

Teacher Role in PBL Contexts: A Qualitative Analysis Using Atlas.ti

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ABSTRACT:

This study investigates how teachers' pedagogical roles are enacted in Problem-Based Learning (PBL). This study explores how teachers exercise professional judgment during PBL enactment. Data were collected from classroom observations, interviews, and instructional artifacts. The context was higher education courses in administrative law. Findings show teachers move fluidly across multiple pedagogical roles. Teaching in PBL emerges as adaptive expertise grounded in contextual sensitivity. The study makes pedagogical decision-making analytically visible. It contributes a model for understanding role transformation in complex learning environments.

Keywords: problem-based learning; teacher role; atlas.ti; qualitative analysis

1. Introduction

Teacher role transformation has become central to pedagogical innovation in higher education, with learner-centered approaches such as Problem-Based Learning (PBL) emphasizing inquiry, collaboration, and knowledge co-construction; while PBL's benefits are well documented, limited attention has been paid to how teachers' roles are enacted and re-conceptualized, as PBL shifts responsibility to students yet increases teaching complexity; teachers must design meaningful problems, scaffold inquiry, monitor group dynamics, and exercise tacit judgment under uncertainty, making their decision-making dynamic, relational, and difficult to observe; existing research has focused more on learning outcomes than on the analytic visibility of teachers' pedagogical judgment; thus, this study employs qualitative analysis to illuminate teacher role transformation during the enactment of PBL in higher education.

2. Literature Review: Educational Research and Qualitative Studies

2.1 Qualitative Analysis as a Methodological Mediator in Educational Research

Qualitative analysis has long played a critical role in educational research seeking to capture the complexity, situatedness, and relational nature of teaching practice. In studies of instructional innovation, particularly within pedagogies such as PBL, teacher behavior is often implicit, dynamic, and context-dependent, rendering it resistant to reduction through purely quantitative measures (Barrows, 1996; Hmelo-Silver, 2004; Savery, 2006).

Within this methodological landscape, computer-assisted qualitative data analysis software (CAQDAS), such as Atlas.ti, has increasingly been adopted as a mediating tool to support systematic coding, relational analysis, and theory development. Prior research highlights Atlas.ti's capacity to manage diverse data sources,

including interview transcripts, classroom observations, visual materials, and reflective documents—in an integrated analytical environment (Gibbs, 2007; Brito et al., 2017; Herbst et al., 2024). Such affordances have proven especially valuable in studies examining instructional interaction, teacher beliefs, and classroom practice, where meaning emerges through multiple semiotic and interactional layers (Friese, 2019).

Importantly, the contribution of qualitative analysis software lies not in replacing interpretive labor but in making analytical processes more transparent, traceable, and reflexively accountable. Visualization tools, co-occurrence mapping, and memoing functions enable researchers to identify patterns of pedagogical action and decision-making that may otherwise remain tacit. However, as several scholars caution, the effectiveness of such tools depends on researchers' theoretical orientation and methodological literacy; without conceptual guidance, coding risks becoming descriptive rather than analytically generative (Smit, 2003; Williamson et al., 2025).

2.2 Teacher Role Transformation in PBL Contexts: Empirical Insights from Qualitative Studies

Extant research consistently demonstrates that PBL entails a substantial transformation of teacher roles, shifting from knowledge transmission toward facilitation, scaffolding, and reflective guidance (Barrows, 1996; Hmelo-Silver, 2004). Within PBL classrooms, teachers are required to demonstrate heightened contextual awareness and pedagogical flexibility, particularly in their use of questioning strategies, adaptive support, and responsiveness to student inquiry under conditions of uncertainty (Savery, 2006).

Empirical studies in medical, legal, and professional education have drawn on qualitative approaches to explore the dynamics of role transformation. For instance, Singaram et al. (2011) and Spruijt et al. (2012) used focus group interviews and grounded theory to examine how facilitation practices, group dynamics, and

linguistic comfort intersect with instructional effectiveness in PBL contexts. Similarly, Kim (2020) demonstrated how reflective journals were analyzed through Atlas. This study captured shifts in preservice teachers' pedagogical beliefs and collaborative orientations during project-based learning.

A growing body of qualitative PBL research has employed Atlas.ti to examine instructional interaction, pedagogical strategies, and implementation challenges across educational contexts (Tshitenge et al., 2017; Mukhtar et al., 2020; Abdullah et al., 2021). Beyond educational contexts, Atlas.ti has also been applied in interdisciplinary research addressing discourse analysis, professional cognition, and complex decision-making (Zairul, 2020; Sha & Clarke, 2025; Kumar et al., 2025). While such applications demonstrate the software's analytical versatility, they also reiterate a central methodological concern: analytical insight does not emerge from technological capacity alone but from the researcher's ability to align coding practices with theoretically meaningful constructs.

