

Industry–Education Integration in Early Childhood Educator Preparation and Professional Development: A Systematic Integrative Review of Barriers and Collaborative Pathways

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Abstract: This systematic integrative review examines how collaboration between education providers and workplace institutions is constructed in the preparation and professional development of early childhood care and education educators. Guided by activity theory and the concepts of boundary crossing and boundary objects, the review synthesizes 28 English- and Chinese-language sources published between 2023 and 2026. Searches were conducted in ERIC, OpenAlex, and CNKI, supplemented by citation and manual searching. The thematic synthesis identified two interrelated patterns. First, collaboration was frequently constrained by tensions between institutional rules and mediating tools, including curriculum frameworks, practicum handbooks, assessment criteria, workplace routines, and performance requirements. Second, potentially productive collaboration involved boundary work through which stakeholders negotiated responsibilities, translated workplace knowledge into curriculum and assessment practices, and developed shared tools. Because it integrates English- and Chinese-language evidence, the review offers a distinctive bilingual perspective that connects internationally reported partnership mechanisms with the Chinese policy discourse of industry-education integration. The synthesis proposes an interpretive pathway in which institutional contradictions create a need for boundary negotiation, while the co-development of tools and roles may support educator learning when sustained by adequate time, authority, and organizational resources. The findings offer practical implications for vocational colleges, early childhood institutions, teacher educators, workplace mentors, and policymakers. Further longitudinal research is required to test and refine the proposed pathway across different institutional and national contexts.

Keywords: Activity Theory; Boundary Work; Early Childhood Care and Education; Industry-Education Integration; Professional Development; Systematic Integrative Review

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1. Introduction

High-quality early childhood care and education (ECCE) depends on the competence, stability and professional judgement of the educator workforce. Across policy systems, educator development is no longer understood as a matter of classroom-based training alone. It increasingly requires sustained contact with the workplaces where care, curriculum, family communication and child development are negotiated in real time. For this reason, industry-education integration has become an important strategy for linking vocational colleges, normal universities, kindergartens, childcare institutions and other ECCE service

providers.

In China, this agenda has gained particular importance as vocational education policy has encouraged deeper cooperation between educational institutions and industry partners. Initiatives such as school-enterprise cooperation, industry-education alliances, practicum bases and the 1+X certificate system aim to align curricula with occupational standards and practical competencies^[1,2]. In ECCE, these reforms respond to a concrete problem: students must learn not only theories of development and pedagogy, but also how to act responsibly in complex care settings shaped by safety requirements, routines, family expectations and institutional constraints.

Existing research shows that such integration is valuable but difficult to sustain. Studies of ECCE workforce preparation point to gaps between formal curricula and workplace needs, shortages of qualified mentors, uneven resources, and weak mechanisms for continuous professional learning^[3-6]. Research from different national contexts also suggests that qualification reform and educator professionalization depend on more than policy declarations; they require workable relationships among institutions that often operate under different logics^[7,8].

A persistent limitation in the literature is that barriers are often listed as static problems. Less attention is given to how stakeholders actually work through those barriers. The practical life of integration is found in meetings, mentoring conversations, revised practicum tasks, negotiated assessment standards and informal translation between school language and workplace language. These small processes determine whether a partnership remains symbolic or becomes a real pathway for educator learning.

This review therefore asks: how do stakeholders negotiate tools, rules, roles and shared meanings to construct viable pathways for industry-education integration in the preparation and professional development of early childhood care and education educators? The question is especially relevant for Chinese vocational education, but it also speaks to broader international debates on workplace learning and collaborative teacher preparation. The study seeks to move from a catalogue of obstacles toward a process account of how integration is enacted.

2. Literature Review and Analytical Lens

The literature on ECCE industry-education integration can be organized around three themes. The first concerns the purposes and barriers of integration. Studies emphasize the need to connect educator preparation with digital competence, developmentally appropriate practice, pedagogical content knowledge, educator well-being, professional identity and child well-being^[3,9-13]. At the same time, they report recurring constraints, including limited funding, inadequate infrastructure, fragmented policy implementation and insufficient workplace support^[5,6,14,15]. These findings establish the importance of integration, but they often leave the processes of negotiation underdeveloped. Recent systematic reviews of school-university partnerships for pre-service teacher preparation similarly document both the benefits and the fragility of collaborative arrangements, yet they remain anchored in classroom-based or general teacher-education settings and do not examine how industry-education integration is negotiated in ECCE vocational preparation^[16].

The second theme concerns stakeholder roles. Educators and student teachers are usually positioned as learners who need stronger practical competence, while colleges and universities are expected to provide curriculum, assessment and theoretical guidance. Industry partners, including kindergarten teachers, childcare center directors and workplace mentors, are treated as carriers of practical knowledge. Yet studies frequently examine these groups separately in relation to administration, interaction quality, pre-service perceptions, mentor identity, STEAM practice, gendered institutional routines and sustainability-oriented pedagogy^[17-23]. The relational space between them remains less visible, even though this is where roles are interpreted and conflicts are resolved.

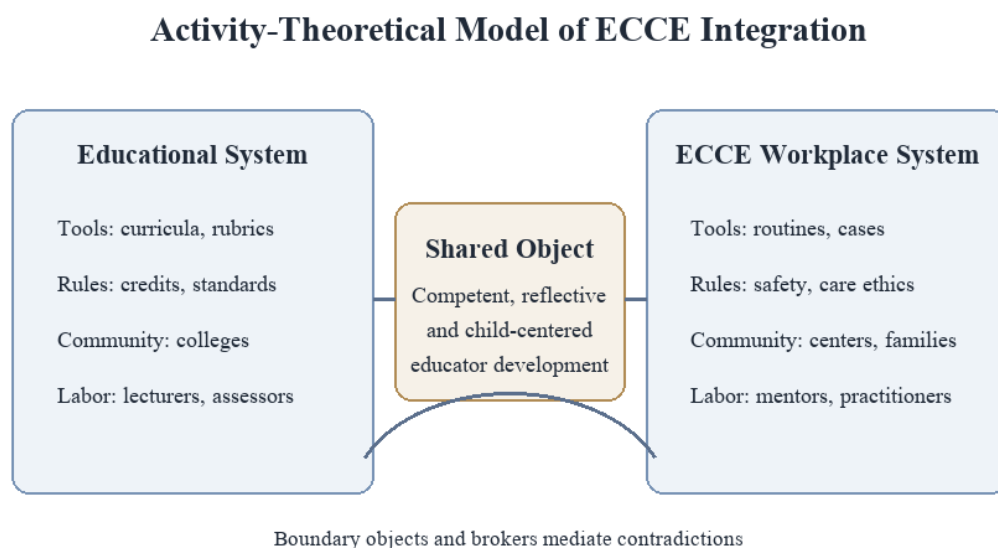
The third theme concerns theory. Human capital and policy-alignment perspectives are useful for explaining why integration matters, but they are less suited to explaining how collaboration unfolds in everyday practice. Activity theory offers a stronger vocabulary for this problem because it treats professional learning as object-oriented collective activity mediated by tools, rules, community and division of labor^[24,25]. It also attends to contradictions, not as simple failures, but as tensions that can provoke learning and redesign.

