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Education Diplomacy in Critical Minerals: Indonesia's Nickel Partnerships with the United States, Japan and Australia

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ABSTRACT

Critical minerals diplomacy is usually analysed as a contest over supply chains, investment and trade rules, while education is treated as a separate field of soft power. This article asks how education is positioned within Indonesia's nickel partnerships with the United States, Japan and Australia, and what that positioning reveals about the terms on which a resource-rich middle power engages its partners. Using a qualitative comparative case design, the study applies document analysis and reflexive thematic analysis to 20 freely accessible official documents and reports, most issued between July 2023 and August 2026, including leaders' joint statements, trade agreements, memoranda and ministerial statements. Four themes were identified. First, partners frame education primarily as workforce formation for mineral and clean-energy supply chains, while Indonesia's own statements foreground downstream industrialisation and battery production. Second, education diplomacy runs largely on a parallel track: scholarships, university campuses and exchanges are prominent but rarely linked to mining, processing or battery skills. Third, framing is asymmetric: partners present education as attraction and long-term friendship, whereas Indonesia treats partnerships as channels for capital, technology and domestic vocational capacity built with industrial-park investors. Fourth, the United States shifted between 2023 and 2026 from a capacity-building partnership to a transactional market-access agreement, while Japan moved towards coupling minerals with industrial human resource development. The article proposes the Critical Minerals Knowledge Diplomacy (CMKD) framework, which locates partnerships by the coupling of education to the minerals agenda and by their developmental or transactional orientation, and introduces the concept of the *downstream knowledge gap*. It argues that education will strengthen Indonesia's bargaining position only if it is negotiated as part of the minerals agenda rather than alongside it.

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1. INTRODUCTION

Indonesia has become central to the global energy transition because of nickel. As the world's largest nickel producer, it banned raw ore exports and compelled importers, primarily from China, to invest in domestic processing; the industry expanded at great speed, and downstream industrialisation, or *hilirisasi*, became both an economic success story and a point of national pride [1]. Indonesia's leverage has drawn intense diplomatic attention. In November 2023 the United States and Indonesia elevated their relationship to a Comprehensive Strategic Partnership in which Washington recognised Indonesia's global leadership in the nickel, cobalt and other critical minerals value chains [2]. Two months earlier Japan and Indonesia had elevated their own relationship to the same level [3], and in July 2023 Indonesia's president had used the annual leaders' meeting in Sydney to call for joint production of electric vehicle batteries with Australia [4]. By February 2026 the United States and Indonesia had signed an Agreement on Reciprocal Trade under which Indonesia undertook to remove restrictions on exports of industrial commodities, including critical minerals, to the United States [5].

Each of these partnerships also speaks the language of education. The 2023 United States–Indonesia joint statement promised more Fulbright awards, educational exchanges and support for workforce training in the clean energy transition [2]. Australia welcomed three new Australian university campuses in Indonesia alongside discussions on electric vehicles [6]. Japan's 2026 summit with Indonesia paired a new memorandum on critical minerals with cooperation on industrial human resources, including in artificial intelligence [7]. Yet scholarship has rarely asked how education and critical minerals are connected in such diplomacy, or whether they are connected at all.

This gap matters for two reasons. First, Indonesia's downstream strategy depends on skills. Processing laterite ore, operating smelters and moving into battery manufacturing require metallurgists, engineers and technicians that the national education system has struggled to supply, and studies of the sector identify human capital as a binding constraint [8], [9]. Second, education is a classic instrument of foreign policy, yet its effects are often asserted rather than demonstrated [10], [11]. If partners offer scholarships and campuses while seeking secure access to minerals, the question is whether education functions as a bargaining asset for Indonesia, as goodwill for the partner, or as both.

The three partners examined here share a strategic purpose that makes the comparison instructive. Each seeks to diversify critical mineral supply chains away from dependence on Chinese processing, and each has elevated its relationship with Indonesia while doing so. Yet Indonesia's nickel boom has been financed largely by Chinese investors, who built the industrial parks where most processing takes place, and commentators have warned that any Western partnership in Indonesia's battery supply chain risks being read as indirect investment in a Chinese-dominated sector [12]. The United States, Japan and Australia therefore approach Indonesia as latecomers seeking a share of a supply chain that is already built. What they can offer that Chinese investors cannot—or do not—is a central question for Indonesian bargaining, and education is one of the most frequently cited answers.

The article addresses three research questions. **RQ1:** How is education positioned in Indonesia's nickel and critical minerals partnerships with the United States, Japan and Australia? **RQ2:** How do Indonesian and partner framings of education differ? **RQ3:** What do these patterns reveal about the relationship between knowledge diplomacy and resource bargaining for a resource-rich middle power?

The article makes three contributions. Empirically, it offers a comparative analysis of three dyads across the period from mid-2023 to 2026, including the 2026 United States–Indonesia trade agreement and the 2026 Japan–Indonesia memorandum on critical minerals. Methodologically, it shows how a transparent corpus of freely accessible official documents can be used to trace the place of education within economic diplomacy. Theoretically, it proposes the Critical Minerals Knowledge Diplomacy (CMKD) framework and the concept of the downstream knowledge gap, which connect knowledge diplomacy with research on resource nationalism and supply-chain geopolitics.

Education Diplomacy, Soft Power and Knowledge Diplomacy

The use of international education in foreign policy has long been framed through soft power: states attract foreign students and offer scholarships in the expectation that graduates will carry favourable attitudes and networks home. Critical studies have questioned this assumption. In the United Kingdom, policy documents repeatedly claimed that international students enhance national influence, but the claim rested on untested premises and an outdated model of power [10]. In Canada, international education was positioned as soft power without a coherent policy framework linking it to foreign policy goals [11]. Studies of the United States show how its dominance in international higher education has been treated as a national asset in strategic competition [13].

