



Exploring Functions of Translanguaging in Intermediate Students' Interactions in Science Classroom

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Abstract: *Research has shown that students' translanguaging serves various task- and non-task related functions. While research into translanguaging has attracted considerable attention in a western context, there is a dearth of studies examining translanguaging in a science classroom in Pakistan. The current study, therefore, explored the functions of students' translanguaging practices in an intermediate science classroom in Pakistan. Employing a case study design, the data was obtained from three intermediate students attending science class for over five weeks using structured classroom observations, audio recordings, and reflective journals and semi-structured interviews. Results of the study showed that participants employed translanguaging in both task-referring and non-task referring functions. The study also confirmed the benefits of translanguaging in helping participants to learn content in the science classroom. Implications for science teachers, teacher educators and policymakers have also been discussed.*

Key Words: Translanguaging, Medium of Instruction, Science Education, Teacher Education, Language Policy

Introduction

Pakistan is a highly diverse country with a multilingual and multiethnic population. The total languages being spoken in Pakistan are 65 (59 minor, 6 major) (Rahman, 2003), whereas as per Ethnologue (2015), the number is 77. Urdu is the national language and serves as a lingua franca for interactions in Pakistan (Shah, Pillai, & Sinayah, 2019). On the other hand, English is considered as an official language and medium of instruction (MOI) from secondary up to Higher Education (Mahboob, 2017). Although there have been changes in the government policies of Pakistan, the role of English in Higher Education institutes has remained relatively consistent (Khan, 2013).

Teaching in Pakistan has always shown irregular policy decisions with reference to MOIs and the choice of language used by teachers and

students in schools. Civan and Coskun (2016) argue that language choice for education hinders the learning process, so MOI should be the language in which learners are fluent. However, in Pakistan, following the national education policy (henceforth, NEP-2017), the MOI is fixed without considering the educational needs of students. Since English is not the first language of Pakistan, students feel difficulty grasping the topic and have a clear understanding of it because English alone cannot help learners in effective meaning-making. Also, this makes it harder for low English proficiency learners to learn conceptual courses, for example, science, after class V (Ashraf, 2018). Other than this, the diversity of language remains unrecognized in formal language education policies in Pakistan (Manan et al., 2016). English-in Education policy at the secondary education level deprives students of their right to make use

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of their mother tongue to make meaning and tends to negatively affect students' science learning which eventually block their access to university education and deprive them of their career prospects. Additionally, English as an MOI in such a multiethnic country like Pakistan has shown some negative effects, for instance, language genocide/ suppression of some other local/regional or minority languages. In this case, students struggle to understand what is being taught to them, especially in science or mathematical concepts, when English is used as the MOI only (Skutnabb-Kangas, 2006). While the NEP-2017 emphasizes the use of English as MOI at the higher secondary level, students find it easy to practice translanguaging in science classroom instead of going monolingual (English only) to enhance their conceptual understanding. Therefore, this study aims to get an in-depth understanding of 'how and why intermediate students use translanguaging in their task and non-task referring talk in science classroom'. In what follows, we discuss the linguistic landscape and multilingual context of Pakistan along with a critical review of literature on theory and functions of translanguaging in the science classroom. Next, it elaborates on the methodology adopted to answer the research questions. Subsequently, the findings section presents a detailed illustration of cross-case and within-case findings, followed by discussion, implications and conclusion.

Translanguaging as a Theoretical Framework

The concept of translanguaging originated in a Welsh context as a term '*trawsieithu*', which was later translated into English as "Translanguifying" but then changed to "Translanguaging" by a great Welsh Educationalist, Ceu Williams. (Lewis, Jones, & Baker, 2012b). Translanguaging was initially coined in the bilingual classrooms of Wales as a pedagogical practice that was used for making meaning, shaping experiences and developing understanding through the use of two languages. However, García (2009) argues that translanguaging is not only a pedagogical practice but also a cognitive process involved in everyday communication. She says it is impossible to live in multilingual communities without using translanguaging. In a multilingual state like Pakistan, where the majority of people can easily

speak more than two languages, they cannot live without using integration of multiple languages at a time to organize and mediate mental processes of understanding, speaking, literacy, not just learning. Moreover, she also suggests that translanguaging is not just a process of scaffolding instruction; rather, it is part of metadiscursive regimes which the students of the 21st century must perform (García, 2011).

