
Ethno-Learning Resources in Teaching Biology

Jeffry M. Saro^{1*}, Ana Mae F. Dayupay² and Gladys Claire A. Aloyon³

¹Research Analyst and Teacher, Department of Education, San Vicente National High School, Prosperidad District V, South Agusan Division, Prosperity Agusan del Sur, Philippines.

²Teacher I, Department of Education, Nasipit National High School Annex, Agusan of the North Division, Nasipit, Agusan of the North, Philippines.

³Teacher I, Department of Education, Kitcharao National High School, Agusan of the North Division, Kitcharao, Agusan of the North, Philippines.

*Corresponding author email id: jeffrysaro123@gmail.com

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Abstract – The school is one of the places where various techniques and procedures are explicitly produced and practice in order for the students to attain learnings and become competent in many aspects in life. This study aimed to assess and determine the ethno-learning resources in teaching biology. Also, the study aimed to answer the following questions: What are the ethno-learning resources used in teaching Biology? What are the issues and problems encountered in using the instructional materials of the teacher? What are the most effective ethno-learning resources in teaching Biology? What instructional materials can you recommend to develop in teaching Biology? This was conducted from selected schools in Butuan City East Districts I, II, & III, particularly in Ampayon National High School, Taligaman National High School, Basag National High School, Los Angeles National High School, and Anticala National High School. There were 31 sciences teachers from selected schools in junior high school in Butuan City East Districts I, II, & III who were taken as participants of the study. The findings indicate books, laboratory apparatuses, modules, worksheets, and laptop are more available in their school. Furthermore, books and real pictures are more effective in teaching biology. This revealed that the science teachers are more resourceful in terms of collecting possible instructional learning resources in a community. It was concluded that the instructional learning resources such as real objects and pictures, indigenous materials and books were plainly effective in the field of teaching Biology. This leads the researchers to design an Instructional Material including real pictures in the community for better understanding of the learning competencies in Biology.

Keywords – Biology, Instructional Materials, Learning Resources, Contextualized, Realia.

I. INTRODUCTION

School is the place where various techniques and procedures are produced and practice in order for the students to attain learnings and become competent in many aspects in life. The resource utilization is described as a process where the learning resources and materials is being organized and managed. Also, it is very necessary that there is a utilization of resources for the fruitful learning of the students because it develops the student's thinking capacity and it motivates them. Based on the study on the science games in national curriculum in the United Kingdom, he further explained that involving games and activities during discussion enables students to stay on task and remained motivated for a long period of time. On the other hand, learning resources refers to any instructional materials whether it is acquired or locally produced with instructional content or function that is used for formal or informal teaching purposes. It includes the print and non-print materials (Ghazali-Mohammed, 2016).

According to Revington S. (2015), he further explained that authentic learning resources is a “real life learning”. Through this manner, it encourages students to create products that are useful with their community & their world. An educator can foster and deliver the necessary planning, criteria, resources, and support to take students success through giving them motivational challenge. In this perspective, the teacher becomes a

facilitator and not a dictator. Likewise, this style of learning engages all the senses putting up the students to produce a meaningful, applicable, shared outcome. They are real life tasks that gives the students an opportunity to connect directly in a real-world context. In addition, authentic learning resources is purposely to interact with a community or the community coming into the student community to interact. It must take consider a project be developed in real world applications beyond the four corners of the room.

Mapaderun & Oni (2002), they explained that the availability of various learning resources and adequacy of facilities greatly affects the teaching and learning because it will become effective, while if a school has inadequacy and lacks of facilities it will affects negatively on the students and make their academic performance lower. In order for the classroom to have an effective learning a careful planning must be considered. In connection to the continuing changes of the nature of science of which biology is discipline Makulu (2004), observes that the strategies that has been used by the teachers of today may become not useful in the future due to the drastic changes in our environment Many students find learning biology difficult. The nature of science itself and re-caching methods used are involve in the difficulties in learning science (Lazarowitz and Penso, 2006). Focusing on the design and learning environments without catering the interest and expectations of the students causes several learning problems and decreases their interest in learning biology (Yuzbasilioglu and Atav, 2004).

The purpose of this study is to promote locally available resources in teaching Biology. Moreover, it helps our science teachers to think of other ways to make teaching instruction effective by using learning resources which are convenient and appropriate. It shows use of contextualization in teaching which let the learners perceive the real things around them. The learners could develop their skills and improve their ability to transfer skills from one context to another, think critically and continuously acquire new knowledge and skills.

