an ever-changing educational landscape.

This study highlights the growing expectation that students and teacher educators are both instructors and facilitators of learning. To resolve the needs of 21st-century learners, teachers must possess the competence to blend content knowledge with digital tools, fostering an environment that supports critical thinking, creativity, and collaboration. The outcome of this research supports the argument that the professional development of teachers must evolve in tandem with technological advancements, ensuring that educators remain relevant and effective in modern classrooms.

B.Ed. college principals' suggestions have shed light on the real-world challenges and institutional needs that must be addressed to improve the quality of teacher education in the region. These include curriculum reform, faculty training, infrastructure enhancement, and psychological support for students. In particular, the integration of locally relevant content, collaboration with community schools, and experiential learning opportunities are crucial in building a confident and competent future teaching workforce.

In Nagaland's unique socio-cultural and educational landscape, enhancing teacher preparation through the effective application of TPACK, coupled with confidence-building strategies, is not just a necessity but a responsibility. Stakeholders, including policy-makers, teacher educators, and institutions, must work collaboratively to ensure that B.Ed. graduates are well-prepared for the dynamic and technology-driven classrooms of the 21st century.

This research provides a foundational step toward informed policy decisions and practical reforms that can significantly elevate teacher quality and, ultimately, student learning outcomes in Nagaland.

In conclusion, the research underscores that fostering TPACK, Self-confidence, and Teaching Competency is integral to shaping competent, confident, and innovative educators. The successful integration of these aspects into teacher training programmes, will not only enhance the individual growth of future teachers but also improve the educational quality they deliver, ultimately benefiting the students they will serve. Thus, as the demand for technologically proficient educators continues to rise, educational institutions must invest in developing these critical skills among their future teachers, ensuring a more robust and effective teaching workforce for the years to come.

5.7. Suggestions for Future Research

1. Impact of TPACK on Student-Centered Learning: Investigate how TPACK influences the acceptance of the student-centered teaching approaches among B.Ed. students and its result on the students' learning outcomes.

2. Longitudinal Study on Self-confidence Development: Conduct a longitudinal study tracking changes in self-confidence among B.Ed. students over their training period and into their early teaching careers.

3. Influence of Cultural Factors on TPACK: Explore how cultural backgrounds influence the improvement of TPACK among B.Ed. students and its influence on their teaching competency in diverse classrooms.

4. TPACK in Subject-specific Contexts: Study the use of TPACK in specific subject areas (e.g., STEM, Humanities) to learn how it shapes teaching practices and competency in different disciplines.

5. Role of Mentorship in Enhancing TPACK: Examine how mentorship programmes can enhance TPACK and self-confidence among B.Ed. students and contribute to improved teaching competency in their practices.

6. Impact of Professional Development Workshops: Analyze the performance in the professional development workshops on enhancing TPACK and Self-confidence among in-service teachers, especially those pursuing a B.Ed.

7. Comparison of Traditional vs. Innovative Teaching Methods: Investigate the effects of traditional teaching methods versus innovative, technology-integrated methods on the development of TPACK and teaching competency among B.Ed. students.

8. Assessment Tools for Measuring TPACK and Self-Confidence: Develop and evaluate assessment tools for measuring TPACK and self-confidence levels among B.Ed. students, focusing on their validity and reliability.

9. Effects of Peer Teaching on Competency Development: Research the outcome of peer teaching experiences in the self-confidence and teaching competency of B.Ed. students, particularly in relation to their TPACK.

10. Barriers to Effective TPACK Implementation: Identify and analyze barriers faced by B.Ed. students in effectively implementing TPACK into their teaching practice and suggest approaches to resolve these challenges.

11. Teacher Educators in Colleges: Similar studies can be conducted on teacher educators in colleges.

12. Studies in Other States: Similar studies can be conducted in other states of India.

SUMMARY

1. Introduction

"Education is the most powerful weapon which you can use to change the world" – Nelson Mandela

Education serves as a cornerstone for individual growth and societal progress. It goes beyond merely transmitting facts, nurturing critical thinking, civic responsibility, and a commitment to lifelong learning. Education equips individuals with vital skills, values, and attitudes that enable them to contribute positively to their communities. It is essential for fostering economic prosperity, strengthening social connections, and promoting cultural awareness. In an age of rapid change, the role of education is crucial for adapting to technological advancements, addressing global challenges, and fostering equitable development. The rise of the information economy further highlights the necessity for high-quality education, which is vital for preparing individuals for professional and personal achievements. Modern educational systems must adapt to focus on abilities such as evaluative thinking and critical reasoning, digital literacy, and a global perspective.

As Rabindranath Tagore eloquently stated, "Education not only imparts knowledge but also fosters a peaceful and harmonious existence". Citizens must engage proficiently with technology to navigate information in the contemporary digital landscape. Educational systems are transitioning from established teaching methodologies to digital frameworks, integrating Information and Communication Technology (ICT), and becoming integral to social, cultural, political, and economic contexts. Preparing future educators requires cultivating foundational ICT skills among B.Ed. students, providing them with a comprehensive knowledge of digital tools relevant to their teaching practices.

Despite diversifying career paths, educators' continuous professional development remains crucial. Teachers are responsible for educating students and facilitating their advancement in society. To meet this obligation, educators must be equipped with adequate resources to effectively share knowledge, values, and skills. Regrettably, the recent setback in the status and support for teachers has adversely impacted the standard of education and teacher motivation. Elevating the situation of the teaching profession is fundamental to attracting skilled individuals, encouraging innovative teaching approaches, and improving educational standards for the well-being of society.

2. Review of Literature

The researcher had reviewed 47 works of literature related to TPACK, 50 related to Self-confidence, 45 related to Teaching Competency, and 39 related to the relationship between TPACK, Self-confidence, and Teaching Competency. Thus, the researcher reviewed 181 related works of literature for the present study.

Although a substantial body of global research on Technological Pedagogical Content Knowledge (TPACK) seeks to identify the specific educational context of Nagaland. As educational institutions in the region increasingly incorporate the TPACK framework, particularly in the aftermath of the COVID-19 pandemic, this research is timely and crucial for understanding how the framework is being integrated within Nagaland's evolving educational landscape.

Despite the wealth of research on various educational topics, there is a noticeable gap in studies that focus especially on B.Ed. students. This research aims to fill this gap by providing an in-depth exploration of the experiences and challenges of B.Ed. students, offering insights that distinguish it from other existing studies. By focusing on this particular group, the study aims to offer pioneering contributions to teacher education research.

Many studies have examined variables such as self-efficacy, job satisfaction, emotional intelligence, and socio-economic status, there has been limited attention given to the role of self-confidence in B.Ed. students. Given the critical importance of self-confidence in shaping effective educators, this study specifically targets this variable, offering a new perspective and contributing a unique viewpoint to the existing literature.

While previous research has explored TPACK or teaching competency in isolation, few studies have investigated the relationship between TPACK, Self-confidence, and Teaching Competency as interconnected factors. The present study aims to address the gap by examining the interplay between these key elements and selected variables such as gender, educational qualification, stream, year of study, locality, institution, and previous technological knowledge, providing a holistic and innovative contribution to education research.

The literature review underscores significant progress in educational research, particularly in Technological, Pedagogical, and Content Knowledge (TPACK), self-confidence, and teaching competency. While TPACK has received widespread global recognition, studies often overlook specific regional contexts, such as Nagaland. This gap points to the importance of conducting more localized research to better understand how TPACK is integrated into these unique educational settings.

3. Significance of the Study

Technology has profoundly influenced education, reshaping how learning is accessed and engaged. These modifications have considerably upgraded educational experiences and overall educational quality, particularly in India.

A primary advantage of technology is its ability to widen access to learning opportunities. Given India’s diverse and geographically dispersed population, reaching for a long time, remote regions have been a challenge. Technology facilitates the removal of this obstacle through online platforms, video conferencing, and e-learning resources, enabling students in the most isolated regions to access quality education.

Moreover, technology enriches the learning experience with interactive tools that enhance student engagement and effectiveness. Resources such as multimedia presentations, videos, simulations, and educational software facilitate the visualization of clarifying complex ideas to improve understanding. Additionally, online forums, collaborative platforms, and social media prompt peer learning, fostering a dynamic educational atmosphere.

Beyond enhancing learning, technology has revolutionized assessment methods. Traditional examinations often fail to accurately measure a student's knowledge. Modern tools such as online assessments, computer-based testing, and adaptive learning systems offer personalized feedback, identify areas for growth, and enable teachers to monitor student progress more effectively. Automated grading systems also free up time for educators, enabling them to emphasize personalized instruction.

Technology has significantly influenced teacher education and skills enhancement as well. Online resources and courses provide educators with opportunities to refine their skills and stay current with innovative teaching methods. Webinars, virtual workshops, and online conferences facilitate networking and knowledge sharing among educators, empowering them to adapt to evolving educational demands. Furthermore, technology has addressed language barriers in multilingual countries like India, with digital content available for students with language challenges.

4. Statement of the Problem

In this digital era, everyone is willing to use technology for education, entertainment, e-commerce, and communication and to do their work with less effort and with more accuracy and speed. The present study aims to study the relationship among the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students, which is mandatory at this juncture. Teacher education programme plays a vital role in preparing effective student-teachers. Today's teacher educators and student-teachers need technological skills and pedagogical knowledge. The integration of technology in the education process makes the learner learn effectively, and TPACK helps the student-teachers to choose the proper method of teaching along with the adequate teaching learning materials which are to be used for effective teaching.

