

The perception and experiences of teachers about language issues in the biology classroom

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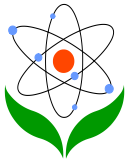
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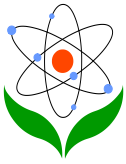
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Abstract

This study examined the teaching-learning issues related to the language in the biology classroom. It has explored the main issues of biological language that encounter students and teachers in the teaching-learning processes. The objectives of the study were to explore the perceptions and experiences of secondary school teachers about language issues in the biology classroom. Therefore, a case study approach within qualitative research methods is used to explore the language issues in biology classrooms. The participants of the study were recruited through the purposive sampling technique. The observations were conducted to get familiar with the teaching practices of teachers. Further, semi-structured interviews were conducted to get in-depth information. The data were analyzed through thematic analysis. The study findings revealed that students and teachers face language issues in biology classrooms. It includes the structured vocabulary of biology, long spellings, and difficult processes, difficult to pronounce the long words. Most of the time, students write incorrect spellings due to the wrong word pronunciation that also leads to misconceptions of biological concepts. The implications of this study for teachers are discussed. This paper will inform the biology teachers and students about different issues encountered in biology classrooms. Similarly, this paper recommends the trainers integrate contextual relevant teaching methods that could overcome the above-mentioned language issues in the biology classroom.

Keywords: Perception, Experiences, Secondary School Teachers, Language Issues, Biology Classroom

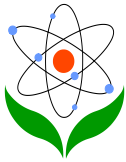
Introduction



Language is like a medium that helps you to communicate with others (Maheux, 2017). For the development of language, the words and mind should work collectively. Mercer (2002) mentioned that “Words and Minds takes a lively and accessible look at how we use language to combine our mental resources and get things done” (p.3). Language plays a crucial role in science learning (Seah, 2016b). Likewise, biology has its scientific language which helps students to understand biology. Learning biology involves learning a specific language of biology like other subjects (McComas, Reiss, Dempster, Lee, Olander, Clément, & Waarlo, 2018). In biological language, the different terminologies are embedded. Hence the acquisition of biology vocabulary is essential for developing scientific concepts (Driel, Slot, & Bakker, 2018).

Jagger and Yore, (2012) emphasized the importance of scientific language. However, little attention has been given to the language of science in terms of the teaching process. The scientific language is rarely discussed and mostly gets neglected. Likewise, there are very few people who are aware of the importance of scientific language in teaching-learning of science. According to Shanahan and Shanahan, (2008), science literacy itself is a core subject and it has three main components. These include basic literacy, derived literacy, and fundamental literacy. Basic literacy demands some skills of writing and reading. Thus, derived literacy required science knowledge. At last, fundamental literacy is about knowledge and the application of science in the solutions to daily life issues. Unfortunately, it is considered that biology literacy is about reading and writing alone (Thompson & Logue, 2006). It is beyond that component and language has a significant role in constructing and communicating knowledge and necessary thinking skills which learners need as citizens of socio-scientific contemporary society. However, the development of language requires opportunities to learn the language of biology through multiple teaching approaches.

Science plays a crucial role in the development of humankind. The word science looks so simple and easy but it includes the information of the world. Science is the field that explores the latest phenomena. Science is the logical exploration of nature. According to Chalmers (2013) that everyone holds the common belief that there is something special in science. It may be the well-structured scientific methods or reliability of scientific methods which make it so special. Nowadays, science is embedded in every field of study such as the life sciences which relates the study of biology. Furthermore, Chalmers (2013) explored that science provides reliable information that is based on facts instead of personal opinions. Therefore, the learning of science is a bit different and complicated from the learning of other disciplines. Hsu and Roth (2014) also endorsed that students learn science employing accommodation and assimilation methods. These two aspects help to understand the new concepts and modify the previously learned concepts in science.



Biology contains detailed information about living and nonliving organisms. Ruiz-Mirazo, Peretó, and Moreno (2010) mentioned that biology is the central part of living organisms. It explains the systems, processes, and functions of living organisms. From a biology perspective, life is something that performs continuous functions for better survival like the heart. Moreover, it is described in Setiawan (2019) that biology is the major discipline that encloses the other disciplines related to living organisms. Life science is another name of biology which distinguishes it from other sciences. In addition, the learning of biology takes place with the help of experiments, observation, and descriptions.