Knight [16] proposes knowledge diplomacy as an alternative to soft power. Where soft power is about attraction in pursuit of self-interest, knowledge diplomacy describes the role of international higher education, research and innovation in building relations between countries through collaboration, reciprocity and mutual benefit [14]. Knight also warns that knowledge diplomacy can become a form of social washing when declared commitments are disconnected from actual reciprocity [15]. This distinction is useful for critical minerals diplomacy, where the question is whether education is offered as one-way attraction or negotiated as a reciprocal investment in the partner's capabilities.

Critical Minerals, Friend-shoring and Resource Nationalism

The geopolitics of critical minerals has been reshaped by efforts in the United States and allied countries to reduce dependence on Chinese processing. The Minerals Security Partnership, launched in 2022, applied the logic of friend-shoring to minerals by building supply chains among politically aligned states [17]. Friend-shoring promises security but raises questions of economic feasibility and environmental, social and governance standards, and it implicitly asks producer countries to align politically in exchange for investment [18].

Producer countries respond with resource nationalism. In Indonesia, resource nationalism has historically served as a discursive rubric through which elites reorganise extractive settlements while bargaining with foreign investors from a position of geological concentration [19]. The nickel export ban represents a newer variant that seeks domestic value addition rather than outright ownership. Warburton [1] argues that the resulting industrial parks meet nationalist demands for a value-added sector while operating as reconstituted extractive enclaves, with limited linkages to the wider economy. Indonesian scholarship describes a hybrid resource nationalism that welcomes foreign capital while insisting on domestic processing [8] and frames nickel diplomacy as a strategy for moving up the electric vehicle value chain [9].

Skills, Human Capital and Resource-based Industrialisation

A further strand of research concerns the role of human capital in resource-based industrialisation. Downstream processing promises higher value added, but the benefits depend on whether domestic firms and workers can take on technically demanding functions rather than only low-skilled tasks. Studies of Indonesia's nickel sector repeatedly identify skills as a constraint: the industry has expanded faster than the supply of engineers, metallurgists and technicians, and much of the technical expertise in the industrial parks has been supplied by foreign investors [1], [9]. Indonesian policy has responded mainly through vocational institutions attached to industrial areas, most prominently a metals polytechnic created by the Ministry of Industry to serve the Morowali region [20].

This literature has seldom been connected to diplomacy. Yet if skills are a binding constraint, then the education offered by foreign partners is not merely a matter of goodwill: it bears directly on whether Indonesia can capture more of the value chain and reduce its dependence on any single group of investors. Knowledge diplomacy, which emphasises reciprocity and mutual benefit [16], provides a normative benchmark against which such offers can be assessed. The question is whether partners' education commitments are designed around Indonesia's capability needs in the minerals sector or around their own objectives of attraction and influence.

Education has, moreover, a long history in each of the three relationships. Australia marked the 70th anniversary of its scholarships for Indonesian students in 2023 [6]; Japan has framed human resource development as a central element of its cooperation with successive Indonesian governments [21]; and the United States has supported educational exchange with Indonesia for decades, including through the Fulbright programme [2]. These legacies mean that education is an established diplomatic register in all three partnerships. The analytical question is therefore not whether education is present when minerals become strategic, but whether the arrival of minerals as a strategic issue has changed how education is used.

Hedging and the Middle-power Bargain

Indonesia's simultaneous engagement with China, the United States, Japan and Australia is commonly described as hedging. Kuik [22] defines hedging as the pursuit of mutually counteracting policies that maximise returns while preserving fallback options under uncertainty. In the minerals sector, hedging takes a distinctive form: Indonesia has relied heavily on Chinese investment to build smelting capacity while courting Western and Japanese partners for markets, technology and access to trade preferences. Education and skills are potentially part of this bargain, because the capacity to operate and upgrade processing industries determines how far downstream Indonesia can move and how dependent it remains on any single partner.

The Gap

Existing research explains why partners want Indonesian nickel and why Indonesia insists on domestic processing. Research on education diplomacy explains how states use scholarships and campuses for influence. What remains unexamined is the intersection: whether and how education is written into critical minerals partnerships, how producer and partner framings differ, and whether education functions as a bargaining asset for the producer. No study has compared this intersection across Indonesia's main non-Chinese partners in the period in which these partnerships were elevated and, in the case of the United States, converted into a trade agreement. This study addresses that gap.

2. METHOD

Design and Case Selection

The study used a qualitative comparative case design in which each bilateral partnership—Indonesia–United States, Indonesia–Japan and Indonesia–Australia—constitutes a case, and the unit of analysis is the officially documented relationship between education and critical minerals cooperation. Document analysis [23] was combined with reflexive thematic analysis [24], [25], [26]. The three partners were selected because each elevated its relationship with Indonesia to the highest diplomatic tier in 2023, each has explicit critical minerals strategies, and each is a major provider of international education to Indonesians. China, Indonesia's dominant nickel investor, was excluded from the comparison because its partnership follows a different logic of direct investment in industrial parks, but its role is considered in the discussion.

Data Sources

Documents were included if they were (a) issued by a government, a head of government or a ministry of one of the four countries, or reported by an established news outlet quoting such a source; (b) dated between July 2023 and August 2026, with two earlier Indonesian documents retained as reference points; (c) freely accessible online; and (d) concerned with critical minerals, education or human resource development in the bilateral relationship. Twenty documents met these criteria (Table 1). Official documents formed the core of the corpus; news reports were used where they recorded official statements or agreements not otherwise published in full, and to capture Indonesian responses and civil society positions.

