



Climate Change or Climate Crisis? Multilingual Framing of Environmental Risk and the Governance of Transnational Climate Education

Reazul Ahsan¹

María Teresa Martínez García²

Abstract:

Transnational higher education programs teach climate and sustainability topics to diverse, multilingual student groups, mainly in English. However, research on how climate terminology affects perceived risks has largely focused on English and monolingual populations, leaving a gap in understanding how language works in transnational classrooms. This paper explores whether the language used to describe climate risk is important for education providers and develops a framework to show how terminology affects understanding of scientific content and risk perception. We combine three areas of research: climate terminology and risk perception, the effects of using a foreign language in decision-making, and English-medium instruction in global education. Our framework compares climate terminology in English, Spanish, and Korean. We propose the Multilingual Risk Transmission Framework, highlighting four areas where languages may differ: the words used, their emotional meanings, knowledge transfer, and how messages are understood. From this, we create seven testable ideas and a research plan that pairs language data with experiments on risk perception. Finally, we stress that language policy in transnational education also involves managing risks. Institutions should focus on standard terms, bilingual explanations, assessment methods, and communication about hazards to address an often-overlooked aspect of education.

Key words: transnational education governance; English-medium instruction; climate change communication; risk perception; cross-linguistic terminology; branch campuses

Received: March 10 Revised: March 19 Accepted: March 23

¹University of Utah Asia Campus, Incheon, Republic of Korea

²University of Valladolid, Valladolid, Spain

Corresponding Author: Reazul Ahsan

Email: reazul.ahsan@utah.edu

1. Introduction

Consider two English words. A tornado, in standard dictionary definition, is a violent whirling wind accompanied by a funnel-shaped cloud that travels over land; a waterspout is a comparable rotating column that descends from cloud to the surface of an ocean or lake (Merriam-Webster, 2021). To a non-specialist, the salient distinction is not meteorological but locational, and location implies exposure: land is where people live. The two words therefore carry different implied consequences even though they describe closely related physical processes.

Korean has two words for similar weather phenomena, but they have different meanings. The word 토네이도 (tonei-do) means "tornado" and comes from English. In everyday Korean, it mainly refers to the dangerous funnel storms found in North America. The other word, 용오름 (yong-oreum), means "waterspout" and is a native term. It literally means "the rising of a dragon," stemming from myths where dragons symbolize good luck rather than danger. This term describes a weather event that happens regularly along the Korean coast and is usually seen as a spectacle rather than a threat. The two words differ in two main ways: one is borrowed from English, and the other is a native word; one represents a dangerous event while the other represents something harmless.

The issue of terminology became a real challenge in June 2014 when a tornado hit Ilsan, which is about 30 kilometers away from any significant body of water. Korean media found themselves in a tough position regarding how to label the event (Online News Department, 2014). They could refer to it as a 토네이도, which accurately described what happened according to standard definitions, but that could create unnecessary panic by suggesting it was as severe as tornadoes in places like Oklahoma.

On the other hand, calling it a 용오름 would signal a less dangerous event and imply a connection to water that didn't apply, potentially misleading people into thinking it was less serious than it actually was. Unfortunately, neither term really captured the true risk involved, highlighting a significant limitation in the available vocabulary.

This situation illustrates that what seems like a simple translation issue is, in reality, part of a broader governance challenge, especially in the context of transnational higher education. With branch campuses, franchised degrees, joint programs, and cross-border online courses, educational frameworks designed in one country are often delivered to students in another—and mainly in English. The rapid rise of English-medium instruction (EMI) in higher education has been largely driven by internationalization efforts and the dominance of English in academic publishing (Macaro et al., 2018). This creates a disconnect when it comes to subjects like climate change or disaster risk, as students are learning to identify and discuss hazards in a language that is not the one they will use in real scenarios.

Three areas of research relate to this situation, but they haven't been connected. The first area studies how words about climate affect public risk perception. It shows that word choice matters, but most research has been done in English with only English-speaking participants. The second area looks at how people make decisions in a second language. This research finds that individuals assess risk differently in a foreign language compared to their first language, but it hasn't been applied to climate issues. The third area focuses on English Medium Instruction (EMI) and how transnational education is governed. While it looks at understanding and fairness, it does not consider how people perceive risk.

This paper makes four key contributions. First, it combines these three areas of research and explains how they connect. Second, it introduces the Multilingual Risk Transmission (MRT) framework, which breaks down the process from scientific

information to perceived risk into four levels where language differences can create misunderstandings. Third, it uses the framework to analyze English, Spanish, and Korean and proposes seven ideas that can be tested. Finally, it outlines a two-part plan for testing these ideas and suggests actions that transnational organizations can take in the meantime.