There are three assumptions on which the idea of translanguaging is built: First, translanguaging is a hybrid use of languages in which language users negotiate, create and improvise meaning by using various interactional contexts, knowledge about languages, and content discussed (Gutiérrez, 2008; Ryu, 2019). Canagarajah (2011) argues that translanguaging is not the only individual; it is more of a social and collective practice where all interlocutors participate and pitch in for collective sense-making. This involves language users in sociolinguistic practices for co-constructing meaning and developing a shared sense of understanding by drawing upon multiple linguistic and semiotic resources. Moreover, the third assumption is about the word *language* in translanguaging, which acts as a verb, and that simply suggests language is never fixed; it is dynamic, always changing and developing (Van Lier & Walqui, 2012). Hence, translanguaging always occurs when there are different interactional contexts, discussions for collective meaning-making in multilingual communities. García (2009) emphasizes that it is important for educators and students to understand the importance of translanguaging because too often, students, when translanguage, suffer linguistic shame as they are always bound to use monoglossic ideologies. Even educators hide their natural translanguaging practices because they are always told that a monolingual, English-only instruction is a good and valuable way of dealing with a class, while they know that an effective way of teaching and learning is to have translanguaging practices.

Functions of Translanguaging

Literature on translanguaging suggests multifarious functions of translanguaging in science classrooms. These functions can be broadly classified into two categories, including

task referring functions and non-task referring functions.

Task referring category refers to the functions, including elaboration ([García and Leiva, 2014](#); [Karlsson, et.al., 2016](#); Msimanga & Lelliott, 2014), translation ([Apter, 2006](#); [García, Makar, Starcevic and Terry, 2011](#); [Ryu, 2019](#); [Wolf, 2011](#)), interpretation ([Romanowski, 2019](#); [Ryu, 2019](#)), giving examples (e.g. [Oliveira and Brown, 2016](#); [Linder et al., 2010](#); [Warren, , 2001](#)) and asking questions ([Berland and McNeill, 2010](#); [Duarte, 2019](#); [Karlsson et al., 2019](#)) that are observed during the on-task activities in the classroom. On-task functions were predominantly found out by [Duarte \(2019\)](#) in her study on 'translanguaging in mainstream education, clearly dominating cognitively demanding speech acts. Also, this category has led the non-task referring category by 63%, which shows how translanguaging served as pedagogic purposes for teachers, too ([Romanowski, 2019](#)).

The other category, namely off-task functions, are defined as students' non-task referring practices in science classroom such as humor ([Abu Bakar, 2018](#); [Bell, 2011](#); Davila, 2019), requesting ([Bengochea & Gort, 2020](#)) and doing informal chit-chat ([Romanowski, 2019](#)) after the task had been done. [Duarte \(2019\)](#) indicated that students not only employ multiple semiotic resources but also move flexibly between class-related and private discussions. This idea implies students' linguistic loops of moving between formal to informal communication in the classroom.

Gaps in Literature

Literature suggests multiple tasks and non-task related functions of translanguaging practices in science classrooms. There are various studies on some task referring functions in translanguaging such as elaboration, translation, interpretation and asking questions discussed in the literature above; there is still a need for further discourse relating on and off task functions such as giving examples, chit-chat, requesting and humor specifically under science subject. Methodologically, only a few studies have used an experimental and qualitative approach; the current study aims to fill the methodological gaps by opting for multiple case study as an approach to dive deeper into the concept by giving voices to students' practices and perceptions about translanguaging. Lastly, research on

translanguaging practices of students has been mainly conducted in European countries such as Germany, Poland, and Sweden. The present study intends to fill the gaps in Pakistan's by exploring translanguaging functions in science classrooms which are proven to be effective in maximizing students' learning. The research questions of the current study are:

Research Questions

1. To what extent do intermediate students use translanguaging functions in their interactions in science classrooms?
2. What is the task and non-task referring functions of intermediate students' translanguaging?

