

Navigating Dual Fields: The Reflective Practice of Professional Doctoral Students

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Abstract

Professional doctoral education aims to cultivate researching professionals rather than professional researchers. To achieve this, it has evolved from the first generation (lacking professional orientation) and the second generation (insufficient in reflection) to the third generation, which emphasizes reflection in professional practice. Drawing on qualitative data from Chinese professional doctoral students in education, medicine, and engineering, along with insights from their stakeholders, this study outlines a five-stage cyclical process of reflective practice: breakthrough, elaboration, dialogue, return, and articulation. Unlike ordinary practitioners and PhD students, this process is uniquely situated within and navigates across both the professional practice and university fields, addressing complex practical problems that require advanced knowledge. The scope of reflection extends beyond actions, results, and practical knowledge (both espoused theory and theory-in-use) to include school knowledge and its relationship with practice. Through this spiral process, professional doctoral students resolve practical problems, accumulate implicit professional experience, and expand explicit theoretical knowledge, contributing to both fields.

Introduction

In the context of an evolving global research landscape, doctoral candidates and early-career researchers face increasing pressure to demonstrate societal impact and navigate complex professional boundaries. For Professional Doctoral students, these challenges are amplified by the unique mandate to bridge academic rigor and industry relevance. It is within this context that professional doctorates (PD) are designed to cultivate *researching professionals* rather than *professional researchers* (Taylor, 2007). These *researching professionals* are high-level applied talents engaged primarily in research-based professional activities, commonly situated within industry, governmental, or non-profit sector contexts, where they undertake research to address practical problems. In response to the escalating societal demand for such professionals, numerous nations have actively pursued the development of professional doctoral education, which has undergone three generational transformations.

The first generation of PD, characterized as "PhD plus coursework" (Maxwell & Shanahan, 1997), remains discipline-oriented, prioritizing academic knowledge and outputs over professional knowledge. The second generation, known as Practitioner Doctorates, sought to integrate professional knowledge with academic rigor through hybrid curricula, distance or part-time learning, and portfolio-based research presentations (Lee et al., 2000; Maxwell, 2003). However, this generation lacked sufficient emphasis on reflection: many students merely paralleled work and study tasks without engaging in reflective practices or critically examining the underlying logic of their professional judgments, thus failing to achieve continuous learning throughout their projects.

To address this deficiency, the third generation of PD, referred to as the Doctor of Professional Studies or Professional Practice, emphasizes the agency and commitment of professional doctoral students, aiming to cultivate advanced professional leadership and reflective scholarly practitioners by merging

professional practice with scholarly inquiry. By investigating research questions within and derived from professional practice, the applied nature of the third-generation PD contributes not only to the profession's knowledge base but also to the advancement of professional practice (Morley & Priest, 1998). However, how research-based practice and practice-oriented research are conducted, and how this reflective practice process aligns with that of other professionals, remain underexplored, particularly regarding the learning patterns in third-generation PD.

China is particularly in need of such research on the reflective practice of professional doctoral students. Following the lead of countries at the forefront of PD, such as the United States, the United Kingdom, and Australia, Chinese educational authorities promulgated the "Professional Graduate Education Program (2020–2025)," which calls for significantly increasing professional doctorate admissions and further innovating professional degree education to serve major national strategies and social needs. In 2022, the Chinese postgraduate discipline catalog was adjusted to include over a dozen new professional doctorates, supplementing the existing Medical Doctorate (MD, established in 1998), Doctorate of Education (EdD, established in 2009), and Doctorate of Engineering (EngD, established in 2011). Nevertheless, Chinese PD has been criticized as academically diminished variants of PhDs, raising concerns about the quality of applied talent training (Wang et al., 2016). The excessive homogeneity with PhDs and insufficient focus on practice (Yang et al., 2023) replicate the discipline-centric approach of first-generation and the practice-theory disconnection of second-generation PDs. It is therefore imperative for China to elucidate **how professional doctoral students can engage in reflective practice to facilitate the transition to third-generation PD**. Leveraging evidence from China, this study aims to shed light on the hitherto under-examined reflective mechanisms of third-generation PD.

To represent the reflective practice of PD students, this paper first reviews existing reflective practice theory and its inadequacies in explaining PD students, then details the data collection and analysis procedures. The results reveal five stages of PD students' reflective practice process, and the discussion juxtaposes this process with that of ordinary practitioners and PhD students to highlight its unique characteristics. By structuring the study in this manner, we intend to **offer an appropriate theoretical framework for PD students' learning and contribute to the refinement of reflective practice theory**.

Literature Review: The Reflective Practice of Professionals

The reflective practice proposed by Donald Schön (1983a) is a key concept in understanding how professionals think and learn in real-world professional settings. It emphasizes continuous learning and problem-solving through reflection, particularly in messy situations where professionals navigate uncertainty by reflection-in-action and knowing-in-action instead of applying rigid theories. Reflection-in-action refers to thinking on one's feet during professional activity. In practical indeterminate zones, practitioners reflect on their actions and adapt their behavior accordingly. Besides this immediate form, practitioners also think back on their work to analyze what went well—a process known as reflection-on-action that enables learning from experiences and improving future practice. Schön (1983b) argues that both forms of reflection involve examining theories-in-use, the tacit knowledge professionals employ

without full awareness. Reflection on knowing-in-action makes theories-in-use more visible and reveals discrepancies between espoused theories and actual practice, allowing professionals to examine whether these align with their values, goals, and desired outcomes.

Schön's theory advocates the development of "reflective practitioners" who continuously refine their practice through reflection rather than a purely technical approach based on fixed procedures. Reflective practitioners improve their practice through double-loop learning (Argyris & Schön, 1978), which questions the fundamental assumptions behind both espoused theories and theories-in-use—critically assessing not just what they do, but why. This is deeper than single-loop learning, which makes adjustments within existing theories-in-use without questioning underlying assumptions. The third generation of PD aims to foster reflective practitioners, establishing Schön's theory as the foundation for exploring students' learning patterns.

