

## **AN INVESTIGATION INTO THE DIFFICULTIES OF STUDENTS IN LEARNING BIOLOGY**

Hnin Oo Wai<sup>1</sup> and Su Su Khine<sup>2</sup>

### **Abstract**

The main purpose of this study is to investigate the difficulties of students in learning biology. Especially, causes of difficulties in terms of subject matter, use of instructional materials, teachers' styles of teaching, students' attitudes, study habits and students' anxiety in subject were examined. Difficult biology topics were also investigated. Sixteen high schools from eight townships of four districts in Yangon Region were randomly selected. (32) biology teachers and (640) Grade Ten science students from the selected schools participated in this study. Three instruments: questionnaire for teacher, questionnaire for student and an achievement test were used. For obtaining questionnaire reliability, the pilot test was administered. According to the questionnaires' responses, causes of students' difficulties learning in biology were presented as percentage. According to the teachers' responses, the most serious causes of difficulties of students in learning biology were due to inadequate use of instructional materials and students' poor study habits in biology. Based on the students' responses, the most serious causes of difficulties were due to inadequate use of instructional materials and students' anxiety. Difficult topics such as plant and animal cells, plant and animal tissues, bacterial cell and protozoa were mostly responded. And then, students' achievement in biology was presented as mean score and standard deviation. Pearson product moment correlation was also used to study the relationship between students' learning difficulties and their achievement in biology. The correlation between students' learning difficulties and their achievement in biology was  $r = -.698$ ,  $p < .01$ . These results showed that students who have difficulties in learning have lower achievement and vice versa.

**Keywords:** difficulty, biology, learning

### **Introduction**

Education is the process through which an individual is developed into individuality and a person into a personality. It refers to the change in behavior, attitude and culture brought about in the individual as a result of his having undergone education during a particular period (Sharma & Vyas, 2017). In Myanmar society, education is traditionally valued as a key determinant for social mobility and it is widely recognized as a critical building block for nation building, national unity and sustainable development (National Education Strategic Plan [NESP], 2016). As children grow up in an increasingly technologically and scientifically advanced world, they all need to be scientifically literate to succeed. Science is the most ideal subject to help improve students' thinking ability, for it emphasizes inquiry, which in turn permits students to construct their own knowledge through active investigation of objects and events (Collette & Chiappetta, 1989). In accordance with Myanmar education curriculum, science is taught from Kindergarten (KG) to Grade Nine as a compulsory subject. At the upper secondary school level, science is optional and students who take science combination have to learn Physics, Chemistry and Biology. The knowledge of biology is the major potent source for social and economic changes in the contemporary history of mankind (Owiti, 2009). Unlike other science subjects, biology is expected to be performed much better because the subject matter touches on life and life processes that are expected to be interesting and motivating to the learners (Samikwo, 2013). Therefore, the teaching and learning of biology should be taken very seriously.

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<sup>1</sup> Senior Assistant Teacher, B.E.H.S (2) South Okkalapa, Yangon Region

<sup>2</sup> Dr, Lecturer, Department of Methodology, Yangon University of Education

## **Background of the Study**

In our universe, plants and animals are depending on each other. Animals have to take food and water to survive. The food that the animals had taken are the products and by products of the plants. For this reason, the study of living things, biology, stands as the most fundamental and important of all the sciences (BEd Correspondence Course, 2018). Biology is a unique discipline where experiments with living organisms can take place both in the laboratory and in the field (Prokop, 2007, cited in Hasruddin & Putri, 2014). But, biological materials that exist today is loaded with biological terms, mostly taken from the Latin so that the loss of important concepts that are simply not understood by the students (Hasruddin & Putri, 2014). According to research done by Samikwo (2013) obtained that respondents named terminologies used in the content of biology, misspelling of biological terms and the strict making of biology examinations as the key challenges faced in the study of biology.

As a result, the improvement of biology learning for all students requires effective teaching in all classrooms. Effective teaching requires clarity in presentation and explanation. According to a study by Smith and Meux (1962, cited in Westwood, 1996), it appears that the greatest source of confusion in learners is lack of precision in teachers' explanations. Poor explanations usually get learners confused and therefore create learning problems. Added with the lack of teaching learning strategies that is used so that students unable to complete the study (Hasruddin & Putri, 2014).