Boundary object and boundary crossing research further sharpens this lens. A practicum handbook, a mentoring rubric or a

co-designed curriculum module can function as a boundary object when it is flexible enough to be interpreted by different communities yet stable enough to coordinate joint work^[26,27]. In ECCE partnerships, such objects matter because colleges and childcare institutions do not always share the same time horizons, accountability measures or professional language. Integration therefore depends on people and tools that can translate between settings.

Together, these perspectives suggest that industry-education integration should be studied as a negotiated activity system. Figure 1 presents the analytical model used in this review. It positions the shared object of educator development between educational and workplace activity systems, with boundary objects and boundary brokers mediating the movement from contradiction to collaboration.

Figure 1. Activity-theoretical model of ECCE industry-education integration.



3. Methods

This study used a systematic integrative review with thematic synthesis. This design was selected because the review question focused on meanings, practices and interactional processes rather than on effect sizes, and because the question spans a heterogeneous evidence base of qualitative and mixed-methods studies, case evaluations, workforce analyses and policy or conceptual sources. The review was informed by PRISMA reporting principles^[28]. The synthesis followed the three-stage thematic synthesis approach described by Thomas and Harden^[29]; the interpretive, comparative stance was additionally informed by meta-ethnographic principles^[30].

The review included qualitative and mixed-methods studies, case evaluations, workforce analyses and policy or conceptual studies published in English or Chinese between January 2023 and 27 August 2026 that addressed ECCE educator preparation or professional development in connection with school-enterprise or institution-workplace collaboration, practicum mentoring, qualification reform, or closely related professional learning processes. In addition, a source had to examine an identifiable relationship between an education or training provider and an ECCE workplace, employer, practicum site, professional body, or industry-related institution; sources that examined general professional development without reference to such an inter-organizational relationship were not treated as core evidence for industry-education integration. Sources were included when they provided empirical or policy-relevant evidence about stakeholder roles, barriers, tools, standards, workplace learning or collaborative practices, and were excluded when they were unrelated to ECCE, lacked sufficient methodological information, or discussed education reform without implications for professional development. The 2023–2026 window was selected because it corresponds to a period of intensified policy reform in Chinese ECCE workforce preparation — including the consolidation of the universal childcare service system and the expansion of vocational-undergraduate programs — and because the review deliberately prioritizes recent post-policy evidence; earlier foundational literature is addressed through the conceptual and theoretical sources cited in the Literature Review.

Table 1. Review eligibility and extraction logic.

Review element	Operational decision
Study type	Qualitative and mixed-methods studies, case evaluations, workforce analyses and policy or conceptual studies
Time span	January 2023 – 27 August 2026; reflects the post-policy reform period for Chinese ECCE workforce preparation and prioritizes recent post-policy evidence
Population/context	Early childhood care and education educators, student teachers, mentors, administrators and training institutions
Phenomenon	An identifiable relationship between an education or training provider and an ECCE workplace, employer, practicum site, professional body or industry-related institution (e.g., industry-education integration, workplace learning, practicum mentoring, qualification or certificate reform)
Inclusion focus	Studies reporting barriers, tools, rules, roles, collaborative practices or professional learning pathways
Exclusion focus	Studies unrelated to ECCE, lacking clear relevance to professional development, or providing insufficient methodological information

Search terms combined three groups of concepts: (a) early childhood care and education, ECEC, ECCE, childcare, kindergarten and preschool; (b) professional development, teacher education, practicum, mentoring, workforce preparation and qualification; and (c) industry-education integration, school-enterprise cooperation, workplace learning, partnership and collaboration. For the Chinese-language channel, the equivalent concepts were searched in Chinese, including 产教融合 (industry-education integration), 校企合作 (school-enterprise cooperation), 学前教育 (preschool education) and 托育 (childcare). The final evidence set comprised 28 sources (22 English-language and six Chinese-language), including qualitative and mixed-methods studies, case evaluations, workforce analyses and policy or conceptual studies, that met the review criteria and contained evidence relevant to collaborative educator development.

Search strategy and screening

To operationalize the review, a systematic search was conducted on 27 August 2026 in three complementary bibliographic databases: ERIC (Education Resources Information Center), an education-specific database; OpenAlex, a comprehensive multidisciplinary database; and CNKI (China National Knowledge Infrastructure), the principal Chinese-language academic database. Because “industry-education integration” is a policy term used mainly in Chinese-language discourse and is not consistently applied as an index term in the international ECCE literature, the English-language search string combined three broad concept groups—ECCE settings, professional development, and collaboration or partnership—applied to titles, abstracts and subject terms; the full strings are provided below. The English-language searches were limited to literature published between January 2023 and 27 August 2026, and the Chinese-language search combined the equivalent concepts (industry-education integration, school-enterprise cooperation, preschool education, childcare) in CNKI. The ERIC search retrieved 140 records and the OpenAlex search retrieved 897 records. In CNKI, three topic searches (industry-education integration and preschool education; industry-education integration and childcare; school-enterprise cooperation and preschool education) retrieved 557, 208 and 889 records respectively (1,654 records in total). Across the three databases, 2,691 records were identified and 404 duplicates were removed, leaving 2,287 unique records. After screening by title and abstract against the eligibility criteria summarized in Table 1, 2,257 records were excluded, and 30 reports were assessed in full text. Seventeen reports were excluded because they did not address industry-education integration or institution-workplace collaboration in ECCE educator development, lacked sufficient methodological information, or fell outside the target population, leaving 13 studies included directly from the database search: seven English-language and six Chinese-language studies. To ensure coverage of the specialist and international literature, the final evidence set was completed through purposive supplementary searching: backward citation searching of the 13 database-included studies and of key reviews; forward citation searching of the same reports; and manual screening of reference lists and of selected specialist ECCE journals (Early Years; European Early Childhood Education Research Journal; Journal of Early Childhood Teacher Education;

