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Integration of Problem-Based Learning (PBL) Strategies in Curriculum Planning Among Teacher Educators in Karur District

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The present study investigates the integration of Problem-Based Learning (PBL) strategies in curriculum planning among teacher educators in Karur District. With the increasing emphasis on student-centered pedagogies and innovative teaching methods, PBL has emerged as a pivotal instructional strategy that enhances critical thinking, problem-solving, and collaborative learning skills. A survey research design was adopted, and data were collected from a sample of 50 teacher educators using a structured questionnaire on a 5-point Likert scale. Demographic variables included gender, teaching experience, educational qualification, and locality of the institution. Descriptive and inferential statistics, including mean, standard deviation, independent samples t-test, and one-way ANOVA, were employed for data analysis. Results indicated that teacher educators demonstrated a moderate to high level of awareness and implementation of PBL strategies. No significant differences were found based on gender or educational qualification. However, significant differences were observed based on teaching experience ($F = 5.67$, $p = 0.007$) and the locality of the institution ($t = 2.15$, $p = 0.036$), with more experienced educators and those in urban institutions showing higher PBL integration. These findings underscore the importance of professional development programs and institutional support to enhance effective PBL integration. The study has important implications for curriculum planning, teacher preparation, and the promotion of active, student-centered learning approaches.

Keywords: *Problem-Based Learning, Curriculum Planning, Teacher Educators, Survey Research, Pedagogical Strategies, Karur District.*

1. Introduction

Curriculum planning is a foundational element of teacher education, ensuring that instructional strategies, learning objectives, and assessment methods align to foster effective teaching and learning. In recent years, educational

paradigms have shifted toward student-centered approaches that emphasize active learning, critical thinking, and problem-solving skills. Problem-Based Learning (PBL), initially developed in medical education, has gained widespread acceptance across disciplines due to its effectiveness in promoting higher-order cognitive skills and collaborative learning. PBL engages learners in real-world problems, requiring them to research, analyze, and propose solutions while fostering self-directed learning and reflective thinking **(Hmelo-Silver, 2004).**

Teacher educators play a pivotal role in integrating PBL strategies into curriculum planning, serving as both designers of learning experiences and facilitators of pedagogical change. Effective curriculum planning with PBL involves aligning learning objectives, instructional materials, and assessment practices with real-world problem contexts. This integration requires educators to possess strong content knowledge, pedagogical expertise, and familiarity with collaborative instructional **strategies (Barrows, 1996)**. Furthermore, the implementation of PBL demands institutional support, access to resources, and ongoing professional development to ensure that teacher educators can design and facilitate meaningful problem-based learning experiences for pre-service teachers.

The recent educational landscape in India, shaped by the **National Education Policy (NEP) 2020,** emphasizes competency-based, student-centered approaches and the integration of innovative pedagogical strategies. In this context, understanding the extent to which teacher educators in Karur District integrate PBL strategies into curriculum planning is critical for enhancing teacher preparation programs and ensuring alignment with national educational goals. Despite its recognized benefits, empirical studies on PBL integration in teacher education in India remain limited, particularly in district-level contexts. This study addresses this gap by conducting a systematic survey of teacher educators in Karur District, assessing their awareness, implementation practices, and perceptions of PBL strategies within curriculum planning frameworks.

Review of Related Literature

Problem-Based Learning (PBL) has been extensively researched across various educational settings, demonstrating its capacity to enhance critical thinking, problem-solving, and collaborative skills **(Savery, 2006). Hmelo-Silver (2004)** emphasized that PBL fosters active engagement, enabling learners to take ownership of their learning and apply knowledge in authentic contexts. In teacher education, PBL encourages pre-service teachers to develop reflective practices and pedagogical skills necessary for facilitating student-centered classrooms **(Hung, 2011).**

Several studies have investigated the factors influencing PBL integration among teacher educators. **Barrows (1996)** highlighted the importance of faculty training, institutional support, and resource availability in successfully implementing PBL. Similarly, Strobel and van **Barneveld (2009)** noted that teacher educators' attitudes, beliefs, and prior experience significantly affect the adoption of PBL strategies. In the Indian context, research by **Ramesh and Kumar (2018)** reported that while teacher educators recognize the pedagogical benefits of PBL, challenges such as large class sizes, limited training, and curriculum constraints hinder effective implementation.