Also, inadequate or lack of practical work during biology lessons could be a stumbling block to pupils insofar as understanding new biological concepts is concerned (Woodley, 2009). Because biology includes many abstract concepts and phenomena that require observation, students need to see what they are learning or to experiment with what is being taught. Moreover, the use of instructional materials in teaching biology is very important because it provides a concrete basis for conceptual thinking which motivates pupils to learn more. However, it is fail to use instructional materials and do practical work in teaching biology lessons today. Failure to use on the part of the teacher as Onyegegbu (2001) explained made it rather difficult for pupils to grasp difficult biological concepts.

In addition, Dillon (2008, cited in Salibio, 2014) stated that students' learning and studying habits were one of the reasons they had difficulties in learning biology. Success or failure of each student depends upon his own study habits. Many students of today memorize biology by rote without acquiring real understanding of principles. Besides, many of them did not study biology regularly, review previously taught materials or work on biology questions on a regular basis. As a result, in such a context, students cannot learn biology with understanding. This causes very rapid rate of forgetting.

Furthermore, if students are not happy with the way that biology is taught, they may show disinterested in and negative attitudes towards biology and its teaching. Without interest or motivation in the subject being studied, it is hard for the learner to keep learning. Thus, students should be given opportunities to develop positive attitudes in relation to their studies in biology. Promoting positive attitudes related to the pupil's understanding in biology is a key part of biology education (Johnstone & Reid, 1981, cited in Chu 2008).

Besides, students of all academic achievement levels suffer from academic anxiety (Dobson, 2012). Anxiety is a negative feeling to learning process. According to the research done

by Ucak and Say (2018) indicate that anxiety and negative attitudes become obstacles to students' participation into the teaching and learning process and they reduce students' performance and achievement.

For these issues, it was aimed to investigate the causes of difficulties of students in learning biology and to give suggestions based on the data obtained from this study to improve biology learning.

### **Purposes of the Study**

The main purpose of this study is to investigate the difficulties of students in learning biology. The specific objectives are as follows:

- (1) To investigate the causes of difficulties students face in learning biology
- (2) To investigate the difficult biology topics for Grade Ten students
- (3) To investigate the relationship between students' learning difficulties and their achievement in biology
- (4) To give suggestions based on the data obtained from the study to develop biology learning

### **Research Questions**

- (1) What are the most serious causes of difficulties of students in learning biology from teachers' views?
- (2) Which biology topics do Grade Ten students have difficulties learning from teachers' views?
- (3) What are the teachers' views of the reasons which students face difficulties in learning biology?
- (4) What are the most serious causes of difficulties of students in learning biology from students' views?
- (5) Which biology topics do Grade Ten students have difficulties learning from students' views?
- (6) To what extent do students achieve in biology in the selected schools?
- (7) Is there any significant relationship between students' learning difficulties and their achievement in biology?

### **Scope of the Study**

- (1) This study is geographically restricted to Yangon City Development Area (YCDA).
- (2) Participants in this study were (32) biology teachers and (640) Grade Ten science students from (16) selected Basic Education High Schools within (2018-2019) Academic Year.
- (3) Three instruments: questionnaire for teacher, questionnaire for student and an achievement test for students were used.
- (4) Questionnaires in this study are limited to find out the causes of difficulties in learning biology in terms of subject matter, instructional materials, teachers' styles of teaching, students' attitudes, students' study habits and students' anxiety.

- (5) The achievement test included true/false items, completion items, multiple-choice items and short-question items.
- (6) The content area is limited to twelve topics from five chapters covered in biology textbook to measure students' achievement.

### **Definition of Key Terms**

**Difficulty:** Something that inhibits the student in accomplishing correctly or in understanding quickly a given terms (Centeno, 1988)

**Biology:** The study of life and living organisms including their physical and chemical structure, function, development and evolution (Richards, 2002)

**Learning:** The acquisition of new behavior or strengthening or weakening of old behaviour as the result of experience (Henry P. Smith, 1962)

### **Significance of the Study**

In accordance with Myanmar basic education curriculum, Grade Ten biology is the foundation course for the beginners to make them aware of the actual meaning of biology that deals with living things, organisms. A subject becomes interesting with systematic learning methods. It is thus greatly depend on the deliverers (teachers) who must prepare each lesson carefully in order to draw the interests of the receivers (students) (Ministry of Education [MOE], 2016). Therefore, teachers should make biology lessons interesting and attractive for students to learn more effectively.