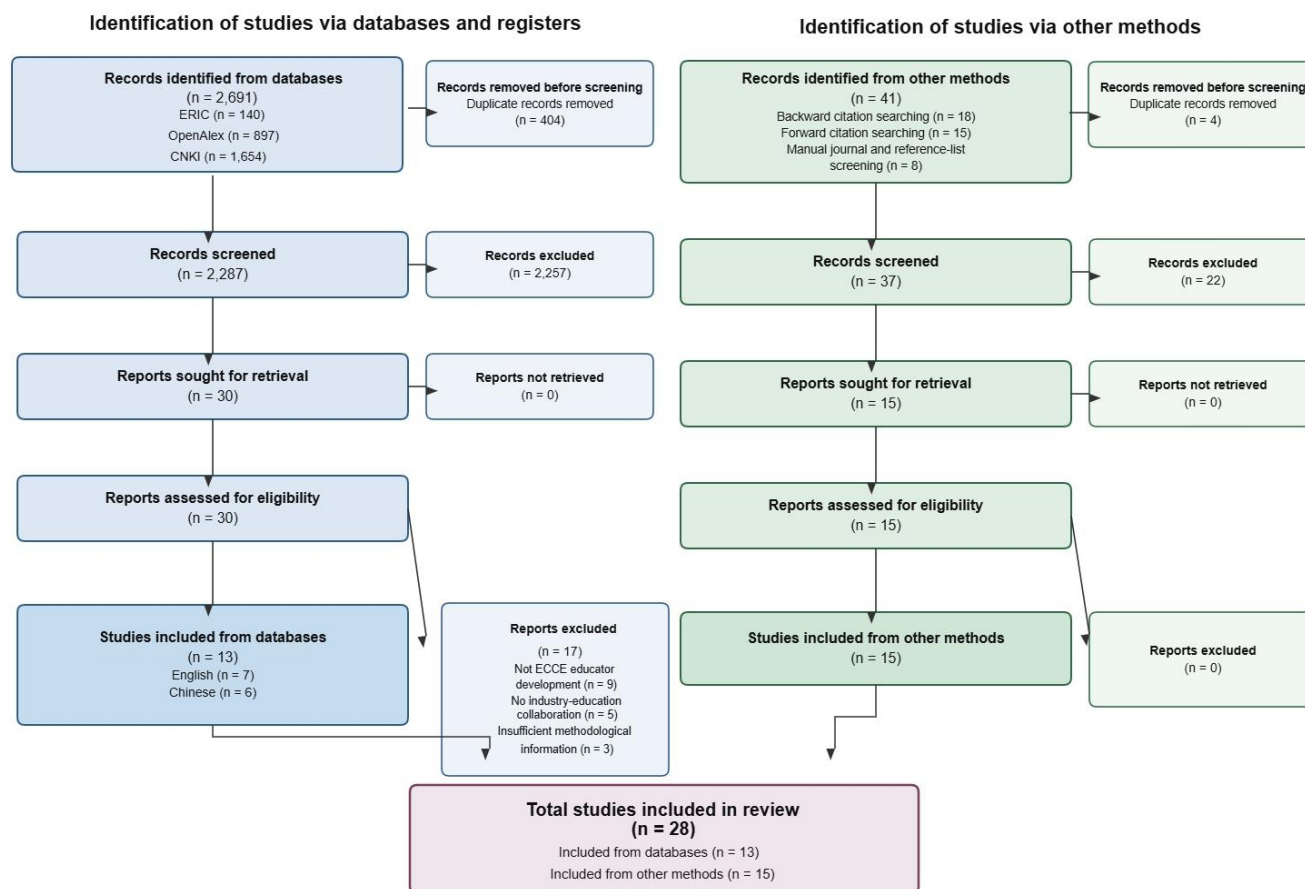
International Journal of Early Years Education) for the 2023–2026 period. This supplementary channel identified 41 records (18 from backward citation searching, 15 from forward citation searching, and 8 from manual journal and reference-list screening); after the removal of 4 duplicates, 37 records were screened by title and abstract, 22 were excluded as unrelated to collaborative ECCE educator development, and the 15 remaining reports were assessed in full text. Because purposive supplementary searching targeted records already known to be highly relevant, all 15 reports met the inclusion criteria. Figure 2 reports the database and supplementary channels separately, following the PRISMA 2020 template[28]. Screening and eligibility decisions were recorded in a screening log.

ERIC search string (applied to title, abstract and subject terms; English-language only; publication date January 2023 – 27 August 2026): (“early childhood care and education” OR ECEC OR ECCE OR childcare OR kindergarten OR preschool) AND (“professional development” OR “teacher education” OR practicum OR mentoring OR “workforce preparation” OR qualification) AND (“industry-education integration” OR “school-enterprise cooperation” OR “workplace learning” OR partnership OR collaboration).

OpenAlex search string (title and abstract; English-language; publication date January 2023 – 27 August 2026): (“early childhood education” OR “early childhood care and education” OR “early childhood educators” OR “early years educators” OR ECCE OR ECEC) AND (“professional development” OR “teacher education” OR “pre-service” OR mentoring OR practicum OR “workforce preparation” OR “workforce development”) AND (collaboration OR partnership OR integration OR “school-enterprise” OR “industry-education” OR “workplace learning” OR “university-school”).

CNKI search strings (topic = subject terms; Chinese-language; publication period 2023–2026): 产教融合 AND 学前教育 (industry-education integration AND preschool education); 产教融合 AND 托育 (industry-education integration AND childcare); 校企合作 AND 学前教育 (school-enterprise cooperation AND preschool education).

Figure 2. PRISMA 2020 flow diagram of study identification and screening.



