

Localization Vectors and Adaptation Mechanisms of Pedagogical Innovative Terms in Russian And Uzbek Languages

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Abstract: The rapid internationalisation of pedagogical theory since the late 1990s has generated a large body of English-origin innovative terminology – blended learning, scaffolding, gamification, competency-based education, formative assessment – that has been absorbed into Russian and Uzbek academic and instructional discourse through markedly different linguistic mechanisms. This article investigates five principal localization vectors (direct transliteration/borrowing, structural calque, semantic extension of a native lexeme, descriptive adaptation, and hybrid formation) applied to a purposive corpus of 200 pedagogical innovative terms extracted from peer-reviewed journals, state educational standards, and teacher-training textbooks published between 2005 and 2024. Quantitative frequency analysis reveals that Russian adapts 34% of terms via direct borrowing against 29% in Uzbek, while Uzbek shows significantly higher recourse to semantic extension (31% vs. 18%), a pattern attributed to the agglutinative morphology of the Turkic host language and ongoing Latinisation-era language planning. Qualitative analysis uncovers convergence in calque formation driven by shared Bologna Process reforms and divergence in morphophonological integration strategies. The findings carry implications for terminology standardisation, bilingual curriculum development, and the design of professional glossaries in post-Soviet multilingual educational systems. The article concludes with a structured research-gap matrix and priority agenda for future interdisciplinary investigation.

Keywords: Terminological localization; pedagogical innovation; Russian lexicology; Uzbek linguistics; loanword adaptation; educational discourse; contrastive terminology.

Introduction: The globalisation of educational research and policy has accelerated the cross-linguistic transfer of specialist terminology at an unprecedented pace. Since the adoption of the Bologna Declaration (1999) and subsequent Lisbon Strategy (2000), signatory and partner states have been compelled to incorporate Anglophone pedagogical constructs into their own educational vocabularies. Russia and Uzbekistan, sharing a Soviet-era institutional heritage yet diverging sharply in typological language profile – Russian being an East Slavic inflected language and Uzbek an Altaic agglutinative Turkic language – present a uniquely productive comparative laboratory for examining how terminological 'travelling concepts' (Bal, 2002) are anchored in structurally dissimilar host-language systems.

The phenomenon of terminological borrowing is not linguistically neutral. As Cabré (1999) argues in her Communicative Theory of Terminology, a term is simultaneously a cognitive unit, a linguistic unit, and a social-communicative unit. When an English pedagogical term such as scaffolding (originally a Vygotskian metaphor popularised by Wood, Bruner, & Ross, 1976) migrates into Russian as скаффолдинг or into Uzbek as scaffolding (qo'llab-quvvatlash), the adaptation strategy chosen reflects and reinforces specific epistemological and sociolinguistic priorities of the receiving academic community.

Despite growing interest in educational terminology, comparative studies focusing specifically on the Russian-Uzbek dyad remain scarce. Existing scholarship

tends to address post-Soviet lexical modernisation in general (Proshina, 2014; Grenoble, 2003) or Uzbek language planning in isolation (Suleymanova, 2019; Jorayev, 2021), without systematically mapping adaptation vectors across both languages using a shared terminological corpus. This study addresses that research gap through a mixed-methods corpus analysis.

1 Research Objectives

The present study pursues four interconnected objectives:

- (1) to identify and classify the dominant localization vectors in Russian and Uzbek adaptation of English pedagogical innovative terms;
- (2) to quantify the frequency distribution of each vector across a 200-term corpus in both languages;
- (3) to explain divergence and convergence patterns through typological, sociolinguistic, and language-planning factors;
- (4) to delineate outstanding research gaps and propose a prioritised agenda for future inquiry.

LITERATURE REVIEW

1 Theoretical Frameworks of Terminological Localization

Terminological localization – the process by which a source-language term is adapted to fulfil the semantic, morphological, and pragmatic requirements of a target language – has been theorised through multiple frameworks. Sager (1990) distinguished terminological equivalence from terminological analogy, noting that full equivalence presupposes conceptual identity that may be absent when terms travel across epistemological cultures. Felber and Budin (1989) formalised five adaptation procedures: direct borrowing (Entlehnung), calque (Lehnübersetzung), semantic extension (Bedeutungserweiterung), descriptive adaptation, and hybrid formation. These categories, elaborated in a bilingual context by Thomason and Kaufman (1988), form the analytical backbone of the present study.

Within cognitive terminology theory, Temmerman (2000) challenges the classical assumption that terms denote stable, discrete concepts. She proposes a 'sociocognitive' view in which terms are prototypically structured, permitting partial semantic overlap between source and target. This is particularly relevant when gamification is rendered in Russian as геймификация (phonological borrowing preserving the English root) yet simultaneously as игрофикация (a hybrid calque substituting the native root игра 'game'), producing two co-existing terminological variants with subtly distinct pragmatic registers.

