SECONDARY SCIENCE LEARNING COMPETENCIES THAT REQUIRE TECHNOLOGY –ORIENTED RESOURCES

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Abstract
It is virtually impossible to ignore the use of technology in classroom because this enhances instruction. Integrating technology into classroom is a very efficient method to easily develop the desired learning competencies. Thus, this study assessed the learning competencies in secondary science that require technology-oriented resources. Researcher-made questionnaire was used to gather the data complemented by interviews. Thirty five science teachers from Oblates of Saint Joseph schools served as respondents. Weighted mean were the statistical tools used to treat gathered data. Findings revealed that the competencies that very often required technology oriented resources in secondary science were recognizing substances into elements and compounds, and describing the process of fertilization in Grade 7, explaining the significance of meiosis in maintaining the chromosome number, and in predicting phenotypic expressions of traits following simple patterns of inheritance for Grade 8; explaining the different patterns of non-Mendelian inheritance, and recognizing different types of compounds (ionic or covalent) based on their properties for Grade 9; and enumerating the lines of evidence that support plate movement, and explaining the operation of a simple electric motor and generator in Grade 10.

Keywords: learning competencies, secondary science, technology-oriented resources

1. Introduction

Teaching science in any educational institution should provide actual and practical activities that will enhance and will hone the skills and understanding of learners in order to produce science literate individuals. It should stress not only the learning scientific facts but also the acquisition of the skills and techniques for solving scientific problems. It should reflect the procedures and the attitudes that are used in the development of scientific knowledge. According to him some principles may apply such as teach scientific ways of thinking; actively involve students in their own learning; help students experience science in varied interesting and enjoyable ways and throughout the learning process [1].

One of the general roles of science teaching is the development of skills in the basic integrative process such as observing and describing properties of objects, comparing and classifying things around them and estimating and measuring various quantities. Different methods of science instruction which include variety of teaching techniques arouse students' interest and simulate them to participate. One strategy for this method is the use of audio-visual aids which makes use of instructional devices that can be seen or heard in providing the necessary learning experience [2]. Petrosino [3] posited that science education should offer the students a new kind of learning that provides real value not just in one unit or one class but throughout their entire life.

The K to 12 curriculum is relevant and responsive as it centers on the Filipino learners, it is also developmentally appropriate and focuses on succeeding in the 21st century. The curriculum is enriched due to use of integrative, inquiry-based, and constructive approaches to develop the competencies of learners [4]. Bauzon [5] viewed that curriculum is the sum of all learning content, experiences and resources that are purposely selected, organized and implemented by the school in its pursuit of its peculiar mandates as a distinct institution of learning and human development.

According to Teves [6] one of the main reasons for adding two years in the basic education to develop mastery of students of many basic education competencies. Thus, decongesting the curriculum was one of the primary aims of K to 12 where the competencies which students are supposed to learn and master in the current 10-year system are now placed in the first ten years of the 12 year cycle.

The component of K-12 Science curriculum covers science subjects as general science, biology, chemistry and physics. It helps the students to understand the natural world through systematic observation, experimentation, and analysis. It is through science curriculum that students should learn how to seek to formulate principles, laws and theories that help to explain and increase an understanding of natural phenomena. Through this, students should also learn how to use things to make lives more comfortable and solve problems to improve surroundings.

Science curriculum is designed and developed into three domains of science, namely: acquiring scientific knowledge which is about accessing information; another is understanding scientific knowledge which focuses on demonstration of different facets of understanding such as explanation, interpretation, application, perspective, empathy and self-knowledge; and creating scientific inquiry. These domains challenges learners to transfer their learning in new settings

and use this creatively to generate new ideas, view things differently and re-engineer process. It also involves designing, constructing, planning and producing and inventing products.

In the key stage standards of K to 12 science curriculum, by the end of Grade 10, the learner should have developed scientific, technological and environmental literacy so that they will not be isolated from the society where they live, will not overwhelmed by change, and can make rational choices on issues confronting them. The content standards in science educations aim to develop scientific literacy among students that will prepare them to be informed and participative citizens who are able to make judgments and decisions regarding applications of scientific knowledge that may have social, health, or environment impacts. The content is transmitted through the aid of different resources like textbooks, information communication technology (ICT) and other community resources for the enrichment of students' knowledge and learning [4].

For Newby [7], modern classroom should be provided with equipment rich of audio-visual materials for learning. Instructional resources are physical means employed by teachers for the purpose of emphasizing, clarifying and vitalizing instructions. Various instructional materials are available to increase the effectiveness of the teaching strategies. Since student's interest and abilities vary, the teacher must see to it that a variety of instructional materials are made available. Skilful teaching can make it possible for each student to benefit from a variety of resources. It does not matter what technology teachers end up using, as long as they find a way to integrate it into their classrooms and they have tried to make the learning interesting and relevant.

