

TRANSLANGUAGING PRACTICE IN SCIENCE EDUCATION

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The aim

The aim of the study is to investigate whether – and if so, in what ways – a *translanguaging* (Wei, 2011) science classroom, in which students are enabled and encouraged to use all available language resources (García & Wei, 2014), benefits science learning. More specifically, the study analyses multilingual students' authentic use of both their first and second languages as tools for understanding and to relate the science content to prior experience.

Research questions

- To what extent do multilingual students use available language resources in a translanguaging science classroom?
- In what ways can a translanguaging classroom have an impact on students' learning in science?
- In what ways does the students' use of both their first and second language have an impact on the ability to develop paradigmatic relations of subject-related concepts and words?

Method

In order to capture and collect the students' authentic language use in a translanguaging science classroom, an ethnographic data collection and research design was used (e.g. Marcus, 1995; Willis & Trondman, 2002). This means that the strategy was a non-participant observation and sought to avoid interfering with the students' and teachers' actions. The data material comprises of recordings from four video cameras and audio recorders, the researchers' field notes and the collection of different types of students' written texts and other teaching materials.

Grade	Lessons	Number of audio players	Number of video cameras	Total recorded movies/film
4	11	3	3	3 x 11h = 33h
5	11	4	4	4 x 11h = 44h
6	10	4	4	4 x 10h = 40h
				In total 117h

Analysis framework

From a socio-cultural perspective (Vygotsky, 1978; Wertsch, 2007; Säljö, 2010; Jakobsson & Davidsson, 2012), the study describes how multilingual students use their first and second languages in authentic communication situations in a *translanguaging science classroom*. In order to investigate how language in use operates, and realize the meaning semantically, the students' use of both their first and second languages with a focus on paradigmatic relations (Halliday & Matthiessen, 2004) is analysed, as well as the students' moves in *linguistic loops* (Karlsson, Nygård Larsson & Jakobsson, 2016) between languages and discourses.

Linguistic loops

Multilingual students often use both their first and second languages when they relate the science content to prior practical experience. The everyday experiences is often expressed in first language (Arabic), while the subject-specific language that describes the abstract science content is often expressed in second language (Swedish). In this way, the students move in linguistic loops both between Swedish and Arabic, and between everyday language and a more subject-specific language.

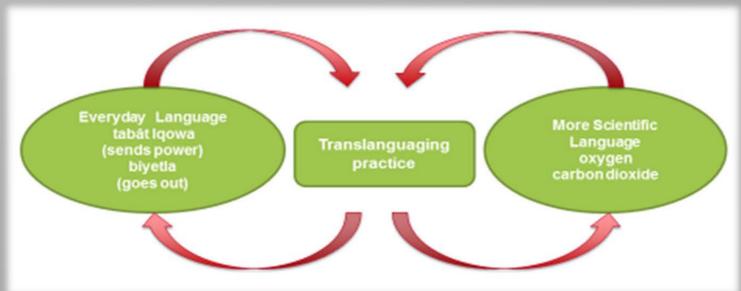
Turn	Person	Transcription	Arabic	Contextual description
1.	Mariam:	What tree trunk		Mariam asks Alaa in Swedish what a tree trunk is.
2.	Alaa:	Tree trunk / which tree trunk		Alaa wonders what Mariam means.
3.	Alaa:	Malt elshagre That which belongs to the tree	مالت الشجرة	Before Mariam has time to respond, Alaa switches to Arabic and asks Mariam, '[Do you mean] that [tree trunk] which belongs to the tree? '
4.	Mariam:	What is tree trunk / Alqism What is tree trunk / a part	القسم	Mariam repeats the first question in Swedish and then switches to Arabic when she clarifies the question by asking if the tree trunk is part of the tree: 'What is tree trunk? / [Is the tree trunk] a part [of the tree]?'
5.	Alaa:	Tree trunk / hay malt elshagre Tree trunk / it is that which belongs to the tree	هاي مالت الشجرة	Alaa answers, 'tree trunk / it is that which belongs to the tree '.
6.	Mariam:	Alqism A part	القسم	Mariam once again asks in Arabic if [the tree trunk is] a part [of the tree].
7.	Alaa:	Yes el akhirshi minne... Yes the last piece of...	آخر شئ من...	Alaa clarifies further in Arabic: 'Yes, [the tree trunk is] the last piece of [the tree]'. Simultaneously, she displays with her hand the thickness of a tree trunk.
8.	Mariam:	Aha Aakher she Aha the last thing	آخر شئ.	Mariam exclaims, 'Aha! [The tree trunk is the] last thing [of the tree]' and shows with both her hands the thickness of a tree trunk.
9.	Alaa:	Yes / Aakher she Yes / the last thing	آخر شئ	Alaa confirms, 'Yes / The last thing [of the tree]'.

Both the first and second languages are used to develop understanding of paradigmatic relationships between words and concepts that students encounter in science classrooms.

Multilingual students use both their first and second languages when they relate subject-specific words and concepts semantically to each other in science learning. The subject-specific words and concepts are often expressed in second language (Swedish), while the explanatory, descriptive and interconnecting words and phrases are expressed in first language (Arabic).

Translanguaging science classroom

The results illustrate the ways in which a translanguaging science classroom constitutes a resource in joint negotiations of the scientific content and its related language for multilingual students, and benefits the students' ability to relate and contextualize the science content to prior experience. The multilingual students move in a kind of linguistic loop (Karlsson et al., 2016) between everyday expressions in their mother tongue (Arabic), and more subject-specific expressions in their second language (Swedish). Thus, the prior experience and the use of everyday expressions in Arabic may be a powerful resource in their meaning-making processes in science. Moreover, in joint negotiations about the scientific content, the subject-specific words are often expressed in second language, while the descriptive, clarifying and interconnecting words and phrases are commonly expressed in the first language. In a semantic perspective, it becomes important for all students and especially for multilingual students to have access to this kind of words in their meaning-making processes.



Implications

The creation of translanguaging science classrooms, in which students' experiences and diverse cultural and linguistic resources interweave with school science, and in which multilingual students are enabled and encouraged to use all available language resources, has important implications for science education.

Publications

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