Students are also more motivated to solve authentic problems and show the preference for the learning activities through a process of thinking and working rather than just learning by listening (Lombardi & Oblinger, 2007, cited in Suwono et al., 2017). Bilbao (2006, cited in Alngog & Aledon, 2014) pointed out that learning through hearing alone proves to be the least effective means of learning. One learns eleven percent by hearing as against eighty-three percent by seeing. As far as retention of hearing is concerned, learning through hearing again stands at the lowest ebb because after three days, we recall only ten percent of what we learn through hearing as against fifty percent of what we learn through both hearing and seeing and ninety percent of what we acquire by applying three of our senses i.e. seeing, hearing and doing. Thus, the need to emphasis on the use and importance of instructional materials in any learning and teaching environment cannot be underestimated. For any learning to take place, the teacher has to make use of these materials that would enable him to teach effectively (Effiong et al., 2015).

Not only do teachers need to know how to teach but students need to know how to study. The link between study habits and academic achievement has strong connection. By learning better study techniques, students may save time and effort and at the same time do their work better (Ellis, 1956). Thus, proper study habits and skills entail to proficiency as well as high quality of learning.

Additionally, the aim of teaching biology is in making educated students: people who can understand the importance of the role of biology in their society and can make judgments or decisions based on biological views, where appropriate. Success in learning is closely related to degree of concentration. Concentration is closely related to interest (Ellis, 1956). Students' like and dislike towards biology as well as their belief are influencing their learning. For these

reasons, it is important to not only give biological knowledge but also to encourage the development of positive attitudes towards biology in biology classes (Suzuki, 2007).

Myanmar secondary education has numerous problems. It completely emphasizes upon rote learning and memorization and regurgitation inhibiting students' creative thinking and critical thinking skills (Wikipedia, 2011). Teachers of today need to know and see in which part their students have difficulties in learning and they also need to explore the ways to minimize the difficulties students face learning in biology.

## **Review of Related Literature**

### **Importance of Biology**

Johnson (1986, cited in Ozcan, 2003) pointed out the importance of biology which will have a profound impact on ones' lives through advances for the next few decades. Biological sciences stimulate human interest to find the truth with an intellectual rigor therefore have important cultural and educational functions (Liras, 1994, cited in Ozcan, 2003). It is a very important thing for all to have healthy life for everybody and biological knowledge can assist: understanding the routes of infection, the immune system, how people practice good domestic hygiene and use ordinary medicine such as antibiotics (Rowland, 2007, cited in Salibio, 2014).

According to Sharma (2009), the knowledge of body structures and its systems help ones to lead a healthy life. Similarly, knowledge about the balanced diet and hygienic principles helps ones to lead a healthy life. The study of botany has also helped ones to understand the germination process of different plants and thus to improve the quality of seeds of useful plants and improve the quality of their variety which will not only have resistance to diseases but also give more yield and production.

Likewise, Samikwo (2013) stated that the biology subject caters for the needs of a learner who may pursue his or her studies in the subject and its related disciplines. In many areas, biological knowledge can be applied in general improvement of man's well-being as evidenced in medicine, agriculture and industry. In brief, it can be seen that knowledge derived from biology has a major significance for the lives of all students and for the way societies may develop.

### **Causes of Difficulties Learning in Biology**

Learning difficulties have probably existed since the beginning of the human race, but have received concerted attention only since the 1950s and 1960s. Since the mid-1960s, efforts on behalf of students with learning difficulties have grown rapidly, with support a very active parent/advocacy group, and state and federal legislative mandates (Bill & Carol, 1989). Learning difficulties may have not only in education but also in other professions (Orton, 1925, cited in Bill & Carol, 1989).

Learning difficulties in biology stem from many causes. The main reasons why students have difficulties learning in biology are the nature of biology (subject matter), teachers' styles of teaching biology, lack of resources, students' learning and studying habits and students' feelings and attitudes towards the subject (Cimer, 2011).

## **1. Nature of Biology**

Biology is a vast subject containing many subdivisions and disciplines. In biology area, students have to learn structure and classification of animals and plants, observation of organisms, structure of cells of organism, reproduction and investigation of environment (Suzuki, 2007). Some topics covered in the biology course are difficult for students to connect with their lives directly because their effects are complex and indirect. For instance, the cell division is a microscopic subject. Unless the expressions seen in this subject (chromosome, chromatid, protoplasm) are related to daily life, the subject is learnt more difficulty (Tasci & Soran, 2008, cited in Ozcan et al., 2013).

Diagrams are critically important in biology teaching. To develop scientific meanings, diagrams and illustrations are universally accepted as being beneficial learning tools in many disciplines (Stieff, Bateman & Uttal, 2005, cited in Liu, 2012). However, research suggests that a large number of students have difficulty understanding and illustrating diagrams (Hartley et al., 2011, cited in Liu, 2012).