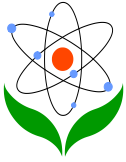
In addition, the situation of teaching and learning of science suggests that our schools are not producing human resources that are scientifically literate in the field of science and technology, which has a significant role in the rise and fall of nations (Khalid & Khan, 2006; Social Policy and Development Centre SPDC, 2002-03). Hence, it is difficult for science teachers, especially biology teachers, to identify and resolve language issues in the biology classroom. On the other hand, teachers are not well trained to use technology gadgets in the classroom and they are also not aware of the search engines on the internet to search more about trends and issues in biology teaching and learning processes.

Literature Review

Language Efficiency Facilitates the Learning

Language helps to decode and make meaning of the message that we receive in audio or written form from others (Buck, & VanLear, 2002). According to Halliday (1993) language learning is a continuous process and every discipline has its language which students have to acquire for the sake of in-depth understanding. Some language students learn consciously like English and Urdu languages. Likewise, language discipline is also the major element that has tremendous effects on teaching and learning. Hence it needs lots of attention for getting knowledge and making meaning out of the messages and conversations. Language allows its users to select the most appropriate words for conveying their message. It also supports organizing thoughts in a good manner.

Similarly, scientific literacy is very important for learning science (Allchin, 2014). In science, there are three types of literacies. Fundamental literacy means students should be able to read, write, pronounce scientific concepts and construct the accurate meaning of the scientific terminology. The second most important scientific literacy is derived literacy which means that students should hold some understanding of scientific knowledge and concepts (Norris & Phillips 2003). Then



we have functional scientific literacy which enables the students to see the role of science in the broader sense. Like how science is helping to resolve social issues and fix curiosity. Functional literacy helps people to acquire information about science on the World Wide Web. So, in the function of scientific literacy, people investigate science in the border aspects (Tabak, 2015).

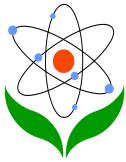
Language as a Way to Construct Personal Knowledge/Understanding

Knowledge is a wider term. There is no single definition of how knowledge gets transferred. As everyone has their way of understanding the transmission of knowledge from one source to another. In addition, Roberts (2000) has broken the word knowledge into three main categories. First is Data that is “a series of observations, measurements, or facts”. Second, information is “data that has been arranged into a meaningful pattern”, whereas, knowledge is “the application and productive use of information, it involves an awareness or understanding gained through experience, familiarity or learning (p.15). These main elements of language help to construct understanding and develop knowledge about any phenomena.

Language is also used as a mode of thoughts transmission from one person to another. As Vygotsky (1962) described every child begins to learn the language for the construction of knowledge and understanding about anything. Language is an essential way to communicate thoughts effectively and understandably. Moreover, conceptual and language development are two interdependent terms. One element cannot function without the support of another element. Further, daily life experiences require language competencies for sharing thoughts and knowledge. Therefore, language is the main source that helps to convey your ideas and construct knowledge effectively.

Essential Role of Language in Science Learning

According to Yore, Bisanz, and Hand (2003), the relationship between language and science learning is based on cognitive science. Additionally, language is a basic component of science learning that provides an advanced understanding of science. Mercer (2002) states that pupils use language to communicate every day, but the main goal of the language is to think collectively and then take action. “Language is a tool for carrying out joint intellectual activity” (p.9) Similarly, Phillips and Norris (2009) described that the main role of language in science learning is to capture the crucial nature of scientific reasoning. Moreover, the scientific language is textured and structured. The textured means “true, probable, uncertain, false” and the structured mean, “cause, effect, observation, hypothesis, method, motivation” (p.20). However, both forms of scientific language help to learn science logically and reassuringly.

