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Translation of Scientific Terms into Hausa: Domestication, Adaptation and Foreignisation

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Abstract
This paper examined the implication of adaptation and challenges of translating scientific terms into Hausa language. It sampled some critical lexical terms that are postured in English-Hausa dictionaries and some Hausa media outlets. As deduced from the findings, the paper discovered that there is a large gap between the provision on the ground and what needs to be achieved as a way forward to a new dawn of intended educational realisation in relation to effective translation of scientific terms into Hausa. The paper recommended that the government should form a team of translation experts to properly and adequately address these challenges. According to the paper, a dictionary of English-Hausa scientific terms should be established.

Keywords: *Hausa language; science translation; domestication; adaptation; and functionality.*

Introduction

All sort of texts, written or spoken, are culturally and intra-linguistically mobile. They are capable of being transferred to new settings, absorbed by different peoples even those of widely differing background and outlook. Translation is the linguistic process that makes this possible, whether for Homer's *Iliad* or Newton's *Principia Mathematica*. Translation is the act that renders knowledge, whether literary or scientific, a mobile form of culture. Such mobility, in turn, is what gives human understanding a deep and lasting influence beyond the borders of its original setting.

Discussions related to the theory, practice and history of translation have tended to focus solely on literary and holy texts. Whereas translation has been a central determinant factor in the history of scientific knowledge, much attention has not been paid to its importance within Nigerian mother tongues. Indeed, modern science would be inconceivable without the contributing elements of Greek, Hindu, and early Islamic thought, which came to Europe through several major

episodes of translation. Today, moreover, the works of Newton, who wrote in Latin, Pasteur, in French, and Einstein, in German, are found in every major language of the world incarnated in important scientific papers, books, reports, procedures, and much more are made available to all nations through the effort of translators.

Despite such importance, scientific translation has been a topic of only sporadic scholarly study. The so-called 'invisibility' of the literary translator, whose labour and worth tend to be ignored in favour of the original author, doubly applies to the scientific translator, who has been neglected even by the field of translation studies, with a few important exceptions. These exceptions – for example, concerning the transmission of ancient Greek and medieval Islamic science – reveal an interesting truth: no less than literary works, translators of science have often imposed new elements upon the texts they have rendered, enriching and expanding them by adaptation to new cultural contexts. Just as the world has benefited greatly from the translation of scientific knowledge into many languages, so has this knowledge been advanced by translation in turn.

Arguably, Hausa language has not gone through processes of accommodating scientific terms and phrases. This problem can be glaringly observed when one listens to the news broadcasts from different Hausa radio stations locally and internationally. The stations face challenges on how to render many scientific terms into Hausa. Likewise, the problem is also eminent in the English-Hausa dictionaries because translators and lexicographers find it difficult to account for such linguistic dichotomies and nuisances. These difficulties should be technically approached especially with a current move of the Nigerian government to reinforce education in the primary and secondary school levels by teaching mathematics and sciences in the indigenous major Nigerian languages. Before taking this pedagogical shift, there is an urgent need to review and restructure the terms and phrases used in the sciences, technology and mathematics with a view to having a sense of functionality and adaptation. These two qualities could allow the smooth running of training the students without getting confused or undomesticated.

Most developed and developing nations use their languages in teaching, learning and applying sciences. In the underdeveloped countries, mostly in Africa, all fields of science are documented in foreign languages. This is one of the challenges found by educators as hindrance to rapid development of languages

and sciences in these countries. According to Okafor (1996), Translation of scientific terms has immensely facilitated rapid advancement in many countries because mother tongue is the better means of instruction. Okafor asserts that languages need to develop their literary and communicative capacities to meet up with current realities.

Looking at the benefits of scientific translation in the world, and the widespread Hausa influence and especially in West, East and Central Africa, some translators made attempts and translated scientific books into Hausa language. Obviously, there are contentious instances infringed as a result of linguistic constraints. Hausa has not reached the standard of European languages. Although developing terminologies is a life-long matter, Hausa language needs to be technically standardised to cater for constructing functionally equivalent scientific terms from English (or any other language) to meet the users' immediate needs.