However, the intrinsic limitations of Schön's reflective practice theory render it inadequate in fully explaining the learning processes of professional doctoral students. Critics argue that it overlooks the significance of school knowledge and technical rationality in professional cultivation, given its emphasis on practical knowledge and the artistry of practice (Grimmett & Erickson, 1988). While tacit practical knowledge is a defining feature of professional behavior, objective school knowledge and technical skills remain crucial foundations, and professionals should make such implicit knowledge explicit (Shulman, 1988). Schön's theory pays insufficient attention to how practitioners facilitate dialogue and transformation between the two knowledge types. Consequently, empirical research based on Schön's theory has predominantly focused on professionals in practical contexts, neglecting professional doctoral students who must handle both knowledge types simultaneously as workplace practitioners and university students. Professional doctoral education requires them to master school knowledge while innovating in practice knowledge, making them an ideal group for breaking through this knowledge dualism and advancing reflective practice research. However, the current studies on PD mainly are individual case studies of programmes (Hawkes & Yerrabati, 2018) and our understanding of how these students manage both knowledge types simultaneously remains limited.

Based on the learning experience of professional doctoral students, this study examines their reflective practice process and conceptual underpinnings, addressing the dualistic limitations of reflective practice theory and offering a novel perspective on their learning.

The Research Approach

Our research approach is ethnographic (Hammersley & Atkinson, 1995), aiming to explore the experience of students who have completed, or are engaged in, a PD that combines professional practice as a practitioner and learning and research as a doctoral student. Data were drawn from 87 narrative stories from students willing to openly reflect on how they handled practical actions and results, practical knowledge and school knowledge during their PD study. We concentrate on the "voice" of PD students, hearing what they have done and how they have thought about their learning and professional lives.

Narrative stories were collected through face-to-face semi-structured interviews with students from different cohorts. To ensure a full picture of their experience, documentary evidence from their theses or research papers was also collected and managers, supervisors, peers and/or employers familiar with these students were interviewed for triangulation. Each interview lasted 45–60 minutes and with the respondents' permission, was tape-recorded, transcribed verbatim and then analysed.

In consideration of the paper's length, seven narrative stories of professional doctoral students in Medicine, Education, and Engineering were selected for inclusion. They represent distinct stages of professional career development from novice to mid- and late-career professionals (Table 1), allowing a comprehensive illustration of the reflective practice process.

Table 1
Information of participants

Student Code	Major	PD Time Range	Work Experience	Collected Documentaries	Interviewed Stakeholders
EdDS01	Educational Leadership and Management	2019-2023	17 years as a high school teacher; 10 years as a high school principal; 3 years as a director of the District Education Commission	The Doctoral dissertation; Two papers in doctoral candidate examination; Two texts of Educational Program and Curriculum Designation	Her supervisor & EdD program manager EdDT01
EdDS02	Advanced Educational Administration Management	2022-	8 years as an assistant to principals	A published journal paper; A working paper; the Educational Program text	His employer principal EdDE02
MDS01	Hepatosplenic Gastroenterology	2020-	4 years as a clinic doctor	The doctoral dissertation proposal; the Educational Program text	Her peers in MD program MDS03
MDS02	Respiratory and Critical Care Medicine	2021-	8 years as an associate chief physician	Two working papers; One collaborative research project mid-term report	His supervisor MDT02; & collaborative researcher MDP02
EngS01	Information and Communication Engineering	2022-	16 years as a senior engineer	The doctoral dissertation proposal; the Educational Program text	His supervisor EngT01; colleague EngC01
EngS02	Electronic information	2023-	8 years as the CEO of a company	A course paper; slides of a working paper; the Educational Program text	His supervisor EngT02; Course faculty EngF02
EngS03	Computer Science	2022-	22 years as a senior engineer	Two conference papers	His supervisor EngT03

Analysis was guided by the comparison with the reflective practice process of professional practitioners described by Schön. The first step was familiarization with the data through repeated, detailed readings of each transcript, which enabled deep familiarity while engaging in constant comparison among the

stories (Glaser & Strauss, 1967). Initial categories and codes were identified during the first reading, providing an early sense of emerging themes, followed by more granular, line-by-line analysis. Indicators of saturation (Morse, 1994), such as recurring themes, were sought until no new categories or themes emerged. Categories and their potential relationships were mapped onto a large sheet of paper, along with emerging themes, which were continually confirmed or refuted through constant comparison. Trustworthiness and authenticity of the data and research process (Lincoln & Guba, 1985; Guba & Lincoln, 1989) were partly achieved through meticulous and transparent record keeping, producing a rigorous audit trail used as a point of reference during triangulation by adding stakeholders' perspectives. Ultimately, this study identified five themes describing the reflective practice process of PD students.

Results: Five Stages of PD Students' Reflective Practice Process

Participants were eager to share their experiences as professional doctoral students, in some cases initiating contact with the researcher to formally register their views. **They characterized their process of advancing practical development and conducting academic research as a spiral progression through five stages: breakthrough, elaboration, dialogue, return, and articulation**, with reference to other professional practitioners and PhD students.

Breakthrough Stage: Moving Beyond the Cycle of Practitioners' Experiential Learning

Schön believes that learning begins with experience, particularly problem-solving experiences (1983), and experiential learning is a cycle consisting of four stages: concrete experience, observations and reflections, formation of abstract concepts and generalisations, testing implications of concepts in new situations (Kolb, 1984). PD students with rich practical experience often demonstrate clear and complete experiential learning trajectories (Smith, 2013).