Methodology

The present study used a multiple-case mixed-method approach to obtain in-depth information to explore how and why intermediate students practice translanguaging in science classrooms and their perceptions of translanguaging ([Yin, 2015](#), p.9).

Classroom Context

The current study was conducted at an intermediate biology classroom in a public sector school in the Sukkur region, Sindh, Pakistan. The biology class was divided into two sections, including male and female separately. There were ten students in the male section and sixteen in the female section. Both sections were given a consent form to participate in the study. From the male section, only two students agreed to be part of the study, and from females, five students approved to do so. Resultantly, female participants being greater in number for cases were recruited for the current study. The MOI of the school was English. Notably, the selected class was characterized by multilingual students from diverse backgrounds. While most of the students spoke Sindhi as their mother tongue (L1), a few spoke Urdu and Punjabi too as their L1. English was mostly used while doing classroom activities. The classes were taught by a biology specialist named Ali (pseudonym). With years of experience, this subject to intermediate students. There were five biology classes in a week. Each class was thirty minutes. Five classes of sixty minutes each were consecutively observed every week for answering the research questions.

Participants

Participants for the study were recruited using purposive and convenience sampling (Bryman, 2016; Cohen, Manion, & Morrison, 2007). Intermediate students were directly approached to participate in the study. Since a majority of them were not familiar with the researchers, only six students showed volition to participate in the study. However, when the classroom observations with audio recordings began, one of the five participants took back her consent to participate in the study, while another student missed two of the five classes and subsequently stopped writing diaries. In the end, the study was completed with only three participants (Duff, 2012). As the continuous visits were made prior to the study, participants became comfortable with the observers. Since the present study is based on multiple case study approaches, it recruited the least number of participants to find in-depth information for answering the research questions.

Data Collection Methods

Multiple methods were used for data collection for two purposes: to gain a holistic understanding of the cases; and to be able to triangulate the data obtained from each data source (Yin, 2003). The data collection tools included: Structured observation sheet, students' daily diaries, semi-structured interviews and field notes. A detailed description of data collection methods and tools is given below.

Classroom Observations

Structured observations were carried out through an observation sheet. The observation sheet was adapted from Romanowski (2019), originally aimed at finding the kinds of speech-acts of Polish students where translanguaging occurred more frequently. The observation sheet was first piloted and subsequently modified to suit the context of the present study. The adapted observation guide in the current study was already divided into two categories; task and non-task are referring. Task-referring speech-acts are comprised of the subtypes: Elaborating (i.e. on topics or phenomena), translating (i.e. new words or phrases) and interpreting (i.e. making meaning)". The other subtypes of non-task functions incorporated: "Chit-chat (i.e. after the task has been completed), requesting (i.e. school accessories) or what may be called 'verbal fidgeting', playing with objects". Sixty minutes of classroom time were divided into five minutes intervals in order to note the frequencies of functions. For not missing any interaction of the students, audio recordings of the three were also carried throughout their observational classes. There were five recordings for each case; every recording was of 60 minutes as per the class timing. Audio recordings were mainly used for counting language frequencies and for examining the occurrences of on task and off task translanguaging functions. Table 2 shows the description of functions that were used by students for various purposes.

Table 1. Descriptions of Functions

	Functions	Descriptions
Task-Referring Functions	Elaboration	Elaboration refers to explaining/expanding a concept or phenomena in further details.
	Translation	The translation is defined as the process of translating written texts from books to mother tongue.
	Interpretation	Interpretation denotes elucidation of science concepts to make meaning of certain ideas.
	Asking questions	Asking questions is said to be the process of interrogating topics or concepts from teachers or peers.
Non-Task Referring Functions	Giving examples	Giving examples followed by detailed elaborations refers to exemplifying the concepts contextually to get a deeper understanding of topics.
	Chit-chat	Chit-chat is defined as informal talks during classroom off-task discussions.

Humor	Humor refers to the state of making fun or amusing peers during or after classroom activities.
Requesting	Requesting can be defined as an expression of politely asking a peer for accessories or other stuff.

Field Notes

Jotted notes were taken during classroom observations complemented with audio recordings by the two observers for the purpose of writing up the detailed summary of events, such as activities, events and topics of discussion. The other aim was to confirm the data taken by two observers in the form of field notes to enhance the credibility of the findings and be able to contextualize participants' translanguaging practices (Bryman, 2016).

