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Pedagogical Content Knowledge for Early Art Education: Rural-Urban Differences among Preschool Teachers in Jiangxi

Jinzhong Cai

Graduate University of Mongolia, Ulaanbaatar 999097, Mongolia

Abstract

How teachers transform artistic content into learning opportunities is central to early arts education. This article proposes a five-dimensional pedagogical content knowledge framework addressing children's artistic understanding, representation and task transformation, adaptive support, formative assessment, and cultural contextualisation. A mixed methods design combines 24 scenario tasks with observations and stimulated recall. The parent project's reported sample provides a recruitment context, but dedicated PCK evidence remains unavailable. Independent synthetic counts demonstrate comparisons without estimating Jiangxi teachers' knowledge. The analysis distinguishes content knowledge, self-efficacy, scenario reasoning and classroom action, and addresses measurement comparability, clustering and task familiarity. Its prospective contribution is a theory of instructional transformation that accommodates multiple legitimate artistic interpretations while requiring defensible pedagogical decisions. Implications concern case analysis, rehearsal and classroom reflection. The framework, rural–urban differences and teacher-learning pathways require empirical testing.

Keywords

Pedagogical Content Knowledge; Early Childhood Visual Arts; Preschool Teachers; Rural–Urban Differences; Scenario Assessment; Teacher Education.

1. Introduction

1.1. From Resources to Professional Reasoning

Differences in materials and professional development opportunities cannot fully explain how preschool teachers respond to children's drawings. A teacher confronting an unusually large hand might correct its proportions or ask what the child intends to emphasise. When a tool proves difficult, the teacher might draw for the child or offer another way to preserve the intended expression. These decisions connect artistic understanding, children's purposes and instructional action.

Pedagogical content knowledge provides an entry point for examining that connection. Shulman (1986, 1987) identified the transformation of subject matter for learners as a distinctive concern of teaching. Here, the issue is not simply whether preschool teachers draw proficiently or endorse creativity. It is whether they can identify an artistic learning problem, interpret available evidence and justify a response for a particular child.

Art complicates the evaluation of such knowledge because several interpretations and outcomes may be legitimate. A framework derived from a subject with different forms of correctness cannot be transferred without argument. The present study focuses on visual arts, especially drawing and associated material exploration. It does not claim to measure knowledge for music, dance or drama, despite the broader wording of the requested title.

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1.2. Questions and Prospective Contribution

Three questions guide the design. What distinguishable dimensions organise preschool visual arts PCK? Under defensible measurement comparability, how do rural and urban teachers differ across dimensions and task contexts? How does scenario reasoning relate to classroom decisions, and what aspects of teacher education might support transformation?

The proposed contribution extends beyond naming dimensions. It concerns how teachers justify instruction when artistic meanings remain open, how assessments distinguish principles from situated reasoning, and how comparison can identify learning opportunities rather than label weaker teachers. These remain claims to be tested rather than established contributions from new data.

2. Theoretical Framework

2.1. Construct Boundaries

Shulman's (1986) account concerns how particular content is organised, represented and adapted for learners. Ball et al. (2008) further developed practice-based distinctions in mathematical knowledge for teaching. This article borrows the focus on professional work while treating subject-specific distinctions as hypotheses rather than verified categories for art.[1]

Content knowledge includes properties of materials, visual forms and artistic interpretation. General pedagogical knowledge concerns organisation and interaction. Self-efficacy describes judgments of capability. PCK requires a link between an artistic issue, a learner's understanding and an instructional decision. Endorsing creativity is not equivalent to explaining why a particular child might need an alternative representation.

Nor is every appropriate action evidence of PCK. Providing paper may reflect routine management or a response to a child's spatial problem. The same visible act can arise from different reasoning. Observations therefore need contextual and explanatory evidence rather than a checklist of apparently desirable behaviours alone.

2.2. Early Visual Arts and Professional Competence

Leung et al. (2025) examined early visual arts content knowledge, teaching-related knowledge and challenges among Hong Kong kindergarten teachers. Their work supports distinguishing foundations from reported practice, but its measures and setting cannot establish Jiangxi rural–urban differences. The present framework adds scenarios requiring content-related justification and comparison with actual decisions.