Theoretical and Conceptual Framework of the Study

There are particular bodies of literature provide a potential framework for understanding aspects of the processes in learning resources in teaching biology. This study was guided by the following theories: Jerome Bruner's Learning Theory, he introduced the concept of learning by discovery. He is into the view that the child will have an effective learning of he will be engaged to the discover facts by himself/herself. He also argues that if the information will be introduced in a mere presentation will not be the solution to the problem. The particular theory asserts the cognitive effectiveness. Bruner believed that the learning by discovery will begin if a science teacher will present a problem and will present it to the students' by showing them contradictions to the source of information which are given in the process of instruction. Those mentioned contradictions will bring discomfort to the students and will motivate them to initiate individual discoveries by their cognitive reconstructing. The inconsistencies that bring discomfort to the students will bring out their curiosity and make them engaged in the mental process and discovery activities that involve observation, hypothesizing, and data collection and inferring. By doing the mental process the students' will be able to generate facts from his experience. According to Bruner there are two forms of discovery process which are: Assimilation occurs when a student will recognize a new situation similar to the existing situation and structure of knowledge and he or she assimilates it. The accommodation occurs when a new situation is not compatible to the existing knowledge and the learner will reconstruct his or her learning expertise and cognitive structure in order to accommodate the new learning information. Moreover, he also includes three (3) types of human activity for learning. Which are:

the physical activity (motor activities) called enactive presentation, imagery called ionic representation, and symbolic activities presentation. Furthermore, during the inactive stage, the child will use the learning resources' directly by new muscular activities. In the ionic stage it involves the mental images of objects but does not involve manipulation. Also, the symbolic stage the child will use language. The discovery learning will encourage instruction, learning resources, and will also aid to the problem solving because discovery would start from problem solving (Mahabadi, 2013). It will also bring out creativity of the students which is of the objectives of teaching and learning science. The students should be introduced to the concepts that will be applicable in every situation in which they were learned. Bruner also supports that the curriculum must begin to the simple contents and then to the complex concepts.

The Constructivist Theory proposed by Bruner further asserts that learning is an active process in which the learners will build their own ideas and concept based on their current knowledge. The instruction will also become effective if the instruction is introduced in a proper sequence for the learners to develop ideas upon what they already know and go beyond the information. According to the theory of Yutchman and Seashores, System Resource Theory on Organizational Effectiveness Theory of effectiveness is the ability of a particular organization to provide advantageous position to its environment and be responsible on its position should contribute and makes sure to provide utilization of scarce resources. They further explained, organizations like schools as an open system which come to have inputs, involves in the transformation process and to produced outputs. This theory is relevant to the study due to the reasons that the school must have an interaction with its environment which is for the obtainment of the needed educational and learning resources which the student can utilized effectively in order to have a good performance. Those things are considered to affects the interest of the students in biology particularly the availability of the learning resources. If the students are involved in the process of learning by doing experiments and usage of other learning resources, they will develop their cognitive minds. Thus, the study aimed to identify any instructional materials considered as locally available resources in the community also called as ethno-learning resources to design an ethno-learning instructional material.

Schematic Diagram of the Study

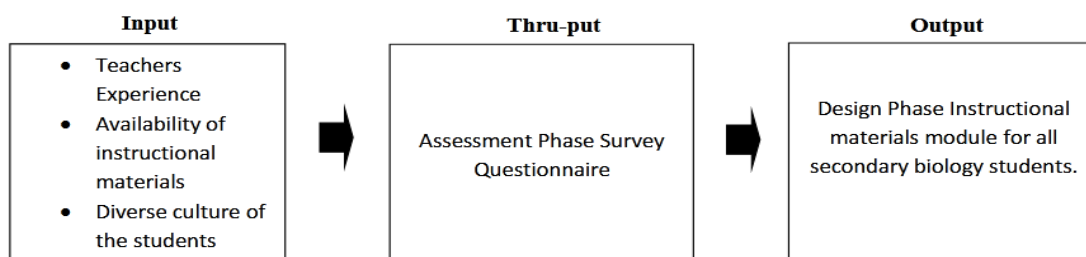


Fig. 1. The flow of the study.