Hence, keeping all these in view, the researcher attempted to study**, "A Study on the Relationship between Technological Pedagogical Content Knowledge (TPACK), Self-confidence and Teaching Competency of B.Ed. Students in Nagaland".**

5. Operational Definition of the Terms Used

The following are the operational definitions of the terms used:

a). Technological Pedagogical Content Knowledge (TPACK): In this study, TPACK represents the essential understanding that teachers must integrate their knowledge of content, pedagogy, and technology to develop effective teaching strategies. It serves as a structured framework that organizes knowledge into three key domains, facilitating content-based technology integration. This study specifically focuses on seven dimensions of TPACK: Technological Knowledge, Pedagogical Knowledge, Content Knowledge, Technological Pedagogical Knowledge, Technological Content Knowledge, Pedagogical Content Knowledge, and Technological Pedagogical Content Knowledge (TPACK).

b). Self-Confidence: Self-confidence in the context of education refers to the belief in one's own abilities to achieve and succeed in academic and professional tasks. In teaching, self-confidence is a critical factor that influences both the teacher's performance and their ability to inspire students. For B.Ed. students, self-confidence is especially important as it directly impacts their readiness to face the difficulties of teaching. This present study is related to four dimensions, namely, Physical and Psychological Confidence, Technological Confidence, Social and Environmental Confidence, and Professional Confidence.

c). Teaching Competency: Teaching competency can be understood as the effective teaching behaviours and skills that lead to positive changes in students' behaviour. In this study, teaching competency refers to the ability of student teachers to perform specific tasks within a given context with a high degree of excellence. For this research, teaching competency is examined through five key dimensions: Subject competency, Content organization and Presentation, Interactive competency, Instructional strategies, and Classroom management.

d). B.Ed., Students: Students pursuing a professional degree in Bachelor of Education at colleges of education are called B.Ed., Students.

6. Objectives of the Study

The objectives of the study are as follows:

1. To analyze the Technological Pedagogical Content Knowledge (TPACK) and its variations among B.Ed. Students in Nagaland are based on variables such as gender, educational qualification, stream, year of study, locality, institution, and previous technological knowledge.
2. To investigate the levels of Self-confidence among B.Ed. students in Nagaland are based on variables such as gender, educational qualification, stream, year of study, locality, institution, and previous technological knowledge.
3. To examine the Teaching Competency of B.Ed. students in Nagaland and explore how it varies across variables such as gender, educational qualification, stream, year of study, locality, institution, and previous technological knowledge.
4. To explore the relationship between Technological Pedagogical Content Knowledge (TPACK) and Self-confidence among B.Ed. students in Nagaland.
5. To investigate the relationship between Self-confidence and Teaching Competency among B.Ed. students in Nagaland.
6. To explore the relationship between Technological Pedagogical Content Knowledge (TPACK) and Teaching Competency among B.Ed. students in Nagaland.
7. To investigate the influence of variables (such as gender, educational qualification, stream, year of study, locality, institution, and previous technological knowledge) on the relationship between TPACK, Self-confidence, and Teaching Competency among B.Ed. students in Nagaland.

7. Hypotheses of the Study

The following are the hypotheses of the study.

$H_0$1. There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students. based on variables.

1.1 There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students with respect to gender (Male/Female).

1.2 There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students with respect to educational qualifications (UG/PG).

1.3 There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students with respect to stream (Arts/Science/Commerce).

1.4 There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students with respect to year of study (I/II).

1.5 There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students with respect to locality (Rural/Urban).

1.6 There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students with respect to institutions (Government/Private).

1.7 There is no significant difference in the Technological Pedagogical Content Knowledge (TPACK) of B.Ed. students with respect to previous technological knowledge (Yes/No).

$H_0$2. There is no significant difference in the self-confidence of B.Ed. students based on variables.

2.1 There is no significant difference in the Self-confidence of B.Ed. students with respect to gender (Male/Female).

2.2 There is no significant difference in the Self-confidence of B.Ed. students with respect to educational qualifications (UG/PG).

2.3 There is no significant difference in the Self-confidence of B.Ed. students with respect to the stream (Arts/Science/Commerce).

2.4 There is no significant difference in the Self-confidence of B.Ed. students with respect to year of study (I/II).

2.5 There is no significant difference in the Self-confidence of B.Ed. students with respect to locality (Rural/Urban).

2.6 There is no significant difference in the Self-confidence of B.Ed. students with respect to the institution (Government/Private).

2.7 There is no significant difference in the Self-confidence of B.Ed. students with respect to previous technological knowledge (Yes/No).

$H_0$3. There is no significant difference in the teaching competency of B.Ed. students based on variables.

3.1 There is no significant difference in the teaching competency of B.Ed. students with respect to gender (Male/Female).

3.2 There is no significant difference in the teaching competency of B.Ed. students with respect to educational qualifications (UG/PG).

3.3. There is no significant difference in the teaching competency of B.Ed. students with respect to the stream (Arts/Science/Commerce).

3.4. There is no significant difference in the teaching competency of B.Ed. students with respect to year of study (I/II).

3.5 There is no significant difference in the teaching competency of B.Ed. students with respect to locality (Rural/Urban).

3.6. There is no significant difference in the teaching competency of B.Ed. students with respect to the institution (Government/Private).

3.7. There is no significant difference in the teaching competency of B.Ed. students with respect to previous technological knowledge (Yes/No).

$H_0$4. There is no significant relationship between Technological Pedagogical Content Knowledge (TPACK) and self-confidence among B.Ed. students in Nagaland.

$H_0$5. There is no significant association between self-confidence and teaching competency among B.Ed. students in Nagaland.

$H_0$6. There is no significant relationship between TPACK and Teaching Competency among B.Ed. students in Nagaland.

$H_0$7. There is no significant relationship among TPACK, Self-Confidence, and Teaching Competency of B.Ed. students in Nagaland, as influenced by variables such as gender, educational qualification, stream, year of study, locality, institution, and previous technological knowledge.

8. Delimitations of the Study

i. The study is restricted to the four districts of Nagaland only. (Kohima, Dimapur, Chumukedima, and Mokokchung)
ii. The study is delimited to B.Ed. students only.
iii. The study is delimited to TPACK, Self-confidence, and Teaching Competency of Nagaland.

9. Variables of the Study

The variables of the study are Technological Pedagogical Content Knowledge (TPACK), Self-confidence (Independent variables), and Teaching Competency (Dependent variable). These variables are studied with respect to gender, educational qualification, stream, year of study, locality, institution, and previous technological knowledge.

10. Method

For the present study, the researcher adopted a quantitative research approach and employed the descriptive survey method to explore the "Technological Pedagogical Content Knowledge (TPACK) levels, Self-confidence, and Teaching Competency of B.Ed. students in Nagaland".

11. Population

The population for the present research consists of all eight Teacher Education colleges within Nagaland, specifically in the districts of Kohima, Dimapur, Chumukedima, and Mokokchung. All these colleges offer Bachelor of Education (B.Ed.) programs affiliated with Nagaland University. Here, the population comprises 1,250 B.Ed. students.

12. Sample

a) Selection of B.Ed. Colleges

In this research, participants were chosen using a simple random sampling method (Lottery method). This approach involved randomly choosing students enrolled in the eight colleges affiliated with Nagaland University, confirming that the sample was representative and unbiased.

Sampling is choosing a subset of individuals from a larger population to take part in a study. A simple random sampling technique was adopted for this research. This method ensures that all the individuals within the population have an equal probability of being selected. To achieve this, participants were chosen using the lottery method, which involved assigning a unique reference to each person within the population and then randomly drawing the selected sample size. This approach minimizes bias and provides an equal chance for all individuals to be included. A total of 625 students were chosen from the eight teacher education colleges.

Table 1 District-wise B.Ed. Colleges and students' enrolment in Nagaland, affiliated with the Nagaland University

Sl. No	Name of the B.Ed. Colleges/District	II Semester	IV Semester	Total
1.	Bosco College of Teacher Education, Dimapur	**94**	**98**	**192**
2.	Mount Mary College of Teacher Education, Dimapur	**99**	**97**	**196**
3.	Salt College of Teacher Education, Dimapur	**100**	**96**	**196**
4.	Unity College of Teacher Education, Dimapur	**98**	**96**	**194**
5.	Mokokchung College of Teacher Education, Mokukchung	**48**	**45**	**93**
6.	Modern College of Teacher Education, Kohima	**96**	**98**	**194**
7.	Sazolie College of Teacher Education, Kohima	**48**	**46**	**94**
8.	State College of Teacher Education, Kohima	**47**	**44**	**91**
	Total	**632**	**618**	**1250**

(Source: Nagaland Board of Higher Education, Kohima, 2024). Results Gazette provisional)

b) Selection of Sample

The present study, a sample of 625 B.Ed. students from eight B.Ed. colleges in three districts in Nagaland were selected randomly and proportionately. Thus, 625 B.Ed. students, including 121 males and 504 females from the II and IV semesters.

The sample was categorized based on several factors, like gender, educational qualifications, year of study, subject streams, locality, institution, and previous technological knowledge. The sample distribution is presented below.

Table 2

List of B.Ed. College students were selected for the sample

Sl. No	B.Ed. Colleges Name	Total Number of Students	Percentage
1.	Bosco College of Teacher Education, Dimapur	96	15.36
2.	Mount Mary College of Teacher Education, Chumukedima	96	15.36
3.	Salt College of Teacher Education, Dimapur	98	15.68
4.	Unity College of Teacher Education, Dimapur	99	15.84
5.	Mokokchung College of Teacher Education, Mokukchung	46	7.36
6.	Modern College of Teacher Education, Kohima	99	15.84
7.	Sazolie College of Teacher Education, Kohima	47	7.52
8.	State College of Teacher Education, Kohima	44	7.04
	Total	**625**	**100 %**

Table 3

Distribution of the Sample across Variables

Sl. No	Category	Variables	Number of Samples	Grand Total
1.	Gender	Male	121	
		Female	504	**625**
2.	Educational Qualification	UG	285	**625**
		PG	340	
3.	Stream	Arts	405	
		Science	168	**625**
		Commerce	52	
4.	Year of Study	I Year	317	
		II Year	308	**625**
5.	Locality	Rural	65	**625**
		Urban	560	
6.	Institution	Government	90	**625**
		Private	535	
7.	Previous technological Knowledge	Yes	446	**625**
		No	179	

13. Tools for Data Collection

The data collection tools utilized for the present study are as follows.

1. To measure the TPACK levels among B.Ed. students, the investigator utilized the Technological Pedagogical Content Knowledge (TPACK) Scale, constructed and standardized by Hemant Lata and Leena Sharma (2017).
2. To examine the B.Ed. students' self-confidence levels, the investigator used a self-constructed tool: The Self-Confidence Scale for B.Ed. students (2024).
3. To assess the B.Ed. students' teaching competency skills, the investigator used the Teaching Competency Scale, constructed and standardized by Jeya S.K.& Denisia S.P. (2016).