Blömeke et al. (2015) conceptualise competence through connections between dispositions, situation-specific skills and performance. This motivates separating knowing, interpreting and acting. It does not warrant assuming a direct path from test scores to classroom quality. A teacher may provide a sophisticated written explanation yet overlook a relevant episode under time pressure; another may act responsively while offering a brief written answer.[2]

2.3. Rural–urban Opportunities to Learn

Location may be associated with preparation, arts coursework, mentoring and professional dialogue, but does not itself explain knowledge. A test dominated by digital museum examples could privilege familiarity with urban resources. Conversely, recognising local materials does not establish knowledge of how to teach through them. Tasks must supply necessary context and permit different justified responses.

Professional learning should be documented through content and participation rather than attendance counts alone. Repeated product-copying workshops and sustained analysis of

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children's representations may provide different opportunities. These differences would require evidence about the work teachers actually undertake.

3. A Five-dimensional PCK Framework

3.1. Dimensions and Relationships

Children's artistic understanding concerns identifying what a child is exploring and distinguishing intentional choices from technical difficulties. Representation and task transformation concern making colour, space, materials or meaning accessible through activities rather than presenting only an adult product. Adaptive support concerns revising questions, demonstrations or materials as children respond.

Formative assessment connects intentions, process and work samples with feedback and subsequent opportunities. Cultural contextualisation transforms local and everyday visual experience into open artistic problems. These dimensions are related: assessment may prompt an adaptive response, while cultural material may require a new representation. A task blueprint therefore identifies a primary scoring focus while recording secondary demands.

The framework is not a validated scale. If empirical evidence supports fewer dimensions, strong task effects or a general factor, the model should change. Dimension labels are useful only if they explain decisions and support meaningful distinctions in teacher learning.

3.2. Cultural Content and Conditional Judgment

A market scene can introduce relationships and spatial arrangement; plant observation can support exploration of pattern and texture. The relevant knowledge lies in transforming these features into an accessible artistic question. Requiring the reproduction of a local motif does not automatically demonstrate cultural PCK. Tasks should not reward rare local facts that are unnecessary to the teaching problem.

The framework also avoids equating less demonstration with better teaching. A short demonstration may enable safe material use or answer a child's expressed difficulty. It may also replace the child's idea. Teachers should explain the purpose, timing and conditions for withdrawing support. Content can remain explicit while outcomes remain open.

4. Methods and Evidence Requirements

4.1. Reported Parent Sample and Dedicated Assessment

The researcher's updated parent manuscript reports 60 kindergartens, evenly divided between rural and urban locations, 480 valid teacher questionnaires with approximately 240 per location, and 60 institutional forms. Twelve intensive case kindergartens contributed 72 observations. Approximately 40 adult interviews and experience materials from 24–36 children are also reported. These figures describe the confirmed scale of the parent project, not completed PCK measurement.

Original items, identifiers, observations and transcripts were unavailable for the present draft. Implementation must first map existing items to constructs and determine whether they support knowledge claims or only describe resources and beliefs. If scenarios were not administered, supplementary assessment is necessary. The final PCK sample must be reported from actual participation and may be smaller than 480.

Linking scores and observations also requires confirmation that they concern the same teachers and an appropriate time interval. Seventy-two observations do not represent seventy-two independent teachers. Interview counts do not establish that every transcript contains evidence of PCK, and children's experience records cannot be treated as teacher knowledge scores.[3]

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4.2. Proposed Assessment

The instrument separates content foundations, 24 PCK scenarios, and professional-learning and self-efficacy questions. Content tasks assess prerequisites without entering the PCK score. Scenarios use drawings, brief classroom descriptions or authorised video and ask teachers to identify an artistic issue, propose a response and justify the decision.

Five tasks address each of the first four dimensions and four address cultural contextualisation. Each is scored from zero to three, giving a raw range of zero to seventy-two. An equally weighted mean of dimension means differs from the raw total because task counts differ. The choice must be stated, and neither total should be used without structural and interpretive support.

A zero indicates an absent content link or a response that clearly replaces the child's expression; one recognises a general principle without content-specific reasoning; two links content, the child and a defensible decision; three adds evidence gathering and conditional adaptation. Different interpretations can earn the same score. The anchors guide reasoning judgments rather than mandate a single instructional method.

4.3. An Illustrative Scenario

A child draws an unusually large hand. An answer proposing to redraw it to correct proportions provides no defensible link to the child's intention. A statement about protecting imagination offers a general principle. A stronger answer asks what the hand expresses and proposes observing movement if relevant. An extended answer distinguishes a wish to show movement from an intention to emphasise strength and adjusts support accordingly.