Research Questions

This study aims to investigate the Ethno-Learning Resources in Teaching Biology in Butuan City East Districts I, II, and III. This proposes to answers the following question:

1. What are the ethno-learning resources used in teaching Biology?
2. What are the issues and problems encountered in using the instructional materials of the teacher?

3. What are the most effective ethno-learning resources in teaching Biology?
4. What instructional materials can you recommend to develop in teaching Biology?

II. REVIEW OF LITERATURE

Related Literature

The ethno-science refers to the materials, ideas, beliefs and technology in a given society or environment that derived from the past and present cultural practices and traditions of students. These evolved from myth, supernatural and mystical realities as well as ongoing acculturation in the environment (Ugwuanyi, 2015). According to Romero (2010), he also suggested that ethno-science is the knowledge that is indigenous to particular groups of people including their language, beliefs, technologies and cultures. The use of Teaching and Learning Using Locally Available Resources (TALULAR) serves to promote meaningful communication, ensure better retention of knowledge, and provide first-hand or direct experience with the realities of the social and physical environment. It encourages active participation, especially if the students are allowed to manipulate the materials. It also encourages creativity and reduction, recycling and reuse of litter that are environmentally friendly (Byers, 2002).

Types of Locally Available Resources:

- Human Resources - are people who facilitate learning process apart from the class teacher. Teachers may also collaborate with other people who can help facilitating a certain activity. For example, laboratory technicians who can assist the students in the laboratory activity. Furthermore, on the next laboratory activity the students already have the knowledge on how to use the laboratory apparatuses.
- Plant Resources - Mostly parts of the plants particularly leaves, flowers, and fruits that can be used as a specimen of the experiment.
- Animal Resources - Animals available in the hands-on experiment like fishes, worms, frogs, and chicken commonly used for dissecting.
- Material Resources - This category includes objects such as visual aids, books, cell-structures, and skeletal structures.
- Non-Material Resources - this type of resources includes personal knowledge, experiences, and strategy in teaching process.
- Other Types of Resources
 - a. Realia - are real objects used as teaching and learning resources. For example, showing a real leaf, stones, insects or frogs but it really depends on the topic.
 - b. Models and Pictures - representation of something real may be used as teaching and learning resources.

Salihu, J. (2012), in his study stated that, some instructional resources/materials are best suitable and effective for secondary school because at their age and stage, students are most curious about the things in the certain environment. Thus, resources such as physical features, skeletal structures with labels, DNA structures, and living organisms and so on, will be very effective for them. Additionally, teaching of science today places

outmost emphasis on content and the use of conventional methods by the science teachers neglecting the culturally based approach which enhances teaching and learning. The negligence attitude of science teachers from cultural oriented approach of teaching led to poor achievement and can cause lack of student's interest in science (Ugwuanyi, 2015).

Likewise, according to Okeke (1972), he suggested that science class and the development of culturally relevant activities as part of science curriculum would give factor of what they learn both in their culture and science classes which will improve their achievement and interest in pure science (biology, physics, chemistry). Many students find learning biology difficult. The nature of science itself and teaching methods used are involve in the difficulties in learning science. Moreover, focusing on the design and learning environments without catering the interest and expectations of the students causes the arousing of several learning problems and decreases their interest in biology (Yuzbasilioglu & Atav, 2004). Also expressed that the relationship of the students to its learning environment greatly affects to their success of learning. For instance, Phoenix (2000), states that the teaching views of the students reflect the ways that they learn best. It is explained that how the students experienced in their learning environment greatly affects to their attitude towards biology and it's learning (Den Brok, Telli *et al.*, 2009).

