



Teachers as Brokers in University-Based Entrepreneurship Education Ecosystems: A Multiple-Case Study of Regional Applied Universities in Central China

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ABSTRACT

Entrepreneurship education ecosystems are often assessed through the presence of courses, competitions, incubators and external partnerships, yet the formal provision does not automatically become accessible or usable in practice. This study considers how teachers broker connections among students, institutional structures and external actors, and identifies the organisational and relational conditions that enable or constrain this work in regional applied universities. A teacher-centred qualitative multiple-case study was carried out across three universities in Central China. Primary evidence was drawn from semi-structured interviews with nine teachers directly involved in entrepreneurship education. Interviews with six university administrators provided organisational explanations, while 33 institutional documents were used to identify formal provision and governance arrangements. Data was analysed through open and focused coding, within-case analysis, cross-case comparison and attention to contradictory evidence. The findings identify four interrelated brokerage practices: curating opportunities, translating institutional and disciplinary requirements, connecting and mobilising actors and resources, and sustaining participation through continuity work. Across the cases, courses, competitions, incubation and external collaboration became usable only when teachers interpreted opportunities, prepared participants, coordinated relationships and supported project handovers. Brokerage was enabled by leadership support, recognised project frameworks, external networks, and specialist expertise, but was limited by fragmented responsibilities, limited recognition of workload, reliance on personal relationships, uneven access to specialist support, and weak continuity after competitions or graduation. The study promotes a processual understanding of entrepreneurship education ecosystems by positioning teacher brokerage as a meso-level mechanism that links formal provision to accessible educational opportunities. It also shows that brokerage can widen access while creating gatekeeping, overload and personal dependence. Healthy ecosystems therefore require universities to institutionalise coordination, recognise brokerage labour, distribute specialist expertise and preserve project knowledge past individual teachers.

Keywords: entrepreneurship education ecosystem, teacher brokerage, boundary spanning, regional applied universities, qualitative multiple-case study

INTRODUCTION

Entrepreneurship education in higher education has gone beyond the limits of a single course. Universities increasingly combine curricular teaching with competitions, incubators, mentoring, industry partnerships, alumni networks, community resources, and interdisciplinary project work (Liu et al., 2021). The ecosystem perspective notices this broadening by treating entrepreneurship education as a configuration of interdependent actors, resources, activities, and support arrangements (Brush, 2014) rather than as an isolated pedagogical

intervention (Miller & Acs, 2017). It likewise reflects a broader shift from teaching entrepreneurship primarily to learning through action, interaction (Hägg & Gabrielsson, 2020), and engagement with real-world problems (Motta & Galina, 2023). From this perspective, the value of a university-based ecosystem lies not only in how many programmes it contains, but also in the relationships through which curricular, co-curricular, institutional, and external resources are connected.

Programmes and resources offering does not necessarily mean that students can identify, access, or meaningfully use them. Courses, competitions, incubators, and university-industry co-operations constitute formal provision, but such provision does not run on its own. Opportunities must be communicated and interpreted; students may need encouragement to participate, assistance in forming teams, introductions to mentors or enterprises, and guidance through unfamiliar administrative and project requirements. Resources dispersed across faculties, administrative units, external organisations, and individual networks may therefore be formally available yet difficult to access in practice. Although ecosystem studies have identified the principal actors and organisational elements involved in university entrepreneurship education (Liu et al., 2021), an inventory of components does not explain how connections among them are produced. The analytical issue is not only what a university provides, but who makes that provision accessible, usable, and continuous.

Teachers are key to this process, although their role has usually been framed in pedagogical terms. Entrepreneurship education research commonly describes teachers as instructors, facilitators, mentors, coaches, or designers of experiential learning (Hägg & Gabrielsson, 2020; Ruskovaara & Pihkala, 2015; Wraae et al., 2022). These roles are important because action-based entrepreneurship education requires teachers to support learning in conditions of uncertainty rather than merely deliver predetermined knowledge. Yet teachers may also interpret competition rules, identify appropriate opportunities, assemble students from different disciplines, negotiate access to facilities, communicate with administrators, mobilise external expertise, and maintain relationships with firms or guides. Research shows that entrepreneurship educators may adopt teacher-focused, student-focused, or network-focused role identities (Wraae et al., 2022), while teachers' networking can broaden the resources available for entrepreneurship education (Ruskovaara et al., 2015). Nevertheless, this connective work has seldom been examined as the mechanism through which a university-based entrepreneurship education ecosystem is enacted.

The concept of brokerage provides a useful lens for examining this mechanism. In schooling contexts, brokers connect actors or groups that are otherwise weakly linked, mediate knowledge and resource flows, translate information across professional or organisational boundaries, and coordinate collective activity (Baas et al., 2023; Rechsteiner et al., 2024). Teacher brokerage may therefore include curating opportunities, translating institutional and market expectations, mobilising resources, aligning participants, and maintaining connections over time. It is not automatically effective or equitable. Brokerage can be constrained by workload, role ambiguity, fragmented responsibilities, limited authority, or weak external networks; it may also make access dependent on individual judgement and personal relationships. This perspective moves analysis from a static description of ecosystem elements towards the situated work required to connect them.

This issue is particularly relevant to the three regional applied universities in Central China examined here. Their applied orientation links graduate preparation toward regional development, while their locations and institutional profiles may shape access to specialist entrepreneurial expertise, industry partners, and sustained mentoring. Entrepreneurship education in these settings may include university-wide courses, competitions, incubation activities, and external collaboration, but uniting these components requires cross-disciplinary and cross-organisational work. Chinese entrepreneurship education has also developed through institutional arrangements that should not simply be treated as reproductions of Western models, making context-sensitive investigation important (Wang et al., 2024). Teachers at regional applied universities may combine routine teaching with project supervision, competition coaching, administrative work, and relationship-building. The operation of entrepreneurship education may consequently depend heavily on a limited number of committed educators and the networks they can mobilise.

Three gaps follow. First, research on university entrepreneurship ecosystems has often focused on identifying institutional components, support structures, or associations between provision and student outcomes. Second,

entrepreneurship education research has devoted extensive attention to pedagogy, entrepreneurial intention, self-efficacy, and other outcomes (Nabi et al., 2017), but less to the organisational work that makes opportunities accessible. Third, although educational brokerage research explains how intermediaries bridge loosely connected groups, it has rarely been applied to teachers within university-based entrepreneurship education ecosystems. What remains insufficiently understood is how teachers enact such ecosystems by connecting fragmented opportunities, actors, and resources, and why their capacity to do so varies across institutional settings.