For instance, EdDS01, an EdD graduate in Educational Leadership and Management with extensive experience as a high school teacher and principal, was serving as principal of a high school in an underdeveloped mountainous region upon admission (later promoted to Director of the District Education Commission during her studies). Facing the problem that *"students in underdeveloped mountainous areas underperformed academically compared to their urban counterparts,"* she framed it through observations and analysis as *"not due to a lack of classroom learning engagement of students and teachers, but rather a lack of organized extracurricular activities."* Based on this newly formed abstract concept, she organized school-based extracurricular activities engaging students in high-impact educational practice, effectively improving academic performance.

However, some practitioners face complex problems that cannot be solved solely through experiential learning within the practical field, motivating them to break through reflective practices in a single field and seek solutions in the university field—the beginning of PD students' reflective practice across dual

fields. For EdDS01, once students' academic performance reached a certain level, further improvement became limited regardless of the time and effort invested. *"Students from underdeveloped mountainous regions struggle to excel academically, and have fewer opportunities to attend elite researching universities compared to their urban counterparts.....Since this complex problem cannot be resolved at my high school, I wanted to look outward at elite researching universities. I wanted to see what the teachers, students, and campus culture at research universities are like."*(EdDS01)

The PD program provided her with the opportunity to observe elite researching universities and started her doctoral journey. While her breakthrough—directly related to universities—was somewhat unique, other PD students offer more detailed insights into why the university field helps address problems difficult to resolve within the practical field alone.

Doctor MDS01 noted that universities bear the responsibility of systematically imparting advanced knowledge. After working in a hospital's Hepatosplenic Gastroenterology department and encountering numerous practical problems, she felt that she had only a superficial understanding of related knowledge. *"While I knew many answers from my previous studies, I didn't fully understand the underlying principles. This desire for deeper knowledge is the primary reason I pursued further education."* Senior Engineer EngS03, designing AI applications for a high-tech company, recognized universities' advantage in producing innovative, cutting-edge knowledge: *"Widespread market application of AI requires original breakthroughs in algorithms, an area where university-based scientific research excels. Entering the university field through a professional doctorate program can not only enhance my research skills but also establish more connections with the university, facilitating future research collaborations"*. Indeed, with the transition in the mode of knowledge production, universities increasingly collaborate with other societal institutions in research (Gibbons et al., 1994). Whether through joint platforms or collaborative projects, such cooperation offers professionals opportunities to recognize universities' academic capital advantage. MDS02, a doctor specializing in lung cancer surgery, highlighted his hospital's collaboration with a university team in biomedical robotics: *"Their research accumulation in this field is crucial for our practical development, but the process has made me aware of the areas where I need to improve. At the very least, you need to understand what these new technologies and methods are doing and the basic principles behind them to better participate in our cooperation."*

In short, complex practical problems involving multiple intertwined factors under the knowledge economy require systematic, comprehensive, interdisciplinary and cutting-edge professional knowledge beyond experiential learning in practical settings. Universities, as hubs of original innovation and talent cultivation, possess far more academic capital particularly in basic research than other fields, and cultivate practitioners serving as catalysts for industry development, especially in high-tech sectors. PD programs provide practitioners with the legitimate opportunity to enter the university field, acquire systematic professional knowledge, and enhance their ability to solve complex practical problems. The need to resolve complex practical problems, combined with universities' academic capital advantages, forms PD students' initial driving force to break through the experiential learning cycle confined to the practical field and begin reflective practice across dual fields.

Not all students, however, automatically enter this stage at the beginning of their studies although they are objectively situated in both the practical and university fields as professional practitioners and doctoral students simultaneously. Motivations for pursuing PDs are diverse (Fulton et al., 2012) including improving academic qualifications while working, gaining advantages in professional evaluations, meeting personal expectations or expanding professional networks, which do not initiate the breakthrough stage. Only after identifying complex practical problems and recognizing that their resolution necessitates engagement with the university field can they develop the initial motivation to embark on reflective practice across dual fields. This embodies a proactive shift from the "comfort zone" to the "challenge zone."

Elaboration Stage: Defining the Research questions underlying the practical problems

After turning to the university for solutions, PD students explore the research questions underlying their practical problems. They must **define specific problem contexts and research subjects, identify appropriate theoretical frameworks, analyze knowledge boundaries and research gaps, ensure access to feasible internal and external resources, and explain the theoretical and practical significance**, making the research questions clear, original, analyzable and meaningful.

When defining contexts and subjects, grand narratives and overgeneralization, which are common problems of PD students' research (Liu et al., 2022), must be avoided. EngS01, working for a telecommunications company with access to large-scale vehicular data, found that *"the integrated human-vehicle-infrastructure big data could be applied to a wide range of scenarios, including traffic enforcement and safety, urban commute analysis, electric vehicle charging pile distribution, public transit optimization, customer profiling, vehicle app preferences analysis, automotive finance and insurance, and so on"*. His supervisor EngT01 commented, *"Having more than a dozen application scenarios is too broad. The specific context is unclear, and the exact research focus has not been well-defined."*

Identifying appropriate theoretical frameworks requires a solid theoretical foundation based on comprehensive understandings of previous research, what EngT02 called *theoretical argumentation*: *"Theoretical argumentation is a necessary step for PD students when they want to research a practical problem. What is the key theory behind the issue that needs to be studied? What does the current research, both domestically and internationally, say about it? You need to compare different perspectives or technical solutions, and choose the one that best aligns with your issue and can most effectively explain or resolve it."*

