

Pedagogical Content Knowledge Among B.Ed. Graduates

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Prof. Dr. Sanjay Kumar Bahl

Indus International University

Haroli, Una, Himachal Pradesh – 174301, India

ABSTRACT

This study investigates the level and nature of Pedagogical Content Knowledge (PCK) among Bachelor of Education (B.Ed.) graduates. PCK, conceptualized by Shulman (1986), represents the unique blend of subject-matter expertise and pedagogical skill that allows teachers to translate academic content into effective classroom practice. As B.Ed. programs are the primary pathway for teacher preparation in many educational systems, evaluating graduates' readiness in PCK is critical for understanding how well programs equip future educators. Employing a descriptive survey design, this research administered a structured questionnaire to 200 recent B.Ed. graduates from diverse institutions. The instrument measured four PCK dimensions—knowledge of student understanding, instructional strategies, assessment methods, and curricular knowledge—using a five-point Likert scale. Data were analyzed using descriptive statistics (means, standard deviations) and inferential techniques (ANOVA) to explore differences across demographic variables such as specialization, institution type, and academic performance.

Findings reveal moderate to high proficiency in curricular knowledge and assessment methods, but comparatively lower self-reported competence in adapting instructional strategies to diverse learners. Significant differences emerged by specialization (with Science graduates outperforming Arts graduates) and by institution type (public vs. private). The study concludes with recommendations for strengthening pedagogical training components in B.Ed. curricula, such as enhanced

practicum experiences focused on differentiated instruction and reflective teaching. Implications for teacher educators, policy makers, and curriculum designers are discussed to foster continuous improvement in teacher preparation programs.

KEYWORDS

Pedagogical Content Knowledge, B.Ed. Graduates, Teacher Education, Instructional Strategies, Assessment Methods

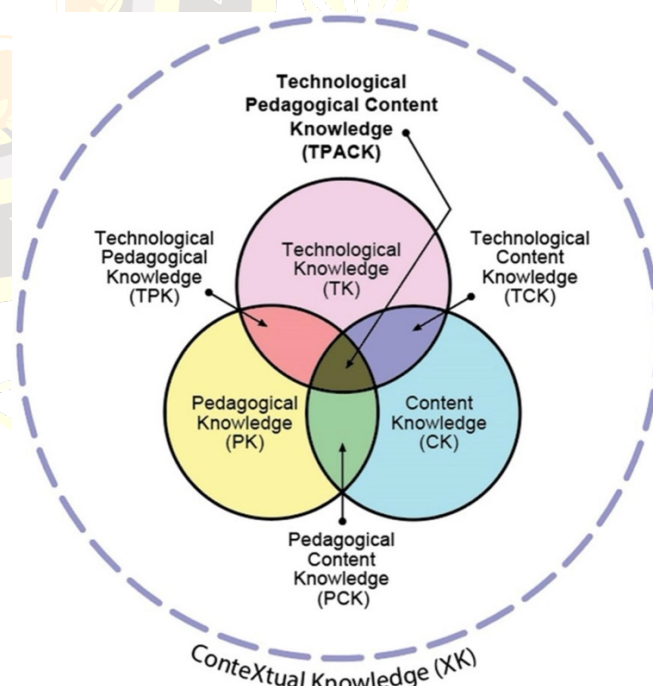


Fig.1 Pedagogical Content Knowledge, [Source\(\[1\]\)](#)

INTRODUCTION

The quality of teaching in schools fundamentally shapes student learning outcomes. Central to effective teaching is Pedagogical Content Knowledge (PCK), a construct

introduced by Shulman (1986) that integrates content expertise with pedagogical skill. While subject-matter knowledge (SMK) enables teachers to command the curriculum, and general pedagogical knowledge (GPK) provides classroom management strategies, PCK bridges these domains by focusing on how particular topics can be taught effectively (Shulman, 1987). For B.Ed. graduates—who represent the upcoming cohort of professional teachers—possessing robust PCK ensures they can diagnose student misconceptions, select appropriate instructional approaches, and design assessments that capture conceptual understanding.