Table 1. Corpus of primary documents

Dyad	Document	Date	Main content
United States	Joint statement elevating relations to a Comprehensive Strategic Partnership [2]	Nov 2023	Critical minerals action plan; workforce training; education exchanges
United States	Fact sheet on the Comprehensive Strategic Partnership [27]	Nov 2023	Assistance and initiatives
United States	Joint statement on 75 years of diplomatic relations [28]	Nov 2024	Critical minerals supply chain and standards
United States	Joint statement on framework for the Agreement on Reciprocal Trade [29]	Jul 2025	Removal of export restrictions
United States	Fact sheet and agreement text on Reciprocal Trade [5], [30]	Feb 2026	Critical minerals provisions
United States	Indonesian and civil society responses [31], [32]	2025–2026	Raw ore ban maintained; criticism of the agreement
Japan	Joint statement on Comprehensive Strategic Partnership [3]	Sep 2023	Areas of cooperation incl. education
Japan	Diplomatic Bluebook 2024, Indonesia section [21]	2024	Human resource development priorities
Japan	Memorandum of cooperation on critical minerals [33]	Mar 2026	Minerals supply chain
Japan	Summit summary, Takaichi–Prabowo [7]	Mar 2026	Industrial human resources incl. AI
Japan	Human resource and employment cooperation [34]	Aug 2026	HRD as a pillar of the partnership
Australia	Leaders' meeting media release [6]	Jul 2023	EVs; skills exchange; campuses; scholarships
Australia	Indonesian president's statement [4]	Jul 2023	Four Indonesian priorities
Australia	Western Australia–KADIN action plan [35]	Jul 2023	Critical minerals and worker skills
Australia	Branch campus announcements [36], [37]	2023–2024	Campuses and programmes
Indonesia	Regulation establishing the Morowali metals polytechnic [20]; training with IMIP [38]	2016; n.d.	Domestic vocational capacity for nickel

Note. Full URLs are listed in the References. The Indonesian regulation of 2016 predates the study period but was included as the reference point for Indonesia's domestic minerals education infrastructure.

Coding Frame and Analytic Procedure

Analysis proceeded in six phases. First, all documents were read in full, and every passage referring to critical minerals, nickel, batteries or clean energy supply chains, and every passage referring to education, training, scholarships, universities, skills or human resources, was extracted with its location. Second, for each document we recorded whether education and minerals passages appeared in the same section, in adjacent sections or in unrelated parts of the text, and whether they were linked by an explicit statement. Third, passages were coded using a frame that combined deductive categories from knowledge diplomacy, soft power and resource bargaining with inductive codes generated from the data (Table 2). Fourth, codes were clustered into candidate themes within each dyad. Fifth, themes were compared across dyads and over time using a matrix that also recorded absences. Sixth, themes were reviewed against the full corpus and named. Figure 1 summarises the procedure.

Two analytic decisions shaped the procedure. First, we treated the location of passages within documents as evidence. Joint statements are negotiated texts organised into sections, and the placement of education in a section on people-to-people ties rather than in the section on economic or minerals cooperation signals how the parties classify it. We therefore coded coupling at three levels: explicit linkage within a sentence or paragraph, co-location within the same section, and separation into different sections or documents. Second, we coded absences. Where a minerals agreement or memorandum contained no reference to education, training or human resources, this

absence was recorded and compared across dyads and over time. All documents were available in English; Indonesian-language documents and reports were read in the original and translated by the authors where quoted.

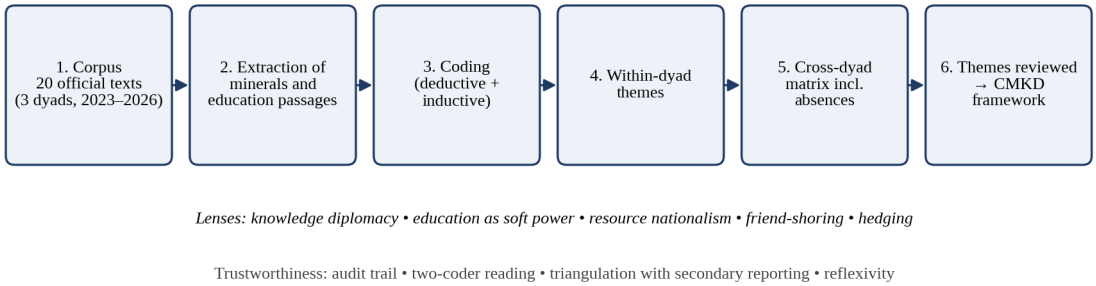


Figure 1. Research design and analytic procedure

Table 2. Coding frame

Category	Guiding question	Example codes
Coupling	Is education linked to the minerals agenda?	Same section; explicit link; separate track; absent
Education form	What type of education is offered?	Scholarships; campuses; exchanges; vocational training; HRD; STEM
Beneficiary	Whose capacity is built?	Indonesian workforce; partner graduates; elites; firms
Orientation	What logic governs the partnership?	Developmental reciprocity; capacity building; market access; conditionality
Speaker	Who frames education, and how?	Partner government; Indonesian government; civil society
Minerals terms	What is exchanged on minerals?	Investment; offtake; export restrictions; standards; processing
Inductive	What else structures the relationship?	Labour standards; environmental standards; AI; China as reference

Trustworthiness, Reflexivity and Ethics

Credibility was supported by an audit trail linking each theme to dated, publicly accessible passages, by independent reading of the core documents by both authors, and by triangulating official statements with Indonesian and international reporting. Coding was treated as interpretive rather than as a measure of inter-rater agreement [26]. The authors' positionality as researchers based in Indonesia with interests in education policy sensitised the analysis to the Indonesian perspective, and particular care was taken to read partner documents on their own terms. Because official texts present negotiated positions, the analysis treats them as evidence of declared priorities and framing rather than of implementation. The study used only publicly available documents, involved no human participants and required no ethical approval.