Based on the appropriate frameworks, PD students analyze knowledge boundaries and identify research gaps for theoretical and practical innovation. EngS02, researching the Micro-Electro-Mechanical System (MEMS) of scanning laser radars on vehicles, conducted an in-depth analysis of its theoretical principles and technological applications by literature review and market research, identifying limitations hindering large-scale application—small aperture size, low performance, and complex optical system integration. *"To fill the gap in optical aperture, resonance frequency, and packaging architecture, I decided to pursue*

original breakthroughs through the design of a small-size unit array, electrostatic drive technology, and hermetic-level packaging and testing techniques." A professor in his field regarded this as *"a critical bottleneck issue that can advance relevant scientific and technological progress and is of great importance for enhancing Chinese competitive edge in autonomous radar technology"* (ENGF02). Similarly, MDS02, focusing on direct mass spectrometry analysis for treating infiltrative lung, found that both chromatographic separation and analytical methods still required validation and improvement based on clinical data. EdDS01, aiming to analyze mountainous students' poor academic performance using cultural capital theory, found through further literature review that the academic debate centers on localizing classic theories for contemporary contexts and the lack of compensatory research on institutionalized cultural capital, such as school education. Addressing these gaps would offer greater originality, so she revised her question to focus on cultural capital compensation for students in underdeveloped mountainous schools under the current Chinese context.

Addressing practical problems while making original contributions to knowledge requires feasibility: whether questions can be analyzed and the research design can be conducted, where external resources and internal capabilities play crucial roles. EdDS01 noted, *"As a PD student, you must ensure that your research is within the scope of your full control. For example, as a principal, my school is entirely within my capacity to manage, and I can freely conduct my research and improve practices here."* Consequently, she refined her research topic as *"Cultural Capital Compensation for Students in Mountainous Schools: An Action Research Based on a Specific School"*. Through the EdD program, she learned quantitative surveys, qualitative interviews, and action research, enhancing her research skills. Beyond such social science problems, where external resources primarily involve mobilizing people and organizing activities, engineering and medical practice-oriented research may require specialized equipment and platforms. EngS02 could conduct research *"because my workplace is the leading unit in the relevant technology field in China, with a well-established technical platform."* MDS02 collected a large volume of bodily fluids from lung cancer patients for research purposes because his supervisor (MDT02) could offer mass spectrometry equipment. Integrating these external resources from both fields, together with the research skills mentioned by EdDS01, forms the internal capability essential to ensuring feasibility.

Research significance lies at both practical and theoretical levels, encompassing practical improvement and knowledge innovation. PD programs' aims of cultivating high-level applied professionals place high demands on practical significance. As EngT03 noted, *"Unlike PhDs, PDs must conduct a trend analysis at three levels when posing research questions. First, at the national strategic level—whether the research aligns with national development needs, as this alignment ensures the greatest resource support and facilitates practical implementation. Second, at the industry level—where the focus is on competitive technologies that determine market share. Finally, at the user level—examining user needs and potential. PhDs may not necessarily emphasize trend analysis when selecting topics, but PDs must, as this underscores the practical relevance of the research question."* Moreover, broader practical significance often accompanies deeper theoretical analysis and generalization. For example, EdDS01's research advances the localization and modernization of cultural capital theory while addressing *"how schools should respond to cultural divides"*. MDS02's research aims at breakthroughs in direct mass spectrometry

technology and new pathways for treating invasive pulmonary adenocarcinoma. EngS02's research advances key "bottleneck" technologies in MEMS, contributing to national competitiveness in autonomous radar systems. These examples demonstrate the dual importance of theoretical and practical significance.

From these experiences in the elaboration stage, it is evident that both fields are actively involved: theoretical framework and research guidance from the university field, resources and platforms from the practical field.

Dialogue stage: interaction between practical experience and theoretical knowledge

With elaborated research questions, PD students engage in an ongoing dialogue between the two fields as "hermeneutic to-ing and fro-ing" (Malfroy, 2004). Practical experiences contribute to situated learning of theoretical knowledge, which, in turn guides them to reexamine and contemplate their practices. Enriched practical experiences assist them in analyzing theoretical knowledge, identifying shortcomings and directions for improvement. They then reconstruct the theoretical knowledge, which becomes a guide for designing practical solutions as they return to practice.

Learning back at the university, EdDS01 found school knowledge related to her previous practical experience easier to grasp. *"Bourdieu's theory of cultural capital and his depiction of the insurmountable divide immediately resonated with me and evoked strong empathy. Isn't that exactly what I encountered in practice? No matter how hard we try, it feels impossible to change. Bourdieu pinpointed the reason—it's the divide caused by cultural capital. So, I became eager to learn more about Bourdieu. Perhaps it's because of this empathy that I found it more motivating and easier to learn than other theories."* This reflects situated cognition: learning is not an abstract entity separated from its context. It is closely related to the learner's identity and role, grounded in their real-life experiences (Brown et al., 1989; Knowles, 1984). PD students, through situated learning, develop school knowledge that is both explicit, like Bourdieu's theory for EdDS01, and implicit, involving relating such theories to practical phenomena.

Newly acquired school knowledge acts as a fresh lens (Smith et al., 2015), guiding PD students to reexamine their practice and uncover previously overlooked or insufficiently explained phenomena. After systematically studying cultural capital theory, EdDS01 noticed the increasing academic and research-oriented nature of examinations: *"Research-based questions have frequently appeared in high school and college entrance exams.....Students from mountainous areas tend to score lower on such questions compared to those from urban areas..... because urban children are familiar with the language of research in their family lives. Students from mountainous areas, whose parents haven't attended university, are completely unfamiliar with this academic discourse system. When faced with new, research-oriented questions, they panic."* This practical phenomenon exposes the limitations of traditional cultural capital theory. *"In Bourdieu's research on France a century ago, listening to opera and learning Greek were markers of high cultural capital. But in today's China, all children have the opportunity to watch plays and read books."*

The traditional definition of cultural capital cannot explain why there is still a gap in academic performance especially in answering research-oriented questions between students from mountainous and urban areas."