14. Data Collection

A standardized scale on TPACK by Hemant Lata and Leena Sharma (2017), Teaching Competency Scale, constructed and standardized by Jeya S.K.& Denisia S.P. (2016), and The Self-Confidence Scale for B.Ed. students (2024) developed by the investigator were employed for data collection.

The researcher systematically planned and executed the data collection process to ensure its efficiency and effectiveness. Information regarding the B.Ed. colleges situated in four districts of Nagaland were collected for the present study with an adequate number of copies for the research tool (TPACK Scale, Self-confidence Scale, and Teaching Competency Scale) finalized thereafter.

The researcher established a good relationship with the teacher educators during their visits to the colleges. The aim of the research was shared with the teacher educators and students, informing to them that their responses would remain confidential and encouraging them to provide sincere and candid answers. The research instruments were given to the B.Ed. students in the Dimapur, Kohima, Chumukedima and Mokokchung districts. Instructions were provided, asking respondents to tick the relevant boxes corresponding to their answers. In some colleges, questionnaires were collected back with the assistance of some teachers, and in some colleges the investigator personally collected the questionnaires from the students on the same day.

15. Statistical Techniques Used

The statistical techniques utilized in this study are presented below.

i. Descriptive Analysis: Descriptive analysis was applied by applying measures of central tendency like the mean and variability measures like the standard deviation. These calculations are essential for understanding the features of different sub-samples. Mean and Standard Deviation were computed to ascertain the status of B.Ed. students for the variables of TPACK, Self-confidence, and Teaching Competency.

ii. Differential analysis: To examine the objectives related to TPACK, Self-confidence, and Teaching Competency of the B.Ed. students, significance tests were conducted. Each of the null hypotheses was tested at significance levels of 0.01 and 0.05, using t-tests and F-tests.

iii. Correlation and Multiple Regression Analysis: The relationships among the variables were examined through Karl Pearson's product-moment correlation Coefficient as follows:

- TPACK and Self-confidence
- Self-confidence and Teaching Competency
- TPACK and Teaching Competency
- TPACK, Self-confidence, and Teaching Competency

iv. T-test: A t-test was utilized to establish the differences in the TPACK, Self-confidence, and Teaching Competency of B.Ed. students concerning selected variables.

v. ANOVA: One-way ANOVA and Post-Hoc t-test of mean and standard deviation were employed to analyze the mean of more than two groups within the same variable, namely, Stream – Arts, Science, and Commerce.

16. Data Analysis

After the data collection, the response sheets from the selected sample were systematically organized for coding, scoring, and tabulation. Statistical analysis was carried out using SPSS version 28 and Microsoft Excel, and the findings were interpreted accordingly. To enhance clarity and presentation, tables and bar graphs were employed to illustrate the results.

17. Major Findings of the Study

The major findings of the study are summarized objectively are presented as follows:

Objective 1: To analyze the Technological Pedagogical Content Knowledge (TPACK) and its variations among B.Ed. Students in Nagaland are based on

variables such as gender, educational qualification, stream, year of study, locality, institution, and previous technological knowledge.

a) Gender: Female B.Ed. students have a higher mean TPACK score (M=188.9484) compared to the male students (M=181.3554). The difference is significant and suggests that gender influences TPACK competency.

b) Educational Qualification: Postgraduate (PG) students have a higher mean TPACK score (M=187.5206) compared to Undergraduate (UG) students (M=185.5514). There are no significant differences in TPACK scores between educational qualifications, suggesting that educational qualifications do not substantially affect TPACK levels.

c) Stream: The F-statistic is relatively small (0.190), which suggests that the differences in means between the streams (Arts/Science/Commerce) are not statistically significant, meaning the stream may not have a substantial effect on the variable.

d) Year of Study: First-year students (M=188.0032) TPACK score is higher than the second-year students (M=186.9383), but this difference is not statistically significant. Thus, the year of study does not significantly impact TPACK.

e) Locality: Urban students score significantly higher (M=188.5018) than rural students(M=178.6615) in TPACK, suggesting that urban area students tend to have better TPACK competencies.

f) Institution: Students from private institutions (M=189.015) outperform those from government institutions (M=178.3444) in TPACK scores. The significant differences indicate that institution type affects TPACK competency.

g) Previous Technological Knowledge: Students with previous technological knowledge had a TPACK score (M=187.352), and those without previous technological knowledge were significantly the same (M=187.7933), suggesting that the previous technological knowledge does not influence TPACK levels.

Objective – 2: To investigate the levels of Self-confidence among B.Ed. Students in Nagaland are based on variables such as gender, educational qualification,

stream, year of study, locality, institution, and previous technological knowledge.

a) Gender: The female students scored a higher mean score (M=170.4048) compared to males (M=163.3554), indicating that the female students possess greater self-confidence competencies, resulting in a significant difference in self-confidence between male and female B.Ed. students.
b) Educational Qualification: The postgraduate students demonstrate higher mean scores (M=170.607) than undergraduate students (M=167.7265), suggesting that postgraduates exhibit slightly better self-confidence levels. The result indicates a significant difference in self-confidence based on educational qualifications.
c) Stream: The F-statistic value is 4.26, which is significant at 0.05 level. It indicates that the mean scores of self-confidence of B.Ed. students with respect to stream differ significantly. The Arts stream has a significantly higher performance compared to the Science stream. Additionally, the commerce stream shows significantly higher performance compared to the Science stream. However, no significant difference was found between the Arts and Commerce streams. These results suggest that while both Arts and Commerce students perform better than Science students, there was no substantial performance gap between Arts and Commerce.
d) Year of Study: The first-year B.Ed. students demonstrate higher mean scores (M=170.2744) than second-year (M=167.7695) B.Ed. students, suggesting that the year of study in B.Ed. students does not significantly influence self-confidence levels.
e) Locality: Urban students score significantly higher (M=170.0446) than rural students (M=160.3846) in Self-confidence mean scores, suggesting that urban students possess better self-confidence than rural area students. This indicates that there was a significant difference in Self-confidence based on whether students come from rural or urban areas.
f) Institution: The private institution students report higher mean scores (M=170.486) than those from government institutions (M=160.4444), suggesting

better self-confidence among private institution students. There is a significant difference in Self-confidence based on Institutions.

g) Previous Technological Knowledge: There is no significant difference in Self-confidence between students with (M=169.3161) and without (M=168.352) previous technological knowledge does not impact the self-confidence levels.

Objective-3: To examine the teaching competency of B.Ed. students in Nagaland and explore how it varies across variables such as gender, educational qualification, stream, year of study, locality, institution, and previous technological knowledge.

a) Gender: The mean scores of Teaching Competency between males (M=198.5124) and females (M=199.629) B.Ed. students do not impact the teaching competency levels, suggesting that gender does not influence B.Ed. students teaching Competency.
b) Educational Qualification: The mean scores of undergraduate (M=199.4035) and postgraduate (M=199.4206) students are nearly identical, suggesting that educational qualifications do not affect teaching competency.
c) Stream: The F-value of 0.945 is less than the table value 3.00 at a 0.05 significant level. It indicates that the mean scores of teaching competency of B.Ed. Students do not differ significantly with respect to Stream (Arts/Science/Commerce).
d) Year of Study: The first-year (M=199.7161) and second-year (M=199.1006) students have similar mean scores, indicating that the year of study does not impact B.Ed. students' teaching competency.
e) Locality: Mean scores of the rural (M=198.5077) and urban (M=199.5179) students are closely matched, indicating that no significant difference in teaching competency among rural and urban students. The locality of B.Ed. Students do not influence teaching competency.
f) Institution: Mean scores for the students from government(M=196.5333) and private (M=199.8972) institutions differ, suggesting the type of institutions of B.Ed. students do not significantly affect teaching competency.

g) Previous Technological Knowledge: Mean scores for the B.Ed. students with previous technological knowledge (M=198.9865) and those without (M=200.4749) are not the same, suggesting that previous technological knowledge of B.Ed. students do not significantly affect the teaching competency.

Objective -4: To explore the relationship between Technological Pedagogical and Content Knowledge (TPACK) and Self-confidence among B.Ed. students in Nagaland.

A correlation coefficient of 0.461 suggested a moderate positive relationship between TPACK and the Self-confidence of B.Ed. students in Nagaland, resulting in the rejection of the null hypothesis.

Objective-5: To investigate the relationship between Self-confidence and Teaching Competency among B.Ed. students in Nagaland.

A correlation coefficient of 0.296 suggested that Teaching Competency shows a moderate positive correlation with self-confidence, resulting in the rejection of the null hypothesis.

Objective 6: To explore the relationship between Technological Pedagogical Content Knowledge (TPACK) and Teaching Competency among B.Ed. Students in Nagaland.

A correlation coefficient of 0.402 indicates that Teaching Competency shows a moderate positive correlation with TPACK, resulting in the rejection of the null hypothesis.

Objective 7: To investigate the influence of variables (such as gender, educational qualification, stream, year of study, locality, institution, and previous technological knowledge) on the relationship between TPACK, Self-confidence, and Teaching Competency among B.Ed. students in Nagaland.

Regression analysis showed a moderate positive correlation (Multiple R= 0.436) between TPACK and Self-confidence, with Teaching Competency explaining

19.09 % of the variance, and confirms that both predictors significantly influence Teaching Competency.

18. Discussion of the Findings

The discussions on the major findings of the present study are presented as follows:

18.1 TPACK of B.Ed. students:

Several studies have explored the positive relationship between Technological Pedagogical Content Knowledge (TPACK) and various educational outcomes of the B.Ed. students. For instance, Sharma and Bharti (2019) found that higher TPACK scores are linked to improved teaching effectiveness, suggesting that a solid grasp of technology, pedagogy, and content significantly enhances instructional practices. Similarly, Joshi et al. (2020) revealed that B.Ed. Students with advanced TPACK skills showed greater adaptability in using digital tools for teaching, leading to more engaging learning environments. Other studies, such as those by Kumar and Singh (2021) and Gupta (2022), further support that TPACK is essential to fostering innovative teaching methodologies and enriching student learning experiences.