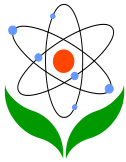


Scientific literacy plays a very important role while learning science. In contrast, scientific literacy is different from English literacy and having no understanding of scientific language could create hurdles for both teachers and students. English literacy has two main aspects: one is reading and writing and the other is knowledge ability. A knowledgeable person can be good at English without having the skill of writing and reading. In contrast, in the case of scientific literacy, the ability of reading and writing is tightly connected with the knowledge of science. Hence, if a person cannot read and write in science, he cannot get the knowledge of science in depth. Moreover, the National Research Council (1996, p. 22) highlights, “Scientific literacy entails being able to read with understanding articles about science in the popular press.” The science language has particular scientific aspects that are structured vocabulary and difficult terminologies. Therefore, reading and writing long terminologies generate issues and scientific language itself becomes the barrier in the learning of science. Teachers required to address these issues as scientific language is like a door to scientific knowledge and concepts (Yore & Treagust 2006).

Science Teaching and Learning: Language Challenges

Language is a crucial element of science learning. It supports as well as hinders the way to learn science. As Wellington and Osborne (2001) mentioned, the language of science is the factor that creates difficulties in the learning of science if it is not treated in routine teaching. Science is dense in words, scientific terms, and vocabulary. Scientific texts contain lots of scientific words which have specialized meaning, pronunciation, and spellings. Science has its language and it is important to develop that language of science while teaching it. Therefore, language is conceptualized as a key to develop an understanding of subject matter knowledge. In addition, every teacher of any discipline must consider a language teacher. For instance, if we talk about the word “biology”, and if students do not pronounce, spell, understand and elaborate so it will not be biology for them because they don't know the meaning of it. According to the report of Koss and Bullock (1975) that every teacher should pretend to be a language teacher. It is also highlighted in Byrne et al. (1994) that science is based on logical reasoning which is developed with the help of language. If students do not understand and express themselves in the science language they will face more difficulties in the reasoning of science. Language expertise could develop good reasoning skills in students (Rillero, Thibault, Merritt & Jimenez-Silva, 2018). The findings of Seah (2016) suggests that teachers acknowledge that the scientific language used in science is difficult and different from the other disciplines. The main difference is the structured and difficult terminologies of science disciplines. Findings of the same study also revealed that the precise nature of scientific language creates obstacles in students' learning.

Language Issues in Biology Classroom: Scientific Writing



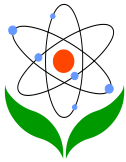
Scientific writing is important but it also creates obstacles in the learning of science. Likewise, the biology discipline has its writing style that is crucial to teach and learn by the students. Scientific writing is a bit different from the other styles of writing. It contains many scientific words and styles. As mentioned in Seah (2016), writing scientific explanations is a skill that students learn in the biology classroom. Many teachers address the conceptual demand of the topic but they do not pay more attention to the language demand. According to Fang (2005), scientific writing has unique features that are based on scientific knowledge, beliefs, and values. In addition, scientific writing is essential because students do not have any idea of how to write a scientific paragraph. It will be problematic for students to read and develop a conceptual understanding of science without the knowledge of scientific literacy. Students cannot understand the language of science because reading and writing are most important in science. If a person is not able to read the scientific paragraph, Conceptual knowledge cannot be gained about the science. Moreover, science requires critical thinking and reasoning so literacy is very important and science has specific terminologies and vocabulary so without reading, writing, and understanding that terminology the science remains a mystery for anyone who's not able to read and write.

The current situation of the world mainly focuses on scientific inquiry which is the need of everyone. It can be developed with the full involvement of the participant in daily life experiences where students get the chance to develop and test the hypothesis (Haerazi, Vikasari, & Prayati, 2019). On the other hand, Wellington and Osborne (2001) said that the biggest issue faced by students while learning science is the language of science. It is also mentioned that secondary school teachers consider science as a practical and theoretical subject. Although, language and literacy are the main parts of science learning which are neglected in the schools while teaching science subjects.

Specialized aspects in scientific writing hindered the students' learning. For instance, when students get involved in the writing of scientific concepts and they explain it in ordinary writing which changes the concept and meaning of the topic. Therefore, scientific writing is useless without specific scientific vocabulary. Lack of scientific vocabulary could stop student's critical thinking because they don't know the ways which are used to express ideas (van Driel, Slot, & Bakker, 2018).