In addition, biology is especially prone to terminology overload. There are many terms and many synonyms; most terms are long, polysyllabic words of Greek or Latin origin, which makes them more difficult to read or say. Learners who learn biology not in their first language face the problem of understanding both the scientific terminologies (technical terms) and regular explanation of the knowledge itself. Language development and concept development are linked so that if the language is not learner-friendly, they will experience difficulties in understanding concepts.

## **2. Teachers' Styles of Teaching Biology**

The teacher is one of the key factors in the actualization of the goals of teaching science in the secondary schools as stipulated by the National Policy on Education (2004). The teacher not only needs the knowledge of subject matter but an in-depth knowledge of the organization of the contents of the subject matter (Arubayi, 2010). Genome (2012, cited in Arubayi, 2010) defined the place of the teacher in biology as "making the biology come alive by illustrating how classroom biology applies to the professional laboratory and make the students aware of the relevance of biology to their lives". The transmission of subject matter from the teacher to the student is done through method. By means of method, the child is guided as to what parts subject matter to appreciate and what attitudes to develop.

In addition, effective teaching requires teachers to check continuously the development of students' understanding and give detailed positive feedback in order to make sure that students correctly integrate new knowledge into the existing knowledge structure (Svinicki, 1999; Cimer, 2004; cited in Cimer, 2007). Cimer (2004, cited in Salibio, 2014) said that teacher styles of biology teaching and teaching methods and techniques may be factors that affect students' learning in biology. As a result, it is of paramount importance for a teacher to adopt the appropriate teaching methods and techniques according to the teaching environment and the curriculum provided. For, according to Kempa (1991), a learning difficulty may be said to exist in such situation as mismatch between instructional approaches used by the teacher and the student's preferred learning mode (learning style).

### **3. Importance of Instructional Materials in Biology**

The use of instructional materials would make discovered facts glued firmly to the memory of students. Trowbridge and Bybee (1990) said that more of the students' senses are stimulated by instructional materials. Similarly, Nwike and Catherine (2013) stated that students learn more and perform better when they are taught with instructional materials because using instructional materials give students the chance to feel, view, listen and touch the material during teaching which help to arouse students' attention and interest in the process of teaching and learning.

Similarly, practical activities in biology lessons have an important place among instructional methods for a meaningful learning. Practical work can provide a good opportunity for students to apply their newly acquired knowledge or skills and gain first-hand experience of phenomena talked about in theory (Millar, 2002, cited in Cimer, 2007). Teaching through practical work enhances students' understanding of the abstract terms. Cross (1987, cited in Ozcan, 2003) concluded that "when students are actively involved in the learning task, they learn more than when they are more passive recipients of instruction". By actively participating, the students with learning advantages in the learning process it is possible to create real meaning (Frankenstein, 1981, cited in Ozcan, 2003). For these reasons, there must be science laboratories in schools and laboratory practice is compulsory for all students in biology classes.

### **4. Concept of Study Habits**

Of all educational objectives, few are more important and none is more difficult to achieve than the development of efficient, independent, permanent study habits and skills. With this in mind one of the continuous objectives of teaching should be the improvement of the study habits and techniques of the students (Trexlar, n.d., cited in Ellis, 1956). Study habit refers to the student ways of carrying out the task of studying by using various techniques and ways in the field of study to keep him afloat along with the wise use of his or her time in studying. Good study habits can be defined as to have a clean, organized area for studying, keeping good notes, reading textbooks as well as studying at the same time each day. According to M.T.V Nagaraju (2004, cited in Ellis, 1956), study habit serves as the vehicle of learning and poor study habits creates anxiety in the students.

Gbore (2006, cited in Odiri, 2015) argue that study habits have strong relationship with the academic performance of students. A student who cultivates certain study habit will perform differently from a student who has another set of study habit. It is believed that student who lacks effective and efficient means of studying would be building on shaking foundation and consequently have weak foundation. It is worthwhile to note and understand that one of the reasons of underachievement by students is lack of proper methods of study.

### **5. Concept of Attitudes**

Attitudes provide a frame of reference for the individual. The attitude towards biology is an important component that is needed to support teaching and learning of the subject. In order to be effective in leaning biology, students need to develop attitudes not only towards the learning of biology such as understanding about the nature of knowledge, about approaches to successful study, about the nature of learning as a lifelong process but also towards the process of biology. Zacharia and Barton (2004, cited in Mavrikaki et al., 2012) suggested that attitudes are affected by students' interest levels in biology, the curriculum and the learning climate. So, students'

attitudes towards biology can be considered as a necessary one to predict biology-related behaviors such as having interest or lack of it, whether or not a student will have the subject further and even in taking it for a career.