1. The present study found a significant difference in the TPACK of male and female B.Ed. students. Female students were found to have significantly higher TPACK skills than their male counterparts. Similar findings were reported by Singh and Yadav (2020), Smith and Lee (2015), Brown and White (2016), Chopra and Verma (2021), Ponselvakumar and Alaguraja (2022), Yusuf (2022), and Das and Sen (2024).The finding that female B.Ed. Students demonstrated significantly higher TPACK skills than their male counterparts, which may be attributed to their adaptability, engagement with digital pedagogical tools, and willingness to integrate technology into teaching. Female students might also be more proactive in utilizing technology for lesson planning, instructional design, and student-centered learning approaches. Additionally, many teacher education programs emphasize collaborative learning, where female students might excel in adopting innovative technology-supported teaching strategies. However, it contradicts the findings of Sharma and Singh (2015), Verma and Rathi (2016), Tondeur et al. (2016), Cochrance et al.

(2020), and Chaudhary and Kaur (2017), Ponselvakumar and Alaguraja (2022) Bhuvana and Arumugam (2023) who reported that male students had higher TPACK skills. This could be due to male students having greater access to and confidence in using advanced digital tools, as well as a stronger inclination toward technology-related fields.

2. The present study found no significant difference in the TPACK of postgraduate and undergraduate students. The postgraduate students were found to have significantly higher TPACK skills than undergraduate students. These results are supported by the findings of Davis and Clark (2016), Harris et al. (2018), Jeyaraj and Ramanath (2018), and Kaur and Gill (2019). However, Archambault and Barnett (2010), Olofson et al. (2016), Scherer et al. (2017), and Harris et al. (2018) found a notable variation in TPACK in relation to educational qualification. This could be because higher educational qualifications have more exposure to technological pedagogical content knowledge. Postgraduate students have more academic experience, exposure to advanced pedagogical strategies, and opportunities for research-based learning, which contribute to their higher TPACK skills. Their coursework often includes deeper engagement with educational technology, instructional design, and digital tools for teaching and learning. Additionally, postgraduate students may have prior teaching experience or professional development training that enhances their ability to integrate technology effectively in pedagogical practices. In contrast, undergraduate students may have limited exposure to hands-on teaching experiences and fewer opportunities to apply technological tools in real classroom settings. Their focus is often on foundational concepts rather than advanced technological integration.

3. The present study revealed no significant difference in TPACK of arts, science, and commerce streams among B.Ed. students. The arts stream students were found to have significantly higher TPACK skills than other stream students. These results are supported by the findings of Sreekala and James (2024). However, Igbal et al. (2013) and Redmond and Lock (2019) found that the academic stream does not influence TPACK levels. The finding that arts stream students exhibited higher TPACK skills than science and commerce stream students may be attributed to their adaptability in

integrating digital tools for creative and interactive teaching methods. Arts students often engage with diverse multimedia resources, digital storytelling, and online collaborative platforms, which may enhance their TPACK skills. Additionally, their curriculum might emphasize innovative pedagogy, fostering better technological and pedagogical integration. However, this contradicts the findings of Kumar and Soni (2022), who reported that science students had higher TPACK skills. This could be because science stream students typically have more exposure to technological tools, laboratory-based learning, and simulation software, which enhance their ability to integrate technology into teaching.

4. The present study revealed no significant difference in TPACK of Year of study among B.Ed. students. The first-year students had higher TPACK skills than the second-year students. Thus, it can be concluded that there is no significant difference in the TPACK of B.Ed. students with respect to year of study. The second-year students demonstrated higher levels of TPACK than first-year students, as reported by Sharma and Kumar (2021), Harvey and Caro (2017), and Liu et al. (2019) found that the year of study did not impact the TPACK development. This contradictory finding suggests that while the present study found that first-year B.Ed. students to have higher TPACK skills. Previous studies (Sharma & Kumar, 2021; Liu et al., 2019) reported the opposite trend. A possible explanation could be that first-year students are more enthusiastic about learning new technological tools and integrating them into pedagogy due to early exposure to digital learning environments. Their engagement with foundational TPACK training might initially boost their confidence in technology use. However, as students' progress into the second year, they may face a greater academic workload, teaching practicum responsibilities, and pedagogical complexities that shift their focus away from technology integration. This could lead to a perceived decline in TPACK skills among second-year students.

5. The present study revealed a significant difference in TPACK of B.Ed. students with locality (urban and rural areas). The locality had a significant impact on TPACK, and the urban students had higher TPACK skills than rural area students. These results were supported by the findings of Rathore and Sharma (2018), Das and

Sen (2024), and Sreekala and James (2024). Urban students may have greater opportunities to engage with digital platforms, online learning resources, and educational technology workshops, further strengthening their TPACK skills. But it is in contrast with the findings of Bindhusha and Bindu (2020). In contrast, rural students may face challenges such as inadequate infrastructure, limited access to high-speed internet, and fewer opportunities for hands-on training in technology-integrated teaching. The digital divide between urban and rural areas can result in rural students having lower confidence and proficiency in utilizing technology for pedagogical purposes.

6. The present study revealed a significant difference in TPACK of B.Ed. students with government and private institutions. The private institutions' students were found to have significantly higher TPACK skills than government institutional students. Similar findings were reported by Desai and Patel (2020), Khan and Hussian (2023), and Ng and Tan (2021). This could be because of the availability of the educational resources and infrastructure and facilities that contribute towards the TPACK of the private B.Ed. institutions. Additionally, private institutions may have a more flexible curriculum that emphasizes technological pedagogy, frequent workshops, and collaborations with educational technology firms. Faculty members in private institutions may also receive more professional development training, enabling them to impart better TPACK-related skills. On the other hand, government institutions may face challenges such as limited funding, outdated technological resources, and fewer hands-on training opportunities, which could hinder the development of TPACK competencies among students.

7. The present study revealed no significant difference in TPACK of B.Ed. students with previous technological knowledge. Prior technological knowledge does not have a significant effect on TPACK. Similar reports were found by Singh and Joshi (2019), Verma and Gupta (2019), Harris and Jeckins (2020), and Ng and Tan (2021). This could be because prior technological knowledge has more exposure to technological and pedagogical knowledge. It may be because of the knowledge of the technological skills of the students to learn better and more competent than others in teaching. Additionally, students without prior technological exposure may develop

competence through formal instruction, narrowing the gap between those with and without previous knowledge.

18.2 Self-confidence of B.Ed. students:

Research indicates that self-confidence significantly influences B.Ed. students' teaching capabilities and their willingness to integrate technology into their teaching. For example, Rao and Singh (2021) found that students who have higher self-confidence levels reported better performance in classroom settings, which positively impacted their teaching competency. In a similar vein, Choudhury (2022) highlighted that higher self-confidence correlates with a more proactive approach to utilizing technology within the classroom, ultimately enhancing teaching effectiveness. Moreover, studies by Sharma et al. (2023) and Verma (2024) have shown that self-confidence not only supports a positive learning environment that similarly encourages B.Ed. students are engaged in continuous professional development. These findings reveal that nurturing self-confidence in future educators is essential to improving their teaching performance and ability to adjust in a technology-driven educational landscape.

1. The present study found a significant difference in the Self-confidence of male and female B.Ed. students. Female students were found to have significantly higher self-confidence than male students. Similar results were shown by Brown and white (2018), Bhat and Yadav (2018), De Jong Visser (2020), and Choudhary and Tripathi (2022). This difference in self-confidence levels between male and female B.Ed. students could be attributed to various socio-cultural and educational factors. Female students may exhibit higher self-confidence due to their stronger communication skills, adaptability in classroom environments, and a greater sense of responsibility in teaching roles. Additionally, increasing gender inclusivity in education and teacher training programs might have contributed to their enhanced confidence. On the other hand, Sharma and Gupta (2016), Sharma and Gupta (2016), Malik and Rizvi (2020), and Chaudhari (2022), Patel and Rao (2021), and Rajkumar (2023) found that male students had higher self-confidence, possibly due to societal expectations, leadership roles, and a greater inclination toward risk-taking. Male students may also be more

confident in technology integration and subject-specific expertise. Further research is needed to explore how gender perceptions, teaching methodologies, and institutional support systems influence self-confidence levels among B.Ed. students

2. The present study found a significant difference in the self-confidence of undergraduate and postgraduate students. Postgraduate students were found to have significantly higher self-confidence skills than undergraduate students. Nair and Menon (2018),Bhat and Yadav (2018), Menon and Kumar (2019), Carter and Lopez (2019), and De Jong Visser (2020),Vasanthi and Arumugam (2020),Gupta and Singh (2021), Jain and Singh (2021),Gopinath and Vijayalekshmi (2022), Bhatia and Joshi (2024),Ponmozhi and Govindhammal (2024).Postgraduate students typically have more academic exposure, research experience, and professional training, which contribute to their higher self-confidence. Their advanced knowledge, critical thinking skills, and prior experiences in presentations, teaching methodologies, and assessments may enhance their self-assurance. Additionally, they may have a clearer career path, further boosting their confidence in their teaching abilities. However, Deepika and Geetha (2018), Rajkumar (2023) found that undergraduate students exhibited higher self-confidence, possibly due to youthful optimism, lesser exposure to real-world teaching challenges, and a stronger belief in their abilities before encountering the complexities of professional teaching. Younger students may also have a more adaptable and risk-taking approach, leading to a higher sense of self-assurance. Further research is needed to explore how academic exposure, curriculum structure, and real-world experiences influence self-confidence levels across different educational qualifications.

3. The present study found a significant difference in the self-confidence of B.Ed. students’ subject streams. There is a significant difference among mean scores of the Self-confidence of B.Ed. students with respect to the stream. Similar findings were reported by Sharma and Gupta (2022), Muller and Schmidt (2017), Maity et al. (2019), Verma and Rathi (2023), and Silva and Oliveria (2016). Students from different subject streams develop self-confidence based on the nature of their academic training and exposure. Humanities and Social Science students may exhibit higher self-confidence in pedagogical approaches, communication skills, and

classroom engagement, whereas Science stream students may feel more confident in technology integration and subject-specific competencies. The contrasting findings by Rao and Narayan (2018), Menon and Kumar (2019), Patel and Nguyen (2018), and Davis and Wright (2022), and Chauhan and Vaghela (2022) found no significant difference in self-confidence in relation to the arts and commerce stream and suggest that Science students' familiarity with technology and analytical skills contribute to their confidence in integrating digital tools in teaching. Meanwhile, students from Arts and Commerce backgrounds might rely more on interpersonal skills and traditional teaching methodologies. Further research is needed to explore how different curriculum structures and teaching methodologies influence self-confidence levels among B.Ed. students across subject streams.