Each source was appraised for quality using a tool matched to its study type. Qualitative and mixed-methods empirical studies were appraised with the Critical Appraisal Skills Programme (CASP) Qualitative Studies Checklist[31] and, for mixed-

methods designs, the Mixed Methods Appraisal Tool (MMAT)[32]; the one systematic review included was checked against the CASP Systematic Review Checklist; and policy, workforce-analysis and conceptual sources were assessed with adapted criteria covering source transparency, conceptual clarity and argumentative sufficiency. Appraisal outcomes were recorded in a quality-appraisal table (Table 3) and were used to inform the interpretive weight assigned to each source in the synthesis rather than as a basis for exclusion. This appraisal step is consistent with the PRISMA-informed reporting of the review^[28].

Data extraction focused on publication context, participant group, partnership form, reported barriers, stakeholder roles, mediating tools, institutional rules and implications for collaborative pathway construction. Evidence was coded in two stages using a coding table maintained in spreadsheet software; coding units were meaning units (sentences or short passages reporting a finding, a quoted experience or an author's interpretation), and a single source could contribute multiple codes. First, descriptive codes captured concrete issues such as curriculum-practice mismatch, mentor workload, assessment conflict, role ambiguity and limited institutional support. Second, analytical codes grouped these issues through the activity theory categories of tools, rules, community and division of labor. The initial descriptive coding was progressively consolidated into the two analytical themes reported in the Results section; Table 4 presents an illustrative extract of the coding and theme-derivation matrix. Negative cases and dissenting findings were actively sought during analysis.

The final synthesis developed themes by comparing recurring patterns across studies and by asking how each reported barrier was handled in practice. Rather than treating contradictions as isolated deficits, the analysis examined whether they produced negotiation, redesign or boundary spanning. All stages of searching, screening, appraisal, extraction and coding were conducted by the author; because there was no independent duplicate screening or coding, the risk of selection and interpretive bias is acknowledged as a limitation of this review. Trustworthiness was supported through transparent criteria, repeated comparison across studies, reflexive memoing and the coding matrix reported in Table 4. Since the review used published studies only, no new human-subject data were collected.

To support transparency, Table 2 summarizes the characteristics of the 28 included studies.

Table 2. Characteristics of the included studies.

No.	Author (Year)	Context	Design	Contribution to the synthesis
1	Yang, H. (2025)	China	Conceptual/policy analysis	Chinese integrated childcare-and-education context; barriers and optimization strategies for educator professional development
2	Fu, K. (2024)	China	Case evaluation	1+X course-certificate curriculum integration; curriculum-standards alignment
3	De Rossi, M., & Ferranti, C. (2025)	Italy	Conceptual/review	Contextual evidence: digital competence in ECCE educator professional development
4	Kim, H., Brand, S. T., & Zeltzer, R. (2024)	USA	Workforce analysis	Contextual evidence: ECCE workforce landscape; preparation and stability barriers
5	Pirzada, G. (2025)	Pakistan	Qualitative	Policy implementation delays, teacher training and resourcing barriers
6	Arasomwan, D. A., & Daries, G. (2024)	South Africa	Qualitative constraint study	Contextual evidence: educators' constraints in implementing curricula (music-based pedagogies)
7	Barabási, T., & Stark, G. (2024)	Romania	Qualitative (perspectives)	Educators' perspectives on integrating nursery education into the national system
8	Adendorff, Z., & Bipath, K. (2025)	South Africa	Policy analysis	Higher education qualification policy implementation challenges
9	Pal, S. R., & Mohanty, S. P. (2024)	India	Assessment study	Alignment of centers with developmentally appropriate practice

No.	Author (Year)	Context	Design	Contribution to the synthesis
10	Sollerhed, A. C. (2023)	Sweden	Action-oriented study	Contextual evidence: pedagogical content knowledge gaps in teaching movement and physical activity
11	Clasquin-Johnson, M., & Ebrahim, H. (2024)	South Africa	Qualitative	Teacher educator self-efficacy and well-being
12	Xu, Y., et al. (2025)	Multi-country (systematic review)	Systematic review	Professional identity construction among immigrant ECE educators
13	Tamblyn, A., et al. (2024)	Australia	Qualitative	Educators' perspectives on the environment and children's social-emotional development
14	Jindal, N., & Jindal, N. (2024)	India	Comparative field study	Integrated vs split ECCE models; policy implications
15	Manoukian, E., & Trube, M. (2024)	USA	Conceptual	Contextual evidence: technology and awareness integration for quality ECCE
16	Ang, L., et al. (2025)	UK	Participatory PD study	ShREC approach; research-to-practice translation in professional development
17	Singh, S., & Roy, P. (2025)	India	Qualitative/practice	Contextualized teacher-led innovations in rural ECCE
18	Kim, S. Y. (2024)	South Korea	Perceptions study	Prospective educators' perceptions of integrated ECEC policies
19	Kim, K., & Park, S. (2025)	South Korea	Curriculum study	Pre-service teachers' understanding through childcare curriculum course experiences
20	Munyif, A. M. A. (2025)	Saudi Arabia	Qualitative	Educators' perceptions of STEAM education
21	Figueroa-Céspedes, I., et al. (2025)	Chile	Qualitative	Contextual evidence: gender and institutionalization in teacher educators' pedagogical practices
22	Pratiwi, H., et al. (2025)	Indonesia	Qualitative	ESD integration into the national curriculum (Kurikulum Merdeka)
23	Shen, Y., & Yang, E. (2026)	China	Curriculum case study	0-3 infant-activity course redesigned through industry-education integration; lagging content and weak practical training
24	Tian, F., & Chen, Q. (2026)	China	Policy analysis	Universal childcare talent cultivation; ambiguous training goals, weak practical training and fragmented cooperation
25	Liu, X. (2026)	China	Survey and field research	Teacher role positioning in internship bases; role-cognition deviation and school-enterprise coordination barriers
26	Xu, N. (2026)	China	Ecological/conceptual analysis	Ecological-imbalance barriers of preschool industry-education integration; subject-empowerment strategies
27	Zhang, Y., & Song, J. (2026)	China	Multi-institution survey (11 colleges)	"S-I-S" (school-agency-student) internship mechanism; four-stakeholder responsibilities; shallow cooperation
28	Wang, S. (2026)	China	Case evaluation	Endogenous integration; kindergarten-college community; "six-shared" collaborative mechanism