This is a conceptual paper; therefore, the comparative material in Section 5 is based on existing research, news articles, and word usage; it is not original data and does not present new findings. This material aims to support the framework and show its relevance, not to test it. Section 7 explains how such a test would be carried out.

2. Three Literatures in Search of an Intersection

2.1 Climate terminology and risk perception

That the wording of a problem shapes the judgements people make about it is among the most durable findings in decision science (Tversky & Kahneman, 1981). Applied to climate change, the question has typically been posed as a choice among competing labels. Early work found that Americans' expressed beliefs varied depending on whether survey questions asked about "global warming" or "climate change" (Schuldt et al., 2011), and that the two terms elicited different levels of familiarity and concern in the United Kingdom (Whitmarsh, 2009). The question acquired practical urgency in 2019, when The Guardian instructed its journalists to prefer "climate crisis" and "climate emergency" over "climate change" in order to convey severity—a shift subsequently traced across global news nomenclature (Schäfer et al., 2023).

The experimental evidence on whether the newer terms achieve their intended effect is, however, largely negative. Feldman and Hart (2021) found that "climate emergency" reduced the perceived credibility and newsworthiness of news stories relative to "climate change," with no compensating gain in engagement. In the largest test to date, Bruine de

Bruin et al. (2024) randomly assigned 5,137 US residents to one of five terms and found that "climate change" and "global warming" were rated most familiar and most concerning, with no evidence that "climate crisis" or "climate emergency" produced greater perceived urgency. Their auxiliary analyses point to a mechanism: unfamiliar terms depressed concern, urgency and stated willingness to act. Familiarity, not intensity, appears to carry the effect.

The critical observation for present purposes is the composition of this evidence base. It is overwhelmingly Anglophone and monolingual. The handful of studies conducted elsewhere either translate English stimuli into a target language or examine a single non-English public in isolation. Hung and Bayrak (2020) found no difference in Taiwanese respondents' concern or willingness to act between "climate crisis" and "climate change" labels; Wege et al. (2024) reported broadly convergent findings on terminology comprehension in Germany. Bruine de Bruin and Dugan (2022), drawing on the World Risk Poll, found that concerns about severe weather and concerns about climate change have different correlates, and that in some regions people report perceiving long-term weather change more readily than they report perceiving climate change. Each of these is valuable, but none asks the comparative question: whether the sets of terms that different languages make available are themselves commensurable.

This matters because the dominant model of climate risk perception treats language as a background condition rather than a variable. Van der Linden's (2015) climate change risk perception model integrates cognitive, experiential, socio-cultural and socio-demographic determinants and accounts for a substantial share of variance in holistic risk perception; affective processes emerge as the single strongest predictor. Notably, van der Linden observes that inconsistent terminology across the studies he synthesises may itself explain some of the variance in the literature. The model is well specified within a language. It is silent on what happens across languages.

2.2 Language, emotional distance, and the foreign-language effect

A largely separate literature has established that bilinguals do not evaluate risk identically in their two languages. Keysar et al. (2012) demonstrated that the classic framing effect on risky choice disappeared when options were presented in participants' foreign language; further experiments showed reduced loss aversion under the same manipulation. Costa et al. (2014) extended the finding to moral judgement. Most directly relevant here, Hadjichristidis et al. (2015) found that foreign-language presentation reduced judged risk and increased judged benefit, and attributed the shift to attenuated affective response.

Two accounts compete. The emotional-distance account holds that a foreign language elicits weaker affective reactions, so that emotion-driven components of judgement are muted. The processing-fluency account holds that a foreign language is processed less automatically, prompting more deliberate and systematic evaluation. The accounts are not mutually exclusive, and the literature has not settled between them; replication has also been uneven across tasks and populations, and the effect should not be treated as a fixed constant.

The analytical move at the centre of this paper follows from placing these two literatures side by side. If affect is the strongest single predictor of climate risk perception (van der Linden, 2015), and if processing in a second language attenuates affective response (Hadjichristidis et al., 2015; Keysar et al., 2012), then delivering climate content in a language that is L2 for the learner should attenuate perceived risk relative to delivering identical content in L1. This is a specific, directional, falsifiable prediction. It has not, to our knowledge, been tested. It also has an immediate institutional referent, because delivering content in learners' L2 is precisely what English-medium transnational education does by design.

2.3 English-medium instruction and transnational provision

EMI in higher education has grown rapidly and unevenly. Macaro et al.'s (2018) systematic review of eighty-three studies documents both the expansion and the thinness of the evidence base regarding its effects on content learning. Reported difficulties cluster around unfamiliar subject-specific vocabulary and reduced comprehension relative to first-language instruction. Their review also records a governance observation of direct relevance: the decision to adopt EMI has rarely involved systematic consultation with the faculty and students who must operate within it. Medium of instruction is typically set as an internationalization or market-positioning decision, not as a pedagogical or communicative one.