Accordingly, this study considers how teachers broker connections among students, institutional structures, and external actors within university-based entrepreneurship education ecosystems, and examines the organisational and relational conditions that enable or constrain these practices in regional applied universities. It addresses two questions:

RQ1. How do teachers broker connections between students and institutional and external entrepreneurship education resources in regional applied universities?

RQ2. What organisational and relational conditions enable or constrain teacher brokerage across the three university-based entrepreneurship education ecosystems?

The study makes three contributions. Conceptually, it shifts attention from ecosystem composition to the relational processes through which entrepreneurship education is enacted. Empirically, it provides a teacher-centred, multiple-case account across three regional applied universities in Central China, drawing primarily on interviews with nine teachers and six administrators, along with pertinent institutional documents, to contextualise formal provision and organisational conditions. Practically, it identifies how universities can move from reliance on individual teachers' discretionary and often invisible connective labour towards institutionalised arrangements for coordination, workload recognition, specialist support, and continuity. It therefore positions teachers not simply as participants in entrepreneurship education ecosystems, but as actors whose brokerage work may be essential to making those ecosystems operational.

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

University-based entrepreneurship education ecosystems

Entrepreneurship education was long treated primarily as a curricular activity, but its increasing emphasis on experiential, interdisciplinary, and externally engaged learning has broadened the relevant unit of analysis. Rather than locating entrepreneurship education within a single module, the ecosystem perspective highlights the interdependence among curricular and co-curricular activities, research, institutional culture, stakeholders, infrastructure, and resources. Brush (2014) conceptualised an internal entrepreneurship education ecosystem through which a university connects educational activities to the wider entrepreneurial environment. Liu et al. (2021) subsequently described university-based ecosystems as configurations comprising universities, learners, educators, government, industry, and communities, supported by curricula, practical activities, organisational arrangements, leadership, core faculty, resources, and operating mechanisms. These formulations establish that entrepreneurship education is produced through relationships among multiple actors rather than delivered by a single academic unit.

The ecosystem perspective is especially pertinent where learning extends into competitions, incubation, enterprise projects and university–industry collaboration. Experiential entrepreneurship education exposes students to uncertain problems, iterative action and feedback from actors beyond the classroom (Motta & Galina, 2023). Such arrangements may involve academic departments, entrepreneurship centres, administrators, laboratories and incubators inside the university, alongside entrepreneurs, firms, alumni, mentors, public agencies and community organisations outside it. Their educational value, however, does not derive from their mere inclusion in an institutional portfolio. It depends on whether knowledge, opportunities and support can move across organisational and disciplinary boundaries and whether participants can coordinate expectations and actions.

This distinction reveals a limitation in accounts that represent ecosystems mainly by mapping their components. An institution may formally offer courses, competitions and incubation while these provisions remain weakly connected. A competition can function as an isolated event rather than as a pathway to sustained project development; a partnership can exist administratively without providing students with meaningful external contact; and a resource may be available in principle but inaccessible to those who do not know how to access the relevant network. The identical formal components may therefore generate different patterns of access and use across universities. Ecosystem research consequently needs to explain not only what resources exist, but also how connections among them are enacted.

Teachers in entrepreneurship education

The movement towards practice-based and student-centred entrepreneurship education has altered rather than diminished the teacher's importance. Teachers remain responsible for designing learning environments, selecting pedagogical tasks, framing uncertainty and supporting reflection on action (Hägg & Gabrielsson, 2020; Motta & Galina, 2023). Depending on their educational orientation, they may act as subject experts, facilitators, mentors or coaches. Wraae et al. (2022) identified teacher-focused, student-focused and network-focused role identities among entrepreneurship educators, showing that educators' understandings of their roles are associated with different expectations of learners and pedagogical choices. More recent research also indicates that role perception is determined by educators' self-efficacy, job satisfaction, values and professional experience (Brush et al., 2024). The teacher is therefore not a neutral carrier of a standard programme; how the role is understood influences how entrepreneurship education is organised and enacted.

Entrepreneurship educators also perform work that goes beyond direct classroom instruction. They may recognise potentially useful opportunities, encourage participation, assemble project teams, interpret competition requirements, introduce students to external specialists, negotiate access to facilities and supervise projects whose demands evolve over time. Teachers' networking activities can broaden the resource base available to entrepreneurship education (Ruskovaara et al., 2015), while educators have been shown to operate within dialogic relationships involving students, institutions and surrounding communities (Wraae & Walmsley, 2020). Evidence from university–society learning environments similarly identifies teachers as network builders, project developers, process facilitators and translators of real-world demands into feasible student assignments (Oonk et al., 2020). These activities place teachers at the interface between formal educational provision and the settings in which it is used.

Nevertheless, such extended responsibilities are not always visible in conventional descriptions of academic work. Formal competence profiles tend to privilege in-class teaching, whereas university–society collaboration adds relationship-building, negotiation, project management and continuity tasks (Oonk et al., 2020). Walmsley and Wraae (2025) found that attempts to legitimise the entrepreneurship educator as a distinctive role remained limited: programme specifications largely emphasised teaching, whereas academic job advertisements foregrounded research. In China, Bell and Bell (2025) likewise showed that educators introducing constructivist entrepreneurship practices struggled to reconcile these practices with existing institutional expectations. This literature suggests that teachers' connective work may be educationally consequential yet remain ambiguously defined, unevenly supported, or dependent on personal commitment. It does not yet adequately explain how that work connects the elements of an entrepreneurship education ecosystem.

Teacher brokerage and boundary spanning

Brokerage affords a more precise way to conceptualise this connective work. In social-network and educational-change research, brokers are actors positioned between individuals, groups or organisations that are otherwise separated or only weakly connected. Brokerage refers not simply to occupying that position but to the activities through which information, knowledge, resources and relationships are organised across it (Rechsteiner et al., 2024). Brokers can bridge geographical, organisational, professional, or cognitive gaps, facilitate trust, and introduce ideas from one setting to another (Long et al., 2013). In this article, brokerage is therefore an organisational and relational concept, not a statistical mediation effect.

Boundary spanning overlaps with brokerage but places greater emphasis on crossing the borders among distinct practices or social worlds. Boundary spanners connect separate groups, translate between their expectations and bring in elements of one practice into another so that collaboration can develop and continue (Baas et al., 2023). In higher education, Oonk et al. (2020) argue that teachers working in university–society learning environments require boundary-crossing competence because they must respond simultaneously to curricular requirements, student learning processes and external partners' practical concerns. Research on service-learning similarly shows that boundary spanners can translate the value of different forms of knowledge across academic and organisational settings (Fougère et al., 2020). Brokerage thus directs attention to the actions and resource flows involved, whereas boundary spanning clarifies the institutional, disciplinary and professional borders across which those actions occur.