Table 3. *Quality appraisal of included sources.*

No.	Type	Appraisal tool	Overall judgment	Weight in synthesis
1	Conceptual/policy analysis	Adapted criteria (policy/conceptual)	Medium	Moderate
2	Case evaluation	Adapted criteria (case evaluation)	Medium	Core
3	Conceptual/review	Adapted criteria (conceptual)	Medium	Supplementary
4	Workforce analysis	Adapted criteria (workforce analysis)	Medium	Moderate
5	Qualitative	CASP Qualitative	Medium	Core
6	Qualitative constraint study	CASP Qualitative	Medium	Supplementary
7	Qualitative (perspectives)	CASP Qualitative	Medium	Moderate
8	Policy analysis	Adapted criteria (policy)	Medium	Moderate
9	Assessment study	CASP Qualitative	Medium	Core
10	Action-oriented study	CASP Qualitative	Medium	Supplementary
11	Qualitative	CASP Qualitative	Medium	Moderate
12	Systematic review	CASP Systematic Review	High	Core
13	Qualitative	CASP Qualitative	Medium	Moderate
14	Comparative field study	MMAT	Medium	Core
15	Conceptual	Adapted criteria (conceptual)	Medium	Supplementary
16	Participatory PD study	CASP Qualitative	High	Core
17	Qualitative/practice	CASP Qualitative	High	Core
18	Perceptions study	CASP Qualitative	Medium	Moderate
19	Curriculum study	CASP Qualitative	Medium	Moderate
20	Qualitative	CASP Qualitative	Medium	Moderate
21	Qualitative	CASP Qualitative	Medium	Supplementary
22	Qualitative	CASP Qualitative	Medium	Core
23	Curriculum case study	Adapted criteria (case evaluation)	High	Core
24	Policy analysis	Adapted criteria (policy)	Medium	Core
25	Survey and field research	MMAT	Medium	Core
26	Ecological/conceptual analysis	Adapted criteria (conceptual)	Medium	Moderate
27	Multi-institution survey	MMAT	High	Core
28	Case evaluation	Adapted criteria (case evaluation)	Medium	Core

Note. CASP = Critical Appraisal Skills Programme; MMAT = Mixed Methods Appraisal Tool; “adapted criteria” refers to the source-transparency, conceptual-clarity and argumentative-sufficiency criteria described in the Methods section. Overall judgment reflects how fully each source reported the procedures relevant to its type: most sources reported their methods but lacked reflexive or sampling detail, hence the clustering at “Medium”, whereas the multi-institution empirical studies with detailed reporting were judged “High”. Weight in synthesis reflects both methodological quality and the directness of evidence on institution–workplace collaboration (contextual sources are weighted as supplementary); it therefore varies independently of the overall judgment.

Table 4. Illustrative extract from the coding and theme-derivation matrix.

Source quotation/finding	Descriptive code	Activity-theory category	Analytical theme
“Mentors lacked protected supervision time”	Mentor workload	Division of labor/rules	Theme 1: contradictions between mediating tools and institutional rules
“College assessment criteria differed from workplace expectations”	Assessment conflict	Tools/rules	Theme 1: contradictions between mediating tools and institutional rules
“Curriculum content lagged behind industry practice”	Curriculum-practice mismatch	Tools	Theme 1: contradictions between mediating tools and institutional rules
“The training goals of childcare talent cultivation remained ambiguous”	Goal ambiguity	Rules	Theme 1: contradictions between mediating tools and institutional rules
“Mentors’ roles were ambiguous and rarely resourced equally”	Role ambiguity	Division of labor	Theme 2: role construction and boundary work
“Alignment meetings and co-teaching built shared understanding”	Joint planning	Community	Theme 2: role construction and boundary work
“Liaison lecturers translated workplace knowledge into curriculum language”	Boundary brokering	Community/division of labor	Theme 2: role construction and boundary work
“Shared rubrics aligned college and workplace assessment”	Shared tools	Tools	Theme 2: role construction and boundary work

Note. Descriptive codes were consolidated into the two analytical themes through the activity theory categories of tools, rules, community and division of labor.

4. Results

The synthesis suggests that industry-education integration in ECCE is not a linear transfer of policy into practice^[7,8,19]. It is a negotiated process in which stakeholders attempt to align tools, rules and roles while protecting the core object of child-centered professional preparation^[13,22]. Two themes organize the findings.

The first theme concerns contradictions between mediating tools and institutional rules. Colleges tend to rely on curriculum plans, lesson-plan templates, practicum handbooks, credit requirements and standardized assessment rubrics^[2,9,20,33,34]. Industry partners work within care routines, safety rules, staffing constraints, family communication demands and child-centered rhythms^[4,5,13,22]. These tools and rules are not inherently incompatible, but they often pull student teachers in different directions^[9,14]. A task that satisfies a college checklist may not fit the timing or emotional climate of a classroom^[6,20]. A workplace routine that protects children may appear too informal to satisfy academic assessment criteria^[9,22].

The evidence suggests that productive partnerships do not eliminate these contradictions at once. Instead, they make the contradictions discussable^[7,14]. Effective integration was associated with the joint revision of practicum tasks, the use of shared observation rubrics, the adjustment of assessment language and the creation of feedback routines that allowed mentors and lecturers to interpret student performance together^[17,20,23]. In these cases, tools became mediating objects rather than administrative burdens^[2,23].

The second theme concerns role construction and boundary work. Integration often begins with ambiguous expectations^[7,19,35]. Workplace mentors may be asked to supervise attendance, demonstrate practice, evaluate students and contribute to curriculum improvement, but these functions are rarely resourced equally^[5,11,17,36]. College lecturers may retain formal authority over assessment while depending on mentors for situated knowledge^[17,19]. Students may receive conflicting messages about whether to prioritize theoretical ideals, institutional routines or immediate child needs^[12,13].

Boundary work becomes necessary when stakeholders redefine these roles through practice^[18,20]. The most promising cases in the reviewed literature described regular alignment meetings, co-teaching arrangements, mentor training, reciprocal site visits and shared reflection sessions^[5,17,18,23,37]. These activities helped move the relationship from a host-placement model toward a shared professional community^[17,23]. Boundary brokers, such as liaison lecturers, experienced mentors or program coordinators, were especially important because they translated expectations and kept disagreements from becoming silent disengagement^[7,18,38].

