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Theorizing the Transmission of Technical Knowledge in a Plurilingual Context: Epistemology of National Languages and Negotiation of Meaning without Stabilized Terminology

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Abstract

Background: The history of educational systems in sub-Saharan Africa is still largely marked by the coloniality of knowledge, a paradigm that elevates European languages as the only vehicles of technical rationality. This hegemonic view erroneously presumes the unsuitability of African national languages for industrial modernity, hiding the high functional technicality that is transmitted informally outside of school structures. **Purpose:** This theoretical article proposes an innovative epistemological and conceptual model to analyze the linguistic mediation of technical knowledge, without stabilized terminology. Importantly, the paper does not measure the socio-economic implications of the policy empirically, but presents theoretical propositions. **Design/Methodology/Approach:** The paper models how informal learning spaces (such as mechanical workshops) operationalize transmission via national languages like Wolof. It draws on critical sociolinguistics from the Global South, interactional sociolinguistics (McLaughlin, 2001; Dreyfus & Juillard, 2001), situated learning theory (Lave & Wenger, 1991) and the conceptualization-in-action framework of professional didactics (Pastré et al., 2006; Vergnaud, 1996). **Findings:** This paper demonstrates that Wolof exhibits an extensive semantic plasticity. Spontaneous neology and analogical schemes make the local language a genuine epistemic tool that empowers the apprentice's agency. Therefore, a three-dimensional analytical matrix is developed to map those informal interactions and demonstrate successful technical mediation through illustrative workshop exchanges. Theoretically, the model indicates that such linguistic flexibility is a conceptual triple lever: (i) economically, hypothesizing how it optimizes oper-

ational throughput and structural viability in the informal sector; (ii) managerially, conceptualizing horizontal local management; and (iii) socially, theorizing vectors of inclusion for marginalized youth. **Conclusions/Implications**: This research, ultimately, calls for a radical decentralization of science epistemology toward an ecology of knowledge, in which the local language is established as a legitimate instrument of scientific rationality.

Keywords

Discursive Coloniality, Semantic Plasticity, Wolof, Socio-Economic Efficiency, Local Management, Professional Didactics, Global South

1. Introduction: The Linguistic Unthinking of Technical Knowledge

1.1. The Paradigm of Discursive Coloniality in Education

[Academic definition of Discursive coloniality: Discursive coloniality is the oppressive, marginalizing, or asymmetrical dimension that language and communication structures produce and reproduce long after the historical end of political colonialism.]

The coloniality of knowledge is a paradigm that privileges European languages (mostly French) as the only carriers of scientific and technical rationality (Bamgbose, 2000). This paradigm deeply marks the institutional history of education systems in sub-Saharan Africa. For the sake of this conceptual framework, we define discursive coloniality as the entrenched institutional process that provides exclusive academic and scientific legitimacy to European languages while systematically marginalizing indigenous languages as inadequate for formal technical conceptualization. In this hegemonic perspective, African orality and national languages are often relegated to the sphere of intimacy, tradition or folklore, wrongly perceived as impervious to the conceptual complexity of industrial modernity (Prah, 2001; Brock-Utne & Mercer, 2014). This epistemological binarism masks a major empirical reality: the ongoing production and transmission of highly technical knowledge taking place outside formal school structures (Ouane & Ouane, 2011; UIL & ADEA, 2010).

1.2. The Paradox of Informal Transmission

But the informal crafts sector, based on local spheres of activity in Rufisque, as in the entire urban space of West Africa, contradicts this alleged inferiority of endogenous languages (UIL & ADEA, 2010). In mechanical, welding or carpentry workshops, master craftsmen and apprentices manipulate arduous physical, mechanical and electronic concepts without resorting ever to the codes prescribed by the academic institution. This change reveals a constant theoretical blind spot: the lack of understanding in classical models of professional didactics of the cognitive

and discursive dynamics at play when transmission is not bound by standardized terminology in exogenous language (Bamgbose, 2000; Lave & Wenger, 1991).

1.3. Purpose of the Article

The aim of this paper is to fill this conceptual gap by proposing a renewed epistemological framework to think about the linguistic mediation of knowledge outside the school form. Based on critical sociolinguistics, interactional sociolinguistics (McLaughlin, 2001) and an interactional approach of cognition (Pastré, 2011), it analyzes the ways in which national languages, more specifically Wolof, organize an autonomous operational rationality, able to conceptualize technical innovation and to stimulate the power of action of trained subjects (Ouane & Ouane, 2011). It should be made clear from the outset that the paper is proposing theoretical propositions and conceptual hypotheses rather than an empirical assessment of quantitative impact on productivity, profitability or apprentice agency.

2. Epistemological Framing: Rethinking Orality and Technique

2.1. Deconstruction of the "Tradition/Modernity" Divide

One of the most stubborn theoretical impasses in post-colonial sociolinguistics is the insistence on a rigid demarcation between modern rationality and oral tradition (Bamgbose, 2000). In the education sciences, learning in national languages is too often understood through the prism of a structural lexical deficit, hence the popular idea that they could not express industrial precision.