3. Research Design and Participants

This study adopts a qualitative research design to examine how teacher roles transform through the implementation of PBL in higher education contexts. The primary aim is to capture the often implicit and dynamic dimensions of teacher behavior that emerge during inquiry-oriented instruction. Given the complexity of classroom interactions and pedagogical decision-making in PBL environments, a qualitative approach is appropriate for uncovering underlying instructional patterns, role negotiations, and strategic pedagogical positioning.

Data were generated through methodological triangulation, including classroom observations, semi-structured interviews, and document analysis. These multiple data sources enabled a comprehensive examination of teachers' instructional practices across enacted, reflective, and contextual dimensions. Qualitative analysis software was employed to support systematic coding, visualization, and relational analysis of

the data; however, analytical interpretation was guided by pedagogical theory rather than technological affordances alone.

The study was conducted at a higher education institution that implements PBL, particularly in courses related to administrative law and the relationship between state and society. Participants included seven experienced instructors, and students were selected through convenience sampling based on their teaching experience and reflective capacity. Data collection spanned two semesters (August 1,

4.1 Group-Based Discussion

2021, to July 31, 2022) and consisted of classroom photographs, student satisfaction surveys, and verbatim interview transcripts.

4. Research Procedures and Analysis

This study follows the natural progression of qualitative research, employing a gradual process of data collection and analysis. Its aim is to capture the fluid and contextual nature of teacher behavior in PBL environments. Data analysis is conducted with Atlas.ti throughout the entire research process.

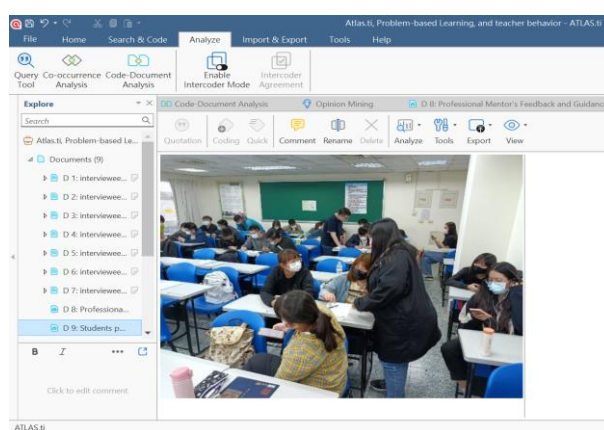


Figure 1. Student Group Discussion

Source: Compiled by the author using Atlas.ti software

This illustration is taken from the ATLAS.ti interface as applied to visual data analysis in a live classroom context with a focus on the qualitative analysis of “classroom interaction.” The image depicts a classroom where students are seated in groups in blue chairs, engaged in activities such

as reading, writing, or using electronic devices. Most people are wearing face masks, in line with pandemic guidelines. This environment works well for qualitative studies involving pedagogy or instances of student engagement and group interaction.

4.2 Coding Analysis

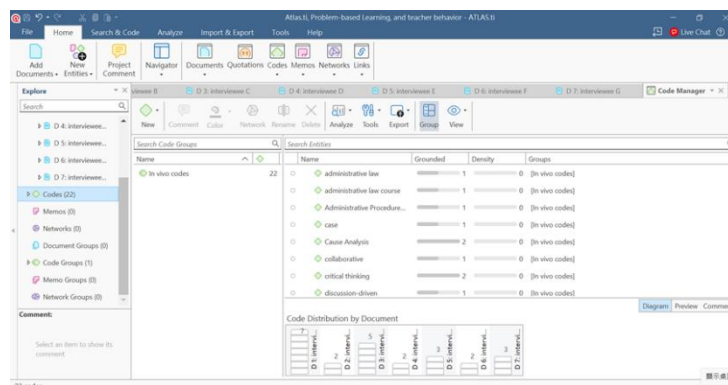


Figure 2. Coding Analysis

Source: Compiled by the author using Atlas.ti software

This figure exemplifies the ATLAS.ti system for qualitative application coding and theme analysis, with in vivo coding, monitoring, and visualization. Multiple interview documents are displayed on the screen, indicating that the researcher is conducting thematic analyses across documents.

4.3 Use of Keywords

In the development phase, the research team used Atlas.ti's co-occurrence analysis and

conceptual mapping functions in order to more thoroughly integrate the relationship between teacher behavior and the essential principles of PBL. These tools enabled the identification of frequently connected codes and the mapping of conceptual webs, thereby expressing the rationale and thematic links embedded in the instructional strategies employed in PBL contexts.