Related Studies

A study conducted in Nigeria by Department of Education which focus on the Production and Utilization of resources in Biology Education in South West Nigerian Secondary Schools that investigate biology resources a production and utilization, teacher's attitude and gender in secondary schools. And how the teachers perceive production of material resources in schools. Based on the findings of their study, they concluded that the biology teachers must improvise and use both materials and ideas for an effective, instruction for all times. Teacher trainings of teacher production and utilization of biology material resources should be considered in teacher education curriculum and instructions (Onasanya, (2004). According to Adeyem (2010), education is the only way to become an instrument in promoting economic development as it includes the experiences that an individual goes through that helps them to develop and use their potentials. Okete (2007), further discussed that by education many individuals will learn and acquire knowledge, skills and even attitude that is needed in order to have an effective living. And this is the primary reason why many modern countries considered in the investment of education most vital. In secondary schools in Kenya a study was conducted which looked on the effect of utilization of biology teaching and learning Resources on students' academic performance. They found out that essential learning resources in teaching biology were available but it is inadequate. The textbooks were available and adequate but the video related to the lessons are less available. Teachers also knew the important role of learning resources to the learning of the students and uses the available learning resources in their lessons. Using of computer and ICT skills of the teachers can lead to efficient teaching and learning of the students. Lastly the performance of the students is compromised due to the lack of resources (Wanjiku, 2009).

Here in the Philippines, sudden studies were also conducted about ethno-science, it sore-out the learning utilization in every secondary schools. The observed practices along modeling pattern of biology subject can contribute to the expansion of learning strand of the teachers. In the study of Tandi *et al.*, (2016), they stated that teachers aspire to have all their students learn. Teaching strategies used in science classrooms have created a situation that we'll refer to here as instructional selection, in which by our very choice of pedagogy, we are

constructing environments in which only a subset of learners can succeed. Understanding the variety of learning styles that students bring to a science classroom will not only help some students learn more science, but also help more students learn any sciences course codes. In the study of Chinweet *al.*, (2010) she cited the from IT Trade Association Comp TIA the use of technology has a good impact in the education process. It's having a significant role as the widespread adoption of technology had an effect that change how teacher teach & students learn. Teachers are engaging in new style of delivery instruction with the use of emerging technologies like laptops, projectors, and speakers. While students are using advance technology to shape how they learn.

Moreover, technology gave many benefits to the learning process where its males learning more fun. Subjects that students consider challenging or boring become more engaging with virtual lesson through a video related to a certain topic. Another concern was technology prepare students for the future. Based on the study from Comp TIA's, it should that nine (9) out of ten (10) students signify that applying technology in the classroom would help them prepare for the digital future. Being technologically-skilled is vital in this 21st century in order to be successful in this day & age. Furthermore, applying educational technology in the classroom prepare students for their future and set them up for this increasing digital economy.

III. METHODOLOGY

This study used descriptive research design where the data gathered from the respondents was recorded and described descriptively. Descriptive statistics was used to analyze the data that were gathered in the study. The study was conducted from the Division of Butuan City, Butuan City East Districts I, and II, and III, province of Agusan del Norte with the selected schools namely; Ampayon National High School, Taligaman National High School, Basag National High School, Los Angeles National High School and Anticala National High School.

Population and Respondents of the Study

The participants of the study were the 31 teachers teaching Biology. Precisely, 6 teachers teaching in Ampayon National High School, 10 teachers teaching in Taligaman National High School, 3 teachers teaching in Basag National High School, 4 teachers teaching in Los Angeles National High School and 8 teachers teaching in Anticala National High School.

Sampling Design and Research Instrument

The study used the Random Sampling Design where only the teachers who are teaching science subjects are chosen as participants in the research study. Thus, the total number of the respondents are 31 teachers. Herein, the study utilized survey questionnaires to the respondents. The checklist and the survey questionnaire given to the teachers was validated by the experts. The questionnaire was used in gathering data. It contains two parts to validate the learning resources.

Part I (Checklist). Checklist instrument contains the list of the learning resources that are available and used by the teacher and the problems encountered by the teacher using that teaching resources.

Part II (Survey Questionnaire). The survey questionnaire contains questions to validate the effectiveness of the learning resources.

Validity and Reliability of the Research Instruments

The research instrument used in the study was validated by the experts. Some of the suggestions of the experts were the questionnaire was revised and then it was piloted in the selected schools in Butuan City East Districts I, II and III to finalized the questions and in order to determine the ethno-learning resources to be validated in the study.

Data Gathering Procedure

The researchers personally distribute the questionnaires to the teachers with the support of the principals in the selected schools. The retrieval of the questionnaires was done right after the teachers finished answering the questionnaires. The responses were tallied and tabulated by the researchers for the statistical analysis.