For the present study, teacher brokerage is organised around four sensitising functions. First, opportunity curation involves identifying, assessing, and recommending courses, competitions, projects, mentors, or other opportunities that teachers consider relevant to particular students or teams. Curation involves more than transmitting information, as teachers may assess the suitability, timing, and educational value of available opportunities. Second, translation entails converting policy language, competition rules, technical requirements and market expectations into intelligible and actionable educational tasks. It can also include translating students' disciplinary knowledge into forms that external partners or competition evaluators can understand. Third, connection and mobilisation refer to linking students with departments, administrators, enterprises, mentors, facilities, funding or specialist expertise and coordinating their contributions. Fourth, continuity work concerns maintaining participation and relationships as projects move between the classroom, competitions, testing, incubation and possible external application. These functions are analytical guides rather than predetermined findings; the empirical analysis inspects how they appear, combine or remain absent across the three cases.

Brokerage should not be assumed to be uniformly beneficial. Because brokers influence the circulation of information and access to resources, they may also become gatekeepers. Opportunities may be channelled towards students already known to a teacher or perceived as especially capable, while those outside informal networks remain less visible. Trust in personal contacts can substitute for transparent institutional routes and make provision vulnerable when an individual withdraws or changes position. Brokerage may also create role overload. Long et al. (2013) note that brokers who become holders or gatekeepers of specialised resources can become overwhelmed, while Baas et al. (2023) show that brokers may face role ambiguity, demanding relational contexts and organisational constraints. A brokerage lens, therefore, makes it possible to examine both the connections teachers create and the fragilities or inequalities that individually sustained connections may produce.

Integrated analytical system and research gap

The analytical system developed for this study links three levels: formal opportunity structures, teacher brokerage practices and accessible entrepreneurship education opportunities. Organisational and relational conditions may enable or constrain the connections between these levels.

Formal opportunity structures comprise the courses, competitions, incubation arrangements, partnerships and support mechanisms officially available within each university. Teacher brokerage practices—opportunity curation, translation, connection and mobilisation, and continuity work—represent the processes through which these structures may become accessible educational opportunities. Accessibility in this system refers to students being informed about, introduced to and supported in using opportunities; it does not presume that participation necessarily produces entrepreneurial intention, capability or venture creation. The relationship between formal provision and accessible opportunities is determined by conditions such as departmental coordination, recognition and rewards for workload, disciplinary fit, teachers' entrepreneurial experience, external networks, access to specialist mentors, support beyond project entry, and the resources available in the surrounding region.

The framework does not treat teachers as the sole actors within an entrepreneurship education ecosystem. Rather, it directs attention to their position between students, academic departments, administrative structures and external stakeholders. It also allows variation to be examined: formal provision may be extensive while

brokerage remains fragmented, or limited resources may be partly compensated for by strong relationships and active coordination. Importantly, the framework leaves open the possibility that brokerage can both broaden and restrict access.

Existing ecosystem research discovers relevant actors and components; entrepreneurship educator research explains pedagogical roles and professional identities; and brokerage scholarship analyses connections across fragmented social and organisational settings. Yet these literatures have rarely been integrated to explain how teachers operationalise university-based entrepreneurship education ecosystems. This omission is especially significant in regional applied universities, where engagement with regional development coexists with potential constraints on specialist expertise, external networks, and institutional capacity. What remains insufficiently understood is how teachers connect otherwise fragmented opportunities, actors and resources, and why their capacity to perform this work varies across institutional settings. The study therefore addresses the previous two questions.

METHODOLOGY

Research design

A teacher-centred qualitative multiple-case study was conducted at three regional applied universities in Central China. Guided by an interpretivist–constructivist orientation, the study examined organisational practices and professional roles through the meanings participants assigned to their experiences (Merriam & Tisdell, 2016). A multiple-case design enabled comparison of recurring brokerage mechanisms as well as context-specific variation across institutional, disciplinary and external-resource settings (Stake, 2006; Yin, 2018).

Universities A, B and C each constituted a bounded case. The university-based entrepreneurship education ecosystem provided the case context, while teachers' brokerage practices formed the primary analytical focus. Administrator interviews and institutional documents were used to contextualise, elaborate and, where appropriate, challenge teachers' accounts of formal provision and organisational support; they were not treated as equivalent primary datasets.

The cases were selected purposively because all three institutions had an applied teaching and regional-service orientation and offered some combination of entrepreneurship courses, competitions, incubation and external collaboration, while differing in organisational arrangements, disciplinary profiles and access to regional partners (Patton, 2015). These similarities and differences supported within-case and cross-case analysis. To protect anonymity, precise locations, distinctive centre names, unique projects and identifiable partner organisations were omitted or generalised. The cases were selected for comparative examination rather than statistical representation of Chinese higher education.

This article reports a deliberately bounded, teacher-centred component of a wider doctoral multiple-case project. Student interviews collected for the wider project were excluded because the present research questions concern how teachers connect actors, opportunities and resources, not how students experience entrepreneurial development. This boundary aligned the evidence base with the article's claims.

Participants and data sources

Primary evidence came from semi-structured interviews with nine teachers directly involved in entrepreneurship education. Three were recruited from each university: one from a business-related discipline, one from a science- or engineering-related discipline and one from a humanities- or social-science-related discipline. Eligibility required direct experience in at least one of the following: teaching entrepreneurship-related courses, coaching competitions or student projects, supporting incubation or practice-based activities, or participating in university–industry collaboration. These criteria focused the interviews on enacted practice rather than general opinions.

Six university administrators, two from each case, provided organisational explanations. Their responsibilities related to academic provision, student development, entrepreneurship programmes or institutional coordination. Interviews addressed governance, curriculum and competition management, funding distribution, teacher incentives, interdepartmental coordination and external partnerships.

Institutional documents were screened from a wider archive of 46 records. Thirty-three documents directly relevant to teacher brokerage, formal entrepreneurship education provision or governance were retained. They included curriculum plans, competition regulations, incubation or practice-based documents, university–industry cooperation arrangements, workload or reward policies, project supervision rules and statements of organisational responsibility. Duplicate records, purely promotional news, unrelated macro-level policies and webpages without a verifiable institutional source or date were excluded. Following Bowen (2009), documents were interpreted in relation to their provenance, institutional purpose and relevance. They established what universities formally provided, expected or recorded, but were not treated as evidence of effective implementation or student outcomes.