3. RESULTS AND DISCUSSION

The analysis produced four themes: (1) education as workforce formation for supply chains; (2) the parallel track of education diplomacy; (3) asymmetric framing between partners and Indonesia; and (4) divergent trajectories from capacity building to conditionality. Figure 2 places the key documents on a timeline, and Table 3 summarises how each dyad is positioned on the main analytic categories.

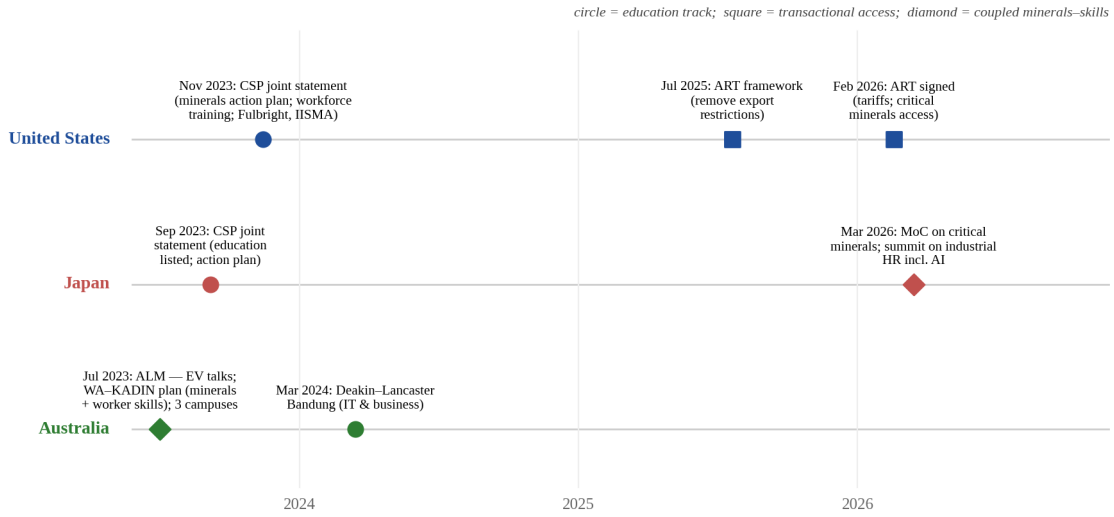


Figure 2. Timeline of key minerals and education commitments in the three dyads, 2023–2026 (authors' compilation from the corpus)

Table 3. Cross-case matrix of education in Indonesia's critical minerals partnerships

Dimension	United States	Japan	Australia
Minerals instrument	Action plan toward a critical minerals agreement (2023); reciprocal trade agreement (2026)	Memorandum of cooperation on critical minerals (2026)	EV cooperation directed to officials; sub-national action plan (2023)
Education instrument	Fulbright, exchanges, IISMA, LPDP, Georgetown presence, STEM	Industrial human resources incl. AI; HRD and employment mobility	Branch campuses; scholarships; skills exchange; engineer recognition
Coupling	Coupled in 2023 (workforce training in energy and minerals section); absent from 2026 minerals provisions	Increasingly coupled: minerals MoC and HRD in the same 2026 summit	Parallel nationally; coupled sub-nationally (WA–KADIN)
Beneficiary	Workers in both countries; future US specialists	Indonesian industrial workforce; mobile workers	Indonesian students and professionals
Orientation	From developmental reciprocity to transactional access	From general cooperation to coupled industrial HRD	Relational and long-term

Theme 1: Education as Workforce Formation for Supply Chains

When partners connect education to critical minerals, they do so through the language of workforce formation rather than higher education or research. The clearest example is the 2023 United States–Indonesia joint statement. In its section on critical minerals, the two leaders emphasised the opportunity to create high-standard clean energy supply chain jobs in both countries and committed to strengthening Indonesia's investment environment with technical assistance and capacity-building resources [2]. In the section on the clean energy transition, they announced a memorandum on sustainable energy and mineral development and stated that the United States would engage Indonesian policymakers on workforce needs, including workforce training and just transition policies [2]. Education, in this construction, is a means of preparing workers for a supply chain whose standards are set jointly but whose market is largely external.

The same logic appears in the Australian case at the sub-national level. During the July 2023 leaders' meeting, Indonesia's chamber of commerce, KADIN, signed an action plan with the state of Western Australia covering the critical mineral supply chain and worker skills [35]. At the national level, the Australian release referred to new pathways to support skills exchange and mutual

professional recognition for engineers under the bilateral economic partnership agreement [6]. Japan's formulation is the most recent and the most explicit about sectoral content: the March 2026 summit confirmed that the two countries would cooperate on the development of industrial human resources, including in artificial intelligence, in the same meeting that referred to the newly signed memoranda on critical minerals and nuclear energy [7].

The workforce framing is closely tied to labour and environmental standards. In the 2023 joint statement, the United States and Indonesia committed to policies advancing occupational safety and health and fair wages, and to ensuring that employers uphold internationally recognised labour standards at mining and processing facilities [2]. Training, in this context, is part of a governance package intended to make Indonesian supply chains acceptable to partner markets. It responds to concerns in partner countries about the social and environmental record of Indonesia's nickel industry, and it positions Indonesian workers primarily as subjects of standards rather than as future innovators.

Across the three partners, then, the minerals–education link is constructed through workers and skills rather than through universities, research collaboration or technology development. The partner provides training, standards or mobility; Indonesia provides the workforce and the resource. No document in the corpus committed a partner to joint research on laterite processing, battery chemistry or recycling with Indonesian institutions, and none tied scholarships to minerals engineering or metallurgy.