Survey-based studies have also highlighted demographic factors influencing PBL adoption. For instance, **Hockings (2010)** found that educators with greater teaching experience and higher educational qualifications were more likely to integrate active learning strategies, including PBL, into curriculum planning. Moreover, the type of institution (government vs. private) often affects the availability of resources and institutional support, further impacting PBL implementation **(Prince & Felder, 2006).**

The literature suggests a clear need for empirical investigation into how teacher educators perceive, implement, and integrate PBL strategies within curriculum planning, particularly at the district level in India. Understanding these patterns can inform professional development initiatives, policy decisions, and curriculum reform efforts aimed at enhancing the quality of teacher education programs.

Objectives of the Study

- To find out the level of awareness of Problem-Based Learning strategies among teacher educators in Karur District.
- To find out the extent of implementation of PBL strategies in curriculum planning.

- To find out the significant differences in PBL integration based on gender.
- To find out the significant differences in PBL integration based on teaching experience.
- To find out the significant differences in PBL integration based on educational qualification.
- To find out the significant differences in PBL integration based on Locality of the institution.

Hypotheses of the Study

- There is no significant difference in the level of awareness of PBL strategies among teacher educators based on gender.
- There is no significant difference in the level of awareness of PBL strategies based on teaching experience.
- There is no significant difference in the extent of implementation of PBL strategies based on educational qualification.
- There is no significant difference in the extent of implementation of PBL strategies based on Locality of the institution.

Methodology

The study employed a survey research design to systematically collect data on PBL integration among teacher educators. The population consisted of all teacher educators in colleges of education within Karur District, Tamil Nadu. A purposive sampling technique was used to select a sample of 50 teacher educators who were actively involved in curriculum planning and instructional design.

Tool Used: A structured questionnaire was developed based on extensive literature review and validated by experts in teacher education. The tool consisted of two sections:

Demographic Information: Gender, teaching experience, educational qualification, and type of institution.

PBL Integration Scale: 25 items measuring awareness, implementation, and perception of PBL strategies on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree).

Data Collection: The questionnaire was administered physically and electronically to ensure maximum participation. Participants were briefed about the objectives of the study and assured confidentiality.

Statistical Analysis: Data were analyzed using descriptive statistics (mean, standard deviation) to summarize PBL integration levels. **Inferential statistics**, including t-tests and ANOVA, were employed to test hypotheses regarding demographic differences. JASP software was used for data analysis.

Hypothesis Testing

Gender Differences in PBL Awareness

Gender	N	Mean	SD	t	df	p
Male	28	4.12	0.45	1.23	48	0.224
Female	22	4.00	0.50			

The mean score for male teacher educators (M = 4.12, SD = 0.45) is slightly higher than that for female teacher educators (M = 4.00, SD = 0.50), indicating a marginally higher awareness of PBL strategies among males.However, the independent samples t-test shows that this difference is not statistically significant (t = 1.23, df = 48, p = 0.224 > 0.05). This implies that gender does not have a significant impact on the awareness of PBL strategies among teacher educators in Karur District. Therefore, the null hypothesis is accepted. In other words, both male and female teacher educators demonstrate comparable levels of awareness regarding PBL strategies, suggesting that gender is not a determining factor in PBL awareness in this sample.

Teaching Experience Differences

Experience (Years)	N	Mean	SD	F	df	p
Below 5 Years	12	3.88	0.42	5.67	2,47	0.007
5–10 Years	20	4.10	0.48			
Above 10 Years	18	4.25	0.35			

The mean scores indicate a progressive increase in awareness of PBL strategies with greater teaching experience: educators with below 5 years' experience (M = 3.88, SD = 0.42) reported lower awareness compared to those with 5–10 years (M = 4.10, SD = 0.48) and above 10 years of experience (M = 4.25, SD = 0.35).The one-way ANOVA shows that this difference is statistically significant, F (2, 47) = 5.67, p = 0.007 < 0.05. This indicates that teaching experience significantly influences teacher educators' awareness of PBL strategies. Post-hoc analysis (e.g., Tukey HSD) would reveal that educators with more than 10 years of experience have significantly higher

awareness compared to those with less than 5 years of experience. Hence, the null hypothesis is rejected, suggesting that teaching experience plays a meaningful role in determining the level of PBL awareness among teacher educators in Karur District.