Table 1. Data Sources and Analytical Functions

Data source	Number	Analytical function
Teacher interviews	9	Primary evidence concerning brokerage practices, connected resources and experienced constraints
Administrator interviews	6	Organisational explanations of governance, coordination, resource allocation and institutional expectations
Institutional documents	33	Evidence of formal provision, responsibilities and policy arrangements, rather than implementation or impact

Data collection

Data were collected after ethical approval between 24 January 2025 and 23 January 2026. Interviews were conducted in Chinese, lasted approximately 50 minutes, were audio-recorded with permission and transcribed verbatim. The teacher guide addressed participants’ roles, how they identified and communicated opportunities, connected students with internal and external resources, supported projects over time, and experienced organisational enablers or constraints. Administrator interviews focused on institutional responsibilities, programme coordination, teacher support, resource deployment and external collaboration. Follow-up prompts elicited concrete incidents, decisions and examples of practice rather than general evaluations of institutional performance.

Documents were obtained from official institutional sources and materials made available during fieldwork. A document inventory recorded the title, issuing unit, date, document type, relevance to the research questions and inclusion decision for each item. This procedure distinguished formal regulations and programme records from publicity materials, documented the screening process and reduced duplication.

Analysis was conducted in Chinese to preserve participants’ intended meanings and contextually specific terminology. Representative quotations were translated only after selection for reporting, checked line by line against the Chinese transcripts and reviewed by a bilingual researcher for semantic accuracy and readability. Idiomatic wording was used where literal translation obscured meaning, without changing the substantive claim.

Data analysis

NVivo 15 was used to organise transcripts, documents, codes and analytical memos, not as a substitute for interpretation. Analysis combined data-led initial coding with concept-informed thematic development (Braun & Clarke, 2021) in six stages. First, the nine teacher transcripts were read repeatedly and openly coded for

actions, relationships, resources, constraints and episodes of project support. Coding initially remained close to participants' wording and did not require accounts to fit the literature-derived framework.

Second, focused coding identified brokerage actions such as recognising opportunities, interpreting requirements, referring students, connecting actors, coordinating resources, and maintaining involvement. Opportunity curation, translation, connection and mobilisation, and continuity work served as sensitising concepts rather than fixed categories; discrepant material was retained to question and revise the interpretation.

Third, a within-case account was developed for each university, mapping formal provision, teacher practices, connected resources, enabling conditions, constraints and points of discontinuity. Fourth, administrator interviews and institutional documents were compared with teachers' accounts to assess convergence, complementarity, and contradiction. For example, formal workload or reward provisions were considered alongside teachers' descriptions of whether guidance and relationship-building were recognised in practice. Documentary evidence contextualised experience rather than automatically verifying institutional effectiveness.

Fifth, cross-case matrices compared recurring patterns and differences across the universities. Disciplinary background was treated as an interpretive dimension rather than as a basis for generalisable disciplinary claims. Sixth, themes and the emerging conceptual model were developed from negative or deviant cases, including instances where provision operated with little teacher mediation, or where active teachers could not mobilise the required resources. Final themes had to address the research questions, be supported across the dataset and preserve important case differences.

Trustworthiness and reflexivity

Trustworthiness was strengthened through within-case analysis before cross-case synthesis, comparison across teacher, administrator and documentary sources, and active attention to convergence, complementary explanations and contradiction (Lincoln & Guba, 1985). The purpose of source comparison was not to construct a single supposedly objective account, but to clarify how formal arrangements, professional experience and organisational explanations converged or diverged. Coding records, document-screening decisions, case summaries, cross-case matrices and analytical memos formed an audit trail, while negative evidence was used to test emerging claims.

The researcher's position as a university teacher and familiarity with regional higher education supported access and contextual sensitivity but also risked normalising familiar practices. Reflexive memos recorded assumptions, reactions, analytical decisions, and emerging claims, and these were repeatedly checked against transcripts and documents, especially when they closely reflected the researcher's professional experience. Contextual detail was retained to support analytical transferability to comparable settings, while identifying information was withheld to protect participants and institutions.

Ethical aspects

Ethical approval was granted by the Human Research Ethics Committee of Universiti Sains Malaysia on 24 January 2025 (Ref. No. USM/JEPeM/PP/24100886). Institutional permission was obtained from each university. Participants received information about the study's purpose, procedures, voluntary nature, confidentiality and right to withdraw, and provided informed consent for participation, audio-recording and anonymous quotation.

Universities and participants were assigned pseudonyms or numeric codes. Department names, project titles, firms, locations and other potentially identifying details were removed or generalised. Audio files, transcripts and the code key were stored in password-protected folders available exclusively to the researcher. Because combinations of role, discipline and project experience could enable deductive disclosure, quotations were reviewed during reporting and non-essential identifying details were omitted.

FINDINGS

The analysis generated five interrelated themes. Across the cases, formal provision was visible, but teachers repeatedly described the work required to make it usable: interpreting opportunities, matching them to project stages, connecting actors and resources, and sustaining participation beyond a single activity. Administrator accounts explained the surrounding arrangements, while documents established what each university formally offered. The results concern teacher practices and organisational conditions rather than student-level outcomes.

Formal opportunity structures became usable only through active enactment

The documentary evidence showed that all three universities had formal opportunity structures, although these were recorded differently. University A's retained documents were comparatively dispersed: they described competition-based provision, a university–industry practice base, institutional attention to applied teaching, and links with the regional employment and entrepreneurship environment. Teacher and administrator accounts added a university-wide entrepreneurship course, student innovation projects, an incubation space, training, and policy services. University B's documents presented a more explicitly systematised architecture. They distinguished innovation training, entrepreneurship training, and entrepreneurship practice projects; promoted cross-disciplinary teams and enterprise mentors; positioned competitions as a link among teaching, learning, and venture creation; and recorded a dedicated entrepreneurship education unit, a seven-part institutional mechanism, and a city-linked entrepreneurship park. University C's documents documented project monitoring, competition training, alumni mentoring, municipal coordination, entrepreneurship awareness training, specialist salons, mentoring studios, and an entrepreneurship park. Its institutional review also acknowledged that disciplinary integration, industry–education depth, and conversion remained incomplete.

These structures nevertheless required activation. Teachers did not describe courses, competitions, incubators, or coalitions as self-executing pathways. Students had to be informed, helped to interpret expectations, introduced to a relevant person or setting, and supported in converting contact into action. A-TE-B captured this distinction: “Resources only enter the ecosystem when they are employed correctly and generate feedback” (A-TE-B, Q02). Standardised notices and application routes reduced some procedural barriers, but they did not determine which opportunity suited a particular team or how one activity should lead to another.