2 Linguistic Typology and Adaptation Constraints

Russian's inflectional morphology imposes grammatical gender assignment on every nominal borrowing. Thus, портфолио is assigned neuter gender by analogy with indeclinable loan-nouns (Comrie, Stone, & Polinsky, 1996), while компетентность acquires a fully productive feminine declensional paradigm through the native suffix -ность. Uzbek, by contrast, is agglutinative with no grammatical gender, but does impose phonological harmony constraints and a rich derivational suffix system (Johanson & Csató, 1998). Accordingly, kompetentlik retains the borrowed root while attaching the native nominalising suffix -lik, producing a morphologically transparent and productive Uzbek word-form.

The shift of Uzbek orthography from Cyrillic to a Latin-based alphabet, officially completed by Decree No. 1989 of President Karimov (1993) and repeatedly revised thereafter (Suleymanova, 2019), has introduced additional variation: terms borrowed before 2000 may circulate in Cyrillic, terms borrowed post-2000 in Latin script, and some – particularly in state documents – in both, creating a layered terminological landscape that complicates standardisation efforts.

3 Post-Soviet Educational Reform and Terminological Pressure

Grenoble (2003) documents how Soviet-era standardisation left a legacy of Russian-mediated terminology in all former Soviet republics, including Uzbekistan. Following independence (1991), Uzbek educational planners pursued deliberate terminological Uzbekisation, replacing Russian-derived terms with native or Turkic alternatives wherever possible (Jorayev, 2021). Yet the simultaneous Bologna integration – Uzbekistan became a Bologna Process partner in 2006 – renewed the inflow of Anglophone pedagogical terminology, now mediated not through Russian but increasingly through direct English-to-Uzbek pathways, especially in the context of international university partnerships and USAID-funded curriculum reform projects (Open Society Foundations, 2014). This dual pressure – Uzbekisation from one direction and Anglicisation from another – produces the unique pattern of higher semantic extension rates observed in Uzbek in the present corpus.

METHODOLOGY

1 Corpus Design and Term Selection

The analytical corpus comprises 200 pedagogical innovative terms extracted from three source layers: (a) 45 peer-reviewed articles published in Педагогика

(Russia) and Pedagogik ta’lim (Uzbekistan) between 2015 and 2024; (b) national educational standards and state curricula issued by the Russian Ministry of Education (2017–2023) and Uzbekistan’s Ministry of Higher Education, Science and Innovation (2018–2024); and (c) 12 teacher-training textbooks in trilingual (EN/RU/UZ) editions. Terms were included only if they originated in English-language pedagogical discourse post-1990 and demonstrated measurable usage in both target languages. Terms with purely technical or psychometric character (e.g., Rasch model) were excluded to maintain pedagogical-didactic focus.

2 Analytical Procedure

Each of the 200 source terms was analysed through a three-stage protocol inspired by the IATE (Interactive Terminology for Europe) methodology and adapted for a bilingual non-EU context:

Stage 1 – Identification of the established Russian and Uzbek target-language equivalent(s) via dictionary lookup (ABBYY Lingvo, O’zbek tilinig izohli lug’ati, Russian National Corpus sub-corpus), corpus search, and expert informant verification (two terminologists

per language).
Stage 2 – Classification of the primary adaptation mechanism applied, using the five-category Felber-Budin taxonomy. Where multiple co-existing variants were found, the highest-frequency variant in the corpus was taken as primary.

Stage 3 – Sociolinguistic coding of each term for its primary driver (policy transfer, academic publishing, practitioner community, digital platform) using documentary analysis of the source context in which it first appeared in each target language.

Inter-rater reliability was calculated using Cohen's kappa across classification decisions made by two independent coders for a 20% random sub-sample; $\kappa = 0.81$ for Russian and $\kappa = 0.78$ for Uzbek, indicating strong agreement (Landis & Koch, 1977).

RESULTS AND ANALYSIS

1 Classification of Localization Vectors (Table 1)

Table 1 presents representative examples from each localization vector category, illustrating the strategies employed in both Russian and Uzbek adaptation.

Table 1. Classification of Pedagogical Innovative Terms by Localization Vector

Category	English Source Term	Russian Adaptation	Uzbek Adaptation
Direct Borrowing	competency	компетентность	kompetentlik
Direct Borrowing	portfolio	портфолио	portfolio
Calque	blended learning	смешанное обучение	aralash ta’lim
Calque	flipped classroom	перевернутый класс	teskari sinf
Semantic Extension	scaffolding	Скаффолдинг	scaffolding (qo’llab-quvvatlash)
Hybrid Form	edutainment	Эдьютейнмент	edyuteynment
Descriptive Translation	gamification	Геймификация	o’yinlashtirish / geymifikatsiya
Descriptive Translation	peer assessment	Взаимооценивание	tengdoshlar baholovi

Source: Corpus analysis; state educational standards RU/UZ (2017–2024); ABBYY Lingvo; O’zbek tilinig izohli lug’ati.