However, research in the ecology of knowledge shows that the technicality of an idiom is not defined by a fixed institutional dictionary, but by its functional plasticity in a real production setting (Ouane & Ouane, 2011; McLaughlin, 2001). Here, we operationally define semantic plasticity as the capacity of a linguistic system to dynamically re-organize its morphosyntactic structures, analogical schemes and lexical borrowings to absorb, re-semantize and express complex technological concepts in the absence of pre-established institutional terminology. To properly deconstruct this binarism, we need to understand that Wolof, far from being fixed in a pre-industrial past, is constantly being reconfigured through endogenous borrowing and semantic extension mechanisms to express technological innovation (Dreyfus & Juillard, 2001).

2.2. Sociolinguistic Criticism of the Global South and Scope Boundaries

Theorizing work interaction outside of Western frames requires some shift in perspective. The sociolinguistic critique of the Global South requires replacing the static notion of "language" with the more dynamic notion of language practices or languaging (Prah, 2001; Canut, 2007). Informal labor is not confined to borders of the state or school. Actors mobilize a multilingual repertoire where the syntax of a local language integrates and absorbs the global industrial lexicon (Bamgbose,

2000; Irvine, 1989).

To maintain analytical clarity, it is important to state the boundary conditions and explicit limitations of the suggested conceptual framework. The main target of this model is urban Wolof, as it is a dominant vehicular language in Senegalese artisan workshops (McLaughlin, 2001). The framework explicitly differentiates between:

(i) Specific Wolof morphological mechanisms (e.g., verbal derivation, noun class adaptations); (ii) Broader plurilingual repertoires with other Senegalese national languages (e.g., Pulaar, Serer, Joola, Mandinka) which have different structural and socio-historical dynamics; (iii) Code-switching and code-mixing phenomena (spontaneous alternation between French and Wolof utterances); (iv) Raw lexical borrowing (direct phonetic absorption of foreign terms without conceptual re-semantization).

This framework is specifically concerned with the epistemic re-conceptualization that takes place at the intersection of these practices, whilst recognizing that multilingual interactions in other national languages may be subject to different structural constraints.

This interactional approach to cognition allows a requalification of technical competence: it is no longer evaluated on the ability to restore formalized jargon coming from school in a Western language, but able to solve a complex operating problem by using all available discursive resources (Pastré et al., 2006).

3. Conceptual Modeling: Semantic Plasticity of National Languages

3.1. The Processes of Spontaneous Neology and Borrowing

[Academic definition of Semantic Plasticity: the capacity of the meaning of a word or expression to change, adapt or re-organize in response to context, usage or new learning experiences.]

Ouane & Ouane (2011) argue that the ability of an idiom to convey specialized knowledge depends on its semantic plasticity. In the professional context of West Africa, Wolof does not simply add foreign words but indeed incorporates them into its language (Bamgbose, 2000; McLaughlin, 2001). Thus, technical terms borrowed from French or English are forced into phonetic and grammatical rearrangement so as to be naturally incorporated into the morphological structure of the receiving language. This spontaneous neology process reveals borrowing as an active semantization strategy that allows actors to manipulate globalized technical objects while preserving the fluidity of didactic communication (Prah, 2001).

3.2. Analogy and Metaphor as Epistemic Tools

If borrowed technical terms are too abstract, trainers resort to complex analogical and metaphorical schemes (Ouane & Ouane, 2011). Metaphor and analogy are genuine epistemic tools. The master craftsman creates a cognitive gateway by translating an imperceptible physical phenomenon or a complicated mechanical

protocol (like hydraulic pressure or the camshaft) into familiar or anthropomorphic realities (Bamgbose, 2000; Vergnaud, 1996).

4. Towards a Broader Professional Didactics

4.1. The Apprentice as a Cognitive Subject and the Power to Act (Agency)

[Academically, linguistic congruence is defined as "the agreement, compatibility, or structural and semantic alignment between different elements of a language or between linguistic systems in contact."]

One of the great challenges of a renewed professional didactics is to apprehend the learner in an informal environment as a cognitive subject in his/her own right (Ouane & Ouane, 2011; Lave & Wenger, 1991). The sole use of an official exogenous language in schools creates cognitive insecurity in post-colonial countries.

However, teaching in a linguistically consistent environment removes these psychological impediments. Linguistic congruence is operationally defined as the sociolinguistic match between the communicative registers used in pedagogical exchanges and the lived linguistic repertoires of the learners. This alignment creates a safe discursive space where the apprentice's agency, i.e. the ability to propose diagnostic hypotheses, to challenge the master's decisions and to exercise cognitive autonomy, is directly promoted (Pastré, 2011).

4.2. Three-Dimensional Analytical Matrix and Systemic Interactions

To operationalize this approach, we propose an intersecting three-dimensional matrix with which to analyze informal didactic interactions along three continuum axes:

1) Speech Register (X-Axis): From standard native Wolof to dense hybrid code-switching, with international industrial jargon.

2) Level of technical abstraction (axis Y) from the immediate sensorimotor gestural execution (procedural know-how) to the high-level theoretical diagnosis of systemic dysfunction (semantic/structural knowledge).