## **6. Concept of Anxiety**

Many foreign language learners experience foreign language anxiety which is a situation-specific and unique type of anxiety closely related to the acquisition of a foreign language. Some conditions of foreign language learning that provoke anxiety in learners like confusion and embarrassment may result from the inability of the learners to comprehend or articulate written input. Test anxiety is one of the major problems among students and it is also thought to be one of the biggest hurdles in achieving good grades. Whenever students take some test, they encounter some level of anxiety, which decreases their performance. Researchers found that anxious individuals find it harder to avoid distractions and take more time to turn their attention from one task to the next than their less anxious peers. This makes learning, reading, remembering and writing difficult affecting academic performance.

## **Method and Procedure**

### **Research Design**

The research design used for this study was a descriptive research design, in which the researcher seeks to determine whether, and to what degree, students' have difficulties in learning biology and the relationship exists between students' learning difficulties and their achievement in biology. In this study, data were mainly collected through a quantitative method.

### **Instruments**

In this study, the relevant data and information were collected by teachers' questionnaire, students' questionnaire and an achievement test. Six dimensions: subject matter, teachers' styles of teaching, use of instructional materials, students' attitudes towards biology, students' study habits and students' anxiety in biology were included in both questionnaires: teachers and students. The item for questionnaire of subject matter was adapted by Zisanhi (2013) and Liu (2012). The items for questionnaire of use of instructional materials and teachers' styles of teaching were adapted by Salibio (2014). Study habit's questionnaire was constructed based on "Educational Psychology" (Ellis, 1956). The item for questionnaire of students' attitudes was based on Chu (2008) and students' anxiety was based on Zeidner (1998). In addition to these questionnaires, an open-ended question for teachers which is adapted by Cimer (2011) was used as an instrument.

## **Research Findings**

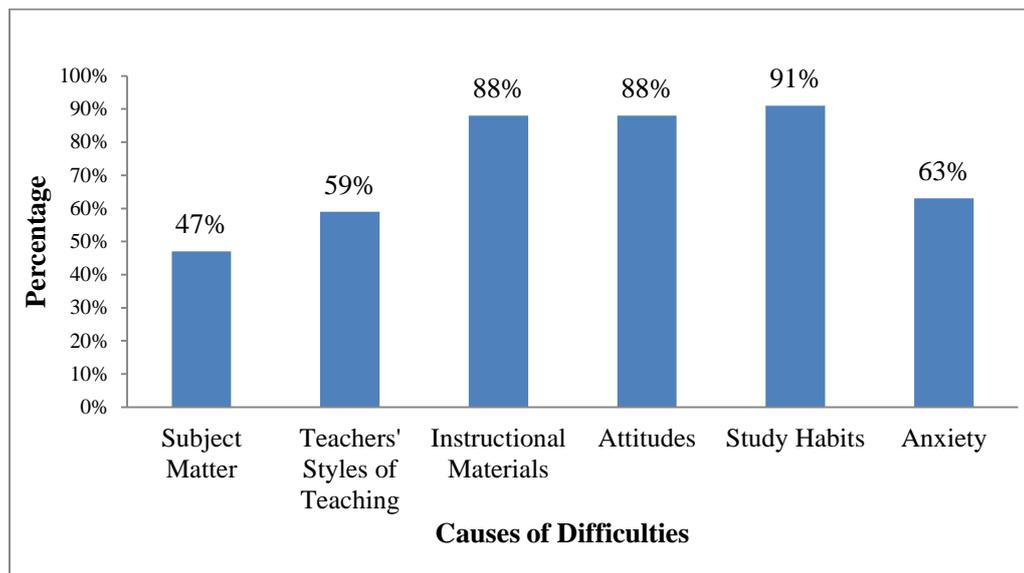
### **Findings of the Difficulties of Students in Learning Biology from Teachers' Views**

In order to find out the difficulties of students in learning biology from teachers' views, a questionnaire on difficulties into six factors was examined. Percentage of teachers' responses to each difficulty was presented (see Table 1 and Figure 1).

**1. Percentage of Teachers’ Responses to Each Difficulty**

Types of Difficulties	Number of Teachers’ Responses to Each Difficulty	Percentage
Subject Matter	15	47%
Teachers’ Styles of Teaching	19	59%
Instructional Materials	28	88%
Attitudes	28	88%
Study Habits	29	91%
Anxiety	20	63%

Note: Total number of teachers = 32



**Figure 1** Percentage of Teachers’ Responses to Each Difficulty

From analyzing the data result, it was found that inadequate use of instructional materials, students’ attitudes towards biology and students’ poor study habits are the most serious causes of difficulties of students in learning biology.