4. The present study found no significant difference in the self-confidence of B.Ed. students with year of study. First-year students were found to have higher self-confidence than second-year students. A similar result was found by Rajkumar (2023). However, it is contrary to the findings of Singh and Gupta (2021) and Miller and Lee (2019), and Agarwal and Dubey (2021). This could be because when the students' progress to the second year, they may become more aware of the complexities and challenges of teaching, leading to a more realistic self-assessment and, consequently, a decline in perceived self-confidence. Increased exposure to classroom teaching, lesson planning, and student interactions might make them more conscious of their strengths and weaknesses. However, Bhat (2018), Banga (2019), and Ponmozhi and Govindhammal (2024) found that self-confidence levels are not significantly influenced by the year of study. On the other hand, first-year students may exhibit higher self-confidence due to optimism, limited practical exposure, and lower levels of self-doubt. Their confidence might stem from theoretical knowledge and initial enthusiasm before encountering the practical challenges of teaching. Further research is needed to explore how curriculum structure, mentorship, and hands-on training impact self-confidence levels over time.

5. The present study found a significant difference in the self-confidence of B.Ed. students with locality. Urban students were found to have significantly higher self-

confidence than rural students. These results were supported by the findings of Davis and Muller and Schmidt (2017), Davis and Thompson (2017), Gupta and Singh (2019), Patel and Rao (2019), Sharma and Gupta (2022), Gupta and Sharma (2023), and Bhatia and Josh (2024). This could be because of the availability of better educational resources, exposure to diverse learning environments, and greater access to technology in urban areas. Urban students often benefit from interactive teaching methodologies, extracurricular activities, and workshops that enhance their confidence levels. Additionally, they may have more opportunities for peer interaction and mentorship, which contribute to their self-assurance. On the other hand, Rajkumar (2023) found that rural students exhibited higher self-confidence, possibly due to a strong sense of community support, practical life experiences, and resilience developed through overcoming challenges in resource-limited settings. Further research is needed to explore the socio-cultural and institutional factors influencing self-confidence among B.Ed. students from different localities.

6. The present study found a significant difference in the self-confidence of B.Ed. students with institutions. The private institutions' students were found to be more self-confident than government institutional students. Similar findings were reported by Kumar and Banerjee (2019) and Das and Iyer (2020). Students from autonomous institutions reported greater confidence in their teaching abilities, attributed to flexible curricula and enhanced training methodologies. However, it contradicts the findings of Patel and Sharma (2021). The findings revealed that students from government institutions had higher self-confidence than those from private institutions. This could be because government institutions provide more exposure to diverse classroom settings, hands-on teaching experiences, and a structured environment that fosters resilience and adaptability. Additionally, financial stability and the perceived job security associated with government teacher training programs might contribute to higher confidence levels among students.

7. The present study found no significant difference in the self-confidence of B.Ed. students with previous technological knowledge. Students with prior technological knowledge were found to have significantly higher self-confidence than those

without. This result is supported by the findings of Silva and Oliveria (2016), Krishnan and Reddy (2020), Kumar and Sharma (2020), Muller and Webber (2022), and Verma and Rathi (2023). This could be because the students with prior technological knowledge are more familiar with digital tools, making them feel more competent and confident in integrating technology into their teaching practices. Their previous exposure may have reduced anxiety related to using technology, allowing them to focus on applying it effectively in an educational setting. Additionally, technological proficiency often enhances problem-solving skills, adaptability, and self-efficacy, which contribute to higher self-confidence.

18.3 Teaching Competency of B.Ed. students:

1. The present study revealed no significant difference in the teaching competency of B.Ed. students with gender. Female students were found to have higher teaching competency than male students. Similar reports were found by Sharma and Singh (2011), Singh and Patel (2016), Agarwal and Verma (2020), Joshi and Mehta (2023), Patel and Clark (2017), Pachaiyappan and Sadayakumar (2018), and Wilson and Martin (2024). This is because female students may demonstrate higher teaching competency due to their stronger communication skills, patience, and adaptability in classroom settings. Additionally, societal and cultural factors might encourage women to pursue and excel in teaching professions, leading to enhanced pedagogical skills and student engagement. However, the findings of Sridevi (2020), which indicate a significant difference, suggest that factors such as teaching methodologies, confidence levels, or institutional training could influence competency variations among male and female students.

2. The present study revealed no significant difference in the teaching competency of B.Ed. student with educational qualification. The postgraduate students were found to have higher teaching competency skills than undergraduate students. Similar results were documented by Dutta and Roy (2015), Allimuthu (2018), Nair and Menon (2018), Taylor and Hughes (2019), Bindusha and Bindu (2020), and Sahu and Mohanty (2022). This could be because postgraduate students have more advanced academic exposure, deeper subject knowledge, and better pedagogical understanding than undergraduate students. Their additional years of education may

contribute to refined teaching methodologies, improved classroom management skills, and greater confidence in instructional delivery. Moreover, postgraduate students might have had more opportunities for hands-on teaching practice, enhancing their overall teaching competency.

3. The present study revealed no significant difference in the teaching competency of B.Ed. students in the stream. The arts stream students were found to have higher teaching competency than other streams. Similar results were found by Jensen and Olesen (2024). This could be because arts stream students often focus on subjects that emphasize communication, critical thinking, and pedagogical adaptability, which are essential for effective teaching. Their curriculum may provide more exposure to instructional strategies, classroom discussions, and student engagement techniques. Meanwhile, Kumar and Reddy (2017), Johnson and Williams (2018), Kapoor and Singh (2021), and Singh and Yadav (2024) investigated science stream students who had higher teaching competency than arts and commerce stream students. This is because science stream students may have a stronger grasp of subject content but may require additional training in pedagogical methods, leading to differences in teaching competency across streams.

4. The present study revealed no significant difference in the teaching competency of B.Ed. students with the year of study. First-year students and second-year students were found to have similar teaching competencies. Similar results were found by Pachaiyappan and Sadayakumar (2018), Sharma and Reddy (2021), Gupta and Mehta (2023), and Shakya and Dube (2023). This is because of the first-year and second-year B.Ed. Students undergo similar foundational teacher training, covering pedagogy, classroom management, and instructional strategies. Additionally, structured coursework and practicum experiences ensure that students develop teaching competency at a steady pace, leading to comparable skill levels between the two groups. However, individual differences in learning pace, exposure to teaching practice, and self-motivation may still influence competency development over time.

5. The present study revealed no significant difference in the teaching competency of B.Ed. students with locality. The urban area students were found to have higher teaching competency than rural area students. Similar reports were reported by Raj

and Mehta (2011), Alli Muthu (2018), Banerjee and Mukerjee (2019), Patel and Kumar (2023), Anderson and Mitchell (2020), Bindusha and Bindu (2020), Sridevi (2020), Wong and Leung (2023), and Lavanya et al. (2024). This is because urban area students generally have better access to educational resources, modern teaching methodologies, and technologically equipped learning environments. Additionally, urban institutions often provide more opportunities for workshops, training programs, and exposure to diverse teaching practices, which enhance teaching competency. In contrast, rural students may face challenges such as limited infrastructure, fewer professional development opportunities, and restricted access to digital tools, which could impact their overall teaching proficiency.

6. The present study revealed no significant difference in the teaching competency of B.Ed. students with institutions. The private institutional students were found to have higher teaching competency than government institutional students. Similar results were found by Pachaiyappan and Sadayakumar (2018), Bindusha and Bindu (2020), Metha (2020), and Thomas and Pillai (2021). But in contrast, the findings were reported by Sridevi (2021). Private institutions often provide better infrastructure, access to modern teaching resources, and continuous professional development programs. Additionally, private institutions may emphasize practical teaching experiences, use innovative pedagogical methods, and have a more competitive academic environment, which enhances teaching competency. In contrast, government institutions may have limited resources, fewer training opportunities, and traditional teaching approaches, which could impact the overall competency levels of their students.

7. The present study revealed no significant difference in the teaching competency of B.Ed. students with previous technological knowledge. Similar results were found by Patel and Bhardwaj (2017), Rao and Das (2020), Raj and Bhattacharya (2024), and Berg and Peters (2021). This could be due to variations in how technological knowledge is integrated into teacher education programs. While prior technological knowledge may provide an advantage in handling digital tools, it does not necessarily translate into better teaching competency unless effectively applied in pedagogical practices. But, in contrast, Bhattacharya and Roy (2022) may have

found a significant difference because their study focused on institutions with strong technology-integrated teaching methodologies, whereas other studies might have examined institutions where technology use was minimal or not directly linked to teaching competency.

18.4 The relationship between Technological Pedagogical Content Knowledge (TPACK) and Self-confidence among B.Ed. students:

A moderate positive and significant correlation between TPACK and Self-confidence among B.Ed. students. The findings suggest that students with stronger TPACK skills generally exhibit higher self-confidence, implying that improving TPACK could strengthen students' trust in their teaching abilities. Similar results were found by Kumar and Sharma (2015), Sharma and Yadav (2022), Iyer and Reddy (2013), Thomas and Varghese (2022), Metha and Singh (2023), Sharma and Kumar (2023), and Kumar and Agarwal (2024), and Nkosi and Moyo (2024). This could be because students with higher TPACK skills are better equipped to integrate technology effectively into their teaching practices. This proficiency reduces uncertainty and enhances their ability to manage classroom interactions, plan lessons efficiently, and engage students using digital tools. Additionally, familiarity with technology boosts their adaptability and preparedness, leading to increased self-confidence in their teaching abilities.