Hausa Language

Hausa, a major language in the West sub-Saharan Africa, is the largest member of the Chadic language family that belongs to the Afro-Asiatic phylum (Newman, 1980). Genetically, Hausa is more related to Arabic, Hebrew, Berber, Semitic and other members of the Afro-Asiatic family than are most of the rest of the languages of sub-Saharan Africa. To this extent, Hausa is not a 'typical' African language. The conceptual framework of the Hausa-speaking peoples expressed through the language is, however, definitely African and bears a close relationship to that expressed through more 'typically' African Niger-Kordofanian languages to the south of Hausa. Hausa is used as the first language to Ethnic Hausa-Fulani. The language stretches across the northern states of Nigeria and into southern Niger, and also of Hausa communities in the Sudan (Abu-Manga, 1999). Ethnologically, there exists some heterogeneity within this group, and religion-wise there are a few Hausa Christians and animists as well as many Hausa Muslims.

The cultural influence of the Near East upon the Hausa people is, however, quite prominent and is reflected in the language. The influence of Muslim thought and culture may be said to permeate many aspects of Hausa life and language. Borrowings of concepts (especially religious and philosophical) and vocabulary are recognizable at every turn. As a result of early Muslim influence, Hausa has a literary tradition extending back several centuries before contact with Western culture. The Hausa script which was first written in Arabic called *ajami* has its representation restricted. Today, this representation of the language is largely

restricted to Muslim scholars, diviners (Malamai) and their Koranic schools, having been superseded for most purposes by the Roman script (minus the diacritics).

Scientific Translation

As a co-branch of technical translation, scientific translation, according to Miyayeva (2022), relates to academic contributions in the fields of medicine and pharmacology, life sciences (papers on biology, astronomy, zoology, chemistry, geology, physics), social science (papers on anthropology, sociology, psychology, political science, economics) and mathematics. Vividly, the rapid advancement of internationalization and exchange of science and technology show the dire need in translation activities worldwide. In practice, unlike literary, religious and social translations, this kind of translation (science translation to be more specific) brings about difficulties in the general field of translation studies.

Historically, modern science had its most immediate beginnings in Europe, mainly in the later 16th and the 17th centuries with a number of cultural and historical sources: Late Classical and Hellenistic Greek thought; Nestorian scholarship of the Near East; Hindu mathematics and astronomy; Islamic science of 9th–12th centuries. According to Srukkai (2001), the material brought into Europe, mainly from Arabic and, to a lesser extent, Greek, combined ingredients from all these sources and proved enormously rich, nutritive. It was at this time that the basic texts of Mathematical Astronomy (Ptolemy, al-Tusi), Geometry (Euclid), Algebra (al-Kwarizmi), Optics (al-Hazen), Mechanics (Archimedes), Medicine (Ibn Sina, Galen), as well as Arabic numerals, the sine function, and the zero (all of Hindu origin) entered Europe. Men such as Adelard of Bath, Gerard of Cremona, and William of Moerbeke gained no small fame at the time for the many translations they produced.

Recently, translation has been the basis for the initiation of a modern scientific culture in non-Western nations. In Japan, for example, nearly all early scientists (late 18th and early 19th century) were translators first: their work involved increasing the number of scientific texts for study, adapting these works to Japanese uses, and attempting to further the knowledge gained thereby. This could mean certain adaptations, reflective of the cultural-historical moment, such as the rendering of the ‘survival of the fittest’ concept as ‘victory of the superior over the inferior’ in a late 19th century, militarizing Japan. Ironic consequences

could also occur, for instance related to the refusal or inability to translate important works.

Montgomery (2000) observes that there are several widely held assumptions about the linguistic transfer of scientific texts. One holds that scientific translation is literal, mechanical work, since it deals only with informational content embodied in terms that have exact equivalents in every language. Thus, a complete one-to-one correspondence exists: word-for-word translation is not only possible, but necessary. Such assumptions grow from the fundamental idea that scientific language constitutes a universal form of human discourse. It follows from this that any transfer among languages merely involves the production of duplicates.

These ideas are disproved by several realities. First, linguistic universality implies a fixed and final, ahistorical discourse. Yet, scientific speech has changed profoundly over time, even during the past century, not only in vocabulary, but in grammar and in many rhetorical elements (techniques of persuasion). Prior to the late 19th century, the written style of physics, astronomy, chemistry, and medicine shared many ingredients with literary and philosophical expression, common to educated discourse as a whole. Galileo's *Sidereus Nuncios* or Darwin's *Origin of Species* were composed according to the general standards for elegance of their era (late Renaissance Latin, Victorian prose). Thus, translation of scientific literature can involve many of the identical challenges claimed for works in the humanities.