Scientific dense vocabulary

Vocabulary plays a crucial role in acquiring subject matter knowledge. Hence, each subject has its unique vocabulary. Likewise, science also has its scientific vocabulary which plays an important role in science learning. According to Shanahan and Shanahan (2008), the challenge which students face is understanding the meaning of



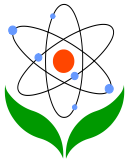
the words. A scientific word has general as well as specific meaning which creates a problem for the students. Such as breathing and respiration have specific and exact definitions. But in daily life, these words have different meanings. Scientific vocabulary creates barriers to the learning of science. Students do not remember the scientific vocabulary because the words have long spellings and different meanings in science from daily life experiences. When students relate science learning with daily life experiences they become unable to create connections. Likewise, Tobias (1994) emphasizes that connection helps to build a bridge between new learning and prior knowledge. If there is no bridge, the acquired knowledge will not make meaningful connections and there will be no accommodation and assimilation. According to Allen (1999) vocabulary is not a big problem but the teaching of vocabulary creates many issues. Most teachers provide the vocabulary lists to the students for memorization. Hence, the students just memorized the words without getting an understanding of the contextual and conceptual meaning of the words. Moreover, the basic purpose of vocabulary is to enhance the student's reading, writing, speaking, and understanding skills. However, most students use general vocabulary which is used in daily life experiences at the place of scientific vocabulary in scientific writing.

Lack of active reading practices in the biology classroom

In the biology classroom, active reading is most important as it engages students in the pronunciation and understanding of the contextual meaning of difficult words. In active reading, students read the content between the lines then stop and break the content for further explanation. It means that students try to acquire the whole understanding with the help of active reading. The spellings and pronunciations also improve when students relate words and develop contextual meaning. The visualization helps the students further to comprehend the content. Active reading develops the skill of making mind maps or graphs of the topic and relates it with daily life practices. In active reading, the student's also involved in predicting the concepts. They predict what the next text will say (Shanahan & Shanahan 2008).

Scientific spellings/pronunciation

Scientific spellings and pronunciation are the most important and key parts of scientific language. If students are unable to pronounce the scientific word correctly, they will be unable to write the accurate spelling of a particular word. The lack of good pronunciation practice leads to more spelling mistakes. The scientific spellings and pronunciation of terms are interconnected. If one is not developed then it affects the other one. Similarly, Ehri and Rosenthal (2007) explained that it's required to pronounce the word before writing its spellings. Therefore, students have to use scientific words for producing more scientific write-ups.



Methodology

Research Method

This is a qualitative exploratory research study in nature. The qualitative research method is used to explore deeply and analyze the multifarious phenomenon. Cohen, Manion, and Morrison (2000) explained that constitutes teacher's perceptions and practices applied in context for addressing the language issues in the biology classrooms. The qualitative exploratory research design is used in this study because it is most appropriate to answer the identified research questions.

Hence, the primary purpose of this study was to explore the perception of secondary school teachers about issues in the language of biology. In addition, this research design is also useful in situations where less or no research study is conducted on a particular phenomenon. So, researchers explored the real problem from the biology teacher's perception by using an exploratory research design.

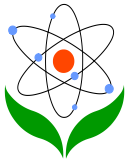
Research Questions

- Q1. What are the teachers' perceptions of the role of language in Biology learning?
- Q2. How have the teachers' experienced language issues while teaching Biology?

Recruitment of Participants

The sample of this study was recruited through a purposive sampling technique from the urban part of the Sindh province of Pakistan. Hence, four teachers were recruited as per their qualification and teaching experience at the secondary school level, and gender balance. The teachers were recruited based on the criteria of (i) having a Master's degree in Biology, (ii) a Masters degree in Education, (iii) at least five years of experience at the secondary school level, and (iv) received professional development training in theory respective subjects. Likewise, Robinson (2014) explained that the criteria for sampling facilitate the novice researchers to recruit the authentic sample from the population. The semi-structured interviews were conducted face-to-face to explore the teacher's perception and experiences about biology teaching focusing on the language issues in the classroom. Participant's identity was kept confidential throughout the process of data collection, analysis and presentation.