The scenario does not assume that the hand is an error. Alternative explanations and responses are acceptable when evidence supports them. Review by early childhood, arts and measurement specialists and cognitive interviews with teachers should identify hidden expectations. Scorers must attend to the function of a justification rather than its similarity to preferred wording.[4]

4.4. Scoring and Validity

Piloting should examine time requirements, reading load, score distributions and omitted responses. Trained scorers would independently score a subset, document disagreements and revise anchors. Appropriate agreement estimates would depend on the data, with attention to scorer severity, task difficulty and teacher differences. No pilot size, reliability coefficient or successful validation is invented here.

Validity work must examine whether PCK can be distinguished from artistic skill and self-efficacy and whether scores relate to relevant classroom reasoning without collapsing into performance. If written expression dominates scores, response formats need revision or comparable oral options. A polished answer is not inherently a more knowledgeable answer.

Before rural–urban comparisons, researchers should examine interpretation, image familiarity and differential item functioning. Ordinal measurement models may be appropriate if sample conditions support them. When constraints are not defensible, task-level comparisons and sensitivity analyses are preferable to unsupported latent mean claims. The parent questionnaire count alone does not establish an adequate validation sample for a new clustered assessment.[5]

4.5. Analysis and Integration

Analysis would report supplementary recruitment, missingness and group composition before measurement evaluation. Teachers are nested in kindergartens, requiring an appropriate multilevel or justified cluster-adjusted approach. Principal contrasts, outcomes and multiplicity

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procedures should be prespecified. Effect sizes and uncertainty should accompany comparisons; location coefficients remain associations.

Background-adjusted and opportunity-related models answer different questions. Education, experience, arts preparation, ownership and professional-learning opportunities should enter according to theory. Training may lie on an explanatory pathway, so coefficient reduction after adjustment does not prove mediation or removal of inequality. Model complexity should reflect the actual number of institutions and respondents.

Observations and stimulated recall would ask what teachers noticed, why they interpreted it that way, which alternatives they considered and what changed their decision. Thematic analysis would retain discrepancies (Braun & Clarke, 2006). Integration would connect score patterns to case selection and merge sources in a joint display (Fetters et al., 2013). Disagreement between sources is an explanatory finding to investigate rather than a reason to discard inconvenient data.

4.6. Ethics and Shared Data

The scope of existing ethics permission must be checked for supplementary tasks, teacher video and stimulated recall. No approval identifier is assumed. Participation should not be directly tied to personnel appraisal, and leaders should not receive identifiable rankings. Child images and drawings require appropriate permissions and continuing assent.

Where this article and a dissertation or related papers share participants, the common source and distinct research question must be disclosed. Reusable tasks, scoring guidance and analysis code can be shared where authorised. Identifiable child media and sensitive interviews are not automatically made public in the name of openness.

5. Synthetic Demonstration

5.1. Separate Hypothetical Counts

The following illustration independently constructs one hundred urban and one hundred rural teachers. These records are not drawn from the confirmed 480 questionnaires and are not a supplementary response count. For one representative task per dimension, the example counts responses reaching score two or three. This threshold demonstrates a content-linked response and is not a professional pass mark.[6]

Table 1. Synthetic counts on representative scenario tasks

Primary dimension	Urban n/100 (%)	Rural n/100 (%)	Urban minus rural pp
Children's artistic understanding	68 (68)	58 (58)	10
Representation and transformation	72 (72)	54 (54)	18
Adaptive support	64 (64)	56 (56)	8
Formative assessment	60 (60)	48 (48)	12
Cultural contextualisation	58 (58)	66 (66)	−8

The directions differ deliberately. The example is not intended to encode a real urban advantage or a rural cultural strength. A single task cannot establish a dimension score, factor structure, overall PCK level or statistical significance. No individual records or kindergarten distribution support inferential analysis of this table.

5.2. Hypothetical Knowledge–action Discrepancies

One scenario presents a teacher who explains the value of listening but ends discussion because of a timetable. Inquiry must distinguish principle knowledge, noticing and implementation conditions. Another presents a teacher with a short written answer who changes paper in

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response to a child while preserving the child's idea. Further explanation is needed to determine whether this reflects content reasoning or habitual management.