Transnational education intensifies this. In a branch campus or franchised program, curriculum design, accreditation standards and often assessment rubrics originate in the awarding institution's national system, while students, hazards and civil-protection infrastructure belong to the host system. The language of delivery bridges the two, and in doing so becomes the channel through which all content—including content about risk—passes. Quality assurance frameworks for transnational provision generally address language in terms of student proficiency thresholds for admission. They do not address what the choice of medium does to the transmission of hazard information.

3. The Monolingual Default in Transnational Climate Education

Bringing the three literatures together makes visible a mismatch that is ordinarily invisible because each of its components is individually unremarkable. In a transnational program teaching climate adaptation or urban resilience, four languages are potentially in play at once: the language in which the underlying science was published, the language

of instruction, the language in which the student thinks and reasons most fluently, and the language of the hazard environment in which the student actually lives. In an Anglophone-designed program delivered in English to Korean-dominant students in Korea, these are English, English, Korean, and Korean respectively.

The consequence is not merely that some content is harder to understand—a familiar EMI finding—but that the risk signal is calibrated in one language and received in another. A student may learn the term "storm surge" in English, encounter 폭풍해일 in a municipal alert, and hold no reliable mapping between the perceived severity of the two. The instructional term and the operational term are lexically unlinked in the student's processing even when they are semantically equivalent in a dictionary.

Coastal reclaimed-land districts in Northeast Asia illustrate the stakes without requiring exotic assumptions. Such districts frequently host international branch campuses, are exposed to typhoon and storm-surge risk, and operate civil-defence and municipal alert systems exclusively in the national language. A student body drawn from multiple linguistic backgrounds receives its formal instruction on coastal flood risk in English and its operational hazard warnings in Korean. Nothing in the institution's quality assurance apparatus registers this as a problem, because each component is separately compliant: the curriculum meets the awarding institution's standards, the alerts meet the municipality's.

We therefore state the governance claim plainly. An institution that has chosen a medium of instruction has, whether or not it deliberated on the matter, chosen a risk-communication channel. Where the curriculum concerns hazards to which students are personally exposed, medium-of-instruction policy is risk-communication policy. It should be governed as such.

4. The Multilingual Risk Transmission Framework

The MRT framework decomposes the path from scientific content to perceived risk into four sequential layers, each of which can attenuate or amplify the risk signal, and each of which can diverge across languages independently of the others (Figure 1). Divergence at any single layer is sufficient to produce different perceived risk from identical scientific content. The framework is deliberately modular: it is intended to locate where a cross-linguistic difference arises, not merely to record that one exists.

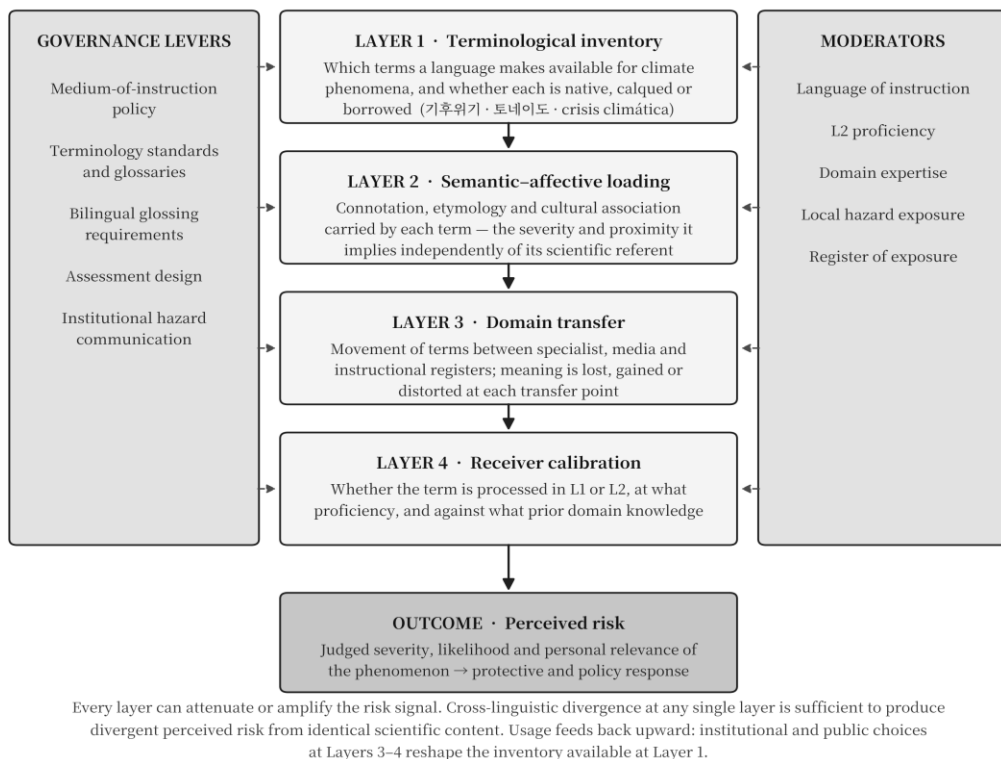


Figure 1. The Multilingual Risk Transmission (MRT) framework. Terminological choice intervenes between scientific content and perceived risk at four distinct layers, each subject to moderation and each addressable by institutional governance.