The Procedure of Data Collection and Analysis



The semi-structured interview guide was used to collect the data from the selected respective schools' teachers. The research ethics were followed by taking permission and consent from the school management and research participants. All the semi-structured face-to-face interviews were tape-recorded with the participants' permission. The duration of each interview was 45 to 50 minutes.

Thematic analysis was used for the robust interpretation of the collected data (Lapadat 2010).

Results

This section presents the major findings of this study. All the themes are comprehensively explained below with the participants' testimonials.

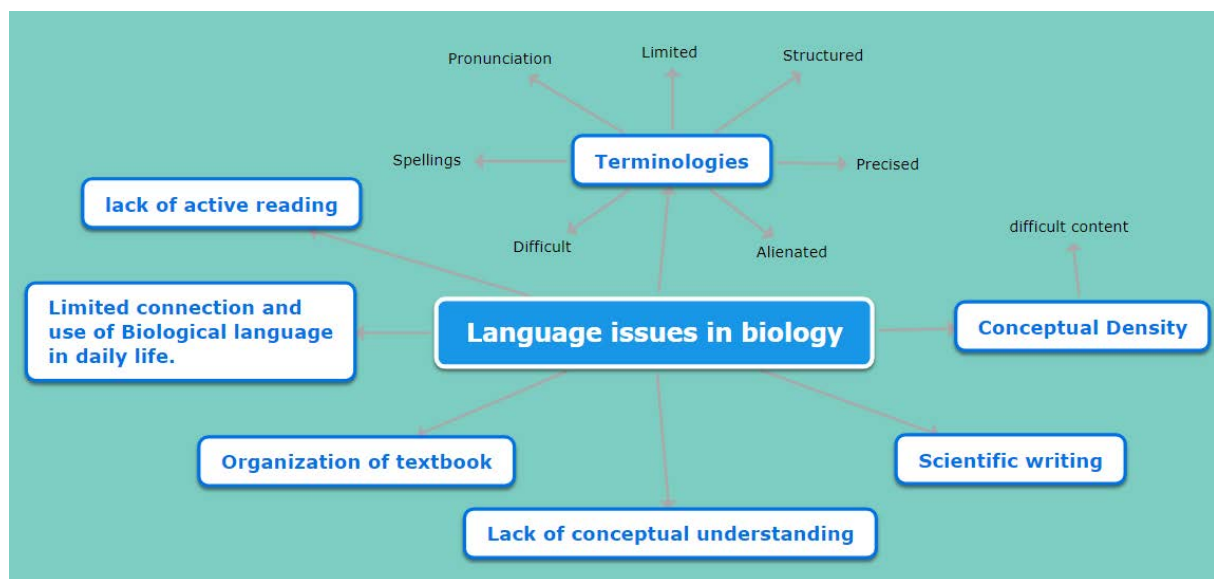
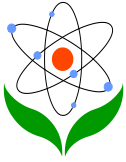


Figure 1. Model of Language Issues in Biology Classroom

Biology is a discipline that has both concrete as well as abstract knowledge. All four participants had the same understanding that biology teaching is a critical process. Therefore, they faced some issues while teaching biology. These issues are described below.

Scientific Terminologies: Limited and Structured

The data analysis reveals that the précised and structured vocabulary creates issues in the learning of biology. There are many terms in biology, but all the terms are limited and structured. *As an Interviewee I* shared experience that, "Biology has pre-



defined limited terminologies. As the digestive system has particular terminologies and those terminologies are used in the whole life kingdoms. It means the same terminologies are applicable in bacteria, animals, even plants' kingdoms". Similarly, it was observed that when teachers involved students in the writing activity about the digestive system, students faced difficulties in writing. The main reason which hinders students from writing on the digestive system is the limited and structured vocabulary of the topic. *Interviewee II* also endorsed that "Students usually complain about these difficult terms that are given in science". It could be analyzed that students perceive biology as a subject that has no connection with language learning. Basically, this is the misconception that students hold science and language are different domains. Teacher responses and observation data depict that every system and process has structured terms in biology and students are bound to use those terms related to that system such as esophagus, intestines, and stomach.