The study of Sagus [8], revealed that the use of different audio visual materials is necessary for teaching purposes. She found out that the collection of films, slides recordings, programmed materials, pictures, videotapes, computer, CD MM and charts for teaching purposes were useful most especially for science. Similarly, Atienza [9], emphasized that schools should provide adequate facilities and other instructional materials to further enhance the teaching of science. Furthermore she suggested that teachers be encouraged to prepare varied instructional materials on their own.

E-learning theories by Mayer, Sweller and Morenoexplain cognitive science principles that describe how electronic educational technology can be used and designed to promote effective learning. It is beneficial for improving the quality of learning. This theory emphasizes the three principles namely multimedia, modality and coherence principles. According to the multimedia principle, the use of any two out of the combination of audio, visuals and text promote deeper learning. From modality principle, learning is more effective when visuals are accompanied by audio narration versus onscreen text while coherence principle states that less the learners know about the presentation content, the more they will be distracted by unrelated content.

Therefore, in the science classroom, teachers' instructional capability should create opportunities that challenge students and promote learning.It is vital to give proper comprehensive scientific education to the population and provide it with the right tools for successful teaching and learning process. The use of technology supports collaborative learning. Recognizing its

importance in science teaching, the researcher realizes the need to assess the learning competencies in secondary science that require technology-oriented resources.

2. Objective of the Study

This study, assessed the learning competencies in secondary science that require technology-oriented resources.

3. Research Methods

This study used descriptive research method in assessing learning competencies in secondary science that require technology-oriented resources in Oblates schools during the academic year 2017-2018. The respondents of the study were 35 science teachers from private secondary schools in Oblates of Saint Joseph Schools. The main instrument used in the study was the researcher made – questionnaire which was evaluated, validated, administered, tallied and scored according to the accepted practices in research. Interview was also conducted to science teachers and administrators to substantiate the findings of the study. The data were submitted to the statistician for treatment after which the data are analyzed and interpreted.

4. Results and Discussions

Technology oriented resources allows for an extremely diverse range of contexts in which students can develop the learning competencies and can support learning environment. Table 1 shows the learning competencies in Grade 7 that require technology oriented resources in secondary science instruction.

Table 1: Learning Competencies in Grade 7 that Require Technology-Oriented Resources

LEARNING COMPETENCIES	WM	VI
1. Recognize substances into elements and compounds.	3.69	VO
2. Describe the process of fertilization.	3.66	VO
3. Explain how solar and lunar eclipses occur.	3.63	VO
4. Identify parts of the microscope and their functions.	3.60	VO
5. Relate the tilt of the Earth to the length of daytime; the length of daytime to the amount of energy received; the position of the Earth in its orbit to the height of the Sun in the sky; the height of the Sun in the sky to the amount of energy received; the latitude of an area to the amount of energy the area receives.	3.60	VO
6. Investigate properties of acidic and basic mixtures using natural indicators.	3.57	VO
7. Describe the motion of an object in terms of distance or displacement, speed or velocity, and acceleration.	3.57	VO
8. Account for the occurrence of land and sea breezes, monsoons, and intertropical convergence zone (ITCZ).	3.57	VO
9. Predict the effect of changes in abiotic factors on the ecosystem.	3.23	O
10. Describe the components of a scientific investigation.	3.20	O
11. Infer that waves carry energy.	3.20	O
12. Describe the characteristics of sound using the concepts of wavelength, velocity, and amplitude.	3.17	O
13. Relate the characteristics of waves.	3.03	O
14. Explain the importance of earthing or grounding.	2.74	O
Composite Mean	**3.37**	**O**

Legend: WM=Weighted Mean VI= Verbal Interpretation VO= Very Often O= Often

As presented in the table, recognizing substances into elements and compounds was the learning competencies in Grade 7 that very often required technology oriented resources. It obtained the

highest weighted mean of 3.69. This maybe because teachers find it difficult for their students to distinguish element and compound if they did not present pictures or videos showing samples of elements and compounds. It is hard for the students to classify substances if they are not aware of it. This can be done by accessing to internet sources and providing powerpoint presentation showing pictures of these substances that seems to be real when viewed using technology resources. In this way students easily classify substances into elements and compounds. This supports the findings of Trinidad [10] that the use of different technology resources like internet enriches the understanding of the learner and it offers a vast of store information and knowledge.

With weighted means of 3.66 and 3.63, the competencies on describing the process of fertilization and explaining how solar and lunar eclipses occur very often required technology oriented resources. This is not surprising since the process of fertilization and occurrence of eclipses can be easily described and understand by the students if introduce using visual aids and computer-aided instruction. These findings support the idea of Libid [11], who stated that visual aids, computerized instruction and other technology-aided instructional materials arouse the interests of learners and make science learning more effective. These materials allow maximum involvement of the students.