4.1 Layer 1: Terminological inventory

Languages differ in the set of terms they make available for climate phenomena, and in the morphological status of those terms. Some are native coinages, some are calques, some are phonological borrowings. Korean discourse distinguishes 기후변화 (climate change), 지구온난화 (global warming) and, increasingly, 기후위기 (climate crisis); discourse-analytic work has shown that these circulate with distinct thematic profiles rather than as synonyms (임연수 et al., 2021), and that 기후위기 emerged as a discursive formation with its own trajectory (강희숙, 2023). Spanish offers cambio climático, calentamiento global, crisis climática and emergencia climática. English offers the corresponding five-term set examined by Bruine de Bruin et al. (2024).

Inventory is not merely a list. What a language lacks is as consequential as what it has. Where a language has no routine, non-technical term for a phenomenon, that phenomenon is difficult to make salient in public or instructional discourse regardless of the speaker's intent. The Ilsan case is precisely an inventory failure: the required term—an inland, moderate-severity funnel storm—did not exist as a distinct lexical item, and the two adjacent items both misrepresented the event in opposite directions.

4.2 Layer 2: Semantic–affective loading

Each available term carries connotation, etymology and cultural association that operate independently of its scientific referent. The dragon etymology of 용오름 is the clearest illustration in our material: a term whose morphological transparency links it to an auspicious mythological figure is unlikely to transmit hazard with the same force as a term with no such association. Conversely, a phonological borrowing carries the affective profile of the contexts in which its source-language use is most visible. 토네이도 imports the severity distribution of American tornadoes into Korean, irrespective of the severity distribution of Korean funnel storms.

Loading also operates on the abstract terms. Commentators writing in both German and Spanish have noted that "crisis" carries an implicature of episodic disturbance—crises are resolved, or they pass—which sits awkwardly with a phenomenon that is secular and irreversible on human timescales. Whether that implicature attenuates perceived severity is an empirical question; that it differs across languages with different lexical histories for the term is a reasonable prior.

4.3 Layer 3: Domain transfer

Terms move between registers: from specialist publication to mass media to instructional materials. Meaning is lost, gained or distorted at each transfer. Two features make this layer language-sensitive. First, specialist registers are more standardised than general ones, and standardisation is partly a function of the size and dispersion of the language community. Second, and more consequentially, English functions as the *lingua franca* of scientific publication, with the great majority of indexed natural-science output appearing in that language (Ammon, 2012; Hamel, 2007). For speakers of other languages, transfer from specialist to general register is therefore frequently also translation, adding a step at which divergence can enter.

The literature on risk communication supplies the reason this matters. Risk perception is socially constructed and mediated through the categories available to describe it (Garvin, 2001); media representations of scientific work shape public perceptions of climate risk (Nerlich et al., 2010); and lay audiences defer more heavily to expert framing in domains where they hold little independent knowledge (Siegrist & Cvetkovich, 2000). Where the expert framing arrives in translation, the translator's lexical choices acquire consequences that neither the scientist nor the reader can inspect.

4.4 Layer 4: Receiver calibration

The final layer concerns the receiver: whether the term is processed in L1 or L2, at what proficiency, and against what prior domain knowledge. This is where the foreign-language effect enters. The prediction from Section 2.2 is that L2 processing attenuates perceived risk through reduced affective engagement.

A competing prediction must be distinguished. Bruine de Bruin et al. (2024) found that unfamiliar terms depress concern and urgency. Because L2 vocabulary is on average less familiar than L1 vocabulary, an observed L2 attenuation might reflect familiarity rather than affect. The two mechanisms make different predictions under proficiency manipulation: familiarity effects should diminish sharply as proficiency and exposure rise, whereas affective attenuation is expected to persist, in reduced form, even at high proficiency. Any adequate design must therefore measure proficiency continuously rather than dichotomizing bilinguals against monolinguals.

4.5 Moderators and governance levers

Figure 1 also identifies two sets of variables that act on the layers rather than sitting within them. Moderators—language of instruction, L2 proficiency, domain expertise, local hazard exposure, and register of exposure—condition the magnitude of transmission at each layer. Governance levers—medium-of-instruction policy, terminology standards and glossaries, bilingual glossing requirements, assessment design, and institutional hazard communication—are the subset of variables that an educational institution can actually manipulate. The distinction is the practical payoff of the framework: it separates what a transnational provider must accommodate from what it can decide.