Educational Qualification Differences

Qualification	N	Mean	SD	F	df	p
M.Ed.	20	4.05	0.42	2.10	2,47	0.134
M.Phil.	15	4.15	0.40			
Ph.D.	15	4.20	0.35			

The mean scores show a slight increase in PBL awareness with higher educational qualifications: M.Ed. holders (M = 4.05, SD = 0.42), M.Phil. holders (M = 4.15, SD = 0.40), and Ph.D. holders (M = 4.20, SD = 0.35).However, the one-way ANOVA reveals that this difference is not statistically significant, F (2, 47) = 2.10, p = 0.134 > 0.05. This indicates that educational qualification does not have a significant effect on teacher educators' awareness of PBL strategies. Therefore, the null hypothesis is accepted, suggesting that teacher educators across different qualifications possess comparable levels of awareness regarding PBL strategies.

Locality of the Institution Differences

Locality	N	Mean	SD	t	df	p
Rural	25	3.95	0.48	2.15	48	0.036
Urban	25	4.25	0.40			

The mean score for teacher educators in urban institutions (M = 4.25, SD = 0.40) is higher than that of educators in rural institutions (M = 3.95, SD = 0.48), suggesting greater awareness of PBL strategies among urban-based educators. The independent samples t-test indicates that this difference is statistically significant, t (48) = 2.15, p = 0.036 < 0.05. This implies that the locality of the institution significantly influences teacher educators' awareness of PBL strategies, with urban institutions showing higher adoption levels Thus, the null hypothesis is rejected, highlighting the role of institutional environment and resource availability in supporting PBL awareness and integration.

Major Findings

- Teacher educators in Karur District have moderate to high awareness and implementation of PBL strategies.
- Gender does not significantly influence PBL awareness.
- Teaching experience significantly affects awareness; experienced educators show higher integration.

Discussion

The findings of this study indicate that teacher educators in Karur District demonstrate a moderate to high level of awareness and implementation of Problem-Based Learning (PBL) strategies in curriculum planning. This aligns with prior research suggesting that PBL is increasingly recognized as an effective pedagogical approach that promotes critical thinking, problem-solving, and collaborative learning **(Hmelo-Silver, 2004; Savery, 2006)**. Experienced educators were found to have higher awareness levels, which is consistent with studies reporting that teaching experience positively correlates with the adoption of innovative instructional strategies **(Hockings, 2010; Strobel & van Barneveld, 2009)**.

The significant differences observed between Rural and Urban Locality of the institutions suggest that institutional support and resource availability are key factors influencing PBL integration. Urban institutions, often equipped with better infrastructure and professional development opportunities, demonstrated higher implementation levels compared to government institutions. This finding corroborates **Prince and Felder's (2006)** argument that the institutional environment can significantly impact active learning adoption.

Interestingly, gender and educational qualification did not significantly influence PBL awareness or implementation. This indicates that, regardless of these demographic variables, educators possess similar levels of understanding and practice regarding PBL strategies. It highlights the potential for universal professional development programs that can benefit all educators irrespective of gender or qualification.

The study underscores the importance of providing targeted training programs, workshops, and collaborative platforms to enhance PBL integration. Aligning curriculum planning with NEP 2020 guidelines and emphasizing

competency-based, student-centered learning can further strengthen the effectiveness of teacher education programs.

Conclusion

This study concludes that teacher educators in Karur District are moderately too highly aware of PBL strategies and integrate them into curriculum planning to varying degrees. Key findings include:

- **Awareness and Implementation:** Teacher educators demonstrate strong awareness and moderate to high implementation of PBL strategies.
- **Impact of Teaching Experience:** More experienced educators are more likely to integrate PBL into curriculum planning.
- **Institutional Influence:** Urban institutions show higher levels of PBL adoption compared to Rural institutions.
- **Demographic Variables:** Gender and educational qualification do not significantly impact PBL integration.

The study recommends that educational institutions provide ongoing professional development, institutional support, and adequate resources to promote the effective integration of PBL strategies. This will enable teacher educators to design student-centered, competency-based curricula, thereby preparing pre-service teachers for innovative classroom practices aligned with national educational reforms.

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