Mother language in Science Education and Communication

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https://doi.org/10.59094/emsj.v56i5-6.25

Keywords Mother tongue, Science

Abstract

While English has emerged as a major language in dissemination of knowledge, through research papers and articles, it has also been observed and understood with experiments conducted over the globe that learning, expression, scientific output in one's mother tongue happened to be easy and effective, more so for students and researchers from many non-English speaking Nations. This article, discussed the constraints and bottlenecks expressed by non-English speaking researchers globally in the study and communication of Science. In addition, studies were also discussed that have been conducted globally to highlight importance of Science communication in mother tongue.

keywords: Science, communication, mother tongue

I. Introduction
Science communication, today is largely dominated by English, with more than 80 percent scientific literature published in English other than a few exceptions of Korean, Portuguese and Japanese. But history records that almost two centuries ago, Latin was the preferred language of science, like Newton Principia in Latin but Opticks in his mother tongue, English (https://www.downtoearth.org.in/news/governance/is-it-realistic-to-teach-science-in-vernacular-languages--60775).

Mother tongue, reflects its culture and identity and therefore plays a pivotal role in teacher education in schools and universities (Kooy and Hulshof 2010). Studies reveal that education in the mother tongue enabled quality learning, with improved learning outcomes and better academic performances. In primary schools it helps to avoid knowledge gaps and cause better learning and comprehension.

II. Language a barrier to scientific communication
Studies have revealed that language is an inseparable component of education, culture, heritage, knowledge and scientific development.

A career in science, globally attracts the minds but researchers with non-English as native language face constraints in expressing their scientific ideas and findings. Although usage of English in scientific communication has made a common platform for understanding, sharing and debating scientific thoughts, it has also been an additional barrier to the non-English speaking scientists.

Studies have revealed that researchers and students knowing or can express science through English helps to communicate faster and are the preferred choice of Scientists and faculty rather than the ones who can express in local/regional language and which in turn becomes a bottleneck for the researchers/students who are not so well in English. On the other hand a researcher/student well spoken in English does not guarantee that he/she is the best contributor to research/technology. Sometimes, it is seen that locals, speaker in local language is better conversant with facts and figures and understands the research problem better than the English trained researcher from outside. This is particularly true when one tries to peruse projects/studies in conservation, wildlife, biodiversity of flora and fauna, habitats, niche, ecology and environment.

The language is a barrier to emigrants, adding an additional burden on them to learn the English-a foreign language to them. Sometime great ideas in research papers/thesis, instead of getting appreciated, gets rejected just because the reviewers/authorities feel that the English is not what they expected. A consensus is largely growing amongst many student communities that institutions need to support and prepare international students.

Thus today, to many students it appears that English has become a gateway to their growth of ideas. When it is closed, the world misses on some of the fantastic ideas and knowledge. Tatsuya Amano, a notable Zoologist in the University of Queensland, Brisbane spoke Japanese and in a study revealed her struggle with language barriers particularly in the study of conservation biology where local language finds importance in doing research. A lot of information regarding importance, distribution, medicinal properties, applications of local flora and fauna exist in local language as compared to the information in English. Although many intellectuals largely think of a solution to this problem by the use of Google Translate, the technology is far from being complete as it still needs inputs for similar meaning words, technical words etc and their proper translation.

(Woolston & Osório et al., 2019).

Fig 1. Language barrier and Science Communication
To overcome, these problems, let us discuss the importance and use of local language/mother tongue in scientific communication and education and how the world is tackling this issue.
III. Learning language and the human brain

Infants begin learning their mother tongue by listening to the words of their mother/close ones, spoken with them or near them and then later start to mimic the words referred to as “babbling.” Studies of Eimas et al., (1971) revealed that infants could recognize and respond to speech patterns which was corroborated by studies on brain images revealing development of specialized neural networks in a 4-month-old infant's brain, that enabled recognition and response to auditory elements of language (Dehaene-Lambertz, 2000). Research reveals that education in mother tongue is related to the mental development of children.

IV. Developments across the globe and India

Every year since 1999, on 21st February, the world celebrates International Mother Language Day, and plays pivotal role in promoting cultural and linguistic diversity, importance of multilingualism for peaceful and sustainable societies. Globally, attempts of multilingual education based on mother tongue are growing with due relevance to its importance, in early school and in public life. Focus on teaching of medical and technical education in local languages is in a recent focus and development in Indian states and has been strongly in focus by the Govt of India. (https://indianexpress.com/article/india/international-mother-language-day-education-mother-tongue-children-mental-development-modi-7784308/).

United Nations Educational, Scientific and Cultural Organization (UNESCO) through its various activities has been working towards promotion of bi-and multi-lingual education and instruction by mother tongue, promoting mother language-based education in different countries.

V. Studies from across the world

Studies of F lávia and Ana in 2021 (Teles and Viana 2021). while performing workshop in Portuguese as native language to a group of young children, revealed the importance and ease and excitement in learners in understanding concepts of immune system, mechanisms of body recognizing and destroying the microorganisms (Teles and Viana 2021).

Multilingual science workshops organised by Native Scientist since 2013 for children of migrant communities, held by scientists in their native language, has gained popularity and revealed that teaching science in native language would help these children improve their performance in school while motivating them to choose careers in STEM – science, technology, engineering, and mathematics (https://www.embl.org/news/lab-matters/teaching-science-in-your-mother-tongue/).

Research conducted in North-East and North-West of Nigeria on mode of teaching of science and technology through mother-tongue revealed that not only did language bear socio-cultural heritage; it is also aids in shaping our thought, expression, and communication.

Studies reveal that mother tongue teacher education finds importance in teaching learning process in domains including knowledge on subject-matter, profession and pedagogy and field-based experiences (Kooy and Hulshof 2010).

A study from Botswana secondary school revealed the impact of mother tongue as language of instruction in domains of astronomy (Prophet and Dow, 1994).

A study with female students of Swabi KPK, Pakistan, at the elementary level, speaking Pashto revealed effectiveness of teaching science through mother tongue that enabled students to
communicate, discuss ideas, experiences, clearance of doubts with teachers and other fellow students during the learning process (Choudhary & Durrani 2020).

In a study reported from South Africa, it revealed that students learning in their mother tongue, have advantages over their fellow students being taught in the second or third language. Both technical and non-technical words comprise the classroom teaching (https://www.weforum.org/agenda/2015/06/why-language-is-so-important-in-science-teaching/).

**Discussion**

Studies reveal the existence of about 7,000 languages spoken globally today with 1500 languages spoken in India but linguistic diversity suffers from threat of disappearance of more and more languages together with loss of entire cultural and intellectual heritage. Thus more and more use of the language not only preserves the language but also preserves the rich cultural heritage.

**References**


**Acknowledgement:** The author acknowledges, NISER Bhubaneswar, Odisha, India for the study.

**Disclosure:** No funding was received for the study.

**Conflict of interest:** The author declares no conflict of interest.