5. Illustrative Application: English, Spanish and Korean

Table 1 maps the three languages against the framework's first two layers. The material is drawn from published discourse-analytic work, lexicographic sources and media reporting. It is offered as illustration of the framework's analytic traction, not as evidence for its propositions.

Table 1. Comparative terminological map across English, Spanish and Korean, by MRT layer.

Concept / MRT layer	English	Spanish	Korean
Superordinate term (L1)	climate change; global warming; climate crisis; climate emergency; climate justice	cambio climático; calentamiento global; crisis climática; emergencia climática	기후변화 (gihu-byeonhwa); 지구온난화 (jigu-onnanhwa); 기후위기 (gihu-wigi)
Morphological status (L1)	Native compounds throughout	Native compounds; partial calques from English	Sino-Korean compounds; conceptually calqued from English
Evidence on relative loading (L2)	"Climate change" and "global warming" most familiar and most concerning; no urgency gain from "crisis"/"emergency" (Bruine de Bruin et al., 2024; Feldman & Hart, 2021)	Documented shift toward crisis framing in media and institutional discourse; little experimental evidence on comparative loading	Distinct thematic profiles per term rather than synonymy (임연수 et al., 2021); 기후위기 traceable as an emergent discourse (강희숙, 2023)
Hazard term: funnel storm over land	tornado (native; catastrophic association)	tornado (borrowed; regionally variable exposure)	토네이도 (phonological borrowing; associated with North American catastrophe)
Hazard term: funnel storm over water	waterspout (native; low-consequence association)	tromba marina; manga de agua	용오름 (native compound, lit. "rising

Concept / MRT layer	English	Spanish	Korean
			of the dragon"; auspicious association)
Inventory gap identified	None for the land/water distinction	None for the land/water distinction	No routine term for an inland, moderate-severity funnel storm (Online News Department, 2014)
Register dispersion (L3)	High: pluricentric, many national media systems	High: pluricentric across Spain and Latin America	Low: single national media system, geographically concentrated

5.1 English

English is the best-evidenced case and simultaneously the least representative. Its five-term inventory has been experimentally tested at scale, and the finding is that the traditional terms outperform the newer ones on familiarity and concern, with no urgency advantage accruing to crisis framing (Bruine de Bruin et al., 2024). English is also pluricentric: because it serves as a first language across multiple continents with sharply different hazard profiles, it has developed a rich and regionally variable vocabulary for climate-produced meteorological events. This richness is a property of English's sociolinguistic position, not of the phenomena, and it is precisely the property that transnational programmes export.

5.2 Korean

Korean presents the opposite profile: a single national speech community, geographically concentrated on a peninsula, with a comparatively narrow hazard range. Its superordinate climate vocabulary is calqued from international discourse but has

acquired independent discursive trajectories in domestic circulation (강희숙, 2023; 임연수 et al., 2021). Its hazard vocabulary mixes native compounds with English borrowings in a pattern that appears to track whether the phenomenon is domestically frequent or foreign-associated. The 토네이도/용오름 pair encapsulates both features: the borrowed term does the catastrophic work, the native term does the routine work, and the space between them—which is where the Ilsan event fell—is lexically empty.

5.3 Spanish

Spanish is pluricentric like English but has been studied like Korean, which is to say hardly at all in experimental terms. The available literature is predominantly media-analytic and social-perception research examining how the crisis frame has propagated through Spanish-language reporting and institutional communication. This asymmetry—a major world language, spoken across radically different hazard environments from the Iberian Peninsula to the Caribbean and the Southern Cone, with almost no comparative experimental evidence on terminological loading—is itself a finding worth stating. It also makes Spanish the highest-value case in a three-language comparison, because it varies from English on evidence base while matching it on pluricentricity, allowing the two properties to be separated.

6. Propositions

The framework generates the following testable propositions. P1 through P3 concern the terminological landscape (Layers 1–3); P4 through P7 concern its perceptual consequences (Layers 2 and 4).

P1. The sets of terms available for climate-produced meteorological phenomena in English, Spanish and Korean are not related by simple translation equivalence; each language contains at least one item with no single-item counterpart in the others.

P2. Divergence between specialist and general registers will be greater in English and Spanish than in Korean, because pluricentric languages sustain greater regional variation in general-register usage while specialist registers remain internationally standardized.

P3. Terminological differentiation for a given phenomenon will track the historical frequency of that phenomenon in the relevant speech community's hazard environment, measurable against national meteorological records.