Theme 2: The Parallel Track of Education Diplomacy

Where education is most visible, it is least connected to minerals. In the 2023 United States–Indonesia joint statement, education appears in a separate section on people-to-people ties. There the leaders committed to increase Fulbright awards and to grow exchanges through the Indonesian state endowment fund for education (LPDP), the Indonesian International Student Mobility Awards (IISMA), the Darmasiswa scholarship and youth programmes, and welcomed the establishment of a Georgetown University presence in Jakarta to build Indonesia's human capital and research capacity [2]. The section also refers to cooperation in science, technology, engineering and mathematics with a focus on women and youth. None of these commitments is linked to the critical minerals section of the same document.

The structure of the document makes the separation visible. The critical minerals commitments appear under the heading on inclusive economic growth, and the workforce training commitment under the heading on the clean energy transition, whereas scholarships, Fulbright awards and university presence appear under the heading on people-to-people ties, cultural exchanges and tourism [2]. The accompanying fact sheet similarly lists education and health assistance as part of a long history of development cooperation rather than as an element of the minerals partnership [27]. The two agendas are thus presented as parts of one comprehensive relationship, but they are organised, justified and implemented separately.

The Australian pattern is similar. The 2023 release described education as a long-standing pillar of the relationship, noted that more than 200,000 Indonesians had studied at Australian tertiary institutions, marked the 70th anniversary of Australian scholarships for Indonesians, and welcomed Western Sydney, Deakin and Central Queensland universities' plans to open campuses in Indonesia alongside Monash University [6]. The electric vehicle discussion in the same release ended with leaders directing officials to advance cooperation, without reference to education. The programmes actually launched illustrate the separation: the joint Deakin–Lancaster campus in Bandung was set to offer undergraduate programmes in information technology and business [37]. The branch campus wave thus expanded Australia's educational presence in Indonesia substantially, but in fields that bear little relation to the minerals agenda that both leaders highlighted.

Japan's 2023 joint statement lists education among many areas of bilateral progress—alongside infrastructure, trade, labour, energy and disaster reduction—without connecting it to resources [3]. Japan's Diplomatic Bluebook frames human resource development as a response to the priorities of the Indonesian government, alongside infrastructure [21]. Education in this account is a long-standing development partnership rather than a component of a minerals strategy.

The parallel track is not the result of a shortage of education diplomacy. On the contrary, the period from 2023 to 2026 saw unusually intensive education activity: new branch campuses, expanded scholarship programmes and a planned American university presence in Jakarta. What is striking is that this expansion occurred at the same moment that critical minerals became the most strategic element of the relationships, yet the two agendas did not meet. The fields of the new campuses, the focus of the new exchange commitments and the stated rationales for them were shaped by long-standing priorities in business, technology, policy studies and people-to-people ties rather than by the minerals partnership.

We call this pattern the parallel track. Education diplomacy and critical minerals diplomacy are conducted in the same documents and the same summits, but in separate sections, by different agencies and with different beneficiaries. The parallel track allows partners to present a comprehensive relationship while keeping minerals negotiations focused on access, investment and standards.

Theme 3: Asymmetric Framing

The third theme concerns who speaks about education, and for what purpose. Partner governments frame education as attraction and long-term friendship. The Australian release describes education as a source of warm friendships between students and young professionals [6], and the United States joint statement presents exchanges as a means of fostering people-to-people connections, describing the planned Georgetown presence as training the next generation of American policy specialists on Indonesia and Southeast Asia [2]. These are classic soft power rationales, in which the partner's reputation and networks are the primary returns [10].

Indonesia's own statements are framed differently. At the 2023 Sydney meeting, the Indonesian president's published statement listed four priorities: joint production of electric vehicle batteries, trade under the bilateral economic partnership agreement, carbon capture and green-energy smelters, and the new capital city [4]. Education was not among them. When Indonesia's energy minister welcomed the 2026 memorandum with Japan, he stressed that Indonesia was open to Japanese government and business involvement in managing its critical minerals [33]. Contemporary commentary on the Sydney meeting made the same observation: the Indonesian president's statement was almost entirely about business, whereas the Australian prime minister was the one who celebrated deepening education links and the planned campuses [12]. In Indonesian official discourse, partnerships are channels for investment, technology and markets that serve downstream industrialisation.

A further asymmetry concerns who pays. Among the vehicles named in the 2023 United States joint statement for expanding educational exchanges are Indonesia's own programmes: the state education endowment fund (LPDP), the Indonesian International Student Mobility Awards (IISMA) and the Darmasiswa scholarship [2]. Much of the student flow that appears in partner documents as education diplomacy is therefore financed by Indonesia itself. Indonesia is not only a recipient of partners' soft power but also a major purchaser of their education services. This position could, in principle, give Indonesia leverage over the fields its scholars study and the institutions they attend; the documents analysed show no sign that this leverage has been linked to the minerals agenda.

Where Indonesia does build minerals-specific education, it does so domestically and with industrial-park investors rather than with these partners. The Ministry of Industry established the Morowali metals polytechnic in 2016 to provide vocational education in metal industry technology [20], and the ministry has organised training with the Indonesia Morowali Industrial Park, whose operators supply competency profiles and workforce needs [38]. The most concrete minerals education in the Indonesian system is therefore anchored in the Chinese-invested industrial parks that Western partners seek to diversify away from. This creates an asymmetry: the partners that offer the most visible education diplomacy are not the partners with which Indonesia's minerals-specific skills system is integrated.