Administrators confirmed that the problem was not simply an absence of actors or programmes. Across the cases, they described courses, projects, competitions, research platforms, student services, incubators, and external partners, yet noted that a team could still have to resubmit similar material, explain its history again, and find a new mentor when moving between them. Formal integration was therefore stronger in institutional descriptions than in reported project journeys. What made provision usable was active enactment at the points of entry, handover, and continuation.

Curating and translating opportunities across institutional and disciplinary languages

Teacher brokerage began with curation rather than indiscriminate referral. Teachers assessed a team's readiness, the evidence already available, and the risks of the next step before deciding whether to recommend a competition, customer interview, laboratory, enterprise mentor, funding window, or incubation service. Business teachers distinguished among need discovery, solution validation, and operational preparation; STEM teachers used stages such as problem confirmation, proof of principle, repeatability, field testing, and compliance; humanities teachers considered authenticity, consent, audience interpretation, and the rights of cultural or community partners. The identical formal opportunity was therefore interpreted differently according to project type and stage.

Translation operated at several boundaries. Teachers simplified competition and policy requirements, converted enterprise demands into feasible tasks, and helped participants understand different professional standards. A-TE-H explained that enterprise partners spoke about users and costs, cultural partners about authenticity, students about creativity, and the university about education: “The teacher helps each party understand why the others are cautious and then finds a small task they can complete together” (A-TE-H, Q02). In technical projects,

translation also protected external access. B-TE-S stated that before resources were connected, students needed “a test plan, awareness of confidentiality and safety rules” (B-TE-S, Q02). Teachers thus translated not only language but also expectations, evidence thresholds, and responsibilities.

Curation contained an unavoidable gatekeeping element. Several teachers reported tiered support: all students received basic methods, while intensive guidance was concentrated on teams that continued to act, submitted evidence, and respected agreed boundaries. This responded partly to limited time and specialist resources and could prevent premature access to risky settings. Ethical gatekeeping was also evident when humanities and STEM teachers stopped exaggerated claims, unauthorised cultural use, or unsafe testing. Yet administrators warned that selective support could reproduce inequality if resources flowed mainly to teams already familiar with the competition rules or to those close to a mentor. Teachers attempted to moderate this risk by transparent stage criteria, low-cost entry tasks, role rotation, open project clinics, and explicit attention to students who were less confident in public presentation. Brokerage therefore widened access in some respects while retaining the capacity to shape whose projects received deeper support.

Connecting actors and mobilising distributed resources

The clearest expression of brokerage was teachers’ work across organisational boundaries. Internally, they connected students with academic and student services, entrepreneurship units, research offices, laboratories, incubators, and other faculties. Externally, they mobilised firms, customers, alumni, government services, parks, cultural institutions, communities, engineers, and advisers. A-TE-B summarised the role directly: “My role is not to decide the project direction for students, but to get resources moving” (A-TE-B, Q02).

Connection was more than making an introduction. Teachers first clarified the task, the students’ preparation, confidentiality or consent requirements, the expected contribution of the external actor, and the feedback point. They then asked teams to convert the encounter into evidence or an action list. This work gave inexperienced students institutional legitimacy when approaching firms or communities, while protecting partners from poorly prepared requests. It also turned broad cooperation agreements into bounded encounters, such as a customer study, a product test, a cultural content review, or a non-critical engineering trial.

Brokerage reflected the resource configuration of each case. At University A, teachers drew heavily on nearby small firms, local industry, cultural and community organisations, and direct relationships with local decision-makers. Proximity enabled repeated visits, but access often depended on trust accumulated by individual teachers. University B teachers connected projects to energy and industrial facilities, small businesses, heritage and tourism organisations, city-level entrepreneurship initiatives, and controlled test environments. Their brokerage placed particular emphasis on evidence thresholds and risk containment. University C combined local firms and local government resources with alumni and professional connections in the provincial capital and neighbouring coastal markets. Here, brokerage is more often involved in moving projects between local validation and wider customer, brand, engineering, or channel feedback.

Cross-disciplinary connection was valued in all cases but remained organisationally difficult. Teachers described matching business, technical, and humanities students from the problem-definition stage rather than shortly before a competition. Timetables, credit recognition, intellectual-property attribution, and the distribution of staff workload were less stable. Consequently, teachers frequently acted as informal coordinators of work that the official framework permitted but did not consistently organise.

Sustaining participation through invisible relational and developmental labour

Brokerage continued after access had been opened. Teachers described repeated reviews, field visits, customer follow-up, team mediation, safety supervision, content checking, partner communication, failure analysis, and project handover. Much of this work occurred outside scheduled teaching and was difficult to capture in contact hours or awards. B-TE-B observed that “the most time-consuming work is not the intensive preparation before an award, but the continuous accompaniment when a project encounters rejection, cash-flow or delivery problems” (B-TE-B, Q03).

The form of invisible labour varied by discipline. Business teachers followed customer evidence, delivery, and team responsibility after presentations. STEM teachers coordinated laboratory access, procurement, safety cover, long-running tests, field validation, and the preservation of versions and raw data. Humanities teachers reviewed claims, authorisation, copyright, representation, and the return of materials to partners, while also mediating relationships and emotions. A-TE-H noted: “As a female teacher, I also notice that students more often leave interpersonal and emotional support to women teachers. This labour is real, but it is difficult to include in assessment” (A-TE-H, Q03). Similar relational work appeared in other interviews, although it was especially visible in the accounts of humanities and female participants.

Continuity work also involved organising repeated feedback and responsible endings. Teachers used records, stage reviews, and failure reflection to determine whether a team should continue, revise, pause, transfer, or stop. They argued that continuity did not mean keeping every project alive. A project could end responsibly if data, obligations, and relationships were handed over and the reasons for stopping were documented. C-TE-S made the organisational significance explicit: “Technical knowledge kept only on an individual computer cannot become an inheritable ecosystem resource, even if the project has won an award” (C-TE-S, Q18).

Teachers also placed limits on their own brokerage. They required students to perform routine work, maintain records, and assume responsibility; some also established communication periods, safety conditions, and evidence thresholds. Invisible labour was therefore not presented as limitless personal care. It was a necessary but bounded form of developmental and relational work whose sustainability depended on institutional recognition and mutual responsibility.