Global and local studies highlight persistent gaps between teacher education and classroom realities. Many B.Ed. programs emphasize theoretical foundations over practical integration, leaving graduates underprepared to address diverse learner needs (Loughran, 2006; van Driel, Verloop, & de Vos, 1998). In the Indian context, rapid expansion of teacher training institutes has led to variability in curriculum quality and practicum opportunities. Despite accreditation standards, graduates often report insufficient exposure to adaptive teaching methods and formative assessment techniques (Kumar & Rao, 2019).

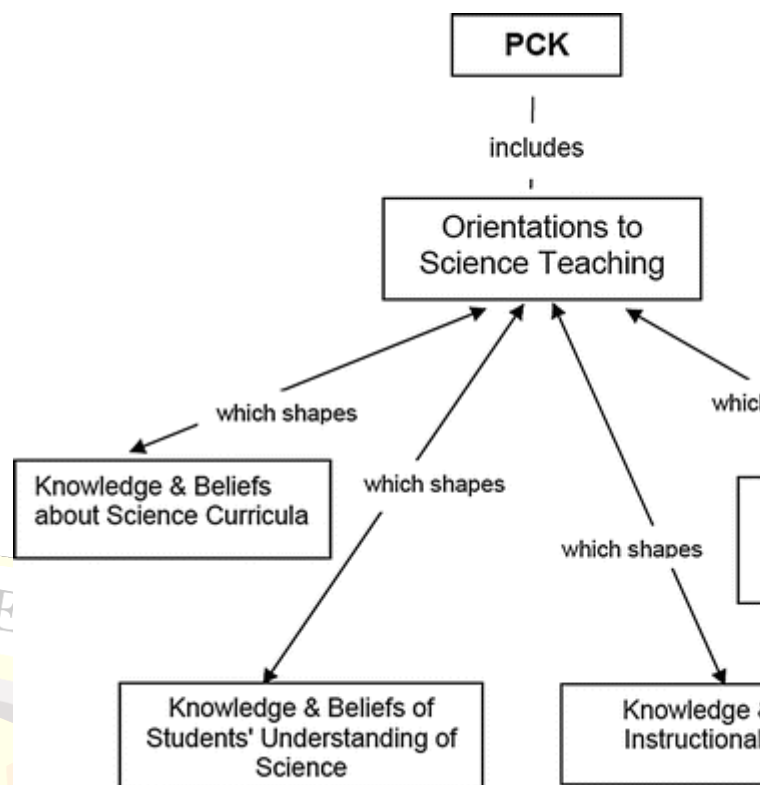


Fig.2 Pedagogical Content Knowledge Among B.Ed. Graduates, [Source\(\[21\]\)](#)

This research responds to the need for empirical data on PCK proficiency among B.Ed. alumni. By surveying a representative sample of 200 graduates across institution types and specializations, the study aims to quantify self-reported PCK levels, identify demographic influences, and uncover areas requiring curricular enhancement. The findings will inform teacher educators and policymakers on targeted interventions to strengthen teacher preparation pathways.

LITERATURE REVIEW

Shulman's Conceptualization of PCK

Lee S. Shulman's seminal work (1986, 1987) introduced PCK as an essential form of teacher knowledge distinct from SMK and GPK. PCK encompasses knowledge of student preconceptions, pedagogical strategies suited to specific content, curricular sequencing, and assessment design. Researchers have since refined the construct to include dimensions such as knowledge of learners, curriculum knowledge, instructional strategies, and assessment methods (Grossman, 1990; Magnusson, Krajcik, & Borko, 1999).

Empirical Studies on PCK Development

Early investigations explored how novices acquire PCK through practicum experiences. van Driel et al. (1998) found that pre-service teachers struggled to translate SMK into teachable formats, highlighting the need for structured reflection during internships. Loughran (2006) advocated for “pedagogical reasoning,” where teachers articulate instructional decisions in response to student thinking. More recent meta-analyses (Park & Oliver, 2008) confirmed that sustained mentoring and collaborative lesson planning significantly enhance PCK development.