P4. Perceived-risk ratings for hazard terms will diverge from the objective severity of their referents in proportion to the affective loading identified at Layer 2, with the largest divergence for phonological borrowings.

P5. Bilingual participants rating semantically equivalent terms in L2 English will report lower perceived risk than the same participants rating those terms in their L1.

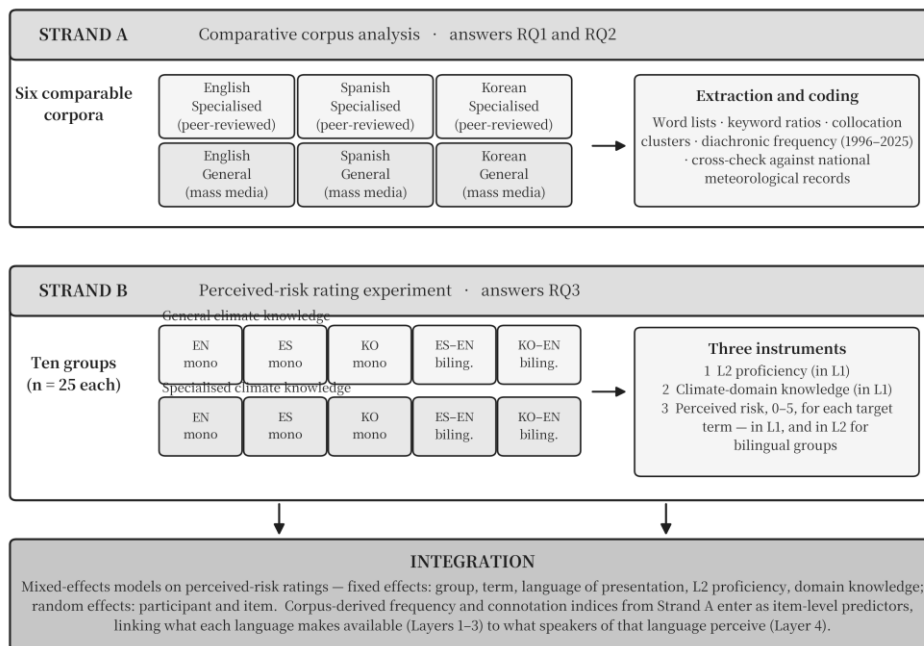
P6. The attenuation predicted in P5 will decrease as measured L2 proficiency increases, but will not reach zero at high proficiency; a familiarity-only account predicts that it will.

P7. Domain expertise will reduce but not eliminate cross-linguistic divergence in perceived risk, because expertise operates on Layer 3 standardization without neutralizing Layer 2 loading.

P6 is the framework's principal diagnostic. If attenuation disappears entirely at high proficiency, the parsimonious explanation is unfamiliarity rather than affective distance, and the framework's Layer 4 should be reformulated accordingly. P1 is likewise falsifiable in a strong sense: if the three inventories prove translation-equivalent, the framework's foundational premise fails.

7. An Empirical Program

Testing the propositions requires two strands of evidence that are uninterpretable in isolation. Strand A establishes what each language makes available; Strand B measures what speakers of that language perceive. Figure 2 sets out the design.



Strand A establishes the terminological landscape; Strand B measures its perceptual consequences. Neither strand is interpretable alone.

Figure 2. Two-strand research design. Corpus-derived indices from Strand A enter the Strand B models as item-level predictors, linking the terminological landscape to its perceptual consequences.

7.1 Strand A: Comparable corpora

Six corpora are constructed on a two-by-three design: specialist and general registers crossed with English, Spanish and Korean (Table 2). Comparability rather than parallelism is the sampling criterion—the corpora are matched on domain, period and

approximate size, not composed of translations of one another, since translation would eliminate the very inventory differences under investigation.

Table 2. Strand A corpus architecture.

Parameter	Specialist corpora	General corpora	Rationale
Source type	Peer-reviewed climate, meteorology and adaptation literature	National mass media: broadsheet, broadcast and major digital outlets	Captures the transfer step at MRT Layer 3
Languages	English, Spanish, Korean	English, Spanish, Korean	Varies pluricentricity (EN, ES) against concentration (KO)
Period	1996–2025	1996–2025	Spans the pre- and post-2019 nomenclature shift (Schäfer et al., 2023)
Sampling	Stratified by subfield and year	Stratified by outlet, editorial orientation and year	Prevents outlet or subfield dominance
Extraction	Word lists; keyword ratios against reference corpora; collocation clusters; diachronic frequency	Identical procedure	Comparable indices across all six corpora
External comparison	National meteorological records for each speech community	Same	Tests P3: terminology against actual hazard frequency

Analysis proceeds by regression on the extracted indices, with language and register as predictors, addressing P1 and P2. The meteorological cross-check addresses P3. Two outputs are carried forward to Strand B: a frequency index for each target term within its language, and a coded connotation profile derived from collocation patterns.