Organisational conditions produced uneven and fragile brokerage

Teacher brokerage was enabled by formal courses, student projects, competition structures, laboratories, incubation spaces, external partnerships, and supportive leaders. Dedicated units in Universities B and C, project monitoring, enterprise mentors, practical-credit arrangements, and emerging recognition of joint guidance created legitimate entry points. Administrators in all three cases also described efforts to establish project records, referrals, cross-departmental meetings, and stage-specific support. These arrangements meant that brokerage did not rest solely on personal initiative.

Their operation, however, remained uneven for four connected reasons. First, organisational responsibilities and evaluation systems were divided. Academic affairs prioritised curricula, credits, and quality; student services emphasised participation and welfare; research units focused on intellectual property and transfer; competitions rewarded presentation; and enterprises expected usable delivery. Teachers reformatted the same project across several systems, while evidence and partner feedback did not keep pace. The result was a series of formally supported activities without a stable handover mechanism.

Second, workload and reward systems recognised visible outputs more readily than the processes that produced them. Competition awards, project approval, patents, and registration were easier to record than failed experiments, relationship maintenance, content review, team repair, or post-graduation follow-up. Teachers therefore integrated projects into courses and research or limited the number receiving intensive guidance. As A-TE-B put it, “The key is institutionalised arrangements, not long-term dependence upon personal overtime” (A-TE-B, Q03).

Third, support was strongest near entry but weakened during specialised middle and later stages. Teachers could often help teams enter a course, competition, project, or incubator, but repeated testing, pilot production, certification, legal and financial advice, market channels, cultural authorisation, and sustained brand operations required expertise beyond that of a single teacher. Across all nine teacher accounts, some form of discontinuity was described after the initial project, prototype, or competition stage. Graduation intensified this break by changing student status, team composition, access to facilities, and the availability of mentors.

Fourth, the identical personal relationships that made brokerage effective also made it fragile. A trusted teacher could gain access to an external partner and compensate for slow institutional coordination. Yet if the teacher,

enterprise contact, or mentor withdrew, the pathway could disappear. Personal brokerage also risked unequal access. B-AD-AA cautioned that “if resources flow only to teams familiar with competition rules or close to mentors, attractive indicators cannot demonstrate a healthy ecosystem” (B-AD-AA, Q16). Institutional documents partly reinforced this interpretation: University C’s own review acknowledged deficiencies in integration and conversion, while the more formally integrated architecture documented at University B did not remove reported handover and middle-stage gaps. University A’s local partnerships created authentic access but did not by themselves establish a continuous development chain.

Teacher brokerage was therefore both compensatory and constitutive. It enabled ecosystems to operate despite fragmentation, but intensive reliance on it could conceal weak organisational pathways. The central organisational condition was not simply resource volume. It was whether responsibility, project knowledge, specialist support, and relationships could continue beyond a particular event or individual.

Cross-case synthesis: different configurations of teacher brokerage

The cases did not form a simple hierarchy. Each combined formal provision, teacher brokerage, and organisational constraints differently.

Table 2. Cross-Case Configuration of Teacher Brokerage			
Analytical dimension	University A	University B	University C
Formal provision profile	Courses and projects reported in interviews; competition provision, a practice base, and regional support visible in documents	Explicit project categories, competitions, enterprise mentors, a dedicated unit, a seven-part architecture, and a city-linked entrepreneurship park	Courses, projects, monitoring, competitions, training, mentors, studios, an entrepreneurship park, and municipal and alumni links
Dominant teacher brokerage	Turning nearby industry, market, and community problems into bounded learning tasks; trust-based introductions	Stage-gated technical, commercial, and cultural verification; risk control and responsible stopping	Connecting local validation with wider market, engineering, brand, and alumni feedback
Organisational support	Formal entry points and local relationships, but cross-stage coordination remained dependent on teachers	Strong formal integration language and project infrastructure, with continuing handover and middle-stage gaps	Broad, outward-facing support and more varied external connections, with acknowledged integration and conversion problems
External resource pattern	Local small firms, health- and food-related industries, cultural organisations, communities, and public services	Energy and industrial settings, small businesses, heritage and tourism organisations, city initiatives, and controlled test sites	Local firms and government combined with alumni, provincial-capital, and neighbouring coastal-market links
Principal constraints	Personal dependence, repeated documentation, limited specialist growth-stage services, and weak post-graduation continuity	Competition time versus engineering or relationship time, thin middle-stage services, and discontinuity at project transitions	Late involvement of specialist disciplines, competition-centred packaging, and loss of accounts, data, and relationships after events or graduation

Continuity pattern	Repeated local access was possible, but project memory and referral pathways were incompletely institutionalised	Strongest emphasis on stage gates, lifecycle records, and responsible transfer or exit, but implementation remained partial	Potential for local-to-external continuation, but sustained operations and graduate or alumni handover remained fragile
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Note. The configurations describe differences in emphasis and resource organisation rather than ranking the universities by overall quality.

Across the cases, formal provision became accessible through a common sequence: teachers interpreted and curated opportunities, connected relevant actors and resources, and maintained the relationship long enough for feedback and a responsible decision to occur. What differed was the dominant content of brokerage. University A was more place-embedded and relational; University B more stage-gated and risk-conscious; and University C more market-facing and outward-connecting. None of these setups was institutionally complete. In each case, teachers compensated for breaks between activities, but the continuity of support remained vulnerable unless project records, referral responsibilities, specialist mentor pools, and workload recognition were embedded in organisational arrangements.

DISCUSSION

This study examined how teachers connected students, institutional structures and external actors within three university-based entrepreneurship education ecosystems. It identified four related forms of brokerage-opportunity curation, translation, connection and mobilisation, and continuity work and showed that their operation depended on organisational recognition, cross-unit coordination, external relationships and specialist expertise.

From formal provision to ecosystem enactment

The data challenge an additive understanding of an entrepreneurship education ecosystem in which development is inferred mainly from the number of courses, competitions, incubators, mentors or coalitions present. Brush (2014) and Liu et al. (2021) broadened entrepreneurship education beyond the classroom by identifying the actors, resources and operating mechanisms that constitute university-based ecosystems. However, wider ecosystem research cautions that a system cannot be understood as a list of independent elements. Ecosystem resources are interdependent and co-evolve (Stam & van de Ven, 2021), and their value is generated through relational configurations rather than isolated possession (Spigel, 2017). Bischoff et al. (2018) similarly demonstrate that the strength and coordination of stakeholder cooperation are central to entrepreneurship education in higher education institutions.