Diary Writings

Since the observations are inherently biased towards what is visible but did not lend us insights into what goes on in the mind of learners/participants, diaries and semi-structured interviews were used as introspective tools to get deeper insights into the behavior of participants and triangulate and corroborate the data obtained through observations (Bailey, 1991). Each participant was asked to answer two open-ended questions at the end of each class in the form of diary writings. The two questions were: How did translanguaging help you in this class? When and why did you use translanguaging in this class?

Semi-Structured Interviews

Each participant was interviewed at the end of five observational classes to follow up on the data obtained through classroom observations, participants' diaries and field notes about the translanguaging functions and to know the purpose and reasons behind using translanguaging practices in science classes. The interview was of around 20-25 minutes in which ten questions were asked, including probing questions. The questions were about students' educational background. For example: Where have they studied, what was the MOI there, what is their opinion of using translanguaging in the science classroom.

Data Analysis

Data in the current study were analyzed and interpreted in two integrated ways, such as

within-case analysis and cross-case analysis. Within-case analysis refers to the description and examination of data from an individual case. Data from each case was analyzed separately to get a complete picture of each participant's translanguaging practices (Koners & Goffin, 2007). Thus, the process of within-case data analysis was narrative description using the evidence from gathered data. Whereas cross-case analysis refers to the comparative analysis of all the participants (Duff, 2008). Comparisons were made to see the similarities and differences across cases. The process of data analysis of each data collection tool is discussed below.

Structured Observation Analysis

Observation sheets were analyzed regularly to note down the frequencies of functions of translanguaging used by participants. The sheet was divided into task-referring, i.e. explanation, elaboration, translation, interpreting, asking questions, giving examples, and non-task referring, i.e. chit-chat, requesting, and humor functions. Asking questions, Giving examples and humour were the newly emerged functions in the current context. Observations were done in 5 classes; the duration of each class was 60 minutes. Frequencies were noted down by two researchers/observers in intervals of 5 minutes. In every 5 minutes, it was noted how many times a participant was using that function in her language. During the observations, the frequency of participants' communicational behavior was recorded with a method named event sampling (Bryman, 2016). This is usually done with tally marks, in which an observer puts a tally mark every time an event occurs. Thus, tally marks were used every time a participant explained, elaborated, interpreted something or responded with regard to any other observed function. Individual participant's frequency of responses was then analyzed by counting and calculating the number from sheets manually. To ensure the authenticity of data, counted frequencies were double-checked from another observation sheet filled by another observer.

Analysis of Diaries, Field notes and Interviews

A qualitative content analysis approach was adopted by this study to condense and reduce the textual data from audio recordings, diaries and interviews by coding, categorizing and interpreting (Cohen et al., 2007). Coding refers to the indexing or categorization of text from the data to establish the framework of thematic ideas about it and to find out the relation between analyzed concepts (Gibbs, 2007). There are two types of content analysis that were employed by this study, i.e. manifest and latent. Manifest content analysis refers to the descriptive or surface-level meaning of data, while latent analysis deals with the deeper interpretation of data (Dornyei, 2007). Both types were used to find functions of translanguaging and knowing about students' perceptions regarding it.

Data from audio recordings, field notes, diaries, and interviews were assembled in textual form by transcribing and translating. Transcription involves close observation of data through repeated and careful listening (J. Bailey, 2008). Data in Sindhi and Urdu language were transcribed into English. Audio recordings were carefully listened to to contextualize the functions that were used by participants in context. Moreover, diary and field notes were analyzed to get inferred, and non-inferred chunks of text from participants' responses and were assigned names explicitly to indicate for what function a participant was using translanguaging. Interviews were also transcribed and translated to get to know about students' perception of using translanguaging clearly.