**Findings of Teachers’ Responses to Difficult Biology Topics for Grade Ten Students**

In order to find out the difficult biology topics for Grade Ten students from teachers’ views, a question as “Read the list of biological topics stated below and tick the difficult topics for students to learn” was examined. Number of teachers’ responses to difficult biology topics for Grade Ten students was presented in Table 2.

**2. Number of Teachers’ Responses to Difficult Biology Topics for Grade Ten Students**

No	Difficult Biology Topics	Number of Teachers’ Responses
1	Plant and animal cells	5
2	Plant and animal tissues	28
3	Bacterial cell	6
4	Protozoa	15

According to the results described in Table 2, it can be seen that “plant and animal tissues” is the most difficult biology topic for Grade Ten students in biology.

### Findings of Teachers' Responses to Open-ended Question

The reasons for why Grade Ten students face difficulties in learning the topics as stated above are as follows:

- Terminology (biological terms are less familiar for most students)
- Confusion (similar words, different meanings are included)
- Students' poor study habits (rote memorization without understanding, lack of writing down the spelling of biological terms)
- Inadequacy of use of instructional materials
- Time for teaching is insufficient
- In plant and animal tissues, tables and meanings are complex unlike the other topics.
- In protozoa, it is broad and includes many topics which are abstract and complex.

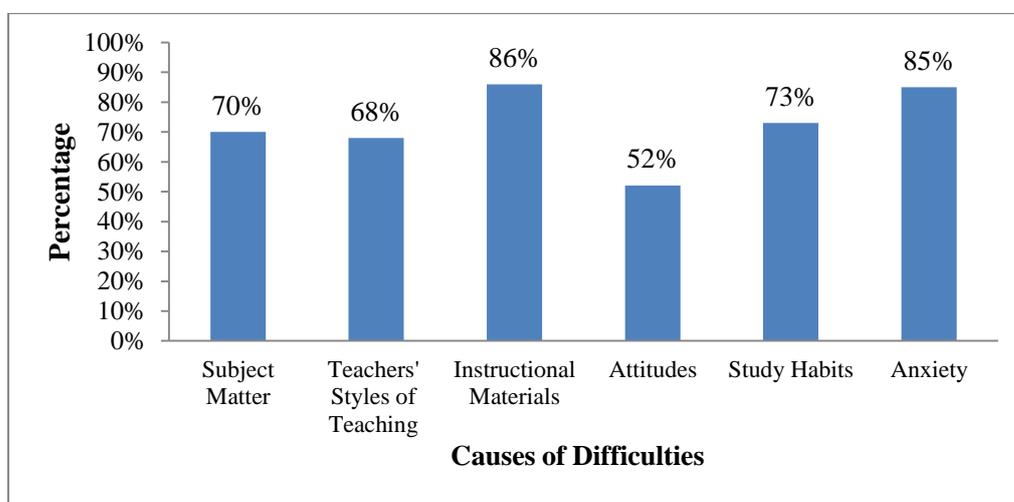
### Findings of the Difficulties of Students in Learning Biology from Students' Views

In order to find out the difficulties of students in learning biology from students' views, a questionnaire on difficulties into six factors was examined. Percentage of students' responses to each difficulty was presented in Table 3 and Figure 2.

#### 3. Percentage of Students' Responses to Each Difficulty

Types of Difficulties	Number of Students' Responses to Each Difficulty	Percentage
Subject Matter	448	70%
Teachers' Styles of Teaching	434	68%
Instructional Materials	552	86%
Attitudes	334	52%
Study Habits	468	73%
Anxiety	541	85%

Note: Total number of students = 640



**Figure 2** Percentages of Students' Responses to Each Difficulty

From analyzing the data result, it can be interpreted that inadequate use of instructional materials and students' anxiety are the most serious causes of difficulties in learning biology.

### Findings of Students' Responses to Difficult Biology Topics

In order to find out the difficult biology topics from students' views, a question as "Read the list of biological topics stated below and tick the difficult topics for students to learn" was used. Number of students' responses to difficult topics was presented in Table 4.