The present findings broaden this relational argument to educational implementation. Across the cases, formal provision remained a latent opportunity structure until someone interpreted its relevance, prepared participants, created a connection and supported the next step. A competition could operate as a stand-alone event or serve as an entry point to testing, mentoring, and incubation, depending on whether project information, relationships, and responsibility travelled across stages. Likewise, a partnership became educationally meaningful only when teachers translated it into a feasible task and aligned the expectations of students and external partners. This accords with research on experiential entrepreneurship education, which emphasises authentic problems, iterative action, reflection, and feedback rather than mere exposure to activities (Hägg & Gabrielsson, 2020; Motta & Galina, 2023).

These patterns support a distinction between ecosystem provision and ecosystem enactment. Provision refers to the formal availability of actors, programmes and resources; enactment refers to the situated relational work through which those components become accessible and connected around a project. A university-based ecosystem should therefore be assessed not only by programme counts or visible outputs, but also by the accessibility, coordination, and continuity of pathways between them.

Teachers as organisational and boundary-spanning actors

The findings broaden conventional descriptions of entrepreneurship teachers as instructors, mentors, coaches or facilitators. Entrepreneurship educators operate within dialogic relationships with students, institutions and surrounding stakeholders (Wraae & Walmsley, 2020), and their role identities affect how they interpret responsibilities and organise pedagogy (Brush et al., 2024; Wraae et al., 2022). The present study shows that these relationships also involve infrastructural work: teachers interpreted rules, curated opportunities, assembled teams and relationships, negotiated access to resources, resolved confusion, and maintained projects.

This interpretation corresponds to research conceptualising teachers as brokers in university–society learning environments. Oonk et al. (2020) identify network building, project development, translation of real-world assignments and process facilitation as extensions to conventional higher education teacher profiles. In entrepreneurship education, teachers' networking can broaden the resources available to learners (Ruskovaara et al., 2015). Boundary-spanning research further shows that reciprocal learning across academic and organisational settings depends on actors who harmonise expectations and translate knowledge into forms useful on both sides of the boundary (Fougère et al., 2020).

The present analysis connects these observations to ecosystem operation. Teachers did not simply occupy one stakeholder position among many; they enabled flows between positions that were institutionally or cognitively separated. They gave students legitimacy when approaching enterprises, protected partners from poorly prepared requests and helped administrators understand changing project needs. Their importance lay less in controlling resources than in enabling those resources to circulate.

The analysis also makes visible labour that standard academic descriptions may overlook. Relationship maintenance, repeated feedback, team repair, ethical review, failed testing, and responsible closure were necessary to sustain experiential activity but were less visible than contact hours, approvals, or awards. Teachers do not simply participate in entrepreneurship education ecosystems; through brokerage work, they help constitute and operationalise them.

The weakness of individually sustained brokerage

The same brokerage that enabled activity also revealed institutional fragility. Educational brokerage research shows that brokers can connect disconnected actors and promote knowledge flow, but their work is affected by trust, role ambiguity and organisational constraints (Baas et al., 2023; Rechsteiner et al., 2024). Boundary-spanning positions may also create dependence on particular individuals and expose brokers to overload (Long et al., 2013). These tensions appeared across the cases.

One risk concerned unequal access. Teachers' selection of teams was sometimes justified by safety, scarcity or project readiness. Nevertheless, informal curation can privilege students already visible to teachers, familiar with competition conventions or connected to existing networks. Brokerage can therefore widen access while also producing gatekeeping. Transparent criteria, open advisory routes and low-threshold entry activities are needed if teacher judgement is to support rather than narrow participation.

A second risk was that institutions benefited from connective work without fully recognising it. The entrepreneurship educator's role remains only partially legitimised in university strategies, programme specifications and job descriptions (Walmsley & Wraae, 2025). Bell and Bell's (2025) study in China similarly found that educators who introduced constructivist practices struggled to reconcile these practices with established institutional expectations. The current findings broaden this concern beyond classroom innovation: teachers also had to justify enterprise communication, repeated testing, relationship repair and unsuccessful iterations. When assessment systems privilege awards, approvals, and patents, the work that produces those outputs may remain invisible.

A third limit emerged as projects matured. Entry-stage brokerage could often be provided by a committed teacher, but certification, finance, intellectual property, advanced validation, market access and post-graduation

transition necessitated distributed professional expertise. Weakening support after competitions or prototypes therefore reflected a structural mismatch between expanding project needs and the resources allocated to a single educator. Individual teacher agency may temporarily compensate for institutional fragmentation, but it cannot substitute for sustainable organisational coordination.

Theoretical contributions

The study makes three related contributions. First, it advances a processual conception of university-based entrepreneurship education ecosystems. Existing research recognises relevant actors, resources and subsystems (Brush, 2014; Liu et al., 2021), while relational and systems research emphasises interdependence and coordinated interaction (Spigel, 2017; Stam & van de Ven, 2021). The present study specifies enactment as the process through which formal structures acquire practical educational meaning.

Second, it positions teacher brokerage as a meso-level mechanism between institutional provision and accessible educational opportunity. Curation, translation, connection and mobilisation, and continuity work explain how organisational arrangements enter situated project activity. This links research on entrepreneurship education pedagogy and role identity with brokerage scholarship on professional and organisational boundaries.

Third, it establishes the dual character of brokerage. Brokerage can integrate fragmented provision, widen access and sustain engagement, but can also generate gatekeeping, overload, personal dependence and discontinuity. An enduring ecosystem is not one in which individual teachers personally mediate every relationship, but one in which their professional judgement is supported by transparent pathways, distributed expertise and institutional memory.

Pragmatic implications

The findings point to four areas in which universities could reduce their dependence on informal and individually sustained brokerage. The first concerns recognition. Project supervision often involves considerably more than preparing students for competitions. Teachers coordinate across disciplines, communicate with enterprises, oversee repeated testing, address ethical and safety concerns, and sometimes help teams bring projects to a responsible close. Such work should be reflected in workload allocation, promotion criteria and teaching evaluation, rather than being recognised only when it produces an award, project approval or other visible output (Brush et al., 2024). Giving formal value to these less visible activities would strengthen the legitimacy of the entrepreneurship educator role and make it less dependent on teachers' personal commitment and unpaid additional labour (Walmsley & Wraae, 2025).

A second priority is to make coordination more explicit and project information more portable. In the cases examined, teams could be required to explain their project history again or rebuild relationships when moving from a course to a competition, laboratory, incubator or external partner. A shared project record that follows the team across these settings would reduce the loss of information and previous feedback (Liu et al., 2021). Named referral responsibilities, stage-based reviews and regular communication among relevant academic and administrative units could also help turn otherwise separate activities into a more continuous development pathway (Bischoff et al., 2018).