Faced with real-world problems not fully explained and resolved by existing theory, PD students must expand school knowledge. Recognizing that dominant cultural capital differs across eras, EdDS01, drawing on her practical experience, identified a form of cultural capital playing a selective and divisive role in contemporary Chinese society—academic cultural capital. Building on this extension of its contemporary significance, she proposed compensating for it through reading academic literature, designing a two-round action research program with three types of academic literature reading classes.

Successfully navigating the dialogue process requires managing the competition for time, energy, and cognitive focus between the two fields. Overcoming challenges such as the work-study-plus (e.g., Family life) balance and entrenched cognitive patterns are essential for PD students' success.

"The workload I have to bear now, combined with the amount of learning tasks, is fighting for my limited time. And I have a child and I am a daughter. At our age, you still have many, many identities and responsibilities that require investing time." (MDS01)

"When returning to school to study, it is a process of completely breaking and starting over..... the knowledge and habits you have accumulated over so many years of working will occasionally and unconsciously emerge." (EngS01)

Return stage: Action Experiments and Attainment of Practical Results

PD students, armed with solutions designed under reconstructed theoretical knowledge, return to the practical field. Executing action experiments requires access permits from the practical organization. Unlike PhD students or other researchers, PD students, as practitioners themselves, need no gatekeeper to enter the workplace. However, they must still mobilize and convince managers, colleagues participating in implementation and affected stakeholders. They secure permission for executing their proposed plan and, in some cases, involve these individuals in action experiments to harness the collective power of the community of practice, thereby gaining organizational changes. EngS01 discovered that, with shared organizational values, explaining the theoretical logic behind the practical action plan—especially the expected outcomes—to other practitioners in the workplace is an effective method. His colleague EngC01 agreed with this idea:

"As long as you clearly explain the purpose of your plan, what problems it can solve if it succeeds, and what results it can achieve, and then show why these outcomes are attainable, proving that you're not just making things up but that there is scientific evidence backing it up, I'd like to support it.....because it's a good thing for our workplace." (EngC01)

In particular, PD students with abundant work experience often hold mid- to senior-level positions and have a certain degree of authority in the workplace, making it easier for them to gain permission from other practitioners and mobilize resources within the practical context.

"This is where they have an advantage over PhD students—they have greater capacity to mobilize resources, especially practical ones. For example, I know a PD student who is the CEO of a new materials technology company and research on optimizing molecular weight control technology for PCR materials.....he could integrate the resources needed to scale up the production line and commercialize the new material.....he eventually partnered with a leading domestic petrochemical company, scaling the production from his company to nationwide promotion." (EngF02)

Such authority allows PD students to circumvent, to some extent, the limitations of traditional applied research—constraints on funding and resources (McNiff, 2016)—thereby ensuring broader, real-world impact. However, this observation necessitates a critical awareness of structural inequity. PD students in lower hierarchical positions may face significantly greater barriers to resource mobilization, underscoring the need for institutional support systems.

Additionally, since the research subjects in education and medicine are human beings, and the ultimate beneficiaries of engineering are also people, action experiments in these three disciplines inevitably affect others' rights and interests. Therefore, PD students in all three fields must adhere to research ethics and professional standards, ensuring plans meet both scientific and ethical principles, and submitting proposals for ethics committee review before practical actions.

With support from fellow practitioners and practical resources under the ethical principles, PD students commence their action experiments, continuously collecting procedural data, analyzing issues discovered, and making ongoing adjustments. *"What we do is to intervene, introduce changes, and then remain fully vigilant, carefully observe the results of implementing the new plan, compare it with the previous situation, and see if our colleagues' workload, user feedback, and benefits have changed. And evaluate if these changes meet our expectations." (ENGs02)* Such continuous comparison constitutes formative evaluation closely integrated with the verification and construction of practical knowledge, and mutually permeated. *"If it meets our expectations, it means that the practical plan we have adopted is effective. If not, what are the reasons? These knowledge about which behaviors are effective, ineffective, and what causes their effects will be mastered, further guiding us to take the next step." (ENGs02)*

Although this continuous self-monitoring and behavior adjustment in real practice settings (Guthrie, 2009) differs greatly from research in laboratory or purely academic environments within universities, it does not exclude scientific methods. Instead, PD students find the data collection and analysis methods learned at university valuable. EdDS02, an assistant to a principal researching principal leadership, noted: *"I use mature psychological scales to measure leadership styles and their variance. And the qualitative research methods I learned in class are also incredibly helpful. If I discuss a principal's leadership style and its impact with teachers, they might worry about whether I'd report back to the principal (EdDE02), leading to some bias. But qualitative research techniques offer various strategies to encourage truthful responses*

from participants and help analyze the underlying meaning behind what they say." These methods enable PD students to move beyond the limitations of being insiders in their practice settings, allowing them to observe, understand, and transform practice more comprehensively.

Ultimately, they achieve practical outcomes in solving practical complex problems and accumulate individual experiences, as well as foster collective capabilities in their workplace.