#### 4. Number of Students' Responses to Difficult Biology Topics

No	Difficult Biology Topics	Number of Students' Responses
1	Life and its characteristics	68
2	Plant and animal cells	76
3	Classification of plant and animal	144
4	Plant and animal tissues	149
5	Bacterial cell	135
6	Protozoa	232
7	Liverworts, mosses and ferns	87

According to the results described in Table 4, it can be observed that "protozoa" and "plant and animal tissues" are the most difficult biology topics for Grade Ten students.

### Findings of Relationship between Students' Learning Difficulties and their Achievement in Biology

To examine the relationship between students' learning difficulties and their achievement in biology, Pearson product-moment correlation was used. It was found that there is a significant correlation between students' learning difficulties and their achievement in biology and it also shows that the direction of correlation is negative ( $r = -.698^{**}$ ,  $p < .01$ ). This means that if students' difficulty is high, their achievement is likely to be low or if students' difficulty is low, their achievement is likely to be high (see in Table 5).

#### 5. Correlation between Students' Learning Difficulties and their Achievement in Biology

Correlation			
		Students' Difficulties	Students' Achievement
Students' Difficulties	Pearson Correlation	1	-.698**
	Sig. (2-tailed)		.000
	N	640	640
Students' Achievement	Pearson Correlation	-.698**	1
	Sig. (2-tailed)	.000	
	N	640	640

\*\* Correlation is significant at the 0.01 level (2-tailed).

## Discussion, Suggestion and Conclusion

### Discussion

This study is aimed to investigate the difficulties of students in learning biology. In this research study, students' learning difficulties in biology had been examined under six factors:

subject matter, teachers' styles of teaching, instructional materials, students' attitudes towards biology, students' study habits and students' anxiety. According to the teachers' responses, it can be seen that inadequate use of instructional materials and students' poor study habits cause learning difficulties in biology mostly. Also, it was found that (5) teachers responded that plant and animal cells is difficult, (28) teachers responded that plant and animal tissues is difficult, (6) teachers responded that bacterial cell is difficult and (15) teachers responded that protozoa is difficult for students among (32) biology teachers.

The reasons for why Grade Ten students face difficulties in learning these topics were due to terminology, confusion, students' poor study habits, inadequacy of use of instructional materials and time for teaching is insufficient. Besides, in plant and animal tissues, tables and meanings are complex unlike the other topics and in protozoa, it is broad and includes many topics which are abstract and complex.

According to the students' responses, it was found that inadequate use of instructional materials and students' anxiety cause learning difficulties in biology mostly. Plant and animal cells, plant and animal tissues, bacterial cell and protozoa are found as difficult topics for most students. It was also found that there was a significant correlation  $r = -.698^{**}$ ,  $p < .01$ . Based on this result, it can be interpreted that students' learning difficulties and their achievement is negatively correlated.

This study is consistent with the study of Cimer (2011) who investigated what makes biology learning difficult and effective: students' views? In his study, the participants identified the nature of the subject matter as the main reason for their difficulties in learning. The main reasons for this were that biology includes there are a lot of concepts, various biological events that cannot be seen by the naked eye, some concepts are too abstract and that there are a lot of foreign / Latin words. Another reason in his study for why students had difficulties learning in biology was teacher qualities. A few of students indicated that teachers' lack of mastery in biology and teaching negatively affected their learning.

Students' study habits were one of the reasons they had difficulties learning in biology. Many students do not study biology lessons regularly, review previously taught materials or work on biology questions on a regular basis. According to Cimer (2011), the final reason students have difficulties learning in biology was the paucity of facilities, materials and lesson time.

### **Suggestions**

A foundation in biology is considered to be critical for the 21<sup>st</sup> century students since many of decisions require an understanding of biology. According to Ozcan (2003), the students through biology education should be able to comprehend basic structure of living organisms, recognize and protect the environment, comprehend the importance of environment for human life, gain conscious of health care, think critically and approach the resolutions to the problems that he or she met through the life with scientific method and relate the gained knowledge to everyday life. Consequently, teaching and learning of biology should be taken very seriously.

Every subject has its difficulty. In biology area, it includes many abstract concepts and also saturates with many scientific terms, Latin words which are less familiar with many secondary school students in Myanmar. This makes students specifically low achievers hard to learn and understand very well. According to the questionnaire responded, it was observed that many students experience difficulties in understanding technical vocabularies (biological terms)

very well and difficult to pronounce these terms, too". So, teachers should explain the scientific terminologies precisely in order for students to understand these terms well and to apply these terms in further studies. In addition, students should be well practised to pronounce these terms correctly.