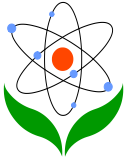
Scientific terminologies: Difficult spellings and pronunciation

Data analysis discloses that language is the major issue in the teaching and learning of biology. Most of the time, students get a conceptual understanding of any topic but they remain unable to describe their understanding because of long and difficult spellings of terminologies. *Interviewee IV* shared that, "Every topic has many and tough terminologies. Syllabus density with a bundle of difficult terminologies create problems for students to learn effectively" (*Interviewee IV*). It shows that students cannot read and spell long terminologies. It is also understood that spelling errors lead to writing errors as both are interconnected. Likewise, the wrong pronunciation of long terms also creates a hindrance while getting a conceptual understanding of the scientific topic. Data also describes that the syllabus of biology has too much content density which creates problems for the students. As more than one concept is described in the same small paragraph. Therefore, the content density and language issues both create difficulties to learn science smoothly.

Ehri and Rosenthal (2007) endorsed that when students start to write the spellings of the words, firstly, they pronounce those words then they write. Similar challenges faced by *Interviewee III*,

Many of the terminologies like peptidoglycan could not be pronounced by the students as it is quite difficult to pronounce peptidoglycan. So I told them to focus on the spellings. So these kinds of problems are used to create problems daily.

It is analyzed that if students are unable to pronounce the scientific word correctly, how they could be able to write the accurate spelling of that word. So, the lack of good pronunciation practice leads to more mistakes in the spelling and expression in writing.



Scientific terminologies: Specific phenomena

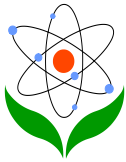
Data analysis elaborates that biology is connected to our lives in many ways. Most of the phenomena students practice in their daily life such as breathing, diseases, and digestion but all these processes have specific terminologies in biology subjects which creates difficulties in the learning of biology. Students feel biology is disconnected due to unfamiliar words. As *Interviewee II* stated:

Biology has particular terminology and phenomena. Regarding every phenomenon, even if we eat food then we take a rest so it also has particular physiology. When we explained that in biology terminology that it is very different from normal terminology. Then we explained the mechanism process step by step. And procedure as well (*Interviewee II*).

This highlighted that when the teacher asked for spellings of the long terminologies students faced difficulties while explaining and spelling out the words.

Alienated scientific terminologies

The analysis of data divulges that students do not use biological vocabulary on a routine basis. So, students do not have much vocabulary for writing any scientific concept. It can be because students don't practice scientific vocabulary in their previous classes or social gatherings with friends or at home. That's why they faced difficulties in learning biology. Moreover, when students relate science learning with daily life experiences they become unable to create connections because both languages have diverse vocabulary and meanings. Tobias (1994) also emphasizes that connection among students' mother tongue and scientific language helps to build a bridge between new learning and prior knowledge. If there is no bridge, the acquired knowledge will not make meaningful connections and there will be no accommodation and assimilation. "No practice of scientific vocabulary daily basis" (*Interviewee III*). The data analysis discovers that every student belongs to a different context and the language that is used at their home is very different from academic language. So, when the teacher compares students' daily life experiences with academic learning, they become so confused because these terminologies seem to be alien to students. In addition, teachers also encounter some sort of difficulties while teaching unfamiliar words to the students. *Interviewee IV* stated that: Suppose if we are focusing on the parts of the brain. Cerebrum, these are words that are never utilized in our common language. So if I teach unfamiliar words I face some difficulties. Because now we are unable to relate the topic to daily life. Because they never listen to these terminologies [before] at home.



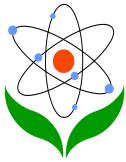
The above response shows that teachers faced challenges while connecting biology learning with students' daily life because many terms seem alien to students.