Identifying parts of the microscope and its functions and relating the tilt of the Earth to the length of daytime; the length of daytime to the amount of energy received; the position of the Earth in its orbit to the height of the Sun in the sky; the height of the Sun in the sky to the amount received; the latitude of an area to the amount of energy these areas were assessed very often require technology oriented resources with weighted mean of 3.60. Interview conducted revealed that oftentimes, the teachers utilize one or two microscopes in a class with 40 students. Most of the students do not have the chance to manipulate the microscope, thus, the teacher provide simulations available in the internet in order to arouse the learners' interest and to develop understanding on the topic. Teachers find it hard for their students to relate the tilt of the earth to the length of daytime if they did not show videos showing the relationship between the two. They find it hard to connect how the tilting of the earth affects the length of daytime. They help their students by showing videos on how the phenomena actually happens. This support the idea of Rigor [12] that science lessons can be interesting and effective using simulations. It can also stimulate interest, simplify, clarify subject matter and increase understanding and motivate the learner to learn and the use of video as teaching and learning tool it will be possible to vary teaching styles and maintains student's interest in the subject.

Competency that got the lowest weighted mean was in explaining the importance of earthing or grounding. This got a weighted mean of 2.74 and often required technology oriented resources. This is maybe because teachers prefer to have an active students' involvement with the used real objects like observing and manipulating motors and circuits of common appliances at home is the best approach to understand concepts relative to earthing or grounding. This is parallel with the idea of Sorden [13] that teachers should emphasized the significance of involving the students in science activities to encourage exploration. Students' involvement should be nurtured and developed since it is the foundation for them to learn more detailed and specific knowledge.

As a whole, the composite mean of 3.37 was an indication that the technology oriented resources are often required in attaining learning competencies in Grade 7. Seemingly, the learning competencies that must learned by students were successfully delivered by their teacher with the use of technology. In addition, teachers are aware of the importance of technology resources in order to prepare students to be more competent and truly ready for life. Consequently, the teachers were able to teach to the students the learning competencies prescribed by the DepEd with the use of technology. Furthermore, the teachers could share the proper way of understanding science concepts through technology oriented resources.

Table 2 presents the learning competencies in Grade 8 which require technology oriented resources.

Table 2: Learning Competencies in Grade 8 that RequireTechnology Oriented Resources

LEARNING COMPETENCIES	WM	VI
1. Explain the significance of meiosis in maintaining the chromosome number.	3.71	VO
2. Predict phenotypic expressions of traits following simple patterns of inheritance.	3.71	VO
3. Differentiate the epicenter of an earthquake from its focus; intensity of an earthquake from its magnitude, active and inactive faults.	3.69	VO
4. Trace the path of typhoons that center the Philippine Area of Responsibility (PAR) using a map and tracking data.	3.66	VO
5. Explain physical changes in terms of the arrangement and motion of atoms and molecules.	3.66	VO
6. Demonstrate how a body responds to changes in motion.	3.63	VO
7. Describe how work is related to power and energy.	3.63	VO
8. Explain the functions of circuit breakers, fuses, earthing, double insulation, and other safety devices in the home.	3.60	VO
9. Explain the properties of solids, liquids, and gases based on the particle nature of matter.	3.60	VO
10. Use the periodic table to predict the chemical behaviour of an element.	3.60	VO
11. Explain how earthquake waves provide information about the interior of the earth.	3.57	VO
12. Explain the regular occurrence of meteor showers.	3.34	O
13. Explain ingestion, absorption, assimilation, and excretion.	3.34	O
14. Explain how diseases of the digestive system are prevented, detected, and treated.	3.31	O
15. Compare and contrast comets, meteors, and asteroids.	3.29	O
16. Explain how materials cycle in an ecosystem.	3.26	O
17. Demonstrate the existence of the color components of visible light using a prism or diffraction grating.	3.17	O
Composite Mean	**3.50**	**O**

Legend: WM=Weighted Mean VI= Verbal Interpretation VO= Very Often O= Often

It can be seen in the table that learning competencies in explaining the significance of meiosis in maintaining the chromosome number and in predicting phenotypic expressions of traits following simple patterns of inheritance very often required technology oriented resources. Both competencies obtained a weighted mean of 3.71. This is not surprising since learning about meiosis can be easily explained with the use of activities to be done through the use of computers. There are lots of interactive activities on these topics that can be provided for students using computers. This finding conforms the study of Traynor [14] that utilizing computer-assisted instruction improved instruction over using traditional methods and increased students' academic achievement.

With a weighted mean of 3.69, the competencies in differentiating the epicentre of an earthquake from its focus; intensity of an earthquake from its magnitude, active and inactive faults very often required technology oriented resources. This is because teachers prefer to use accessible

technology materials like powerpoint presentation in teaching concepts about earthquakes. The teacher can easily deliver science instruction using this technology resource to achieve the needs of learners living in the modern and digital environment. This support the idea of Richman [15] that powerpoint presentation is one very useful technology used in science instruction which facilitates learning delivery and stimulates students interest.