Despite the initial configuration, the most competent strata will reach the highest structural position at the end of deformation. The more literary character of the French compared with the English version is clear. Results of professional translation today, like the above, indicate that one-to-one correspondence in scientific translation does not exist. A more accurate rendering of the original French (Therefore, whatever the initial setting of the most competent strata, these have a tendency, finally, to occupy a high structural position at the end of deformation.) would not likely be considered proper scientific style in English. In addition, the experience of machine translation has shown that word-for-word renditions utterly fail to yield a publishable result and are often, in whole or part, incomprehensible (Montgomery, 2000).

Techniques of Translating Scientific Terms

Scientific terminology which we refer to as "term" is an apt choice of lexical units labelled on a defined scientific object, theory or idea. Terminology is prudently selected in order to be unequivocal and explicit. Subjective and expressive expressions generally do not occur in the style. The more scientific the style is, the more specific the terms are. In the particular scientific branches and their language, we can get by with low lexical variety, therefore the index of repetition is quite high. The main features of scientific translation are strictly logicality, explicitness, objectivity, impersonality, lack of emotionality and condensation. Thus, science translation entertains rigidity because it is not mere free rendering and retelling. Technically, the translator should avoid any emotional statements and subjective assessments.

Miyayeva (2022) enumerates the techniques of translating scientific terms as follows:

Equivalence: The translator scans the target language for a term, equivalent to the original. For example, "**an atom**" translates equivalently to "**el átomo**" in Spanish. This is the best way, but impossible in many cases;

Concretization: The original term with a broader meaning is replaced by a similar term with a more specific meaning. This method is used to clarify a term that might have several meanings in the source material. For example, "**bird**" in scientific translation can be replaced with the bird's genus (like **Columba livia** can be a concretization for **a pigeon**);

Generalization: The opposite of the previous method: the narrower term is replaced by a more general term in a target language. For example, "**Taraxacum**" (Latin name for a genus of **dandelion**) in translation might be replaced with "**flower**" or "**dandelion**".

Transliteration: The original term is described in letters of the target language. The expert must explain the term, especially if it was never used in the target language before. For example, "**bill**" is transliterated from English to Japanese in hieroglyphs that are read "**bi-ru**";

Semantic calque (or loan translation): A term/phrase is borrowed from the source language word-for-word. For example, the word "**translation**" itself is a calque from Latin "**translātiō**".

Borrowing: In this method, the translator uses the word in the target text in the same form as it was in a source text. This technique is used when there's no equivalent to the word in a target language or it's a new word introduced by the author of the original document. For example, English borrowed the word "**résumé**" from French.

Domestication, foreignization, adaptation

Domestication and foreignization are two opposing strategies applied during translation. These are concepts introduced by Lawrence Venuti (1991, 1995, 1998). Adaptation on the other hand is one of Vinay and Darbelnet's technical procedures of translation.

a. Domestication is the strategy used for certain terms of translation to the target language culture, in other words, the translator "leaves the reader in peace, as much as possible, and moves the author towards him" (Schleiermacher 1977: 74). It is the process of adhering to the target language when translating a text by conforming as closely as possible to the culture of the target audience.
b. Foreignization is the strategy of maintaining the information being translated by retaining the culture of the source text. It is when the "translator leaves the author in peace, as much as possible, and moves the reader towards him" (Schleiermacher 1977: 74).
c. Adaptation is the process of replacing a linguistic or cultural term of the source text into a more acceptable form in the target text. This is usually done when the translator is faced with situational difficulties during the process of translation structural, pragmatic or cultural translation (Baker, Saldanha 2011).