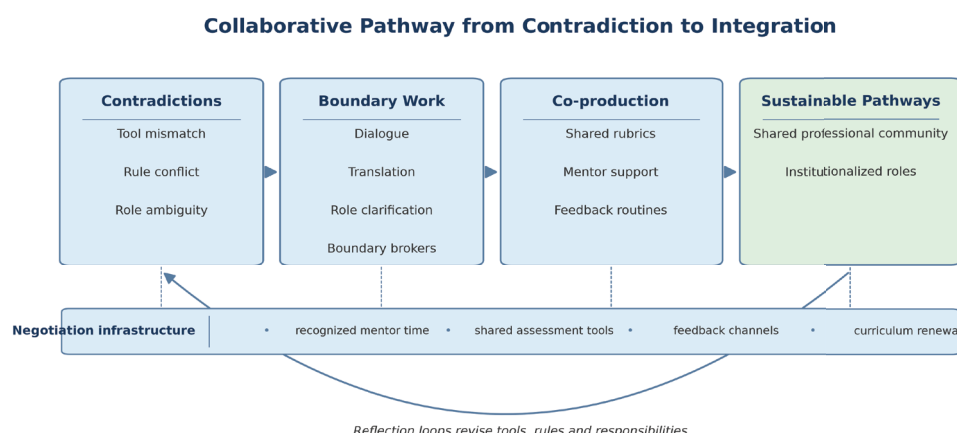
A cross-theme pattern is that successful integration depends on infrastructure for negotiation^[8,14]. Partnerships were stronger when institutions recognized mentor time, developed shared assessment tools, created channels for rapid feedback and treated workplace knowledge as a legitimate source of curriculum renewal^[2,17,23]. They were weaker when cooperation depended on personal goodwill alone^[5,8]. Table 5 summarizes the thematic synthesis, and Figure 3 presents the resulting pathway model.

Examining the Chinese and international evidence separately adds nuance to these patterns. The Chinese-language studies — predominantly policy-driven analyses of school-enterprise cooperation and the 1+X certificate system — document lagging curriculum content, weak practical training and shallow college–workplace cooperation^[33,34,36,37]. International studies, which focus more on practicum mentoring, university–workplace partnership and situated professional learning, report parallel tensions between academic assessment criteria and workplace routines^[5,9,16,17,22]. Across both bodies of evidence, productive collaboration depended on negotiated roles, joint assessment practices and recognized support for mentors^[9,16,17,33,38]. The main contextual differences concern the extent of enterprise participation, the structure of regulatory and teacher-qualification systems, and the policy vocabulary used to frame collaboration: in the Chinese context, industry-education integration (产教融合) denotes a systemic, state-steered reform agenda, whereas international partnership research tends to treat collaboration as a locally negotiated institutional arrangement.

Table 5. Thematic synthesis of barriers and collaborative pathways.

Theme	Main contradiction	Collaborative response	Pathway implication
Tools and rules	Curriculum templates, practicum handbooks and assessment rubrics do not always fit care routines, safety requirements and workplace performance indicators.	Jointly revise tasks, align assessment language, and create shared observation and feedback tools.	Treat tools as negotiable boundary objects rather than fixed administrative forms.
Roles and community	Mentors, lecturers and administrators carry overlapping responsibilities without equal authority, time or recognition.	Use alignment meetings, mentor preparation, reciprocal site visits and liaison roles to clarify responsibilities.	Build a shared professional community around educator learning rather than a placement-only relationship.
Boundary infrastructure	Partnerships weaken when collaboration depends on personal goodwill or short-term projects.	Institutionalize broker roles, recognize mentor labor and create routines for curriculum-practice feedback.	Move from symbolic cooperation to sustainable co-production of professional development pathways.

Figure 3. Interpretive pathway model proposed by the review. The arrows represent an interpretive sequence proposed by the review rather than a tested causal relationship.



5. Discussion

The findings refine current understandings of ECCE industry-education integration in three ways. First, they show that barriers are not merely external constraints. Many barriers are contradictions within the activity system itself. Curriculum templates, workplace routines, institutional performance indicators and mentor responsibilities can all be reasonable in their own settings, yet become problematic when they meet in a partnership. This interpretation helps explain why integration policies may look coherent on paper but feel unstable in daily practice.

Second, the study highlights the central role of boundary objects and boundary brokers. A practicum handbook is effective only when both college lecturers and workplace mentors can use it to coordinate action. A mentoring rubric is useful only when it captures both developmental theory and the situated judgement required in childcare settings. People who can translate between these worlds are therefore not peripheral administrators. They are key actors in the construction of sustainable integration pathways.

Third, the review suggests that professional development should be designed as joint work rather than as school-based preparation followed by workplace application. This has practical implications. Vocational colleges should involve industry mentors in curriculum review before practicum begins, not only after problems appear. Childcare institutions should receive recognition and support for mentoring labor. Policymakers should move beyond counting partnership agreements and instead evaluate whether partnerships create shared tools, stable communication routines and jointly understood standards.

For the Chinese context, the findings are particularly relevant to the implementation of certificate-based and workplace-linked vocational reforms. The 1+X certificate system can strengthen educator preparation when certificates are connected to authentic care practices and supported by mentor development^[33,38]. Chinese-language analyses of vocational ECCE and childcare programs corroborate these tensions, documenting lagging curriculum content, weak practical training and shallow school-enterprise cooperation^[34,36,37]. It may become superficial, however, if certificate tasks are treated as additional paperwork detached from the rhythms of ECCE work. The challenge is not simply to import industry standards into school curricula, but to create a mechanism through which standards, curricula and care practices can be interpreted together.

The Chinese policy context adds a further layer of boundary work that is directly relevant to this argument. Binzhou Vocational and Technical University, where the present author is based, has recently been upgraded to a vocational undergraduate institution, and its early childhood care and management program is being prepared for undergraduate degree status. During such institutional transitions, the rules and tools of vocational training—certificate standards, practicum hours, course-certificate integration schemes and industry performance indicators—are renegotiated alongside new academic expectations such as research-informed teaching, degree-level knowledge requirements and scholarly assessment criteria. Boundary work therefore shifts from a predominantly skill-oriented logic toward a dual academic-and-skill orientation. Mentors and lecturers must satisfy industry standards and degree-level requirements at the same time, and the contradictions between tools and rules identified in this review become sharper: a care-practice task that serves certificate assessment may be judged insufficiently academic for an undergraduate curriculum, while a theory-heavy module may drift away from authentic workplace learning. The 1+X certificate system can act as a boundary object that stabilises this transition when certificate tasks are jointly designed to carry both occupational and academic value. This example illustrates how the analytical model travels beyond stable policy environments and gives international readers access to a distinctive Chinese case of high-level vocational education reform.