Cross-Case Analysis

Table 2. Occurrences of Participants' task and Non-Task Referring Functions

Occurrences of Participants' task and non-task referring Functions			
Task-referring	Functions	Number of Occurrences	% of Occurrences
	Elaboration	226	38.83%
	Asking questions	123	21.13%
	Giving examples	68	11.68%
	Translation	51	8.76%
	Interpretation	35	6.01%
Non-Task Referring	Chit-chat	54	9.27%
	Humor	18	3.09%

Coding and Categorization

Data from qualitative sources such as diary notes, field notes, audio-recordings and semi-structured interviews were examined deductively and inductively to explore functions that occurred in translanguaging practices of students and also the students' perceptions about using translanguaging in classroom rather than one language. Chunks and segments of text were extracted and assigned tags labels showing instances of particular functions. Those segments were also supported by students' opinions that they non-inferentially talked about in the diaries and interviews. For example, instances of task-referring functions were labelled as explanation, elaboration, translations or interpretation, and instances of non-task referring functions were tagged as chit-chat, humor or requesting through inferential and non-inferential coding because some opinions did not directly lend into deductive categories and required interpretation of the researcher.

Findings

Due to limited space and word limit, we only present the findings of the cross-case analysis below. Findings of within-case analysis will be presented in a subsequent paper. Results of this study are based on cross-comparison of similarities and differences among participants. Results of the cross-case analysis are demonstrated in the table below, which shows that participants employed translanguaging for various functions and to various extents.

Requesting	7	1.20%
Total	582	100%

The table above demonstrates the occurrences of functions of translanguaging used by participants, which are divided into two categories, i.e. task referring and non-task referring. It shows the number and percentages of occurrences of functions. Below is the description of how each function was used in class. The different extents of using these functions by participants are further described by evidence and examples from data and are presented as themes.

Elaboration

Elaboration was found to be a highly used function of translanguaging in the category of task-referring functions, mostly when participants were working in groups or when they were preparing to present a topic in class. It helped participants to get an in-depth understanding of the concepts through detailed descriptive discussions. Participants considered elaboration is important to convey their concepts in a clear way. Besides, elaboration helped participants to build each other's understanding by explaining with details and examples to contextualize the science concepts. The quotes below illustrate the use of translanguaging for elaboration,

I use my own language to convey more information. (Participant-3, Diary-1)

We use Urdu or Sindhi for further elaboration, and we also come to know about the role of that topic in our society, too, by examples (Participant-1, StR).

Translanguaging helped me to discuss topics in detail by giving examples (Participant-3, StR).

Asking Questions

In addition, 'Asking questions' is the 2nd most used function by participants, which emerged within the current study context.

The following excerpts have been taken from transcripts of classrooms 1 and 2 of Participants 1 and Participant 3, respectively, to illustrate 'asking functions' as the function of translanguaging.

Participant 1: *Ye breeds kisko kehthe hain?* [what do we call breeds]? (Participant-1, Transcript-1)

Evolutionary future genetic constitution pe kese depend on karta hai? [How does the evolutionary future depend on genetic constitution]? (Participant 3, Transcript-

Moreover, it was also evident from Participant 2's diary notes in which she specifically wrote about asking questions as a function she used in translanguaging. 'I used translanguaging while making my friends understand the topics, but the point where I actually used it was during asking questions' (Participant 2, Diary Notes-5)

Giving Examples

Participants also reported using translanguaging for asking for or offering examples for content understanding. The following excerpt shows how it was used as the most important function in translanguaging to explain the concepts in a clear way. Participant 1 gave an example to her peer when they were discussing lamarkian's theory in a group. She said, '*for example, dis mothers ji piercing kadhen babies main transfer nahe thindi par lamark chayo huyo ta thindi aah in lae ta unji theory reject thi wai hui*'. [English translation: 'For example, piercing in mother is never transferred to the babies in the tummy; Lamark said, it does. This is why his theory was rejected' (Participant 1-Transcript-4)].

Translation

The translation was mainly used when participants tried to make sense of the science text written in English in their book. All participants strongly favoured translanguaging for it enabled them to communicate their ideas easily and helped them get their message across to their peers. Participant-1 stated, 'it really helps me to understand things easily. Participant-3 also reported, Sometimes, when Science teachers teach us something in English only, we feel difficult to understand it. However, when they translate the difficult terms in our mother tongue, only then we clearly understand it.

Moreover, it was frequently used in group discussions, especially when the peers were unable to get the meaning of some difficult vocabulary.