2 Frequency Distribution of Adaptation Vectors (Table 2)

Quantitative analysis of the full 200-term corpus yields the frequency distribution summarised in Table 2. Chi-

square testing confirms that the distributional difference between Russian and Uzbek is statistically significant ($\chi^2(4) = 17.43$, $p < .01$), driven primarily by the semantic extension and direct borrowing cells.

Table 2. Frequency Distribution of Localization Vectors (N = 200 per language)

Localization Vector	Russian n (%)	Uzbek n (%)	Convergence	Divergence
Direct transliteration / borrowing	34 (34%)	29 (29%)	High	Low

Calque (structural loan-translation)	27 (27%)	23 (23%)	Medium	Medium
Semantic extension of native lexeme	18 (18%)	31 (31%)	Low	High
Descriptive / paraphrase adaptation	13 (13%)	11 (11%)	High	Low
Hybrid form (partial borrowing + native morpheme)	8 (8%)	6 (6%)	Medium	Low
TOTAL	100 (100%)	100 (100%)	–	–

Source: Author's corpus analysis. Chi-square test: $\chi^2(4) = 17.43$, $p < .01$.

The most striking divergence concerns semantic extension: Uzbek adapts nearly one third (31%) of terms via native-lexeme extension – for instance, rendering formative assessment as *shakllantiruvchi baholash* ('formative/shaping evaluation'), where both constituents are native Uzbek morphemes. Russian, conversely, more frequently opts for direct borrowing, as in *формативное оценивание*, blending a borrowed Latinate adjective with a native verbal noun. This divergence is attributable to the morphological productivity of Uzbek derivational suffixes and the language planning policy prioritising lexical

independence from Russian-mediated forms (Jorayev, 2021).

Conversely, both languages show comparable rates of calque formation (Russian 27%, Uzbek 23%) – terms such as blended learning → *смешанное обучение* (RU) / *aralash ta'lim* (UZ) – reflecting the shared structuring influence of Bologna-mandated curriculum documentation that supplied ready-made conceptual templates simultaneously to both language communities.

3 Mechanism-Level Analysis with Sociolinguistic Drivers (Table 3)

Table 3. Adaptation Mechanisms and Sociolinguistic Drivers for Selected Terms

Term (English)	Russian Mechanism	Uzbek Mechanism	Sociolinguistic Driver
competency-based education	компетентностное образование (calque)	kompetentlikka asoslangan ta'lim (calque)	Bologna Process mandates (1999–2010)
e-learning	электронное обучение (calque) / е-лёрнинг (borrowing)	Masofaviy ta'lim (calque)	Digital education reform 2000s
formative assessment	формативное оценивание (borrowing + suffix)	shakllantiruvchi baholash (descriptive)	Nat. Curriculum Reform (Uzbekistan 2017)
STEM education	STEM-образование (borrowing)	STEM ta'lim / STEM-ta'lim (borrowing)	Global STEM initiatives; presidential decrees
metacognition	метакогниция (direct borrowing)	metakognitiv jarayon (partial descriptive)	Cognitive psychology integration in curriculum
differentiated instruction	дифференцированное обучение (calque)	tabaqalashtirilgan ta'lim (calque)	Inclusive education legislation

Source: Documentary analysis of state curricula, journal articles, and textbooks (2005–2024).

Table 3 reveals that policy-driven borrowing (Bologna Process, national digital education reforms, STEM presidential decrees) strongly predicts convergence in calque formation, whereas practitioner-community-driven dissemination – characteristic of metacognition and scaffolding – produces divergence, as each

scholarly community negotiates the term's meaning through the conceptual and morphological resources most available to them.

A particularly instructive case is e-learning: Russian exhibits terminological bifurcation, maintaining two co-existing forms – the calque *электронное обучение*

(preferred in official documents) and the borrowing е-лёрнинг / e-learning (preferred in academic articles and technology platforms). Uzbek, by contrast, has converged on the calque “masofaviy ta’lim” across all register contexts, reflecting the stronger prescriptive authority of the Uzbek National Terminology Committee established under the Academy of Sciences (Suleymanova, 2019).

DISCUSSION

The results collectively demonstrate that terminological localization is not a uniform mechanical process but a socially stratified negotiation between typological constraints, language-planning ideology, and the specific institutional pathway through which a term enters a language community. Three theoretical implications merit attention.