3) Degree of language plasticity (the Z-axis): Rigid literal borrowing to creative spontaneous neology, analogical modeling and anthropomorphic metaphors.

Systematic Interactions and Effective Technical Mediation:

These three dimensions of the matrix do not function independently of each other, but rather they dynamically interact to form different pedagogical configurations. A particular indicator of successful technical mediation is a high-congruence configuration of the following: -A fluid register of speech (moderate-to-high hybridization permitting fluidity between local vehicular expressions and industrial jargon); -A high to intermediate level of technical abstraction (where physical principles are abstracted from the immediate physical objects); -High semantic plasticity (use of metaphors and spontaneous neologisms by master and apprentice to negotiate meaning).

In the upper quadrant (Hybrid Register + Conceptual Abstraction + High Plasticity), the three axes converge and technical mediation succeeds in establishing a link between empirical gesture and theoretical understanding without producing cognitive insecurity.

4.3. Illustrative Workshop Interaction

To see how a loan word, metaphor or neologism is located in this matrix, imagine a hypothetical workshop exchange during a diagnostic session on an engine cylinder head gasket failure:

Master Craftsman: "Xoolal joint de culasse bi, dafa 'lakk' ndax ndox mi dafa wàcc, moteur bi tàng ba tàkk".

(Translation/Gloss: "Look at this cylinder head gasket, it 'burned' [lakk] because the coolant level went down and the engine got hot to ignition point.")

Apprentice: "Kon patron, compression bi dafa 'doxantu' ba refroidissement bi ci système de?"

(Translation/Gloss: "So boss, did the compression walk/wander" [doxantu - metaphorical usage for pressure leakage] into the cooling system?)

Master Craftsman: "Wow", look at that. That's some good "pression" in there.

(Translation/Gloss: "Yes", that's right. The "pressure" opened a path to breakthrough.)

Positioning Analysis Matrix: -Mode de discours: point médian hybride sur l'axe X (syntaxe wolof et noms techniques français: joint de culasse, moteur, compression, système de refroidissement, pression). -Abstraction: Rises to a high level on Axis Y, moving from visual inspection of physical parts, to abstract thermodynamic reasoning about fluid dynamics and pressure loss. -Plasticity Degree: located in high plasticity on the Z axis, using the epistemic metaphor "doxantu" (literally "to take a stroll"), which turns the invisible gas leakage into an intuitive spatial movement. This metaphoric shift allows the apprentice to show conceptual mastery of pressure transfer.

5. Discussion: Implications for the Epistemology of Science

5.1. Conceptualizing Socio-Economic and Managerial Levers (Theoretical Propositions)

This framework models cognitive processes finely, but its socio-economic implications should be taken as theoretical propositions and conceptual hypotheses that need to be empirically validated in the future:

- Economically (Theoretical Hypothesis): The model proposes that semantic plasticity optimizes intervention time and reduces material errors through faster diagnostic comprehension. Thus, hypothetically, it guarantees structural profitability in informal micro-enterprises.
- Managerially (Theoretical Hypothesis): The model imagines workshop transmission as an embodied, horizontal local management style, where master-apprentice communication adaptively reduces hierarchical distance to promote

skill acquisition.

- Socially (Theoretical Hypothesis): The model argues that the recognition of oral technical expertise restores dignity and agency to youth excluded from formal academic schooling.

5.2. Decentralizing Science: Towards an Ecology of Knowledge

The theoretical analysis of language practices in the informal workplace requires a radical de-centralisation of science epistemology. The paper challenges the abstract universalism of the standard models of learning (Bamgbose, 2000; Lave & Wenger, 1991) by showing how Wolof builds up a rigorous operational rationality without Western standardization. Reflections on the ecology of knowledge (Ouane & Ouane, 2011; UIL, 2025) lead the applied science to find in the vitality of suburban workshops and the plasticity of vehicular idioms a proven conceptual legitimacy (Prah, 2001).

5.3. Scope and Limits of the Conceptual Model

The theoretical framework provides a strong reading grid for vocational training in multilingual contexts (Brock-Utne & Mercer, 2014). However, the power of endogenous mediation is a matter of a dialectic: orality promises immediate cognitive anchoring but has problems of macro-economic transferability (Bamgbose, 2000). The challenge is to think through the articulation between the heuristic power of national languages and the requirements of institutional formalization (Ouane & Ouane, 2011; UIL & ADEA, 2010) for educational sciences.

6. Conclusion

This article has established the foundation for an epistemological framework to reframe technical transmission outside formal education. We have shown that by liberating itself from discursive coloniality, national languages like Wolof have a semantic plasticity that situates local languages as tools of scientific rationality (Bamgbose, 2000; Prah, 2001).

The model makes explicit theoretical propositions on the economic, managerial and social levers of linguistic flexibility in informal learning spaces. By laying these conceptual foundations, this theoretical paper provides an analytical basis for further empirical research on the discourse of workshops in real time in the West African vocational ecosystem (Ouane & Ouane, 2011).

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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