7.2 Strand B: cross-linguistic perceived-risk experiment

Ten participant groups of twenty-five are recruited on a five-by-two design (Table 3): three monolingual groups and two English-bilingual groups, each at two levels of climate-domain knowledge, with specialist-knowledge groups recruited from relevant university programs.

Table 3. Strand B participant groups (n = 25 per cell; N = 250).

Language profile	General climate knowledge	Specialized climate knowledge
English monolingual	Group 1	Group 6
Spanish monolingual	Group 2	Group 7
Korean monolingual	Group 3	Group 8
Spanish–English bilingual (intermediate to advanced L2)	Group 4	Group 9
Korean–English bilingual (intermediate to advanced L2)	Group 5	Group 10

Three instruments are administered online. The first measures L2 English proficiency and is delivered in the participant's first language. The second measures climate-domain knowledge and is likewise delivered in the first language, so that neither instrument confounds the construct it measures with the language competence under investigation. The third elicits perceived risk: participants rate each target term on a scale from 0 (not risky at all) to 5 (very dangerous situation). Monolingual groups rate in their first language only; bilingual groups rate in both languages, in counterbalanced blocks separated by a filler task, giving a within-participant test of P5 and P6.

Stimulus construction is the design's most delicate element. Target terms are selected from the Strand A inventories to span three categories: superordinate terms, native hazard terms, and borrowed hazard terms. Because the propositions concern non-equivalence across languages, item sets cannot be strictly matched; instead, items are

linked by referent rather than by lexical form, and referent-level severity is coded independently from meteorological definitions so that divergence between rated risk and referent severity is measurable.

7.3 Analysis

Perceived-risk ratings are modelled using mixed-effects regression with fixed effects for group, term category, language of presentation, continuous L2 proficiency, and domain knowledge, and random intercepts for participant and item. Corpus-derived frequency and connotation indices enter as item-level predictors, which is the point at which the two strands join: it allows the analysis to ask whether what a language makes available (Layers 1–3) predicts what its speakers perceive (Layer 4). The critical test for P5 and P6 is the language-of-presentation term and its interaction with proficiency in the bilingual subsample.

7.4 Design limitations and ethical considerations

Three limitations warrant statement in advance. First, twenty-five participants per cell yields limited power for detecting the moderation effects specified in P6 and P7; item-level replication partially compensates, but the study should be understood as a calibration exercise whose function is to establish effect sizes for a subsequent adequately powered design rather than to deliver definitive estimates. Second, monolingual and bilingual groups differ on more than language profile, and comparisons across them are correlational; only the within-participant bilingual comparison supports directional inference. Third, participants recruited from university climate programs differ systematically from general-population samples in ways beyond domain knowledge.

Ethically, the study presents low risk but two considerations. Hazard stimuli may be distressing to participants with direct disaster experience, and the protocol should include screening and withdrawal provisions. Second, participants are not debriefed on the terminological manipulation until completion, since foreknowledge would compromise the measure; standard deferred-debriefing procedures apply. Ethical approval would be sought from the institutional review boards of both participating institutions.

8. Implications for Transnational Education Governance

The framework's practical value lies in separating what institutions must accommodate from what they can decide. Table 4 maps the available levers to the layers they act on.

Table 4. Governance levers by MRT layer.

Lever	Layer targeted	Institutional owner	Indicator
Bilingual terminology glossary for hazard and climate terms	1, 3	Program committee; discipline lead	Proportion of hazard terms in course materials with host-language equivalents supplied
Medium-of-instruction policy reviewed against risk-relevant content	4	Academic board; partner institution jointly	Existence of a documented review; identification of risk-critical modules
Bilingual glossing requirement in risk-critical modules	3, 4	Module convener	Compliance rate across designated modules
Assessment permitting host-language demonstration of hazard comprehension	4	Assessment board; awarding institution	Availability of the provision; uptake rate
Campus hazard communication issued in all major campus languages	1, 2, 3	Estates, safety and student services	Languages covered; time lag between first and last language issued

Lever	Layer targeted	Institutional owner	Indicator
Staff development on terminological transfer	2, 3	Academic development unit	Participation among staff teaching risk-critical content

8.1 Terminology standards and glossing

The lowest-cost intervention is also the most immediately actionable: programs teaching hazard content should maintain a bilingual or multilingual glossary linking instructional terms to the terms students will encounter in the host jurisdiction's operational communications. This is not translation for comprehension, which EMI programs already do informally; it is deliberate lexical bridging between the instructional register and the civil-protection register. The framework predicts that the bridge matters most precisely where the terms are least obviously problematic—where a dictionary equivalent exists but carries different affective loading.