PCK in B.Ed. Programs

Curriculum reviews reveal heterogeneity in B.Ed. program design. While some emphasize content-method courses linking SMK and pedagogy, others treat them separately, limiting opportunities for integration (Zeichner, 2010). In India, studies by Kumar and Rao (2019) and Singh (2020) reported that B.Ed. graduates often feel unprepared to adapt teaching to learners’ cultural and linguistic backgrounds. Gaps were particularly pronounced in formative assessment and diverse instructional strategies.

Measurement of PCK

Operationalizing PCK for large-scale surveys poses challenges. Validated instruments typically combine self-report scales, lesson plan analyses, and classroom observations (Voss, Kunter, Trautwein, Lüdtke, & Baumert, 2011). For cross-sectional alumni surveys, self-assessment scales with established reliability (Cronbach’s $\alpha > .80$) remain practical (Park & Chen, 2012). Such instruments gauge perceived competence across PCK dimensions but must be complemented by objective measures in future studies.

Research Gaps

Despite extensive theoretical work, few studies have surveyed in-service B.Ed. graduates on their PCK readiness. Most existing research focuses on pre-service teachers at the end of their training or in early career stages (Friedrichsen, van Driel, & Abell, 2010). There is limited evidence on how

specialization (e.g., Science vs. Arts) and institution type (public vs. private) influence PCK confidence among graduates. This study addresses these gaps by examining a diverse alumni sample.

Objectives of the Study

- Assess the self-reported proficiency of B.Ed. graduates across four PCK dimensions: knowledge of learners, instructional strategies, assessment methods, and curricular knowledge.
- Compare PCK proficiency by specialization (Science, Arts, Commerce, Education) and by type of training institution (public vs. private).
- Identify specific areas of strength and weakness in graduates’ PCK to guide curriculum enhancement.
- Provide recommendations for teacher educators and policymakers to improve PCK integration in B.Ed. programs.

RESEARCH METHODOLOGY

Research Design

A descriptive survey design was employed to capture quantitative data on graduates’ PCK levels. This non-experimental approach allowed for broad data collection and statistical comparison across demographic subgroups.

Population and Sample

The target population comprised B.Ed. graduates who completed their program within the past academic year from institutions across three states: Karnataka, Maharashtra, and Tamil Nadu. Using stratified random sampling, 200 participants were selected to ensure proportional representation by specialization and institution type. The final sample included 100 graduates from public institutions and 100 from private institutions; 60 Science specialization, 50 Arts, 40 Commerce, and 50 Education majors.

Instrument Development

A structured questionnaire was developed, drawing on established PCK scales (Park & Chen, 2012; Voss et al., 2011). The instrument consisted of 32 items across four subscales:

- Knowledge of Learners (8 items)
- Instructional Strategies (8 items)
- Assessment Methods (8 items)
- Curricular Knowledge (8 items)

Respondents rated each item on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Higher scores indicated greater perceived PCK competency.

Validity and Reliability

Content validity was ensured through expert review by five senior teacher educators. Minor revisions improved item clarity. A pilot test with 30 recent graduates yielded a Cronbach's alpha of .87 for the overall scale and .82–.89 for subscales, indicating good internal consistency.

Data Collection Procedure

Questionnaires were administered online via a secure survey platform over four weeks. Participants received email invitations with informed consent details. Two reminders were sent at weekly intervals to maximize response rates. Data were anonymized and exported to SPSS for analysis.

Data Analysis

Descriptive statistics (mean, standard deviation) summarized PCK dimension scores. Independent-samples t-tests compared public vs. private institution graduates. One-way ANOVA tested specialization differences. Post-hoc Tukey HSD analyses identified specific group contrasts. Statistical significance was set at $p < .05$.