Scientific Terminologies cannot be translated into the Native Language

The findings reveal that some of the teaching methods are not suitable in science teaching such as translation. Hence, while using the translation method a teacher could translate the concept but the difficult terminologies and complexity of the concept remain the same. So, most of the teachers faced difficulties while using translation methods in the biology classroom. As (*Interviewee I*) discussed, when I tried to translate the scientific terminologies in another language students got confused and started cramming the words". This is also asserted that many terms in biology can't be translated into the mother language (Sindhi or Urdu) of students. If teachers attempt to translate the scientific terms into students' mother tongue the key terms remain the same as there are no corresponding words in local languages. For instance, the teacher cannot change the Golgi bodies, cellulose in the student's native language (Sindhi). As there is no word for such biological terms. *Interviewee III* shared, "Every topic has many and tough terminologies. Even in the world it is declared that biology has very difficult terminology. Therefore, it is difficult to translate it into mother tongue". The scientific terminology cannot be converted nor translated into the native language.

Huge Conceptual Density in Biology

The analysis of the data reveals that there is too much content of biology at the secondary level that hinders active teaching. There are 19 chapters in the biology textbook of secondary school and each chapter has many topics with different concepts (Ministry of Education, 2006) Teachers pressurized to complete the syllabus, hence they don't have more time to focus more on language issues in biology. Further, teachers cannot teach every topic effectively which holds a huge concept density. Likewise, there are separate terminologies for each concept in biology, hence, the teacher finds it difficult to teach students several new terminologies of biology present in the 19 chapters. As *Interviewee IV* shared, "Too much material, facts, and terminologies create difficulty for them. Suppose that the digestive system has more than 50 terminologies required to understand the complete system and its diagram." It is found that more content in the textbook of biology at the secondary level does not allow us to think of other ways of teaching, resolve their issues in teaching, and reflect on their teaching. It can be said that if there would be fewer chapters in the textbook, teachers should have thought about resolving the language issues in biology teaching and working more on teaching terminology present in each chapter.



Lack of Conceptual Understanding of Scientific Concepts

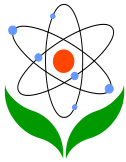
The data analysis discovers that students come from different schooling backgrounds, hence, they have different levels of understanding depending on their particular school. In addition, the mother tongue of students is varied as well as their previous school's medium of instruction. Observation data reveals that students which are enrolled in the biology subject have a weak understanding of the subject. When they learn new and different terminologies they face lots of problems. For example, Interviewee II stated that "If the students are coming from rural areas, they are having other problems like they do not have that understanding level which we want them in the level which we are teaching especially related to our board." (*Interviewee II*)

Problem with Text Organization in Biology Textbooks

The analysis of data highlights that organization of biology textbooks is also the main factors that creates language issues in the learning of biology. It can be because of less description of terminology and more structured scientific words provided in the textbook. According to Eronen (2018), the organization of the biology books should start from simpler concepts to the most difficult. The topics are related to the life placed at the starting of the books. So students can easily make the connections between daily life and biology learning. "In our context, the organization and language of the book are not provided easily. On the other hand, language has sentences, visual representations, diagrams, and complete organizations and flow charts." (*Interviewee IV*)

Discussions

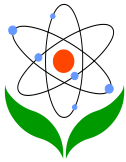
The key findings of this study suggests that students consider biology subject more difficult than other subjects because of the difficult language of biology. Likewise, teachers also faced adversities while teaching the different concepts of biology with structured and limited vocabulary. Some of the issues that emerged from the findings are: structured terminologies, unique way of writing, difficulty to read and pronounce the long spellings of biology. The findings reveal that one of the main problems in learning biology is the obnoxious terminology of the biology subject. Biology uses specified terminology that roots back in Latin and Old English (McComas, Reiss, Dempster, Lee, Olander, Clément, & Waarlo, 2018). Most of those terms are obscure and hard to comprehend for students. Despite having a conceptual understanding of certain topics, students still face difficulties while describing them in biological language. Most of the terms are to be remembered as they are, and there are hardly any alternate words available for those terms. The grouping of language and content



of biology can improve the theoretical learning of learners (Brown & Ryoo, 2008). This makes students cram those terms and cramming vanishes after some time. Findings also explored that it is very difficult for adolescents to memorize the spelling of compound words like *peptidoglycan*. Though biology explains the process and systems that every individual comes across in daily life its pattern and terms are recurrent.