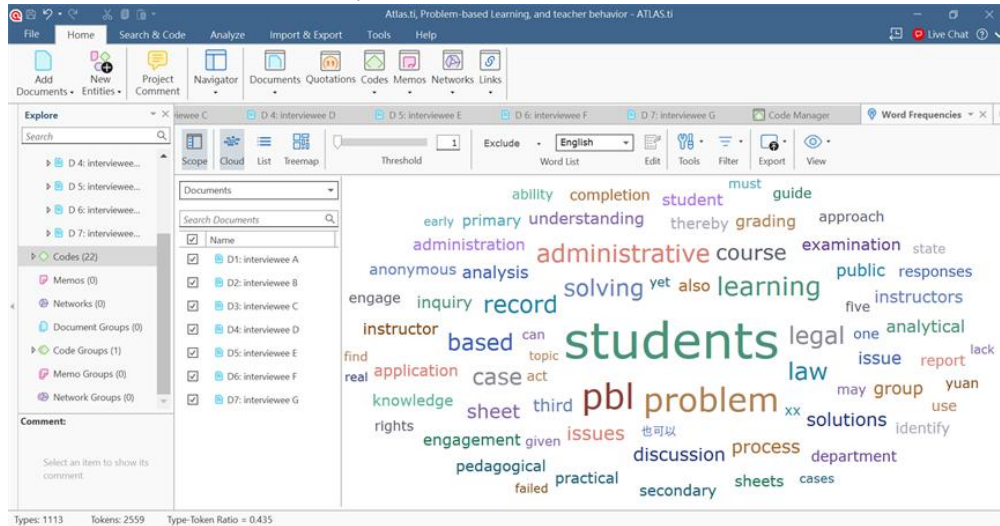


Figure 3. Keyword Visualization

Source: Compiled by the author using Atlas.ti software

This figure shows how ATLAS.ti visualizes text data, particularly the Word Cloud function. The word cloud, centered on the screen, displays keywords in varying sizes based on their importance and frequency in the data. Words like students, PBL, problem, learning, course, administrative, law, and legal clearly indicate that the study is based on PBL and on administrative law in an educational context.

5. Discussion

5.1 Making Teacher Role Transformation Analytically Visible

This study demonstrates that shifts in pedagogical positioning are rarely overt or linear. Through qualitative coding, teachers' role transformation became visible as a movement across operational, interactional, and reflective dimensions of instruction. At the operational level, teachers remained responsible for structuring learning tasks and framing problems.

However, deeper analysis revealed that instructional decision-making increasingly occurred at interactional and reflective layers, where responsiveness to student inquiry and pedagogical judgment became central. Importantly, the visibility of these shifts was not inherent in classroom activity itself but emerged through systematic qualitative analysis.

5.2 Patterns of Teacher Behavior in PBL Contexts

The findings support a layered understanding of teacher behavior rather than a binary distinction between teacher-centered and student-centered roles. Teachers frequently operated simultaneously across multiple layers, shifting emphasis in response to student engagement, conceptual difficulty, and instructional phase. For instance, moments of high student autonomy often coincided with heightened reflective–strategic engagement, where teachers exercised

restraint while maintaining awareness of epistemic goals.

5.3 Implications for Reflective Practice and Qualitative Methodology

Beyond illuminating the transformation of the teacher role, the findings highlight the value of qualitative analysis in supporting reflective professional practice. By externalizing tacit decision-making through coding and visualization, teachers and researchers alike gain access to dimensions of instructional reasoning that often remain implicit. This has implications for teacher education and professional development, particularly in pedagogical models such as PBL that demand high levels of contextual sensitivity and role flexibility. However, the study also underscores the necessity of theoretical guidance in qualitative analysis. The analytical affordances of qualitative software do not generate insight independently; rather, insight emerges through the alignment of methodological rigor with pedagogical theory.

5.4 Enhancing Group Participation of Special Education Students in PBL Contexts

This study simultaneously examines the use of PBL in a course with two special education students. Since the two special education students have greater difficulty participating in group discussions than regular education students, instructors must use additional support strategies when working with these students. These support strategies include designing more inclusive

discussion procedures and providing individual guidance to each student participating in the course. By implementing these support strategies, special education students can be better supported to participate in more group discussions and improve the overall quality of group interaction.

6. Conclusion

This study examined the teacher role in PBL through an analytical model that renders pedagogical practice empirically visible, showing that qualitative coding illuminates dynamic shifts in teachers' positioning across operational, interactional, and reflective dimensions, thereby underscoring how professional judgment underpins adaptive expertise; the model reveals patterned behaviors across phases of PBL implementation, indicating that rather than a linear transition from instructor to facilitator, teachers continuously reposition themselves in response to instructional demands, student engagement, and epistemic uncertainty, which reframes role transformation as relational and non-linear; the analysis further demonstrates that theoretically guided qualitative approaches support educators' reflective understanding of tacit pedagogical decision-making, with coding practices aligned to theory providing systematic rigor and deeper professional reflection, and the layered framework illustrating how methodological precision and theoretical clarity can be mutually reinforcing.

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9. Author Declaration

This research project did not require approval from a research ethics committee. The author declares that there are no conflicts of interest in relation to this study.