Inadequate use of instructional materials while teaching and learning biology is one of the reasons which makes students' learning difficult. To minimize it, teachers should use various visual teaching and learning materials and tools as figures, models, computer simulations, videos and real specimen in teaching biology, a practical subject. Moreover, practical work should be done regularly for students to comprehend new ideas or concepts and construct their own knowledge because as stated above biology includes many abstract concepts and phenomena that require observation and experiment with what is being taught. In addition, microscope is such an essential instrument for biology teaching that all schools should have at least one and teachers should let students make contact with it.

The role of teacher in education is very important as well. Teachers' qualities influence students' achievement. Teachers should explain the objectives of the lesson before it starts. Knowing the objectives of the lessons make students more interested and more meaningful. This helps students learn in a more meaningful way. Besides, teachers should employ appropriate teaching methods and techniques depending on the nature of subject matter. Subsequently, teachers should provide examples from the real world or students' daily lives to recognize easily what is being taught and should establish links between topics. Teachers should also be confident enough to handle with the subject matter and should be ready to explain and answer to the questions probed by the learners. Likewise, as there are students having mixed ability in a single classroom, teachers should try to understand his students with regard to their abilities, capacities, needs, aims, weakness and their level of aspirations and beliefs. In addition, teachers should also give regular feedback to his students on their performance without any personal bias. In so doing, the gap between the teacher and his students should be minimized.

If students are not happy with the ways that is learnt or dislike the subject they learn, negative attitudes will develop. Developing negative attitudes causes learning problems. As a result, they may fail to achieve highly in classes or exams. Accordingly, teachers should help their students to develop the right kind of attitudes towards subjects in classrooms through the use of teaching methods that arouse and sustain students' interest in the subject. In other words, teachers should make biology lessons interesting, fun, attractive and challenging. In addition, motivation is needed to create positive learning environment as it pushes the students to gain interest and develop positive attitudes towards the subject being taught. So, teachers should not miss to motivate their students.

It is noted that biology is a subject which includes many technical terms and non-technical terms that require to be memorized. But, learning by heart it is needed to know the meaning of the scientific terms because learning by rote is easily forgotten. Therefore, students should be forced to learn the biology lessons with understanding. In this study, many students agreed the fact that they do not study the biology lessons regularly. How a student takes his or her studies greatly determines his or her level of academic achievement. Without good study habits, a student cannot succeed. So, students should be nurtured to enhance good studying habits as writing down the important notes, studying the lessons regularly, and learning by linking the real life's happenings, etc.

Students of all academic achievement levels suffer from academic anxiety. According to this study, it was observed that many students agreed the statement that lack of understanding the biology questions, lack of understanding the vocabulary, lack of understanding the biological concepts cause students' academic and test anxiety. Anxiety can negatively affect academic performance. Therefore, reducing anxiety levels in students is essential for helping to improve academic achievement. Hence, teachers should practice students to have good study skills and good test taking skills. Similarly, students should be taught to use methods such as mindfulness meditation whenever anxieties increase.

To conclude up, a teacher should be aware in which parts his or her students experience difficulties in learning and also let students overcome it with his act of teaching. For further study, the following points are suggested.

- As this study was carried out in Yangon Region, the generalizability of this result may be uncertain to be representative nationally.
- It would be better to conduct if sufficient time is allowed.
- Interviews and observations should be conducted in addition to questionnaire to acquire the complete figures of students' learning difficulties in biology.

### **Conclusion**

Education is a necessity of life. Without education, no new ideas will be explored. Without new ideas, there will be no creativity. Without creativity, there will be no development. Therefore, "plants are developed by cultivation and men by education" stated Rousseau. The standard of livings can be raised through education. Human beings do learning and teaching to be educated since learning and teaching are the foundation of education and training. Learning is a never ending process. Teaching is a process that facilitates learning. As a result, teacher plays an important role in the teaching-learning process as a facilitator of learning.

The function of a teacher in a creating positive classroom environment is very important. A teacher should identify and meet the educational needs of the learners. A teacher must try to know the motivational level, abilities, attitudes, emotional conditions, interests and intelligence of the learners. As students are unique individuals, teaching methodologies must be varied by teachers to accommodate the different individual learning styles of student. Several important questions are come out concerned with learning as "How do individuals learn? What are the factors that influence learning? What makes students learning difficult? How do overcome learning difficulties?" It is essential to investigate the factors influencing learning or the causes which makes learning difficult.

Based on the results shown in above, a generalization can be drawn that inadequate use of instructional materials in teaching biology mostly causes learning difficulty in most students. It is believed that this research will be beneficial for teachers and students in order to minimize difficulties in learning. It is hoped that it will give some assistance for further study concerned with biology.

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