8.2 Medium of instruction as risk-communication policy

The stronger claim is that medium-of-instruction decisions should be reviewed against the risk-relevant content of the curriculum, not only against internationalization objectives and proficiency thresholds. This does not entail abandoning EMI. It entails identifying the modules in which perceived risk is a learning outcome that matters operationally—coastal flood risk, heat exposure, seismic and typhoon preparedness—and asking explicitly whether those outcomes are being achieved through a channel that the evidence suggests may attenuate them. Given Macaro et al.'s (2018) finding that faculty and students are rarely consulted on medium-of-instruction decisions, the governance deficit here is procedural before it is substantive.

8.3 Assessment and quality assurance

If a student can define storm surge in English but cannot recognise the corresponding term in a municipal alert, the learning outcome has been assessed but not achieved. Assessment design in risk-critical modules should permit or require demonstration of comprehension in the operational language of the host jurisdiction. This is a departure from standard transnational practice, in which assessment language follows instruction language as a matter of course, and it would require negotiation with awarding institutions and accreditors.

Quality assurance frameworks for cross-border provision currently treat language as an input variable—admission thresholds, staff proficiency—rather than as a mediating variable affecting outcomes. Extending review criteria to ask how risk-relevant content is transmitted across the language boundary would be a modest addition with disproportionate reach, since accreditation requirements propagate through partner networks in a way that individual institutional policy does not.

8.4 Equity

A distributive consideration follows directly from the framework. Under the Layer 4 prediction, students with the lowest proficiency in the medium of instruction receive the weakest risk signal from identical content. In a transnational cohort, those students are disproportionately from the host country and from lower-resourced educational backgrounds, since higher prior English proficiency correlates with prior access to international schooling. The institution has thus distributed a safety-relevant good in inverse proportion to prior advantage—without intending to, and without any mechanism that would detect it. Whatever the eventual empirical verdict on effect sizes, this is the reason the question deserves institutional attention rather than only scholarly attention.

9. Limitations and Boundary Conditions

The primary limitation of this work is clearly stated at the beginning and reiterated here: this is a conceptual paper. While the framework is based on published evidence and documented cases, it has not been empirically tested. The propositions outlined in Section 6 are hypotheses rather than confirmed findings. The comparative material presented in Section 5 is illustrative and drawn from secondary sources; it serves to establish plausibility rather than quantify magnitude.

Three significant boundary conditions apply to this framework. First, the study focuses on only three languages—English, Spanish, and Korean—selected for analytical contrast based on their linguistic characteristics (pluricentric versus concentrated) and research depth (well-evidenced versus under-studied). This selection does not represent the diversity of the world's languages. Consequently, the findings may not readily extend to languages with different relationships to English or differing traditions in scientific publishing.

Second, the literature on the foreign-language effect is not consistent. Replication of findings has varied across different tasks and populations, and the underlying mechanisms are still debated. This framework builds on the foreign-language effect while acknowledging it as a variable with uncertain impact. Thus, Proposition 6 is framed as a diagnostic tool rather than a firm assumption. If the effect proves to be unreliable, particularly regarding hazard stimuli, significant revisions to Layer 4 will be necessary.

Third, it is essential to distinguish between perceived risk and actual behavior. Evidence from Anglophone contexts indicates that the effects of terminology on individuals' willingness to act are much smaller than those on their expressed concerns. Moreover, political orientation has a more significant influence than terminology on both

willingness and concern (Bruine de Bruin et al., 2024). Any assertion that terminological governance will alter student behavior during a hazard event exceeds the support provided by current evidence. A more defensible claim is that institutions are currently making consequential choices without recognizing that they are indeed making choices.

10. Conclusion

When Korean media could not decide what to call the Ilsan storm, the difficulty was not journalistic incompetence. It was a structural feature of the language's terminological inventory meeting an event that inventory had not been built to describe. Transnational education institutionalizes a version of the same difficulty and does so continuously rather than episodically: it takes hazard concepts formed in one linguistic and geographic context and transmits them, in a language that is foreign to most recipients, to students living in a third context whose operational hazard communications use different words again.

This paper has argued that the resulting transmission is neither transparent nor neutral and has proposed a framework that locates where it can fail. The framework's four layers are individually well grounded in existing scholarship; what is new is their combination and the specific prediction that follows from it, that English-medium delivery of hazard content may attenuate perceived risk relative to first-language delivery. That prediction is testable, and Section 7 specifies how.

For the governance of transnational education, the implication does not depend on the eventual effect size. Medium of instruction is currently set by internationalization strategy and adjudicated by proficiency thresholds. Where the curriculum concerns risk to which students are personally exposed, it should additionally be adjudicated by

whether the risk signal survives the crossing. That is a question institutions can begin to ask before the evidence is complete, and the levers in Table 4 are available now.

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