"The AI drawing review system we developed has been well validated, with an accuracy rate of over 90%, which is 8.7 times higher than manual efficiency. Now, more than 100 companies have signed contracts with us and started using this system. So far, we have reviewed 1 million drawings and discovered over 1.008 million various problems, avoiding potential losses of 6.55 billion yuan for customers, and the benefits are very significant." (EngS03)

"Not only have I gained a lot myself, but I also feel that it has a good impact on other members who consciously or unconsciously participate in academic literature co-reading project. It has established a value system among the teachers in the school. When encountering something, teachers often say that principal, I will first look up the literature and then talk to you, which has developed such a thinking habit." (EdDS01)

Results may also fall short of expectations or even fail, but these are equally important, *"proving that this method is inappropriate and ruling out a wrong option."* (EngS01)

The challenges in the return stage stem from the dual environmental constraints of the workplace and the university. PD students need to dance with shackles of dual fields. The workplace, as the site of implementation and influenced by its personnel, resources, and ethical norms (McNiff, 2016, p.42), determines whether plans succeed. PD students must mobilize people, coordinate resources, and adhere to ethical guidelines as practitioners. However, unlike ordinary practitioners, they must also consider their ongoing, legitimate relationship with the university as doctoral students even when returning to practice. They should be aware of the university's existing regulatory requirements, and, if they disagree with them, must find innovative ways to coordinate dual fields (McNiff, 2016, p.44). For example, universities often emphasize that researchers maintain value-free, yet PD students return to practice with the explicit purpose of improving it. EdDS01 had a clear value preference—ensuring that her academic literature co-reading project was useful to enhance the academic cultural capital of mountainous students. In the first round of her action experiment, she leveraged her authority as a principal to amplify its positive effects, but she was also aware of her EdD program's requirement for objectivity in evaluation. Therefore, in the second round, she used scientific methods to mitigate bias in overestimating the results and candidly acknowledged any biases. This approach was later cited by her program's manager (EdDT01) as a model case for teaching action research with a value stance.

Articulation Stage: Creating and Articulating their Own Living Practical Theory

After obtaining results from action experiments, PD students explore and abstract the underlying patterns or theory behind their practical actions and results, using explicit academic discourse to make new knowledge. Since such knowledge is driven by real-world problems and verified by practice, such theories-in-use align with the definition of good applied theories (Baskerville & Pries-Heje, 1999). By articulating their living practical theories through research reports, patents, journal papers, doctoral dissertations or others, PD students demonstrate that they meet the standards of a researcher, gaining recognition within the universities. This stage of contributing back to theory is not only a clear requirement from the university field for PD students to advance knowledge production, but also addresses the needs of the practice field in the context of shifting knowledge production models, where practitioners seek to engage in knowledge creation and pass on their expertise (Gibbons et al., 1994). As practice increasingly demands the involvement of advanced knowledge and practitioners are no longer satisfied with merely being consumers of knowledge but actively participate in its production, our definition of practice needs to be updated accordingly. For PD students, their practice encompasses not only their work but also the practice-oriented research activities that contribute to knowledge production. This helps explain why reflective practice of PD students does not stop at transforming practice but must involve creating and articulating the living practical theories behind those actions. Through articulations, they ensure that their work is disseminated openly and publicly available aligning with the key norm of knowledge, communalism (Merton, 1973), for the benefit of both university and practice fields.

The tension between practical and academic discourse presents a major challenge in this stage, especially for PD students who are less familiar with the latter. To harmonize these disparate discourse systems, they must adopt strategies such as code-switching, segmentation, and integration. This dynamic is exemplified by EdDS01: *"In my daily work, being a principal involves one set of communication logic, working at the District Education Commission involves another, and doing research as a doctoral student brings yet another. For me, it's like the confluence of three rivers. It was really stressful and painful at first. My supervisor (EdDT01) suggested that I should adjust my priorities. Since I was least familiar with academic discourse but knew it was important, I prioritized it. After persevering, I found that once these different discourses converged, I gained new perspectives and could converse with teachers, officials, and researchers alike—there's an advantage to this integration."* This narrative underscores the significant psychological strain placed on PD students, who must reconcile conflicting communicative logics and navigate the cognitive dissonance of shifting between professional identities—a challenge that requires considerable resilience, a key competency for future researching professionals.

Additionally, explicit articulation as a form of knowledge sharing requires more robust intellectual property (IP) and privacy protection systems. EngS03, who holds dual roles in both practice and university, encountered the IP division issues. *"I'm both a company employee and a doctoral student. So, who owns my research findings—my company or the university? Since the research outcomes hold significant competitiveness in the market and considerable economic benefits, deciding who to prioritize in the authorship is a big deal."* EngT01 further emphasized that the IP articulated explicitly has broader implications beyond financial considerations, depending on the nature of the findings. *"One of my PD*

students works on jet engines—a project of national defense significance, top secret. We had to be extremely cautious about how much of the technical results could be shared with the university and who at the university could access them." Even when the research is not classified as secret, the knowledge distilled from action experiments in the practice field involves the experiences or information of multiple stakeholders. Open access requires obtaining renewed consent from all the stakeholders, as well as anonymization to ensure their privacy.

The articulation of the underlying principles of practice is not the end of reflection. After presenting their living practical theories, PD students go back to practice with such new knowledge, where they will encounter new practice problems, initiating the cycle of breakthrough, elaboration, dialogue, return, and articulation once again. This spiral ascent through these five stages leads to continuous progress in the practice.

Discussion: Characteristics of the Reflective Practice in Dual Fields of PD Students

Compared to the reflective practice of ordinary practitioners consisting of four stages including concrete experience, observations and reflections, formation of abstract concepts and generalizations, and testing the implications of concepts in new situations (Kolb, 1984) and the reflective research of PhD students involving five stages including problem identification, research design, data collection, argument organization, and writing (Wayne et al., 2016), the reflective practice of PD students differs in terms of the context, aim, object, and final output.