Statistical Treatment

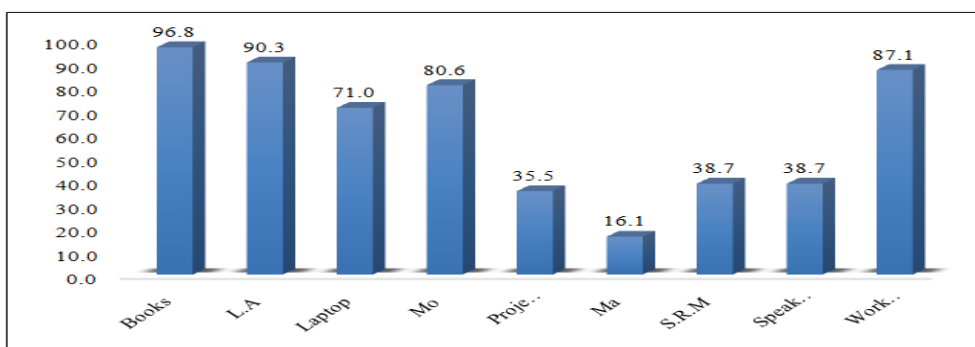
The data gathered was compiled, sorted out, organized and tabulated to facilitate the presentation analysis and the interpretation of the results.

IV. RESULTS AND DISCUSSION

This research has been carried out with data collected as needed. These data discuss the answer to the study about the ethno-learning resources in teaching biology. It has also corresponded analysis and data interpretation, and the discussion of the findings which are presented in order with problem as follows.

Ethno-Learning Resources Used in Teaching Biology

Figure 2 shows the summary of the kinds of instructional materials that are certainly available in junior high school in Butuan City East Districts I, II, & III. The data revealed that among the instructional materials available namely; laboratory apparatuses, books, laptop, modules, projectors, magazines, supplementary reading materials, speakers, and worksheets. It implies that the majority of the participants said that the books (96.8%), the laboratory apparatuses had (90.3%), the worksheets and modules got (87.1% and 80.1%), and the laptop obtained with (71.0%). Other instructional materials like, projectors, magazines, supplementary reading materials, and speakers had the lowest percentage based on the data. Based on the data gathered, the source of science teachers’ activities are textbooks and books, and laboratory apparatuses. As mentioned, that the books had a highest percentage of the study and the most effective learning resources for the reason that students can take it in their homes or anywhere where they can study. Hence, this illustrates that most science teachers are more confident in using books rather than other supplementary materials.



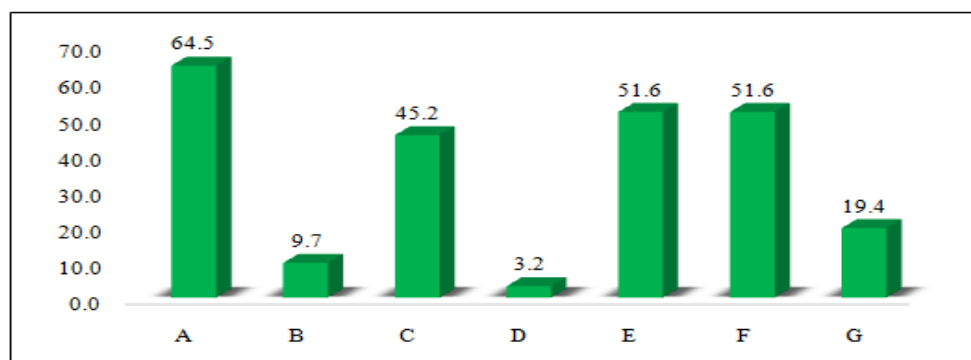
Legend: LA; Laboratory Apparatuses, Mo; Modules, Ma; Magazines, S.R.M; Supplementary Reading Materials.

Fig. 2. Kinds of instructional materials available in junior high school in Butuan City East Districts.

In the study of Hutchinson & Torres (2008), textbook has a vital and positive part to play in the everyday job of teaching and learning biology, and that the important of textbooks becomes even greater in periods of change. Also, according to Tandi (2016), he explains that books are potentially useful aids in teaching and learning process. In other words, books and other reading materials are suited in developing for the learning process of the students, as well as for the school matters.

Issues and Problems Encountered in using the Instructional Materials of the Teacher

The figure 3 presents about the issues and problems encountered by the science teachers in junior high school in Butuan City East Districts I, II, & III. It implies that the majority of the participants said that the inadequate number of books got (64.5%), the inadequate number of projectors and inadequate number of instructional materials had the same percentage (51.6%).