Moreover, this study asserted that many terms in biology that can't be translated into the mother language (Sindhi or Urdu) of students. If teachers attempt to translate the text to the mother language of students the key terms remain the same as there are no corresponding words in local languages. However, Kauser and Shah (2019) suggested that alternative and easy terms should be used while teaching biology to resolve the issues of terminologies in the biology textbook in Pakistan. Additionally, this research depicts that the syllabus and depth of contents are beyond the natural capacity of teenage students. Due to a large number of chapters and extensive topics teachers are unable to do just with all content. Consequently, some parts of syllabubs remained untouched or taught superficially. Moreover, the main issue which is highlighted by teachers is that textbooks lack a reasonable explanation of precise terminologies. They emphasized a textbook must carry reasonable and understandable explanations of biological terms and expressions. In contrast, Mohammad and Kumari (2007) pointed out that teachers are lacking in content knowledge and they are facing language issues to understand the textbook effectively.

Similarly, Seah (2016a) also found the same type of language issues that this study has explored. The findings of this study are consistent with Seah (2016b), who elaborated that there are three types of language issues in the biology classroom such as discipline, mode, and lexical terms. Moreover, the discipline issues reflect the nature of the different languages used in different subjects such as biology has its way to read and write like this the mathematics subjects have unique nature. So it is difficult for the students to learn different subjects in different ways. The second issue was related to the mode, which means that the different representation of the one subject. In biology, the oral, written, and symbolic modes of language entail different language features which create issues in understanding difficult concepts. The third main issue which is founded by this research is the lexical terms which mean content density with difficult terminologies. Moreover, the semantics issues were also explored in this research. Semantic issues are mainly connected with the different words and their meanings. In biology, each word has a unique meaning and that is also connected with the process. Therefore, sometimes students face difficulties while connecting scientific terminologies with their first language. Due to the weak connection between scientific vocabulary and students' mother tongue, it doesn't become challenging to memorize the spellings, definitions, and concepts.



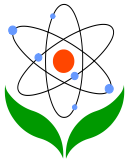
It was also suggested by Mahmood and Iqbal (2000) that science teacher education should be improved to make science learning effective and meaningful. However, the science education situation is worse in the context of Pakistan.

Conclusion, Recommendations and Limitations

This study is mainly based on the exploration of language issues in the biology classroom. The findings of the study reveal that there are many language issues in biology teaching that are encountered by teachers and students. Language issues include difficult and specific terminology, unique way of writing, long and difficult pronunciation and alien phenomenon. These issues are creating hindrance in students' performance and looking at their career in biology. Sometimes, it discourages students from participating in the biology classroom discussion because of the limited vocabulary that students hold in biology. Students prefer to remain silent because of the lack of familiar scientific vocabulary. Teachers have also tried to connect biological terminology with students' daily practices by translating the words. But it seems useless because many words in biology cannot be translated into the native language. Therefore, it is recommended to organize training sessions for teachers where they can learn about these issues and also work collectively to solve these issues in the classroom.

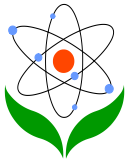
The one key recommendation for the biology teachers is that they should reflect on their daily practices, especially reflecting on language issues. Reflection is a key to think and review classroom teaching practices and make alterations in the way of teaching. It also helps to overcome the classroom teaching issues that teachers and students encounter in the biology classroom. The findings of this research also suggested that teachers are not well aware of the language issues in biology classrooms. Therefore, it is recommended to conduct more training and/or workshops on language issues in biology classrooms.

The action research should be conducted in Pakistan to teach teachers innovative ways for biology teaching. The cross-analysis study on different contexts should be conducted because it will give awareness about the language issues and teachers' routine practices. Based on findings, survey questionnaires should be developed to conduct a nationwide study for the generalization of the findings and making aware the concerned educational institutes. This study cannot be generalized to the whole population of the biology teachers because there are contextual challenges and students' intellectual diversities that might bring variations.

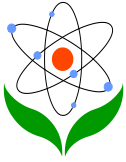


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