The proposed model also contributes to activity theory by showing how contradictions can be converted into collaborative learning when institutions provide boundary infrastructure. The object of activity — competent, reflective and child-centered educator development — is not owned by one party. It is stabilized through repeated negotiation among parties whose tools and rules differ. This processual view is more realistic than assuming that integration can be achieved through a single policy framework or memorandum of cooperation.

The pathway model in Figure 3 can be read as a proposed three-stage interpretive pathway — rather than a tested causal sequence — with an enabling condition and a feedback loop. In the first stage, contradictions between college tools and workplace routines pull learners in different directions^[2,5,9,14]. The second stage, boundary work, is where dialogue, translation

and role clarification occur; this stage is most productive when boundary brokers translate expectations between settings^[7,17,18]. The third stage, co-production, builds shared rubrics, mentor support and feedback routines that move the relationship toward a shared professional community^[17,23]. Across all three stages, the model identifies negotiation infrastructure (recognized mentor time, shared assessment tools, rapid feedback channels and workplace knowledge treated as a legitimate source of curriculum renewal) as the enabling condition that distinguishes sustainable pathways from goodwill-dependent cooperation^[2,5,8,17,23]. The feedback loop in Figure 3 captures how reflection on co-produced tools revises the tools, rules and responsibilities that generated the initial contradictions, consistent with the expansive learning account of activity theory^[24,25].

6. Conclusion

This systematic integrative review examined how stakeholders construct pathways for industry-education integration in ECCE educator development. The synthesis suggests that viable pathways may emerge when stakeholders negotiate contradictions between educational and workplace activity systems. Misaligned tools, conflicting rules and uncertain roles are not simply obstacles to be removed; they are the practical sites where integration is either weakened or reconstructed.

The study proposes an interpretive pathway in which institutional contradictions create a need for boundary negotiation, and in which the co-development of tools and roles may support educator learning when sustained by adequate time, authority and organizational resources. For practice, the findings suggest that sustainable integration requires protected time, institutional resources and decision-making authority for joint design. For research, the next step is longitudinal case study work that follows specific college-kindergarten or college-childcare partnerships over time, tracing how boundary objects are created, revised and stabilized.

The main limitations concern scope and interpretability. Although the search was extended to Chinese-language sources through CNKI, the six Chinese-language studies included draw mainly on vocational-education journals and policy-oriented analysis; a fuller engagement with Chinese empirical work would require additional database-level searching and coding. The synthesis is also interpretive in nature, and more precise database-level search logs, coding audit trails and country-specific subgroup analyses would strengthen its transparency and generalizability. Because searching, screening, appraisal, extraction and coding were conducted by a single author, the absence of independent duplicate screening and coding may have increased the risk of selection and interpretive bias; future reviews should involve independent reviewers. Even so, the synthesis provides a useful conceptual and practical framework for improving the quality of ECCE educator preparation through more deliberate, negotiated and institutionally supported industry-education collaboration.

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Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

Reference

- [1] Yang, H. (2025). The Value Implications, Practical Challenges, and Optimization Strategies for Early Childhood Educators Professional Development in the Context of Integrated Childcare and Education. *International Journal of Independent Research Studies*, 14(1), 736. <https://doi.org/10.55220/2304-6953.v14i1.736>
- [2] Fu, K. (2024). Research on the construction of the curriculum system of integration of courses and certificates for the 1+X Certificate in Early Childhood Care in the era of big data. *Applied Mathematics and Nonlinear Sciences*, 9(1), 20242316. <https://doi.org/10.2478/amns-2024-2316>
- [3] De Rossi, M., & Ferranti, C. (2025). Digital Integration in Early Childhood Education and Care: Innovating Educators' Competencies. *Media Education*. <https://doi.org/10.36253/me-17161>
- [4] Kim, H., Brand, S. T., & Zeltzer, R. (2024). Exploring the Current Landscape of the United States Early Childhood Care and Education Workforce. *Early Childhood Education Journal*, 53(7), 2407-2419. <https://doi.org/10.1007/s10643-024->