Theme 4: Divergent Trajectories, from Capacity Building to Conditionality

The fourth theme is temporal. Between 2023 and 2026 the three partnerships moved in different directions. The United States moved from a capacity-building partnership to a transactional market-access agreement. In 2023, its commitments on critical minerals were embedded in a broad relationship that included labour standards, technical assistance, workforce training and an action plan intended to lay the foundation for a future critical minerals agreement [2]. By 2024, the leaders were still committing to a supply chain built on sustainable development principles, including strong environmental and labour standards [28]. In July 2025, however, the framework for the reciprocal trade agreement reduced the minerals component to a commitment by Indonesia to remove restrictions on exports of industrial commodities, including critical minerals, to the United States [29]. The agreement signed in February 2026 maintained a 19 per cent tariff on most Indonesian goods while Indonesia committed to remove those restrictions [5]. Its critical minerals provisions call for Indonesia to cooperate on developing its rare earth and critical minerals sector in partnership with United States companies and to promote recovery of critical minerals from waste streams [30]. The provisions we examined contain no education or workforce training commitments.

Indonesian responses show that the transactional turn was contested. Immediately after the 2025 framework, officials from the energy ministry stated that the ban on raw mineral exports would remain and that any exports to the United States would consist of processed materials consistent with the downstreaming policy [31]. After the 2026 signing, the environmental organisation Walhi called on the president to cancel the agreement, and critics highlighted provisions granting United States investors treatment no less favourable than domestic firms across the minerals value chain [32]. Education, which had been part of the 2023 package, was absent from these debates.

Japan's coupling also sits within a wider regional framework. The 2026 summit placed critical minerals and industrial human resources alongside cooperation on geothermal power and waste-to-energy under the Asia Zero Emission Community, and alongside civil nuclear cooperation [7]. Education and skills are thus being integrated into an energy-transition agenda in which Japan positions itself as a provider of technology and finance. Whether this produces minerals-specific training or broader industrial labour cooperation remains to be seen, but the direction differs clearly from that of the United States.

Japan moved in the opposite direction. Its 2023 joint statement elevated the partnership in general terms and anticipated an action plan [3]. In March 2026 the two governments signed memoranda on critical minerals and nuclear energy, and the summit later that month placed industrial human resource development, including artificial intelligence, in the same economic agenda as resource and energy security [7]. By August 2026 Indonesian and Japanese officials were describing human resource development as a key pillar of the partnership [34]. Japan thus moved towards coupling minerals and skills, although the coupling remains framed around industrial labour and mobility rather than higher education and research.

Australia's trajectory is the most stable. The education track continued to expand through branch campuses and scholarships, while minerals cooperation remained concentrated in commercial and sub-national arrangements such as the Western Australia–KADIN plan [35], [36]. Commentators at the time observed that an electric vehicle partnership looked good on paper, given that Indonesia accounted for 37 per cent of world nickel production and Australia for 53 per cent of world lithium production [12]. The Australian relationship therefore combines a strong education track with a minerals track that is weakly institutionalised at the national level.

Cross-case Synthesis and Disconfirming Evidence

Taken together, the themes show that education is present in all three partnerships but rarely negotiated as part of the minerals agenda. Coupling, where it exists, is through workforce formation rather than knowledge co-production, and the most minerals-relevant education in Indonesia is built domestically with industrial-park investors. The partnerships nonetheless differ in direction: the United States decoupled education from minerals as it moved to a transactional agreement, Japan began to couple them through industrial human resources, and Australia maintained a parallel track with sub-national coupling.

Three pieces of evidence qualify these findings. First, the absence of education from the 2026 trade agreement's minerals provisions does not mean that education cooperation between the United States and Indonesia has ended; exchanges and scholarships may continue through other channels not covered by the corpus. Second, Australian branch campuses may in future offer engineering or minerals programmes, and scholarship fields are not specified in the documents analysed. Third, the corpus captures declared positions; actual programmes such as training under the United States–Indonesia energy memorandum may exist below the level of leaders' statements. These qualifications point to the need for implementation research but do not alter the pattern in how education is positioned at the level of strategic commitment.

Education as Goodwill Rather Than Bargaining Asset

The findings suggest that, in Indonesia's main non-Chinese minerals partnerships, education has functioned more as goodwill for partners than as a bargaining asset for Indonesia. Scholarships, exchanges and branch campuses are presented as evidence of a comprehensive relationship, and they build the networks and reputations that soft power theory associates with international education [10], [13]. Yet they are not tied to the capabilities Indonesia most needs to move further downstream. This is the situation that Knight [15] warns about when she distinguishes genuine knowledge diplomacy from declarations that are disconnected from reciprocity: knowledge cooperation is invoked to signal partnership without being designed around the partner's development goals.

This interpretation does not imply bad faith. Education and minerals are governed by different ministries, budgets and constituencies in all four countries, and the parallel track may simply reflect bureaucratic separation. But the effect is the same. Because education is not negotiated as part of the minerals agenda, Indonesia cannot easily use its resource leverage to obtain the research partnerships, specialised training and technology transfer that would strengthen its position in the battery value chain. The bargain struck in critical minerals diplomacy is therefore narrower than the language of comprehensive partnership suggests.

Resource Nationalism and the Skills Dimension of Downstreaming

Research on Indonesian resource nationalism has focused on ownership, export bans and domestic processing requirements [19], [8]. The present findings point to a skills dimension that has received less attention. If, as Warburton [1] argues, nickel industrial parks risk becoming nationalist enclaves with limited linkages to the wider economy, one reason may be that the knowledge needed to operate and upgrade them is produced within the enclaves themselves. Indonesia's most specific minerals education institution was created to serve the Morowali industrial area and works with the park's operators [20], [38]. Western and Japanese partners, by contrast, offer education largely outside the minerals sector. Resource nationalism has secured domestic processing, but it has not yet secured domestic control over the knowledge base of processing.