18.5 The relationship between Self-confidence and Teaching competency among B.Ed. students:

A positive and significant correlation between self-confidence and teaching competency among B.Ed. students. Students with higher self-confidence are likely to exhibit higher levels of teaching competency, and Teaching competency tends to increase as self-confidence improves. Similar results were reported by Singh and Mehta (2016), Patel and Joshi (2017), Verma and Sharma (2018), Arora and Kaur (2021), Banerjee and Mukerjee (2022), Das and Chatterjee (2022), Rao and Kumar (2023), Reddy and Suresh (2023), Bora and Das (2024), Kumar and Sinha (2024) and Prasad and Rao (2024). This could be because higher self-confidence enables

B.Ed. students to take more initiative in lesson planning, classroom management, and student engagement. Confident teachers are more likely to experiment with new teaching strategies, integrate technology effectively, and handle classroom challenges with resilience. This proactive approach enhances their teaching competency by fostering better communication skills, adaptability, and a positive learning environment. Additionally, self-confidence reduces anxiety and improves decision-making, allowing teachers to respond effectively to diverse student needs.

18.6 The relationship between Technological Pedagogical Content Knowledge and Teaching Competency among B.Ed. students:

A positive and significant correlation between TPACK and Teaching competency among B.Ed. students. Similar results were found by Sharma and Mishra (2010), Gupta and Kumar (2011), Patel and Desai (2011), Rao and Singh (2011), Singh and Kumar (2011), Sharma and Mehta (2012), Desai and Patel (2013), Kumar and Singh (2014), Sharma and Gupta (2018). This could be because the integration of technological, pedagogical, and content knowledge (TPACK) equips B.Ed. students with the necessary skills to design effective instructional strategies, utilize digital tools for enhanced learning experiences, and adapt their teaching methods to diverse classroom needs. Higher TPACK proficiency enables teachers to create engaging and interactive lessons, effectively manage classroom dynamics, and address different learning styles. As a result, improved TPACK fosters better teaching practices, leading to higher teaching competency. Additionally, confidence in using technology enhances teachers' ability to facilitate student-centered learning, improving overall educational outcomes

18.7 The Influence of the selected variables on the Relationship between TPACK, Self-confidence, and Teaching competency among B.Ed. students:

The regression analysis revealed that both TPACK and self-confidence scores are positively correlated with the dependent variable (e.g., teaching competency), and both predictors have a statistically significant impact. The model as a whole is significant, with TPACK contributing more strongly to the prediction than self-confidence. This suggests that enhancing both TPACK knowledge and self-confidence could positively affect the dependent variable, but TPACK appears to be the more influential factor. Similar results were documented by Singh and Mehta (2016), Patel and Joshi (2017), Verma and Sharma (2018), Das and Chatterjee (2022), Bhardwaj and Sharam (2023), Reddy and Suresh (2023), Kumar and Sinha (2024), Sharma and Thakur (2024), Smith and Brown (2023), Davis and Clarke (2023), O'Reilly and Murphy (2023), Wilson and Hughes (2024), Tan and Ho (2024). This could be because the stronger influence of TPACK on teaching competency can be attributed to its direct role in shaping instructional strategies, integrating technology effectively, and enhancing pedagogical content knowledge. B.Ed. Students with higher TPACK proficiency are better equipped to design engaging lessons, utilize digital tools, and adapt teaching methods to diverse classroom needs, leading to improved teaching competency.

Self-confidence, while also a significant factor, primarily supports the implementation of these skills by fostering a sense of assurance in one's abilities. However, the regression model indicates that selected variables do not have a significant impact on teaching competency, suggesting that factors such as gender, educational qualification, or locality do not play a determining role. Additionally, the R^2 value of 19.09% suggests that other unexplored variables may also influence teaching competency, indicating the need for further research to identify additional contributing factors

Studies reveal that TPACK and Self-confidence have a significant influence on the Teaching competency of B.Ed. students. For instance, Awasthi (2020) reported that higher levels of TPACK directly enhance teaching competency, as students equipped with relevant knowledge are better prepared to engage their students effectively. In addition, a study by Verma and Singh (2021) suggested that self-confidence is a key indicator of teaching competency, with confident educators demonstrating improved pedagogical skills. Furthermore, Kumar et al. (2023)

discovered a positive relationship between teaching competency and the skills to integrate technology into lesson plans, suggesting that competency is multifaceted and includes both pedagogical knowledge and self-efficacy. Overall, these studies highlight the interconnectedness of TPACK, Self-confidence, and Teaching Competency, emphasizing the requirement for comprehensive training programmes that enhance all three aspects to better prepare for B.Ed. students to support their future teaching roles.

19. Educational Implications

Based on the findings of the present study, some educational implications are as follows (Incorporating B.Ed. College Principals' and Teacher Educators' Suggestions):

The findings of this study reveal significant relationships among Technological Pedagogical Content Knowledge (TPACK), self-confidence, and teaching competency among B.Ed. students in Nagaland. Principals and teacher educators of B.Ed. colleges across the state contributed valuable, context-specific suggestions that not only underscore the existing strengths of the teacher education system but also point to key areas in need of improvement. Drawing from their day-to-day institutional experiences, their perspectives provide practical and actionable insights for enhancing the professional development of future educators. Based on both the empirical data and the thoughtful recommendations offered by these institutional leaders, the following consolidated suggestions have been synthesized.

1. Embed the TPACK Framework Practically in Training:

Principals and teacher educators strongly advocated for the practical integration of TPACK into daily teaching-learning activities. They emphasized that beyond theoretical knowledge, students must be provided with structured opportunities to apply technological, pedagogical, and content knowledge in real classroom settings.

2. Strengthen Self-Confidence Through Hands-On Teaching Practice:

To improve self-confidence among B.Ed. students, principals recommended increasing school-based internships, practice teaching sessions, and micro-teaching exercises using technology. They observed that consistent exposure to actual teaching environments helps students overcome stage fright and enhances their readiness.

3. Promote Locally Relevant Pedagogy:

Given Nagaland's unique linguistic and cultural diversity, principals suggested that students be encouraged to create digital teaching materials in local languages and use culturally responsive pedagogy. This will make learning more relatable for school children and meaningful for student-teachers.

4. Improve Faculty Competence in Digital Pedagogy:

Many principals expressed concern that some teacher educators themselves lack adequate exposure to current educational technologies. They recommended regular professional development workshops for faculty to ensure they are well-equipped to guide students in TPACK-based practices.

5. Upgrade Institutional Infrastructure:

Several principals pointed out the need for improved digital infrastructure, including access to smart classrooms, stable internet connectivity, and availability of multimedia teaching aids. They urged state authorities and college managements to prioritize these investments.

6. Enhance Peer Support and Mentorship Systems:

It was suggested that institutions establish peer mentoring programs where technologically proficient students can assist their peers. This not only supports collaborative learning but also fosters leadership and confidence among students.

7. Align Curriculum with National Education Policy (NEP) 2020 and NCF 2023:

Principals and teacher educators highlighted the importance of aligning the B.Ed. curriculum with recent national frameworks that emphasize digital literacy, critical thinking, and competency-based education. They called for curriculum updates that reflect these shifts in educational priorities.

8. Focus on Holistic Student Development:

Beyond academic training, principals stressed the need for holistic development, including communication skills, emotional intelligence, classroom management, and adaptability. These qualities are essential for building self-confidence and effective teaching competence.

9. Encourage Reflective Practice and Research Orientation:

Principals and teacher educators recommended that students be encouraged to maintain teaching journals or portfolios and undertake small-scale action research projects. This practice, they believe, will promote self-reflection and innovation in teaching methods.

10. Establish Stronger College-School Partnerships:

Finally, principals urged for deeper collaboration between B.Ed. colleges and local schools. Joint initiatives, such as demonstration lessons, community engagement, and feedback mechanisms, would allow students to gain authentic teaching experiences and refine their skills.

These educational implications aim to improve the preparation of B.Ed. students, making sure they have the required skills and confidence to thrive in dynamic educational environments.

20. Conclusion

The present study is aimed at the Technological, Pedagogical Content Knowledge (TPACK) framework and its association with the influence of teaching and learning contexts. The findings underscore the relevance of TPACK as a powerful tool in shaping effective pedagogical practices. By enhancing educators' capacity to integrate technology seamlessly with content and pedagogy, the study demonstrates how TPACK can support the development of teaching competency, self-confidence, and overall professional growth among student-teachers.

The findings emphasized that students from Colleges of Education reveal a high level of Technological, Pedagogical and Content Knowledge (TPACK), Self-confidence, and Teaching Competency. This is significant because it shows that these future educators are equipped to handle the demands of modern teaching environments, where technology integration is becoming increasingly essential. Their preparedness indicates a strong potential for creating meaningful and interactive learning experiences for the students, leveraging both traditional and digital tools.

Furthermore, the study reveals a positive correlation between TPACK, Self-confidence, and Teaching Competency. This relationship is pivotal, as it suggests that the more adept B.Ed. Students are integrating technology with pedagogy, the they become more confident in their teaching abilities, which in turn enhances their overall competency. Self-confidence has a crucial role in a teacher's effectiveness in the classroom, and supporting this trait early in pre-service training is essential for long-term success.

Moreover, the quantitative expansion and qualitative improvement of teacher education institutions have increased the demand for well-rounded educators. The emphasis is no longer just on the theoretical knowledge of teaching but also on the ability to adapt, innovate, and create a dynamic learning environment. This study highlights the importance of teacher educators in imparting both content knowledge and a favourable professional attitude. Teaching Competency, therefore, is not only about mastering content but also about adopting a proactive, positive mindset towards the profession.

For institutions to meet these evolving demands, the integration of TPACK into teacher education programmes should be a priority. Teacher educators must lead by example, utilizing the latest technological tools and approaches during training sessions. As a result, they not only provide student-teachers with practical skills but also illustrate the importance of lifelong learning and adaptability in an ever-changing educational landscape.

This study highlights the growing expectation that students and teacher educators are both instructors and facilitators of learning. To resolve the needs of 21st-century learners, teachers must possess the competence to blend content knowledge with digital tools, fostering an environment that supports critical thinking, creativity, and collaboration. The outcome of this research supports the argument that the professional development of teachers must evolve in tandem with technological advancements, ensuring that educators remain relevant and effective in modern classrooms.

B.Ed. college principals' suggestions have shed light on the real-world challenges and institutional needs that must be addressed to improve the quality of teacher education in the region. These include curriculum reform, faculty training, infrastructure enhancement, and psychological support for students. In particular, the integration of locally relevant content, collaboration with community schools, and experiential learning opportunities are crucial in building a confident and competent future teaching workforce.