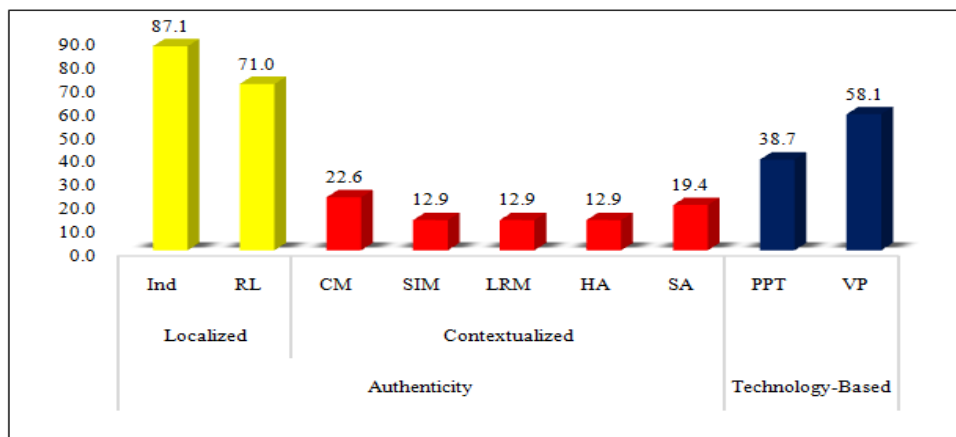
Legend: A; Inadequate number of books, B; Old visual aids, C; Inadequate number of laboratory apparatuses, D; No electricity, E; Inadequate number of projectors, F; Inadequate number of instructional models (cell structures and etc.), G; Obsolete books

Fig. 3. Issues and problems encountered by the science teachers.

Moreover, the data shows that the teacher’s most common issue and problem was the inadequate number of books. In comparison from the figure 1 presented above it showed that books are the most common available resources used by the science teachers. Thus, in this case books are commonly available resources but inadequate to provide it for all the students. This indicates that books or any learning resources must have a great value for teaching and learning process because it is proven effective to improve students reading skills and speaking skills. Johnson E.B. (2002). Hence, it coincides in the study of Wanjiku (2009), that secondary schools in Kenya which looked on the effect of utilization of Biology teaching and learning resources on students’ academic performance. He found out that the books are available but it is inadequate. He further discussed that the performance of the students affects by the availability of the learning materials. It implies that using instructional materials like books, supplementary reading materials, and modules had a great effect for the students. In fact, learning materials are important because they can significantly increase student achievement by supporting student learning process. Revington, (2015).

The Most Effective Ethno-Learning Resources in Teaching Biology

In figure 4, it illustrates the status of the learning resources used by the science teachers in junior high school in Butuan City East Districts I, II, & III. Based on the findings, there are main categories about the type of learning resources used by the science or biology teachers which are authentic and technology-based learning resources. Under authentic category, it was classified into localized and contextualized learning resources.



Legend: Ind; Indigenous Resources, RL; Realia and Replica, CM; Contextualized Modules, SIM; Strategy Intervention Materials, LRM; Learning Resources Materials, HA; Hands-on Activity, SA; Science Apparatuses, PPT; PowerPoint Presentation, VP; Video Presentation

Fig. 4. Learning resources used by the science teachers.

Furthermore, localized involves the indigenous learning resources which got the highest percentage (87.1%) and followed by the realia and replica (71.0%). On the other hand, technology-based resources got the third and fourth highest percentage (58.1% & 38.7) which obtained that science teachers more usually used these as learning resources. In part of the contextualized learning resources, it had lesser percentage among localized and technology-based learning resources. Based on the findings, the localized and contextualized learning resources made contains real pictures and materials that can be found in a community. The findings comprise with a real object or indigenous materials. It is explained that how the students experienced in their learning environment greatly affects to their understanding in real object towards nature and the community. Based on the study from Contextualized Instructional Materials: Their Effects on Pupils' Academic Achievement in Science, it stated that there's significant differences exist on the academic achievement in science of the grade VI pupils in favor of the experimental group which involves the teaching method using contextualized instructional materials (Javier, J., 2011). Also, the goal of contextualized learning is to bring the environment for increased efficient learning as proof by higher retention and completion rates. Furthermore, the study identified review where all outcomes for skills achievement were positive, that low-skilled students can learn more effectively.