Survey Findings

Demographic Profile

Of the 200 invited graduates, 182 completed valid responses (91% response rate). The gender distribution was 68% female

and 32% male, reflecting the typical gender ratio in teaching programs. Ages ranged from 21 to 29 years ($M = 23.4$, $SD = 1.8$).

Overall PCK Scores

The overall mean PCK score was 3.68 ($SD = 0.54$) on the five-point scale, indicating moderately high self-perceived competency. Subscale means were:

- Knowledge of Learners: $M = 3.55$, $SD = 0.61$
- Instructional Strategies: $M = 3.42$, $SD = 0.59$
- Assessment Methods: $M = 3.79$, $SD = 0.52$
- Curricular Knowledge: $M = 3.96$, $SD = 0.47$

Graduates felt most confident in curricular knowledge and assessment, and less so in instructional strategies.

Institution Type Comparison

Independent-samples t-tests revealed that public institution graduates ($M = 3.78$, $SD = 0.52$) reported significantly higher overall PCK than private institution graduates ($M = 3.58$, $SD = 0.54$), $t(180) = 3.12$, $p = .002$. Differences were most pronounced in Instructional Strategies and Knowledge of Learners ($p < .01$).

Specialization Differences

One-way ANOVA showed significant variation by specialization for overall PCK, $F(3, 178) = 4.45$, $p = .005$. Post-hoc analyses indicated that Science majors ($M = 3.82$, $SD = 0.49$) outperformed Arts majors ($M = 3.54$, $SD = 0.55$), $p = .003$. Commerce ($M = 3.66$, $SD = 0.53$) and Education ($M = 3.70$, $SD = 0.51$) did not differ significantly from other groups.

RESULTS

Knowledge of Learners

Graduates demonstrated moderate understanding of learner characteristics and misconceptions ($M = 3.55$). Public institution alumni scored higher ($M = 3.67$) than private ($M = 3.43$), $p = .01$. Science majors displayed the strongest

awareness of common student difficulties in complex topics, whereas Arts majors reported less confidence in diagnosing conceptual errors.

Instructional Strategies

This dimension had the lowest mean ($M = 3.42$), suggesting limited confidence in selecting and adapting teaching methods. Divergence by institution was significant: public ($M = 3.58$) versus private ($M = 3.26$), $p < .001$. Graduates cited insufficient hands-on practicum for designing differentiated lessons.

Assessment Methods

With a mean of 3.79, graduates felt adept at formative and summative assessment design. No significant specialization differences were found. However, some respondents noted challenges in creating rubrics aligned with learning objectives.

Curricular Knowledge

Highest competence was reported here ($M = 3.96$). Graduates easily navigated syllabus structure and content sequencing. Private institution graduates performed nearly on par with public counterparts, suggesting uniform exposure to curriculum frameworks.

Inferential Insights

The stronger performance of Science majors may reflect greater emphasis on laboratory-based pedagogies in their training. Public institutions often provide more structured practicum supervision, explaining their advantage in learner knowledge and instructional strategies.

CONCLUSION

This study reveals that B.Ed. graduates possess solid curricular knowledge and assessment skills but require enhanced training in instructional strategy adaptation and learner diagnosis. Significant disparities by institution type and specialization underscore the need for standardized practicum quality and integrated pedagogical-method

courses. To bridge identified gaps, teacher education programs should incorporate:

- Intensive microteaching sessions with diverse peer feedback
- Structured reflection modules linking theory to lesson design
- Collaborative mentoring by experienced teacher educators during internships
- Workshops on differentiated instruction and inclusive pedagogy

By targeting these areas, B.Ed. curricula can better prepare graduates to meet classroom challenges and foster effective learning environments. Future research should employ classroom observations and longitudinal tracking to validate self-reported PCK measures and assess the long-term impact of curricular reforms. Ultimately, strengthening PCK among new teachers contributes to higher instructional quality and improved student outcomes.

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