A third scenario involves familiarity with regional patterns but compulsory copying. Cultural facts are present, yet instructional transformation remains limited. These are authored scenarios without fabricated quotations. They identify questions for observation and recall, not emergent findings from completed transcripts.

5.3. A Joint Display for Teacher Learning

High scenario reasoning with limited classroom response would prompt examination of attention and implementation conditions. Strong oral reasoning with weaker written performance would raise response-format questions. Cultural familiarity with closed tasks would motivate inquiry into transformation. Responsive adaptation under resource constraints would direct attention to professional judgment rather than material counts alone.

Each combination suggests a different professional-learning problem. A joint display should preserve competing explanations and the evidence required to assess them. It should not select whichever source best reproduces an expected urban–rural hierarchy.[7]

6. Discussion

6.1. Transformation under Interpretive Openness

The central theoretical proposition is that artistic interpretations can remain plural while professional reasoning remains assessable. Teachers need not produce identical child outcomes, but should explain why a response addresses an artistic issue for a particular learner. Evaluating the warrant for action differs from prescribing a single image or method.

Five dimensions are useful only if they clarify decisions, receive measurement support and distinguish learning needs. Highly overlapping dimensions or a total dominated by writing skill would require revision. The framework should not simply rename the parent project's resource, curriculum and implementation domains as knowledge. It asks how those conditions relate to the formation and use of professional understanding.

6.2. Differences as Opportunities to Learn

If empirical rural–urban contrasts emerge, interpretation should investigate the arts and case-reasoning opportunities teachers have encountered. Coursework, mentoring and sustained reflection may offer different pathways. Credentials and attendance can describe background but do not explain the substance of learning. Within-group contrasts and counterexamples are essential to testing location-based accounts.

A putative rural cultural strength cannot be inferred from material choice alone. Relevant evidence requires transforming a familiar resource into an artistic question children can explore and revising it in response to them. Similarly, access to urban cultural institutions does not establish the knowledge needed to teach through those encounters.

6.3. Implications for Teacher Education

A proposed professional-learning sequence connects case interpretation, rehearsal and classroom reflection. Teachers first generate alternative explanations of a drawing and accompanying child account, then rehearse a brief response and justify it, and finally compare anticipated with actual participation. Each cycle addresses a specific artistic problem rather than general endorsement of creativity.

Teachers with limited foundations may need material and visual-form experiences connected to instructional explanation. Teachers with strong principles but limited adaptation may benefit from noticing and decision exercises. Teachers with extensive local knowledge but

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closed tasks may practise turning product requirements into investigable questions. These are framework-informed proposals, not demonstrated training effects.

Cross-setting collaboration should exchange cases in both directions and provide time and accessible formats. Platform logins or workshop attendance cannot substitute for evidence of knowledge development. Evaluating professional learning would require pre- and post-assessment, classroom follow-up and a justified comparison design, alongside attention to participation and unequal access.

6.4. Limitations and Journal Positioning

No original PCK evidence supports factor structure, reliability, rural–urban differences or teacher-education outcomes in this draft. The parent project's confirmed scale does not resolve the unknown dedicated assessment sample or record linkage. Interpretive scoring, task familiarity, comparability and clustering remain substantive research challenges.[8]

Journal of Teacher Education prioritises contributions to teacher learning and education, and its guidance excludes instrument-only manuscripts without relevant new insight (Sage, n.d.). The present article therefore connects measurement to professional-learning problems. However, it remains a condensed working manuscript. The journal currently specifies 8,000–10,000 words including references and tables, and an abstract of no more than 150 words. An independent empirical English submission would require real evidence, developed argumentation, anonymisation, and the prescribed format.

7. Conclusion

Preschool visual arts PCK can be investigated as professional reasoning that links artistic problems, children's interpretations, representations, adaptation, assessment and cultural context. This article proposes a five-dimensional framework and complementary evidence design while separating a confirmed parent sample from unavailable dedicated knowledge data. Independent synthetic counts demonstrate reporting rather than empirical differences. Future research must test whether the framework distinguishes content foundations, confidence and situated reasoning and whether teacher education supports their transformation into action. Only then can conclusions about Jiangxi teachers' rural–urban differences be warranted.

Declarations

Generative AI assisted drafting. Authors must verify sources, original data and analyses and supply accurate contribution, funding, competing-interest and ethics statements. Parent-sample information reflects the researcher-confirmed manuscript; synthetic counts are not findings from that sample.

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