Table 2

The comparison of reflection among ordinary practitioners, PD and PhD students

context	ordinary practitioners	PD students	PhD students
	practice field	practice and university field	university field
aim	solve practical problems	solve complex practical problems	solve academic problems
object	actions and results; practical knowledge (espoused theory & theory-in-use)	actions and results; practical knowledge (espoused theory & theory-in-use); school knowledge	school knowledge
output	changes in actions and their results; accumulation of implicit individual experience	changes in actions and their results; accumulation of implicit individual experience; production of explicit knowledge	production of explicit knowledge

As shown in Table 2, ordinary practitioners engage in reflective practice within the practice field and PhD students research in the university field. PD students, who are professional practitioners and university

students simultaneously, span both practice and university fields for their research-based practice and practice-oriented research. It is worth noting that field is used here to emphasize the social structure, rather than simply referring to a physical place. Each field has its unique rules, values, and power structures, and members within these fields interact and compete to gain resources and status (Bourdieu, 1990). In the university field, core activities involve the research of advanced knowledge, with scholars competing for academic resources and prestige following academic ethics. Similarly, in the practice field, such as hospitals or engineering firms, practitioners engage in patient care or engineering projects, with their own underlying professional logic, for professional development. While ordinary practitioners may sometimes interact with universities, and PhD students may occasionally enter practical workplaces, they do not have legitimate identities within these fields and are not bound by their rules or value systems, nor can they fully utilize them. PD students, formally positioned within both fields, interact with members in the community of disciplinary learning and practice (Lave & Wenger, 1991), adhere to the rules of each, and use their dual-field legitimate positions to mobilize resources and shape both fields through their actions.

Regarding the aims of reflection, ordinary practitioners reflect to solve practical problems encountered in their work, while PhD students aim to advance academic research by addressing gaps in existing studies (Gill & Hoppe, 2009). PD students, however, engage in reflective practice in response to complex practical problems which often involve systemic even interdisciplinary theoretical knowledge (Lester, 2004). While their primary objective remains solving practical issues, their reflections also hold significance for academia. Indeed, prior research has highlighted the limitations of PhD students' reflective aims under the transformation of knowledge production. Anderson and Gold (2019) argue that current doctoral education prioritizes academic over practical concerns, with the application of knowledge to real-world problems taking a backseat to the production of new epistemological and methodological insights. As traditional research institutions increasingly collaborate with external organizations in the new mode of knowledge production, the global research system and the way researchers work must inevitably change (Gibbons et al., 1994). PD students, with their practice-oriented, collaborative, and interdisciplinary reflective aims (Zhang et al., 2024), represent a critical breakthrough in reshaping the academic role.

In terms of the objects of reflection, ordinary practitioners typically reflect on practical issues arising from actions that fail to produce the desired results or that do not align with the explicit, espoused theory. To uncover these issues, they must analyze the implicit, culturally-influenced theory-in-use that directly drives their actions. Thus, ordinary practitioners reflect on actions and results, practical knowledge including espoused theory and theory-in-use, and the relationships between these elements. PhD students, in contrast, reflect primarily on school knowledge, focusing on concepts and theories recognized and legitimized by academia. Even if these theories may have originated from practical experiences in certain periods and they may collect evidence from practice to engage in new dialogues with existing theories, PhD students' primary concern is producing scientific knowledge within the boundaries of autonomous disciplines (Wang et al., 2024) rather than solving practical problems. The objects PD students reflect on are combinations of practitioners and PhD students including practical

actions and results, espoused and implicit theories within the practice field, school knowledge and the interrelationships among them. The added school knowledge and its interaction with practical knowledge and experience in dual fields break the inherent dualistic limitations of traditional reflective practice theory (Grimmett & Erickson, 1988) and enhance the explanatory power of this theory for the PD students.

As for the outcomes of reflection, ordinary practitioners improve their performance in practice through experiential learning, solving specific practical problems and enriching their implicit practical knowledge. PhD students, however, extend explicit theoretical knowledge through academic reflection, without necessarily influencing the practical world. PD students, by engaging in reflective practice across dual fields, simultaneously address practical problems through action experiments, accumulate individual implicit practical experience and expand explicit theoretical knowledge by abstracting and articulating the underlying practical theories of their experiences. Their reflective outputs resemble a strongly explanatory empirical map (Lester, 2004) of specific problems in a given practical situation which are the explicit product of traversing between real-world and the abstract world of theory.

Overall, different from the academic doctoral education for training professional researchers, the third generation of PD aims to foster reflective scholarly practitioners. The reflective practice of professional doctoral students occurs across both the practice and university fields, targeting complex practical problems involving advanced knowledge. In addition to reflecting on actions, results, and practical knowledge including both espoused theory and theory-in-use as ordinary practitioners, PD students must also reflect on school knowledge and its relationship with practice. Such processes enable them to address practical problems through action experiments, accumulate individual implicit practical experience, and expand explicit theoretical knowledge, thus fulfilling the core objective of the third generation of PD. These findings illuminate the distinctive learning journey of PD students, thereby addressing a gap identified in the existing literature on conventional PD education (Hawkes & Yerrabati, 2018) and suggesting PD programs to support students' reflective practice through the five stages—breakthrough, elaboration, dialogue, return, and articulation—forming a spiral ascent that continuously improves professional practice. Furthermore, this research extends reflective practice theory by demonstrating how professionals handle practical and school knowledge concurrently, thus moving beyond the limitations identified by Grimmett & Erickson (1988) and Shulman (1988).

The identified process of reflective practice in dual fields underscores that the successful development of researching professionals depends not only on individual agency but also on robust institutional support systems. To facilitate students' navigation across dual fields, this study suggests two key pathways:

First, universities should establish clear mechanisms to mitigate the friction inherent in crossing academic and professional boundaries. Specifically, institutional support is needed to streamline administrative and procedural hurdles—such as clarifying IP ownership and adapting ethical review

processes to fit practical settings. Such provisions enable students to focus on the substance of their research rather than being stalled by conflicting regulatory frameworks.

Second, given the proactive agency required to initiate the dual-field reflective practice process and the significant psychological strain experienced during the navigation, the role of supervision must extend beyond academic guidance. Mentors should be trained to support students' identity transitions and build the resilience necessary for researching professionals. Furthermore, to address the structural inequity noted in the return stage—where students in lower hierarchical positions face greater resource barriers—programs should provide targeted seed funding or access to resources for conducting applied research, ensuring that all PD students have the capacity to translate reflection into practice.