Universities should also acknowledge that no individual teacher can provide every form of expertise required as a project develops. Standing networks of internal and external advisers are therefore needed, with support introduced according to the project stage. Depending on the nature of the project, this may include legal and financial advice, intellectual-property support, technical validation, market development or guidance concerning cultural rights (Ruskovaara et al., 2015). Professional development for entrepreneurship educators should similarly extend beyond classroom teaching to include networking, boundary crossing and the design of learning involving multiple stakeholders (Oonk et al., 2020).

Finally, institutional support should not end when a team enters a competition or completes an initial prototype. Repeated testing, project revision, incubation, enterprise engagement and the transition beyond graduation all require continuity. Clear handover procedures are particularly important when team membership or student status changes, because project data, partner relationships and intellectual-property responsibilities may otherwise be lost. Sustainable collaboration depends on arrangements that remain functional when an individual teacher or external contact is no longer available (Baas et al., 2023). The aim is not to reduce teacher agency, but to allow teachers to exercise professional judgement within an ecosystem that no longer expects them to repair every organisational gap themselves.

Limitations And Future Research

The conclusions of this study should be read in relation to its institutional and evidential boundaries. The research was conducted in three regional applied universities in Central China, with nine teachers providing the principal interview evidence. The cases offered useful variation in organisational arrangements, disciplinary settings and access to external resources, but they do not represent the full range of Chinese higher education institutions. The study therefore supports analytical interpretation of teacher brokerage in comparable settings rather than statistical generalisation across the sector. Research universities, vocational institutions and private universities may organise entrepreneurship education around different missions, incentive systems and stakeholder relationships.

A further limitation concerns the nature of the evidence. Teachers described their practices retrospectively and may not have recalled every unsuccessful attempt, informal decision or abandoned connection. They may also have presented their work in ways consistent with professional expectations. The study sought to moderate this limitation by comparing teacher accounts with administrator interviews and institutional documents. Nevertheless, these additional sources served particular purposes rather than providing independent confirmation of educational impact. Administrators explained governance, coordination and resource arrangements, while documents showed what the universities formally provided, expected or recorded. Neither source could establish how consistently those arrangements operated in practice or how they were experienced by the people receiving support.

The teacher-centred design also placed clear limits on the claims that could be made about access and outcomes. Student interviews from the wider doctoral project were deliberately excluded because the article examined how teachers connected actors, opportunities and resources. As a result, the analysis cannot show whether students regarded those connections as accessible, fair or educationally meaningful. Nor can it determine whether different groups of students benefited equally from teachers' selection and referral decisions. Perspectives from enterprises, external mentors, alumni organisations and public agencies were also absent. Such participants might interpret teachers' boundary-spanning work differently, particularly in relation to trust, preparation, reciprocity and the demands placed on external partners.

Finally, the study captured brokerage at a particular point in time. Retrospective, cross-sectional interviews could identify reported patterns of connection and discontinuity, but they could not trace how relationships changed as projects moved between courses, competitions, testing, incubation and graduation. They also offered limited insight into whether practices initially dependent on an individual teacher later became embedded in formal organisational routines.

Future research could address these limitations by following projects and relationships over time and by bringing together the perspectives of teachers, students and external stakeholders. Longitudinal case studies would make it possible to examine where support intensifies, weakens or changes form during project development. They could also show whether project records, referral systems and specialist networks reduce dependence on individual teachers. Social network analysis may provide a complementary means of identifying where brokerage is concentrated, which actors connect otherwise separated groups and how a network changes when a central teacher or external contact withdraws. Comparative research across different institutional types and regions could further clarify how university mission, organisational capacity and local resource environments produce distinct configurations of teacher brokerage.

CONCLUSION

The three cases show that a university-based entrepreneurship education ecosystem does not become operational just because courses, competitions, incubators and external partnerships are formally available. Its practical value depends on whether dispersed opportunities, people and forms of expertise can be connected when a project requires them. In case universities, teachers frequently undertook such type of work. They helped projects cross organisational and professional boundaries, interpreted unfamiliar expectations and maintained momentum where formal pathways were incomplete.

Teacher brokerage can therefore be understood as a meso-level process through which institutional provision is enacted in practice. This perspective helps explain why universities with apparently similar programmes may generate quite different project pathways. What matters is not only the resources an institution possesses, but whether those resources can be brought together, adapted to a project's stage and carried forward when responsibilities shift. It also makes visible forms of academic work that conventional measures often overlook, including relationship maintenance, unsuccessful iterations, ethical judgement and responsible handover.

The importance of brokerage, however, should not be taken to justify continued dependence on individual teachers. The discretion that enables a teacher to respond flexibly may also concentrate access, increase workload and leave a project vulnerable when a personal relationship ends. For regional applied universities, the central issue is therefore not whether teacher agency should be reduced, but how it can be supported without turning organisational weaknesses into private responsibilities. Project knowledge needs to be retained, referral responsibilities clarified and specialist support made available beyond the initial course or competition stage. A sustainable entrepreneurship education ecosystem is one in which teachers' connective judgement remains important, but continuity no longer depends on invisible labour or the presence of a particular individual.

Ethical approval

Ethical approval for this study was granted by the Human Research Ethics Committee of Universiti Sains Malaysia (JEPeM-USM) on 24 January 2025 (Reference No. USM/JEPeM/PP/24100886). The study was conducted in accordance with the approved research protocol and the relevant ethical principles governing research involving human participants.

Informed consent

Permission to conduct the research was obtained from each participating university. Before data collection, all participants received information about the purpose and procedures of the study, the voluntary nature of participation, audio-recording, confidentiality, anonymity, and their right to withdraw. All participants provided informed consent to participate, to audio recording, and to the anonymous use of their interview quotations in academic publications.

Data availability statement

The qualitative data analysed in this article were generated as part of a doctoral research project. Interview recordings, verbatim transcripts, coding files, case-level analytical matrices, and other raw or case-linked qualitative materials are not publicly available. Although direct identifiers were removed, combinations of institutional role, disciplinary background, university context, and project experience could permit the deductive identification of individual participants or participating institutions.

To protect participant confidentiality and institutional anonymity, and to comply with the conditions of the approved ethics protocol, requests for access to the raw interview data or other case-linked qualitative materials cannot be granted. Findings are reported only in anonymised and aggregated form. Institutional documents that remain publicly accessible may be obtained directly from the relevant issuing institutions.

Conflict of interest

The authors declare that they have no conflicts of interest in relation to the research, authorship, or publication of this article.

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