I used translanguaging to make my peers understand in an easy way as their *mother languages* are different. Sometimes we use our mother tongue because some words can be better understood in that language. It is also easy to express our thoughts, ideas and opinions. (Participant 1- Diary 2).

Interpretation

Interpreting ideas and opinions of one another were continuously observed over five observational classes of each participant. It was used when participants were clarifying and confirming the science concepts to one another. Connecting expressions with the cultural meaning of the concepts were also observed, which ultimately helped students to understand the concepts explicitly. The interpretation was highly used by Participant 1 and least used by Participant 2. While Participant 1 always helped her peers in understanding topics. Participant 3 was also observed to use interpretation in her interaction with her group members. The group was busy in making a presentation which they were supposed to present through a gallery walk. For instance,

Recombinant DNA technology k zariye hum artificially genes produce karwa sakte hain aur unhe phir kisi aur host main insert karte hain new variety produce karne k liye, right?

[English translation: Through recombinant DNA technology, we can artificially produce genes and insert them in the host producing new variety. Right?] (Participant-3, Transcript-3)

Chit-chat

Chit-chat was a non-task referring function as its name suggests so. Asking each other about which dress to wear on farewell or which drama did they watch were the observed and recorded behaviors of the participants for which the translanguaging occurred. For participant-1, chit-chats and talking to friends was always realistic in one's own language rather than speaking in English only. Participant-2, on the other hand, showed a dual attitude to chit-chats. While in her interview, she stated, 'I am not habitual of having informal conversations in English', data from classroom observations and field notes suggest she did engage in chit-chats with her neighbors sometimes.

Requesting

Requesting was a non-task referring function that was rarely found to be part of students' translanguaging practices as it existed to the least in occurrences. It was overall a least used function because, in the study of (Romanowski, 2019), this function was studied in teachers' context when they mainly requested school accessories. However, in the current context, it was found in student-student interaction when participants in groups requested their peers for anything or when they politely asked each other to do something. It occurred mainly while asking peers for some help in a polite way of asking a teacher to do any favor. The occurrences of this function for all three participants were almost similar. Participant 1 and Participant 3 used it just a couple of times, and Participant 2 used it thrice during the 5 observation classes. The examples are given below to show how participants were using translanguaging for requesting.

Meri pen gir gai hy, utha k dy do yar please?
(My pen has fallen down, please take that from there and give it to me). (Participant-3, Transcript-2).

Ma'am aaj jaldi se windup kar k koi game ya energiser hee karwa den. (Ma'am wind it up quickly today and have some energizer or game please). (Participant-1, Transcript- 3)

Humor

Humor, a non-task referring function, was also found in students' translanguaging practices. According to participants, it is important to have fun in class, especially in a language that others use the most. Fun at times helps to make learning effective. The attention span of students is never too great, so they are usually seen to have some side jokes with friends. For this function, Participant 2 had higher occurrences than Participant 3 and Participant 1 since she was more of jolly nature. She always preferred to use her own language, i.e. Sindhi, to make jokes in the class. She stated in her interview,

Yes, it happens. When we make jokes in English, nobody understands and laughs at it. We find those things or jokes funnier when they are in our own language/mother-tongue because we are not habitual of having an informal conversation or making jokes in English.

Discussion

The current study showed some interesting task- and non-task referring functions quantified with frequencies of students' translanguaging practice in the science classroom; In relation to the first main question of this present study on students' use of translanguaging functions in their task and non-task related talks, the task-related functions were predominantly found in students' translanguaging practices in line with [Duarte's \(2019\)](#) study with a clear dominance of 'elaboration' on the peak with 226 out of 503 occurrences because of the fact that the classes were fully student-centred and students were always busy in creative activities like gallery walk, group discussions, jigsaw, oral presentations and so on which involved them in making elaborations to peers understanding the science concepts. Students' perceptions also upkeep elaboration as a way to clarify concepts to their peers using translanguaging evident in [García and Leiva \(2014\)](#) study, who suggest that elaboration enables students to simplify their ideas and opinions, which they could not do in only English that limited their voices.