01730-9

- [5] Pirzada, G. (2025). Challenges in Early Childhood Care & Education (ECCE) in public sector schools of South Punjab: A Qualitative Study. *UMT Education Review*, 8(1). <https://doi.org/10.32350/uer.81.05>
- [6] Arasomwan, D. A., & Daries, G. (2024). Music-based Pedagogies to Teach Conversational Skills to Early Childhood Care and Education's Learners: The Educators' Constraints and the Proposed Solutions. *E-Journal of Humanities, Arts and Social Sciences*, 5(7). <https://doi.org/10.38159/ehass.20245713>
- [7] Barabási, T., & Stark, G. (2024). Early childhood educators' perspectives on the integration of nursery education into the national education system. *PedActa*, 14(2), 90-103.
- [8] Adendorff, Z., & Bipath, K. (2025). Higher education qualifications for early childhood educators: Policy implementation challenges. *South African Journal of Childhood Education*, 15(1), a1597. <https://doi.org/10.4102/sajce.v15i1.1597>
- [9] Pal, S. R., & Mohanty, S. P. (2024). Assessment of alignment of early childhood care and education centres with developmentally appropriate practice principles. *International Education and Research Journal*. <https://doi.org/10.21276/ierj24750473407095>
- [10] Sollerhed, A. C. (2023). Perceived insufficient pedagogical content knowledge in teaching movement and physical activity: Experiences from an action-oriented study among educators in early childhood education and care. *Frontiers in Sports and Active Living*, 4, 1050311. <https://doi.org/10.3389/fspor.2022.1050311>
- [11] Clasquin-Johnson, M., & Ebrahim, H. (2024). Self-efficacy and well-being of female teacher educators for early childhood care and education during COVID-19. *South African Journal of Education*, 44(1), a2354. <https://doi.org/10.15700/saje.v44n1a2354>
- [12] Xu, Y., Yip, S. Y., Saito, E., et al. (2025). The construction of professional identity among immigrant early childhood educators: A systematic review. *Journal of Early Childhood Teacher Education*, 47(1), 128-145. <https://doi.org/10.1080/10901027.2025.2454924>
- [13] Tamblyn, A., Sun, Y., North, A., et al. (2024). Educators' perspectives on the role the early childhood education and care environment plays in supporting children's social and emotional development. *Australasian Journal of Early Childhood*, 49(2), 140-154. <https://doi.org/10.1177/18369391231221560>
- [14] Jindal, N., & Jindal, N. (2024). Integrated versus split approach for better Early Childhood Care and Education in India: Lessons from the field and policy implications. *Journal of Administrative Development*, 2(1), 1-17. <https://doi.org/10.48001/jad.202421.1-17>
- [15] Manoukian, E., & Trube, M. (2024). Applying Technology and Awareness Integration Theory for Quality Early Childhood Care and Education. *International Journal of Academic Studies in Technology and Education*. <https://doi.org/10.55549/ijaste.57>
- [16] Green, C., Tindall-Ford, S., & Eady, M. J. (2020). School-university partnerships in Australia: A systematic literature review. *Asia-Pacific Journal of Teacher Education*, 48(4), 403-435. <https://doi.org/10.1080/1359866X.2019.1651822>
- [17] Ang, L., Grenier, J., Harmey, S., et al. (2025). Supporting early years professional development to enhance high-quality conversational interactions in early childhood care and education settings: The ShREC approach. *Early Years*. <https://doi.org/10.1080/09575146.2025.2498717>
- [18] Singh, S., & Roy, P. (2025). Reimagining Early Childhood Care and Education (ECCE) in Rural Bihar: A Case for Contextualised Teacher-Led Innovations. *International Journal for Multidisciplinary Research*, 7(3), 47473. <https://doi.org/10.36948/ijfmr.2025.v07i03.47473>
- [19] Kim, S. Y. (2024). A study on the direction of integrated early childhood education and care policies through the perception of prospective early childhood educators. *The Journal of Politics of Education*, 31(2), 207-228. <https://doi.org/10.52183/kspe.2024.31.2.207>
- [20] Kim, K., & Park, S. (2025). Expanding educational perceptions and understanding of the integration of early childhood education and care among pre-service early childhood teachers through childcare curriculum course experiences. *Korean Journal of Early Childhood Education*, 27(4), 26-46. <https://doi.org/10.15409/riece.2025.27.4.2>

- [21] Munyif, A. M. A. (2025). Discovering Early Childhood Educators' Perceptions of STEAM Education in the Saudi Context: A Qualitative Study. *Journal of Posthumanism*, 5(6), 2169. <https://doi.org/10.63332/joph.v5i6.2169>
- [22] Figueroa-Céspedes, I., Dufraix, I., & Fica, E. (2025). Between intuition and institutionalization: A gender perspective on the pedagogical practices of early childhood education teacher educators. *Contemporary Issues in Early Childhood*. <https://doi.org/10.1177/14639491251392937>
- [23] Pratiwi, H., Ismail, M., Yarliani, I., et al. (2025). Integrating education for sustainable development into the Kurikulum Merdeka: Pedagogical practices in early childhood education centers in Indonesia. *Environmental Education Research*, 31(5), 920-934. <https://doi.org/10.1080/13504622.2025.2462254>
- [24] Engeström, Y. (1987). Learning by expanding: An activity-theoretical approach to developmental research. *Orienta-Konsultit*.
- [25] Engeström, Y. (2001). Expansive learning at work: Toward an activity theoretical reconceptualization. *Journal of Education and Work*, 14(1), 133-156. <https://doi.org/10.1080/13639080020028747>
- [26] Star, S. L., & Griesemer, J. R. (1989). Institutional ecology, translations and boundary objects: Amateurs and professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39. *Social Studies of Science*, 19(3), 387-420. <https://doi.org/10.1177/030631289019003001>
- [27] Akkerman, S. F., & Bakker, A. (2011). Boundary crossing and boundary objects. *Review of Educational Research*, 81(2), 132-169. <https://doi.org/10.3102/0034654311404435>
- [28] Page, M. J., McKenzie, J. E., Bossuyt, P. M., et al. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, 372, n71. <https://doi.org/10.1136/bmj.n71>
- [29] Thomas, J., & Harden, A. (2008). Methods for the thematic synthesis of qualitative research in systematic reviews. *BMC Medical Research Methodology*, 8, 45. <https://doi.org/10.1186/1471-2288-8-45>
- [30] Noblit, G. W., & Hare, R. D. (1988). *Meta-ethnography: Synthesizing qualitative studies*. Sage.
- [31] Critical Appraisal Skills Programme. (2018). CASP qualitative studies checklist. Critical Appraisal Skills Programme. <https://casp-uk.net/casp-tools-checklists/>
- [32] Hong, Q. N., et al. (2018). The Mixed Methods Appraisal Tool (MMAT) version 2018 for information professionals and researchers. *Education for Information*, 34(4), 285-291. <https://doi.org/10.3233/EFI-180221>
- [33] Shen, Y., & Yang, E. (2026). Curriculum reform and practice of the course "Design and Guidance of Educational Activities for 0-3-Year-Old Infants and Toddlers" from the perspective of industry-education integration. *Modern Vocational Education*, 2026(20), 135-138.
- [34] Tian, F., & Chen, Q. (2026). Talent cultivation for childcare in vocational colleges under universal childcare: Value implications, practical difficulties and expected pathways. *Vocational and Technical Education*, 47(17), 18-24.
- [35] Liu, X. (2026). Research on the role positioning and optimization strategies of preschool teachers in internship bases under the "New Double High Plan". *Science and Technology Wind*, 2026(20), 164-166. <https://doi.org/10.19392/j.cnki.1671-7341.202620055>
- [36] Xu, N. (2026). Dilemmas and countermeasures of industry-education integration in preschool education in higher vocational colleges from an ecological perspective. *Journal of Hubei Open Vocational College*, 39(14), 61-64.
- [37] Zhang, Y., & Song, J. (2026). Research on the construction of an internship mechanism for childcare service majors under industry-education integration: Evidence from 11 vocational colleges in Shanxi Province. *Modern Vocational Education*, 2026(19), 141-144.
- [38] Wang, S. (2026). Research and practice on the construction of a kindergarten-college community based on endogenous industry-education integration. *Journal of Shangqiu Polytechnic*, 25(2), 43-46.