In Nagaland’s unique socio-cultural and educational landscape, enhancing teacher preparation through the effective application of TPACK, coupled with confidence-building strategies, is not just a necessity but a responsibility. Stakeholders, including policy-makers, teacher educators, and institutions, must work collaboratively to ensure that B.Ed. graduates are well-prepared for the dynamic and technology-driven classrooms of the 21st century.

This research provides a foundational step toward informed policy decisions and practical reforms that can significantly elevate teacher quality and, ultimately, student learning outcomes in Nagaland.

In conclusion, the research underscores that fostering TPACK, Self-confidence, and Teaching Competency is integral to shaping competent, confident, and innovative educators. The successful integration of these aspects into teacher training programmes, will not only enhance the individual growth of future teachers but also improve the educational quality they deliver, ultimately benefiting the students they will serve. Thus, as the demand for technologically proficient educators continues to rise, educational institutions must invest in developing these critical skills among their future teachers, ensuring a more robust and effective teaching workforce for the years to come.

21. Suggestions for Future Research

1. Impact of TPACK on Student-Centered Learning: Investigate how TPACK influences the acceptance of the student-centered teaching approaches among B.Ed. students and its impact on the students' learning outcomes.

2. Longitudinal Study on Self-confidence Development: Conduct a longitudinal study tracking changes in self-confidence among B.Ed. students over their training period and into their early teaching careers.

3. Influence of Cultural Factors on TPACK: Explore how cultural backgrounds influence the improvement of TPACK among B.Ed. students and its influence on their teaching competency in diverse classrooms.

4. TPACK in Subject-specific Contexts: Study the use of TPACK in specific subject areas (e.g., STEM, Humanities) to learn how it shapes teaching practices and competency in different disciplines.

5. Role of Mentorship in Enhancing TPACK: Examine how mentorship programmes can enhance TPACK and self-confidence among B.Ed. students and contribute to improved teaching competency in their practices.

6. Impact of Professional Development Workshops: Analyze the performance in the professional development workshops on enhancing TPACK and Self-confidence among in-service teachers, especially those pursuing a B.Ed.

7. Comparison of Traditional vs. Innovative Teaching Methods: Investigate the effects of traditional teaching methods versus innovative, technology-integrated methods on the development of TPACK and teaching competency among B.Ed. students.

8. Assessment Tools for Measuring TPACK and Self-Confidence: Develop and evaluate assessment tools for measuring TPACK and self-confidence levels among B.Ed. students, focusing on their validity and reliability.

9. Effects of Peer Teaching on Competency Development: Research the outcome of peer teaching experiences on the self-confidence and teaching competency of B.Ed. students, particularly in relation to their TPACK.

10. Barriers to Effective TPACK Implementation: Identify and analyze barriers faced by B.Ed. students in effectively implementing TPACK into their teaching practice, and suggest approaches to resolve these challenges.

11. Teacher Educators in Colleges: Similar studies can be conducted on teacher educators in colleges.

12. Studies in Other States: Similar studies can be conducted in other states of India.

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NAGALAND UNIVERSITY

(A Central University established by an Act of Parliament No. 35 of 1989)
Department of Teacher Education

(School of Humanities & Education)

Kohima Campus, Meriema, Nagaland- 797 004.

To

The Principal

College of Teacher Education

Sub: Permission for Data Collection- Reg.

Sir/Madam,

In fulfilment of the Degree of Doctorate of Philosophy, Ms. LAVANYA. S, a research scholar from the Teacher Education Department, Nagaland University, bearing Reg. No: Ph.D/TED/00678 is undertaking a study entitled " A Study on the Relationship between Technological Pedagogical Content Knowledge (TPACK), Self-Confidence, and Teaching Competency of B.Ed. Students in Nagaland".

In this regard, I request your cooperation and support in collecting data from your institute, which will significantly support her, and I assure you that this work will not hamper your daily routine.

Thanking you,

Yours faithfully,

Prof (Dr). Gyanendra Nath Tiwari

Professor & Head

Department of Teacher Education
Nagaland University, Kohima Campus

Appendix -I

Technological Pedagogical Content Knowledge (TPACK) Scale by Hemant Lata and Leena Sharma (2017).

General Information about the B.Ed. Students:

Please fill out the following information. Kindly tick (✓) the appropriate options.

1.	Name (Optional)	:	
2.	Name of the College	:	
3.	District	:	
4.	Gender	:	Male / Female
5.	Educational Qualification	:	UG / PG
6.	Subject Stream	:	Arts/ Science / Commerce
7.	Year of Study	:	I / II
8.	Locality	:	Rural / Urban
9.	Institution	:	Government / Private
10.	Previous Technological Knowledge	:	Yes/ No

Instructions:

On the following pages, statements about TPACK have been given. Read each statement carefully and decide your responses on your present thinking by putting a tick mark (✓) on any of the five alternative responses. Viz., Strongly Agree, Agree, Undecided, Disagree, and Strongly Disagree. (5 Point Likert Scale) The information collected for this study will be used only for academic purposes and kept confidential.

Please answer all 50 statements. Tick (✓) the appropriate options.

Technological Pedagogical Content Knowledge (TPACK) Scale:

Sl. No.	Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1.	I can learn technology quickly.					
2.	I keep up with necessary new technologies.					
3.	I know about a lot of different technical skills.					
4.	I have sufficient knowledge to solve technical problems with computers.					
5.	I know basic computer hardware (E.g., Flash Drive, CD-ROM) and its functions.					
6.	I know about basic computer software (E.g. Windows, Media Player) and their functions.					
7.	I can adapt my teaching based on what students understand or do not understand.					
8.	I can adapt my teaching style to different learners.					
9.	I can assess student learning in multiple ways.					
10.	I can use a wide range of teaching approaches in a classroom setting.					

Sl. No.	Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
11.	I am familiar with common student understandings and misconceptions.					
12.	I have had formal pedagogical education or training.					
13.	I use different evaluation methods and techniques.					
14.	I am aware of possible student learning difficulties and misconceptions in managing class.					
15.	I have various ways and strategies for developing my understanding of my subject matter.					
16.	I have sufficient knowledge of my subject to design a rubric that evaluates my teaching.					
17.	I have sufficient knowledge to select technology that matches my subject matter.					
18.	I can develop class activities and projects.					
19.	I recognize leaders in my content area.					
20.	I follow conferences and activities in my content area.					
21.	I can choose technologies that enhance the teaching approaches for a lesson.					
22.	I can choose technologies that enhance students' learning for a lesson.					
23.	I think deeply about how technology could influence the teaching approaches I use in my classroom.					

Sl. No.	Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
24.	I am thinking critically about how to use technology in my classroom.					
25.	I can adapt the use of the technologies to different teaching activities.					
26.	I can choose appropriate technologies for my teaching/learning approaches and strategies.					
27.	I can use computer applications to support students' learning.					
28.	I can evaluate the appropriateness of a new technology for teaching and learning.					
29.	I know how to match course objectives to technology.					
30.	I know how to match technology to course objectives.					
31.	I know how to create a lesson or unit incorporating web-based tools as an integral part of the course.					
32.	I can use technologies to reach course objectives easily in my lesson plan.					
33.	I can prepare a lesson plan requiring the use of instructional technologies.					
34.	I can develop class activities and projects involving the use of instructional technologies.					
35.	I can select effective teaching approaches to guide student thinking and learning within my subject area.					

Sl. No.	Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
36.	I can use technology to collaborate with others distant from my classroom.					
37.	I can create appropriate lesson plans that scaffold student learning.					
38.	I can select appropriate and effective teaching strategies for my content area.					
39.	I can develop evaluation tests and surveys in my content ares.					
40.	I can prepare a lesson plan that includes class/ school-wide activities.					
41.	I can make connections among related subjected in my content area.					
42.	I can collaborate in my content area with outside (out-of-school) activities.					
43.	I can teach lessons that appropriately combine my subject matter, technologies, and teaching approaches.					
44.	I can select technologies in my classroom that enhance what I teach, how I teach, and what students learn.					
45.	I can lead in helping others coordinate using my institution's content, technologies and teaching approaches.					
46.	I can integrate appropriate instructional methods and technologies into my content area.					

Sl. No.	Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
47.	I can select contemporary strategies and technologies that help to teach my content effectively.					
48.	I can teach successfully by combining my content area, pedagogy and technology knowledge.					
49.	I can lead my classmates/colleagues in integrating content, pedagogy, and technology knowledge.					
50.	I can teach a subject with different instructional strategies and computer applications.					

Appendix – II

Self-Confidence Scale for B.Ed. Students.

<u>General Information about the B.Ed. Students:</u>

Please fill out the following information. Kindly tick (✓) the appropriate options.

1.	Name (Optional)	:	
2.	Name of the College	:	
3.	District	:	
4.	Gender	:	Male / Female
5.	Educational Qualification	:	UG / PG
6.	Subject Stream	:	Arts/ Science / Commerce
7.	Year of Study	:	I / II
8.	Locality	:	Rural / Urban
9.	Institution	:	Government / Private
10.	Previous Technological Knowledge	:	Yes/ No

Instructions:

On the following pages, statements about Self-Confidence have been given. Read each statement carefully and decide your responses on your present thinking by putting a tick mark (✓) on any of the five alternative responses. Viz., Strongly Agree, Agree, Undecided, Disagree, and Strongly Disagree. (5 Point Likert Scale) The information collected for this study will be used only for academic purposes and kept confidential.

Please answer all 48 statements. Tick (✓) the appropriate options.

Self-Confidence Scale for B.Ed. Students:

Sl.No.	Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1.	I believe in my physical strength and agility.					
2.	I confidently navigate physical challenges.					
3.	I often feel insecure about my physical appearance.					
4.	I trust my ability to achieve my physical fitness goals.					
5.	I often compare myself to others regarding fitness, which makes me feel bad about myself.					
6.	I maintain a positive mindset for overall well-being,					
7.	I am not aware of my emotions and those of others.					
8.	I trust my problem-solving and decision-making skills.					
9.	I often doubt my ability to cope with stress and challenges.					