Hedging, Friend-shoring and the 2026 Turning Point

The divergent trajectories identified in Theme 4 can be read through the lenses of hedging and friend-shoring. Friend-shoring asks producer countries to align supply chains with politically trusted partners [17], [18]. In 2023, the United States approached this goal through a developmental package that included labour standards, capacity building and workforce training. By 2026 it pursued the same goal through trade conditionality, linking tariff treatment to the removal of export restrictions. For a hedging state, these two approaches carry different implications [22]. A developmental package expands Indonesia's options by building capabilities it can use with any partner; a transactional agreement narrows them by binding market access to concessions on resource governance. Indonesia's insistence that only processed materials would be exported [31] shows that it continues to defend the core of its downstream strategy, but the absence of education from the agreement means that this defence is not accompanied by gains in capability.

Japan's trajectory points in a different direction. By pairing its minerals memorandum with cooperation on industrial human resources, Japan offers a form of coupling that is closer to Indonesia's stated priorities [7], [34]. The coupling remains centred on industrial labour and mobility

rather than university research, but it suggests that education can be written into minerals diplomacy when the partner's own industrial strategy requires a skilled counterpart workforce.

From Scholarships to Knowledge-for-access Bargains

The findings also suggest what a different bargain could look like. Indonesia's leverage in critical minerals rests on geology and on the export ban that turned geology into processing capacity. Partners seek access to processed nickel, investment opportunities and compliance with standards. Indonesia could treat education as a currency in this exchange, seeking knowledge-for-access bargains in which partner access to minerals is linked to specific commitments on research, training and technology. Such bargains would differ from the current pattern in three ways. They would target the minerals value chain rather than education in general; they would build institutional capacity in Indonesian universities and polytechnics rather than only individual mobility; and they would be negotiated within minerals agreements rather than announced in separate sections of joint statements.

The comparison with Chinese investment sharpens this point. Chinese firms have trained Indonesian workers on site because they need them to run their plants, and Indonesian vocational institutions have been built around those parks. Western and Japanese partners, arriving later, have less need to train workers on site, because their interest is primarily in offtake, standards and diversified supply. Unless Indonesia makes knowledge cooperation a condition of access, the partners most interested in diversifying away from China may also be those least likely to invest in the skills that would reduce Indonesia's dependence on Chinese expertise. In that sense, the downstream knowledge gap is not only a domestic policy problem but also a diplomatic one.

Rethinking Education Diplomacy from the Producer Side

Most research on education diplomacy is written from the perspective of the provider: the state that offers scholarships, hosts students or exports campuses [10], [11], [13]. Even knowledge diplomacy, which emphasises reciprocity, is often illustrated through initiatives led by countries with established research systems [14]. The Indonesian case suggests the value of reversing the perspective. For a producer country, the question is not how much attraction an education offer generates for the provider, but what capabilities it builds at home and how it changes the producer's bargaining position. From this angle, a branch campus offering business degrees and a training programme in battery metallurgy are not equivalent forms of education diplomacy, even if both appear in the same joint statement. Producer-side analysis also brings into view the producer's own spending on education abroad, which is usually treated as part of the provider's soft power rather than as an instrument the producer might use strategically.

New Theoretical Contributions

Beyond its empirical findings, the study makes four theoretical contributions, summarised in Table 4.

The Critical Minerals Knowledge Diplomacy (CMKD) framework. Existing frameworks treat knowledge diplomacy and resource diplomacy separately. The CMKD framework places partnerships on two dimensions: the *coupling* of education to the minerals agenda (from a separate track to explicit integration) and the *orientation* of the partnership (from transactional access to developmental reciprocity). The resulting matrix identifies four types: parallel-track relational, coupled developmental, coupled conditional and decoupled transactional partnerships (Figure 3). Applied to the three dyads, the framework shows that the United States moved from the coupled-developmental towards the decoupled-transactional quadrant between 2023 and 2026, Japan moved from a parallel track towards coupling, and Australia combined a parallel national track with sub-national coupling. The framework extends Knight's [16] concept of knowledge diplomacy by specifying the conditions under which knowledge cooperation becomes part of resource bargaining.

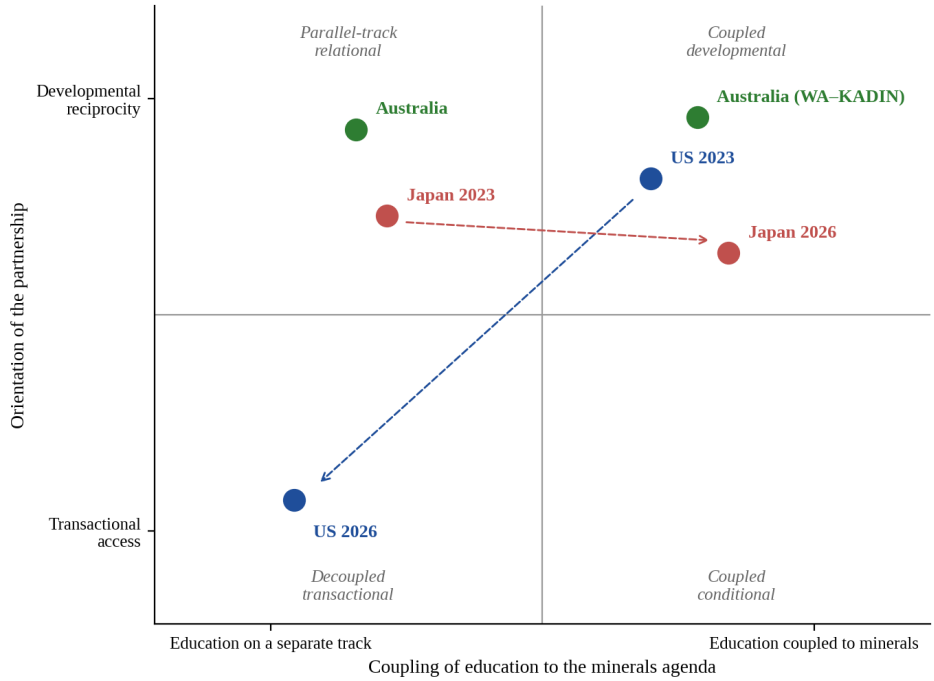


Figure 3. The Critical Minerals Knowledge Diplomacy (CMKD) framework and the positions of the three partnerships (authors' analysis)