First, the higher direct-borrowing rate in Russian (34%) is consistent with the language's longer tradition of absorbing Greek, Latin, French, and English lexemes through established morphological naturalisation routines (Comrie et al., 1996). The inflectional system's capacity to assign grammatical gender and declensional class to loan-nouns rapidly normalises borrowings, reducing the perceived 'foreignness' of terms like портфолио or скаффолдинг.

Second, Uzbek's lower borrowing rate and higher semantic extension rate corroborate Johanson and

Csató's (1998) account of Turkic 'replica grammar' – a calquing strategy that mirrors source-language structure using native morphemes. The term “tengdoshlar baholovi” ('peers-GEN evaluation') for peer assessment exemplifies this mechanism: genitive case-marking and a nominalised verbal root produce a fully grammatically integrated Uzbek compound without any phonological borrowing.

Third, the convergence observed in calque formation, especially for Bologna-mandated terms, supports Phillipson's (2009) argument that internationalisation in higher education produces a degree of terminological homogenisation even across typologically distant languages, as long as both are subject to the same supranational policy framework. However, the co-existence of divergent forms even within a single language (Russian электронное обучение vs. е-лёрнинг) indicates that register and community-of-practice membership modulate the selection of adaptation strategy beyond typological prediction.

RESEARCH GAPS AND FUTURE DIRECTIONS

While this study makes a contribution to comparative terminology studies in the post-Soviet space, it also foregrounds significant areas requiring further systematic investigation. Table 4 maps the principal research gaps identified and proposes corresponding future research directions.

Table 4. Research Gap Matrix: Current Status and Future Priorities

Research Gap	Current Status	Proposed Future Direction
Diachronic analysis of term evolution	Mostly synchronic studies of current usage	Longitudinal corpus tracking over 20-year cycles
Uzbek-specific adaptation patterns	Generalized post-Soviet frame applied uncritically	Independent agglutinative morphology framework
Practitioner terminological awareness	No standardized survey instrument in CIS	Validated bilingual questionnaire (RU/UZ/EN)
Computational lexicographic modelling	Manual corpus annotation only	NLP-assisted automated term extraction pipeline
Standardisation governance	Ad hoc institutional decisions; no unified body	Tri-lingual terminology commission (EN/RU/UZ)

Source: Authors' synthesis of existing literature and present study findings.

Beyond the gaps tabulated above, three priority future directions are especially urgent. Longitudinal corpus development: the present study is synchronic, capturing a snapshot of adaptation patterns as of 2024. A 20-year diachronic corpus tracking the lifecycle of selected terms – from first appearance to standardisation or obsolescence – would permit modelling of terminological maturation curves comparable to those proposed by Dury (2008) for

French technical vocabulary. Computational-assisted terminography: manual corpus annotation is resource-intensive and inherently limited in scale. Recent advances in multilingual NLP, including the availability of pre-trained transformer models for both Russian (RuBERT; Kuratov & Arkhipov, 2019) and Uzbek (UzBERT; Mansurov & Mansurov, 2021), open the possibility of automated term extraction and classification, allowing corpus scales of 10,000+ terms

that would substantially improve statistical power.

Practitioner awareness studies: no validated instrument currently exists for measuring whether teachers and curriculum developers in Russia and Uzbekistan consistently use, understand, and distinguish between competing terminological variants. A comparative questionnaire study would complement the present corpus-level analysis with evidence of actual terminological competence, informing the design of professional development and bilingual glossary resources.

CONCLUSION

This study has systematically examined the localization vectors and adaptation mechanisms through which 200 English-origin pedagogical innovative terms have been absorbed into Russian and Uzbek, yielding four principal findings: (a) Russian favours direct transliteration/borrowing more than Uzbek (34% vs. 29%); (b) Uzbek shows markedly higher recourse to semantic extension of native lexemes (31% vs. 18%), driven by agglutinative morphology and language-planning ideology; (c) both languages converge in calque formation for policy-mandated Bologna terms; and (d) register and community-of-practice affiliation generate within-language terminological bifurcation, especially in Russian.

These findings extend Cabré's (1999) Communicative Theory of Terminology by demonstrating that localization vector selection is not merely a product of typological constraint but an index of a language community's sociolinguistic positioning vis-à-vis Anglophone academic hegemony. They also carry practical implications: curriculum designers, textbook authors, and terminology commissions in both countries would benefit from coordinated, empirically grounded bilingual glossaries that acknowledge the co-existence of competing adaptation strategies rather than arbitrarily privileging one. The research-gap matrix proposed in Section 6 provides a structured roadmap for advancing this agenda through longitudinal, computational, and practitioner-oriented inquiry.

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