One of the respondents stated that localized instructional materials need local materials such as plants and other supplementary materials. Thus, exposing learners to more suitable environment by providing them authentic or real materials whereas plants and animals are available and easily found in the surroundings. Likewise, the use of microscopy for viewing small live specimen samples are also used for learning process.

Instructional Materials that Could be Recommended in Teaching Biology, Particularly to Science Teachers

Based on the findings, the most effective instructional learning materials are localized learning resources. As the overall findings of the study, localized learning resources includes indigenous materials and realia are useful and easily resources for motivating the students to engage learning because they can relate and express their ideas and experiences about it. In addition, realia enable students to make connections to their own lives because it's a real-life object. Students can cope-up and retain the lesson better when they have seen or touched some object associated with it. Realia provides students' opportunity to apply all of their senses to learn more and it's

appropriate for any levels. It also makes students' more interesting in real objects or certain materials, easy to understand and it will explicitly make them enjoy to learn (Akenhead *et al.*, 1999). Moreover, the instructional materials made contains real pictures that can be found in a community. In addition, most of the activities given require cooperative learning which involves small group of students working together to complete a task or activity. This kind of instructional materials had a big impact for the science teachers to make their teaching realistic and contextualized.

According to Danio (2012), he explained that indigenous materials is very efficient because it is not costly and consume less energy and resources. He further discussed the advantages' of using indigenous materials. He explained that one of the advantages of integrating indigenous materials is that it is lower very cost effective. In other words, it does not need much expenses. Also, he states that indigenous is not harmful and naturally non-polluting. Thus, the researchers made an output that shows real objects/pictures in the junior high school in Butuan City East Districts I, II, & III for the students to easily understand and relate in the activity given to them. Moreover, it really helps make the lesson real to the students; it creates opportunity for the students to listen and participate in the provision of teaching materials and help develop their skills of creativity and manipulation of object in the classroom settings. Jacob, (2007).

V. CONCLUSION

Books, laboratory apparatuses, modules, worksheets, and laptop are more available in their school. Furthermore, books are main instructional materials used by the science teachers in terms of availability, utilization and effectiveness learning resources in Biology in junior high schools. There were two effective learning resources identified and were made in the basis of the survey questionnaire namely; authentic learning resources includes localized and contextualized learning resources and technology-based learning resources includes PowerPoint presentation and video presentation. The data revealed that localized learning resources specifically the indigenous materials and realia/replica are the main instructional learning materials used by the science teachers. This study revealed that by the used of these learning resources made the discussion interactive and motivate students' interest. Based on the findings, researcher's instructional material was designed and developed based from the results and the highest percentage of learning resources and learning competencies from the books and indigenous learning materials that are certainly available in a community.

VI. RECOMMENDATIONS

Based on the conclusions drawn, the researchers have the following recommendation.

- The researchers recommend for the validation of the designed Instructional Materials in selected junior high school in Butuan City East Districts I, II, & III.
- The junior high school science teachers in Biology are free to use the designed Instructional Materials made by the researchers.
- The researchers recommend that in designing Instructional Materials it must be localized and contextualized.
- The proposed study is also recommended for the future teacher that they will be more hands-on to their students for the enhancement and improvement in teaching Biology.

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AUTHOR’S PROFILE



First Author

Mr. Jeffrey M. Saro, LPT, Research analyst and teacher, Master of Science Education, major in Biological Science at Caraga State University-Main Campus. Received an award of Mindanao’s exemplary young professional educator and most outstanding educational research analyst and entrepreneur of the year & Asia’s most exemplary professional educator, Researcher and Innovative Business Leader of the Year.



Second Author

Ms. Ana Mae F. Dayupay, LPT, Professional Educator and Secondary Teacher, Master of Science Education major in Biological Science at Caraga State University – Main Campus. Received an award as third place for Research Presentation from College of Education last May 2018 at Caraga State University, Ampayon Butuan City, Philippines.



Third Author

Ms. Gladys Claire A. Aloyon, LPT, Professional educator and secondary teacher, Master of Science Education major in Biological Science at Caraga State University - Main Campus. Received an award as second place for Strategic Intervention Materials (Localized and contextualized Worksheets in Biodiversity and Ecosystems) at Caraga State University, Philippines.