Conclusion

The Process of PD Students' Reflective Practice in Dual Fields

Based on qualitative data from Chinese professional doctoral students across education, medicine and engineering and their stakeholders, this study outlines the process of PD students' reflective practice. As illustrated in Fig. 1, reflective practice of PD students begins with breaking out of the experiential learning of ordinary professional practitioners. Dissatisfied with reflective practice confined solely to the practice field, they seek the academic capital advantages of the university field to address complex practical problems together. This leads them into the elaboration stage, where they identify research questions behind practical problematic experiences. With clear, original, analyzable and meaningful research questions, they begin a hermeneutic to-ing and fro-ing dialogue (Malfroy, 2004) between the theoretical knowledge in the university and practical experience in the practice including learning school knowledge based on their situated practical experiences, reexamining and analyzing their practices using their newly learned school knowledge and identifying limitations of existing school knowledge when applied in practice. They then try to reconstruct the theories in universities and return to practice with corresponding action plans, conducting planned experiments and obtaining practical results. Finally, they abstract and articulate the underlying theories of their actions and results and present them explicitly, solving the initial complex practical problems from both practical and theoretical perspectives. This entire process forms new practical experiences for the PD students, guiding them to continue reflecting on next complex practical problems. The five stages of breakthrough, elaboration, dialogue, return, and articulation form a spiral ascent that continuously improves professional practice, including the progressive resolution of practical problems, the production and accumulation of both implicit and explicit practical knowledge, by which practitioners' collective capabilities develop. This spiral process distinguishes PD students from professional researchers, as their knowledge production is deeply rooted in and aims to transform practical settings, rather than solely advancing disciplinary theory. However, PD students face many challenges at each stage, and failing to address these challenges effectively can hinder their progression to the next stage of reflective practice, preventing them from becoming researching professionals highlighted by the third-generation professional doctorate education (Morley & Priest, 1998).

Declarations

Ethics Declaration

Ethical approval for this study was granted by the Tsinghua University Science and Technology Ethics Committee (Humanities, Social Sciences, and Engineering Committee) under approval number THU-04-2026-0224.

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Conflict of Interest

The authors declare no conflict of interest.

Data Availability Statement

The datasets generated and analysed during the current study are not publicly available due to the confidential nature of the qualitative interviews and the informed consent agreements with participants, which strictly limit data sharing to the research team. However, anonymized data excerpts, interview guides, and analytical memos are available from the corresponding author on reasonable request.

Author Contributions

Lanwen Zhang: Conceptualization, Methodology, Investigation, Writing – original draft. Fei Guo: Supervision, Writing – review & editing. Liang Li: Writing – review & editing. All authors reviewed the manuscript.

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Figures

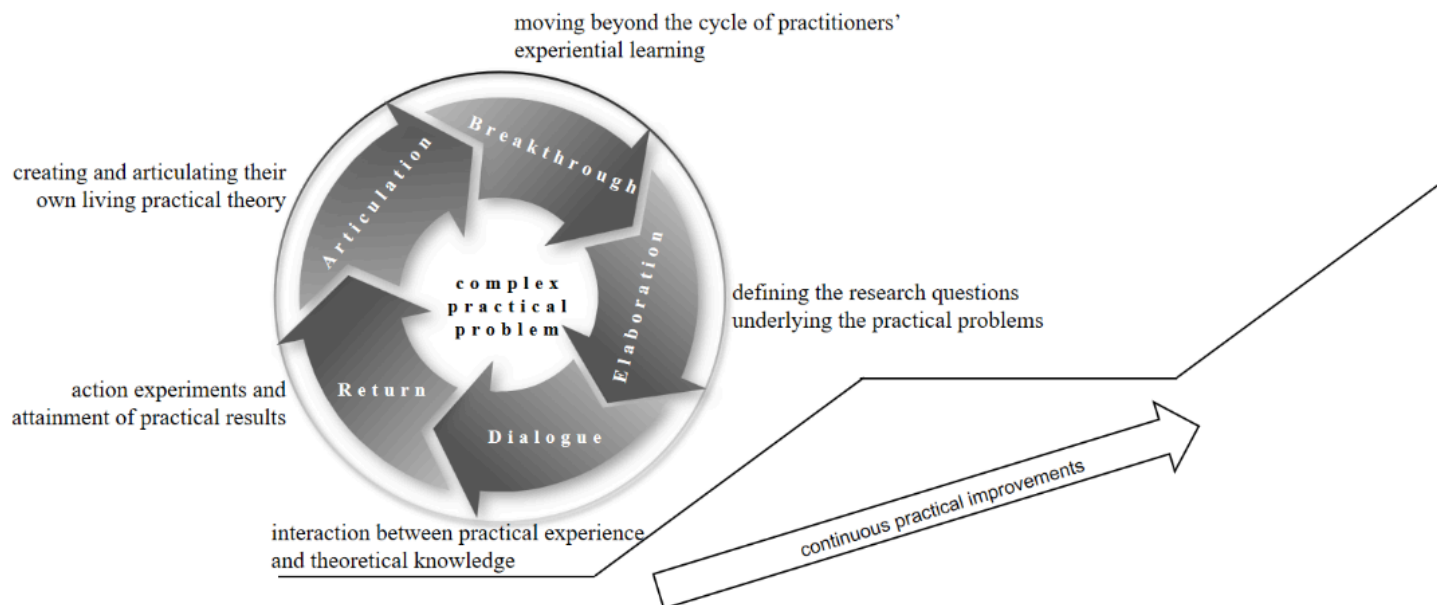


Figure 1

The reflective practice process of professional doctoral students in dual fields