The downstream knowledge gap. We define the downstream knowledge gap as the mismatch between a producer country's success in localising mineral processing and its limited control over the knowledge needed to operate, upgrade and diversify that processing. The gap arises when resource nationalism secures domestic processing through export restrictions, while education partnerships with diversifying partners remain disconnected from the minerals sector and minerals-specific training is concentrated within investor-led industrial parks. The concept connects research on resource nationalism [1], [19] with knowledge diplomacy and offers a measurable target for policy.

The parallel track as a diplomatic form. The study identifies the parallel track—the co-presence of education and minerals commitments in the same diplomatic documents without functional linkage—as a recognisable form of partnership diplomacy. The parallel track allows partners to present comprehensive relationships while keeping minerals negotiations narrow. It refines soft power critiques [10], [11] by showing how education can be used not only for attraction but also to broaden the appearance of reciprocity in resource relationships.

Workforce formation as the dominant minerals–education link. When education and minerals are coupled, the link runs through workers and standards rather than through research and technology. This finding qualifies the friend-shoring literature [17], [18], which emphasises investment and standards but not the distribution of knowledge. It suggests that friend-shoring, as currently practised, tends to position producer countries as sources of compliant labour and processed material rather than as partners in innovation.

Table 4. Summary of the new theoretical contributions

Contribution	Theory extended	Core proposition	Evidence in this study
CMKD framework	Knowledge diplomacy; resource diplomacy	Partnerships vary by coupling of education to minerals and by developmental or transactional orientation	Cross-case matrix (Table 3); Figure 3

Contribution	Theory extended	Core proposition	Evidence in this study
Downstream knowledge gap	Resource nationalism	Localised processing without control over its knowledge base	Indonesian polytechnic and IMIP training versus partner education offers (Theme 3)
Parallel track	Education as soft power	Education broadens the appearance of reciprocity without functional linkage	US and Australian documents (Theme 2)
Workforce-formation link	Friend-shoring; supply-chain geopolitics	Coupling runs through labour and standards rather than research	US 2023, Japan 2026, WA–KADIN (Theme 1)

Implications

For Indonesian policymakers, the findings imply that education should be negotiated as part of minerals agreements rather than alongside them. Concrete options include tying scholarship quotas to metallurgy, materials science and battery engineering; requiring partner investment to include joint research centres with Indonesian universities; and seeking recognition of Indonesian vocational qualifications from institutions such as the Morowali polytechnic. For partner governments, the findings suggest that offering minerals-specific knowledge cooperation would make their partnerships more attractive relative to investors who already train Indonesian workers on site. For universities, including the new Australian branch campuses, the critical minerals agenda offers an opening for programmes that connect their presence in Indonesia to the country's industrial strategy. For researchers, the CMKD framework offers a template for comparing other producer countries, such as Chile, the Democratic Republic of Congo or the Philippines, whose resources are courted by the same partners.

4. CONCLUSION

This article examined how education is positioned in Indonesia's nickel and critical minerals partnerships with the United States, Japan and Australia. It found that education is present in all three partnerships but rarely negotiated as part of the minerals agenda. Where the two are coupled, the link runs through workforce formation rather than research or technology; where education is most visible, in scholarships, exchanges and branch campuses, it runs on a parallel track. Partners frame education as attraction and friendship, while Indonesia frames partnerships as channels for investment and builds its minerals-specific training domestically with industrial-park investors. Between 2023 and 2026, the United States moved from a capacity-building partnership to a transactional agreement without education commitments in its minerals provisions, while Japan moved towards coupling minerals with industrial human resource development. The Critical Minerals Knowledge Diplomacy framework and the concept of the downstream knowledge gap explain these patterns and suggest that education will strengthen Indonesia's bargaining position only if it is written into the minerals agenda itself.

The broader lesson concerns how critical minerals diplomacy is studied. Analyses that focus only on investment, trade rules and standards risk missing the knowledge dimension of supply chains, which ultimately determines who captures value from the energy transition. Bringing education into the analysis shows that the terms of partnership are set not only in trade agreements but also in decisions about who is trained, in what fields and where. For Indonesia, and for other resource-rich middle powers courted by competing partners, these decisions may prove as consequential for long-term development as decisions about export bans and smelter investment.

The study has several limitations. The corpus consists of official documents and news reports and therefore captures declared positions rather than implementation. Some agreements, including the full text of the Japanese memorandum on critical minerals, were analysed through official summaries and reporting rather than complete texts. China, Indonesia's largest nickel investor, was excluded from the comparison, although its role in minerals education was considered through Indonesian sources. The period of analysis ends in August 2026, and the partnerships continue to evolve. Future research could examine implementation through interviews with officials, universities and companies; compare China's education and training activities in the nickel sector with those of

the three partners; trace the fields of study of Indonesian scholarship recipients; and apply the CMKD framework to other producer countries.

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Data availability. All documents analysed are publicly accessible at the URLs listed in the References. No new data were generated.

Ethics. The study analysed publicly available documents only. It did not involve human participants or personal data, so no ethics approval was required.

Disclaimer. The findings concern the content of published official documents and reports, not the implementation of programmes or the intentions of any official. Agreements and policies may have changed since the time of writing. The views expressed are solely those of the authors.

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