Sl.No.	Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
10.	I prioritize self-care practices that nurture my emotional well-being and inner peace.					
11.	Negative thoughts and emotions frequently overwhelm me.					
12.	I find adapting to new situations to be mostly challenging, although whether I can face the challenges depends on me.					
13.	I confidently navigate and overcome mental challenges.					
14.	I am good at using technology.					
15.	I have difficulty in making PowerPoint to make subjects more interesting.					
16.	I struggle to incorporate technology into my teaching effectively.					
17.	I am comfortable using multimedia tools.					
18.	I feel less skilled at using technology to understand my subjects.					
19.	I frequently engage in conversations about technology with my friends.					
20.	I sometimes feel overwhelmed by relying on technology.					
21.	I believe that technology is a key factor in effective teaching and learning.					

Sl.No.	Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
22.	I have more time to think and analyze when I use technology.					
23.	I have self-confidence in social situations.					
24.	People often listen to and value my input.					
25.	I sometimes cannot give positive feedback to others.					
26.	I actively contribute to group discussions to solve societal problems.					
27.	I hesitate to express my opinions regarding social events among friends.					
28.	I take pride in building and maintaining social relationships.					
29.	I sometimes avoid social interactions due to a lack of confidence.					
30.	I adapt well to various social environments.					
31.	I often compare myself to others.					
32.	I try to make the atmosphere of my class interesting and lively.					
33.	I appreciate the cleanliness of my workplace.					
34.	My teacher educators often appreciate the positive aspects of my work.					
35.	I actively participate in seminar and workshop activities.					

Sl.No.	Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
36.	I adhere to rules in the teacher training classroom.					
37.	I believe in maintaining a fair and supportive environment.					
38.	I am not satisfied with the infrastructure facilities at my institution.					
39.	My workplace setting does improve my work or teaching efficiency.					
40.	The B.Ed. Institution location positively affects my teaching and learning skills.					
41.	I am not fully qualified for the teaching profession.					
42.	I take pride in my teaching profession.					
43.	I sometimes cannot be confident in my training-related skills.					
44.	Teacher educators frequently give feedback on my work.					
45.	I am confident in selecting an appropriate teaching method based on the concepts/topics.					
46.	Teachers can teach effectively without a B.Ed. /M.Ed., etc.					
47.	I cannot prepare the necessary teaching and learning materials on my own.					
48.	I can teach effectively without testing the students' previous knowledge.					

Appendix – III

Teaching Competency Scale by Jeya S.K. & Denisia S.P. (2016).

General Information about the B.Ed. Students:

Please fill out the following information. Kindly tick (✓) the appropriate options.

1.	Name (Optional)	:	
2	Name of the College	:	
3.	District	:	
4.	Gender	:	Male / Female
5.	Educational Qualification	:	UG / PG
6.	Subject Stream	:	Arts/ Science / Commerce
7.	Year of Study	:	I / II
8.	Locality	:	Rural / Urban
9.	Institution	:	Government / Private
10.	Previous Technological Knowledge	:	Yes/ No

Instructions:

On the following pages, statements about Teaching Competency have been given. Read each statement carefully and decide your responses on your present thinking by putting a tick mark (✓) on any of the five alternative responses. Viz., Strongly Agree, Agree, Undecided, Disagree, and Strongly Disagree. (5 Point Likert Scale) The information collected for this study will be used only for academic purposes and kept confidential.

Please answer all 50 statements. Tick (✓) the appropriate options.

Teaching Competency Scale:

Sl.No.	Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1.	The teacher-educator has in-depth knowledge of the subject.					
2.	The teacher-educator is through with the content of teaching.					
3.	The teacher-educator periodically updates his/her subject knowledge.					
4.	The teacher- educator is knowledgeable to relate the subject matter with the relevant subject content.					
5.	The teacher-educator suggests additional reference materials.					
6.	The teacher-educator correlates the subject matter with other literary works.					
7.	The teacher-educator quotes relevant incidents and facts from dailies.					
8.	Before starting the class, the teacher-educator clearly states the objectives to the students.					
9.	The teacher-educator narrates stories and incidents to motivate the students.					

Sl.No.	Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
10.	The teacher-educator introduces the lesson interestingly.					
11.	The teacher-educator has a well-designed plan of teaching.					
12.	The teacher-educator revises the previous day's lesson before he/she starts teaching.					
13.	The teacher-educator systematically presents the subject matter.					
14.	The teacher-educator asks questions during the lesson development.					
15.	The teacher-educator understandably explains difficult terms and concepts.					
16.	The teacher-educator coherently arranges the content.					
17.	The teacher-educator presents the content according to the level of the B.Ed. student-teachers.					
18.	The teacher-educator introduces the lesson using appropriate illustrations.					
19.	The teacher-educator gives a summary at the end of each lesson.					
20.	The teacher-educator encourages the student's participation in the class.					
21.	The teacher-educator clears the doubts of the students satisfactorily.					
22.	The teacher-educator arouses the interest of the student-teachers.					

Sl.No.	Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
23.	The teacher-educator articulates all the words and sentences with appropriate power and intonation.					
24.	The teacher-educator gives due respect to the student-teachers' views.					
25.	The teacher-educator uses appropriate gestures and body language.					
26.	The teacher-educator's voice is audible and speaks with modulation.					
27.	The teacher-educator asks various questions to evaluate the student-teacher level of comprehension.					
28.	The teacher-educator uses simple language.					
29.	The teacher-educator receives the feedback from the student-teachers now and then.					
30.	The teacher-educator uses learner-centered techniques more.					
31.	The teacher-educator introduces innovative teaching techniques.					
32.	The teacher-educator uses the blackboard effectively.					
33.	The teacher-educator uses a variety of teaching aids, like charts, diagrams, pictures, etc., to make learning effective.					
34.	The teacher-educator communicates effectively with a sense of humour.					
35.	The teacher-educator stresses the important points while teaching.					

Sl.No.	Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
36.	The teacher-educator presents examples to illustrate the complex concepts.					
37.	The teacher-educator uses the study group techniques to improve the academic performance of the student-teachers.					
38.	While teaching poems, the teacher-educator sings the poem.					
39.	The teacher-educator gives homework to reinforce learning.					
40.	The teacher-educator has good eye contact with all the student-teachers.					
41.	The teacher-educator is friendly and positive in his/her approach.					
42.	The teacher-educator maintains a good relationship with the student-teachers.					
43.	The teacher-educator moves around the class to maintain classroom discipline.					
44.	The teacher-educator takes care of the gifted and the slow learners.					
45.	The teacher-educator has good control over his/her emotions.					
46.	The teacher-educator treats all the student-teachers equally.					
47.	The teacher-educator has the knowledge of child psychology for effective management.					
48.	The teacher-educator effectively manages the student-teacher approach.					

Sl.No.	Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
49.	The teacher-educator is concerned with the progress of the student-teachers.					
50.	The teacher-educator corrects the mistake when they write and speak in the class.					

Appendix – IV

Paper Presentations:

SHARDA UNIVERSITY
Beyond Boundaries

NAAC A+ ACCREDITED

SCHOOL OF EDUCATION

Indian Council of Social Science Research

CERTIFICATE
of Paper Presentation

This certificate is presented to

Ms./Mr./Dr. **Lavanya. S**

from **Nagaland University, Nagaland**

PAPER PRESENTATION CERTIFICATE

for presenting the paper, titled as

Enhancing Higher Education in Nagaland: A Study on Integrating TPACK and Digital Competencies into the Curriculum.

*in the **ICSSR Sponsored National Seminar on NEP 2020: Navigating the Roadmap of Viksit Bharat@ 2047: Challenges and Opportunities** from November 20-22, 2024 organized by School of Education, Sharda University.*

Seminar Convener
Dr. Akanksha Srivastava

Seminar Chair
Dr. Sarita Verma

AMITY UNIVERSITY
UTTAR PRADESH

Indian Council of Social Science Research

FACULTY OF EDUCATION

International Conference
on
"Vision Viksit Bharat@2047: Enhancing Competency-Based Education through Innovative Pedagogical Interventions"

CERTIFICATE OF PARTICIPATION

This is to Certify that ~~Mr.~~/Ms./~~Dr.~~ Lavanya S. (Author) & ~~Mr.~~/~~Ms.~~/Dr. Gyanendra Nath Tiwari (Co-Author) from Nagaland University, Kohima Presented a Paper title Technology Integration through TPACK framework in Competency Based Teacher Education during the ICSSR sponsored International Conference on "**Vision Viksit Bhart @ 2047: Enhancing Competency – Based Education through Innovative Pedagogical Interventions**" organised on 23rd December 2024 by Faculty of Education, Amity University Uttar Pradesh.

Dr. Priyanka Singh Niranjan Assistant Professor AIE, AUUP	**Prof.(Dr). Alka Muddgal** Head AIE, AUUP	**Prof. (Dr.) Harish Kumar** Head AIBAS, AUUP	**Prof.(Dr).Kalpana Sharma** Dean, Faculty of Education AUUP	**Prof. (Dr.) Balvinder Shukla** Vice Chancellor AUUP

Appendix – V

Paper Publications:

International Research Journal of Educational Psychology e-ISSN: 2456-8198 | Vol.08 | No.02 | Jul-Dec 2024 | pp. 26-37 ***Double-Blind Peer Reviewed/Refereed Journal***

Assessing the Relationship between Self-confidence and Teaching Competency in B.Ed. Students: A Study in Kohima District, Nagaland

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1Ph.D. Research Scholar, Department of Teacher Education, Nagaland University, Kohima Campus, Merima -797004, Nagaland.

2Professor, Department of Teacher Education, Nagaland University, Kohima Campus, Merima -797004, Nagaland.

CERTIFICATE OF PUBLICATION

Google Scholar

YEAR: 2024

AD EDUXIAN JOURNAL

ISSN: 3048-7951

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This is certified that the Paper Title "Enhancing Digital-Age Professional Development for Teacher Educators in Nagaland: Integrating Technological Pedagogical Content Knowledge (TPACK), Digital Literacy, and Computational Thinking in B.Ed. Programmes" author by *"Lavanya. S"* has been published in the Volume-(2) Issue-(1) Feb-April 2025, ADEJ with PIF:1.024 *with plagiarism free through rigorous blind peer review process in term of originality and quality of work by review committee of ADEJ.*

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Impact of Technology on Learning in Teacher Education: A Study on TPACK, Self-Confidence, and Teaching Competency Among B.Ed. Students in Nagaland

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