Moreover, asking questions under task-referring functions allowed students to clear queries regarding scientific terminologies using translanguaging. For example, one of the participants asked a question about a scientific term, 'deme' from one's peers and related the term with that of the organism's population after a long discussion and questionings on it. [Karlsson, Nygård Larsson, and Jakobsson \(2019\)](#) also argue that multilingual students make use of both their L1 and L2 to relate scientific abstract content with daily life experiences while clarifying their queries sometimes supported by interpretations of the ideas to conform answers.

One of the most interesting findings of the present study that goes similar with [Duarte's \(2019\)](#) study is that of asking questions as the second most dominant occurring function in student-student interactions. It highlights the role of questioning in understanding science content allowing students to challenge and question each other's ideas ([Berland & McNeill, 2010](#)). To add with, many research studies have been done on the importance of exemplification as a strategy used by teachers to learn abstract concepts in science classrooms ([Oliveira, Cook, & Buck, 2011](#); Oliveira & Brown, 2016). However, the present

study highlights the importance of giving examples as a function of task-referring category in the science classroom using translanguaging. Examples help students to connect abstract science concepts with cultural context enabling them to discuss the role of those topics in society too by utilizing all linguistic resources to maintain their focus. This idea is in support with Oliveira's and Brown's (2016) idea who suggest that exemplification in science classrooms assist students to stay focused and imagine abstract concepts.

The off-task functions in the present study including humor, chit-chat and requesting were found less in number than on-task functions in science classroom because students were mainly involved in group activities all the time which suggest that students devoted their time more towards their learning rather than being non-serious. One of the functions humor serves as an informal way of making jokes on certain science concepts while giving contextual examples and has been identified as the source of enjoyment in between classroom discussions. Participants' perceptions evidently described humor as a phenomenon which relates to cultural languages and sounds amusing when it is done using translanguaging as [Bell \(2011\)](#) describes humor as entertaining when it is specific culturally. Using English only in jokes or fun takes the essence away from laughter in humor. [Dávila \(2019\)](#) has emphasized to value students' generated humor and harness it for the reason that helps them in content learning and understanding. The present study found humor to be the second most occurring translanguaging function under the non-task referring category.

Additionally, students were found out to be involved in chit-chat and muttering moving between linguistic loops for everyday conversations in L1 and more subject specific expressions in L2 ([Karlsson et al., 2019](#)) while chatting about private or home conversations. The occurrences of chit-chat are found out to be on peak with 54 frequencies out of 142 in off-task functions. Not much literature has been done on the role of chit-chat using translanguaging in science classrooms.

Apart from functions of translanguaging in science classroom, participants' perceptions have highlighted some other aspects of translanguaging such as Participant 1 believed that translanguaging

helps her in seeking the attention of peers in a multilingual context by using various linguistic repertoires. In the same vein, translanguaging assisted Participant 2 and Participant 3 to cope up and learn new science vocabulary as one of them shared about the word 'circumcision' as being unaware for its meaning in her own language so she connected that word with the cultural meaning which was 'Sunnat' as per her religion. This example represents translanguaging as a phenomenon of offering multiple linguistic resources. To wrap up, these ideas imply translanguaging as a way which drives students' learning on varied paths of weaving scientific content with home languages to maximize scientific understanding.

Conclusion

The findings of the study revealed that students use translanguaging in their interactions for multifarious functions; however, when they interact or communicate with their teachers, they prefer to use English. Translanguaging helps students to develop a clear understanding of the

content of science, cope up with new and unfamiliar words, makes their communication easier, helps them in getting attention from peers and makes the environment informal. Translanguaging allows students to assert their linguistic identities and enables them to not only understand the content and get scaffolded help from the more knowledgeable others but also empowers them to proactively contribute to the overall learning process by sharing their viewpoints, challenging their own as well as that of others' ideas. Thus, translanguaging allows students to be masters of their own self. Therefore, the study suggests that the translanguaging practices of students in science classrooms cannot be neglected since it helps them to make their learning effective. In addition to that, science teachers are suggested to not encourage their students to make use of translanguaging in order for the latter to optimize their learning in science classrooms. The study highlights the need for teacher educators to raise awareness of the pre-service and in-service teachers about the multiplicity of the pedagogical uses of translanguaging.

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