Methodology

The methodology employed to collect and analyse our data is through a quantitative method. We used *Quadrilingual Glossary of Legislative Terms (English, Hausa, Igbo, Yoruba).* And *Taron Bita na Kasa don Daidaita Sababbin Kalmomi daga Ingilishi Zuwa Hausa* (National Conference on Harmonizing New Terms from English to Hausa). Samples of scientific terms were collected from various domains in English and their Hausa versions, were explained in a table. The said terms are in the domain of: medicine, economics and finance, environment, computer science, mechanical engineering, physics, biology and chemistry as well as agriculture.

d. Data Presentation and Analysis

Medical Terms		
English	**Hausa**	**Comment**
Anaemia	Karancin jinni	Adaptation: blood shortage
Appendix	Chindon hanji	Adaptation: intestine extension
Ectopic pregnancy	Daukar ciki a wajen mahaifa	Adaptation: pregnancy outside the womb
Ebola fever	Zazzabin ebola	Foreignization
Orthopedic hospital	Asibitin kashi	Adaptation: bone hospital
Economic and Financial Terms		
Accounts	Littafin shiga da fitar kudi	Adaptation: record of inflow and outflow of cash
Current asset	Dukiyar hannu	Adaptation: cash in hand
Expenditure	Kudi da aka kasha	Adaptation: money spent
Ledger	Leja	Foreignization
Net profit	Riba bayan an cire haraji	Adaptation: profit after tax
Environment		
Acid rain	Ruwan asid	Foreignization: acid water
Desert	Hamada	Adaptation
Global warming	Dumamar duniya	Adaptation
Nuclear waste	Dagwalon nukiliya	Foreignization
Ozone layer	Gadon ozon	Foreignization
Computer Science		
Hard Disk drive	Gurbin babban kundi	Adaptation
Scanner	Sikana	Foreignization
Keyboard	Kibodi	Foreignization
Microsoft Excel	Malissafin Makurosuf	Foreignization: Microsoft calculator
Password	Makuli	Adaptation: lock
Mechanical Engineering		
Accelerator/Throttle	Totur	Foreignization
Chassis	Gado	Adaptation: bed
Engine oil	Bakin mai	Adaptation: black oil
Gear box	Akwatin giya	Adaptation
Sulphuric acid	Ruwan batir	Adaptation: battery water
Physics/Biology/Chemistry		
Ammonia	Amoniya	Foreignization
Artery	Majinan ciya	Adaptation: blood feeder
Electrons	Kwayoyin lantarki	Adaptation: light cells
Bacteria	Kwayoyin cuta	Adaptation: sick cells
Germination	Tsira	Adaptation: growth

Test tube	Kwalbar gwaji	Adaptation: test bottle
Hydrogen	Hadirogen	Adaptation
Agriculture		
Agronomy	Nazarin harkokin noma	Adaptation:
Animal husbandry	Kiwon dabbobi	Adaptation:
Cabbage	Kabeji	Foreignization
Fertilizer	Takin zamani	Adaptation: modern manure
Manure	Takin gargajiya	Adaptation: local manure
Perennial crops	Amfanin gonar yau da kullum	Adaptation: everyday crops

Results:

Following the analysis of the data we gathered, the results show that there are various ways of translating scientific terms into Hausa. It is important to state that this study is limited to the use of domestication, foreignization and adaptation. In the course of this study, we discovered that often times the translator is left with the task of getting appropriate terms while translating scientific terms into African languages. Some terms are used as paraphrases to explain certain terms in order to get an equivalent which best describes the term from the source language translated into the target language. It is probably in line with this that Elsabe Taljard (2013:15) states that:

> Obviously, most of the terms used in the afore-mentioned subject fields do not have readily available equivalents in the African languages. The translator therefore has little choice but to create terms as he/she goes along, a practice which, in principle, is unsatisfactory, since term creation is the responsibility of a terminologist, and not that of a translator. In the South African context, it is however more often than not the task of the hapless translator him-/herself to provide the necessary equivalents.

This author makes it clear that terminologists are always finding new ways of creating these terms.

Conclusion

Translation into an African language comes with a lot challenges and it is even more so when it comes to translating scientific terms. In the course of this research, we discovered that a lot translations to Hausa are carried out by way of explanation rather than proper and acceptable ones. As it is presently the practice

of groups of scholars of the three major Nigerian languages (Hausa, Igbo and Yoruba) coming together to update the existing terminologies, Hausa scholars on their own should not relent in this exercise in order to achieve appreciable and acceptable translation of terminologies into Hausa language. This work in progress should equally be encouraged by the various governments (Local, State and Federal) in order to create room for new researches into translation to African languages. Such research could lead to publication of a scientific Hausa-English dictionary.

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