Tracing the path of typhoons that center the Philippine Area of Responsibility (PAR) using a map and tracking data was the learning competencies in Grade 8 that very often required technology oriented resources. It obtained a weighted mean of 3.66. This is not surprising since the path of typhoons that center PAR can be easily traced using projected image of the map. The teacher can present the projected image of the map and navigate the cursor from one location to another in order to trace the path of typhoons that enter the PAR. This will help the learners to have a clearer view of the location and easily trace the path of the typhoon. This finding conforms to idea of Rigor [12] that projected visuals aids to teaching and learning which is appropriate to make lesson interesting and increase the effectiveness of teachers.

With a weighted mean of 3.66, the competencies in explaining physical changes in terms of the arrangement and motion of atoms and molecules very often required technology oriented resources. This means that teachers find it challenging for their students to explain physical changes in terms of the arrangement and motion of atoms and molecules since the learners cannot actually see the atoms or molecules, thus teachers used realia to show the physical changes that happens in an object. At the same time it is very difficult to rely only on the learners' imagination on what exactly happen to the molecules and atoms. It would be better if the teacher will use pictures or video films showing what exactly happens to the atoms and molecules of an object in a physical change. This support the findings of Madeja [16] that film viewing was effective for the students. It motivated the students' interest in the subject and stimulated them to think objectively.

Demonstrating the existence of the color components of visible light using a prism or diffraction grating obtained the lowest weighted mean of 3.17. This competency often required the use of technology oriented resources. This means that aside from technology oriented resources science teachers also used other resources and strategies in accomplishing this competency. From the interview conducted teachers also prefer to conduct experimentation using prism on this topic. This offers opportunities to gather and interpret data as well as draw conclusions based on evidence they have gathered. Students can perform simple experiments, manipulate simple laboratory equipment and improvised laboratory equipment and tools using this approach. This confirms the idea of Alcantara [1] that successful teaching is a result of the systematic use of appropriate strategies for delivering and assessing the learning objectives targeted for each lesson. The right method of teaching is based on the nature and needs of the learners being directed and this method has to do with the way a teacher communicates the subject to the students. Thus, different approaches differ in the level of teacher and student participation. For every classroom, a method that is effective in one setting may not be as effective in another setting.

The composite mean of 3.50 justified that the learning competencies in Grade 8 Science were often required technology oriented resources. This means that realization of learning competencies really require the use of technology that can be very helpful to motivates students interest in science concepts.

The learning competencies requiring technology oriented resources for Grade 9 is presented in Table 3.

Table 3: Learning Competencies in Grade 9 that RequireTechnology Oriented Resources

LEARNING COMPETENCIES	WM	VI
1. Explain the different patterns of non-Mendelian inheritance.	3.71	VO
2. Recognize different types of compounds (ionic or covalent) based on their properties such as melting point, hardness, polarity, and electrical and thermal conductivity.	3.71	VO
3. Differentiate basic features and importance of photosynthesis.	3.69	VO
4. Illustrate how energy from volcanoes may be tapped for human use.	3.63	VO
5. Describe the location of genes in chromosomes.	3.57	VO
6. Describe how the Bohr model of the atom improved Rutherford's atomic model.	3.57	VO
7. Explain properties of metals in terms of their structure.	3.57	VO
8. Infer that heat transfer can be used to do work, and that work involves the release of heat.	3.26	O
9. Explain how heat transfer and energy transformation make heat engines like geothermal plants work.	3.26	O
10. Explain how ions are formed.	3.20	O
11. Describe certain climatic phenomena that occur on a global level.	3.20	O
12. Explain why machines are never 100-percent efficient.	3.20	O
13. Infer that the total momentum before and after collision is equal.	3.17	O
14.Explain energy transformation in various/activities/events (e.g., waterfalls, archery, amusement rides).	3.17	O
15. Construct a model to demonstrate that heat can do work.	2.97	O
Composite Mean	**3.40**	**O**

Legend: WM=Weighted Mean VI= Verbal Interpretation VO= Very Often O= Often

As manifested in the table, explaining the different patterns of non-Mendelian inheritance and recognizing different types of compounds (ionic or covalent) based on their properties such as melting point, hardness, polarity, and electrical and thermal conductivity were the learning competencies that required technology oriented resources justified by a weighted mean of 3.71 and got the highest weighted mean among thirty-nine items. This competency really requires technology because as revealed by science teachers that were interviewed there are available and accessible application softwares related to this competency that can be used. With the support of these technology oriented resources, teachers can easily catch the attention and interest of students to listen. This finding supports the study of Sumaong [17], which revealed that science teachers need to include different learning activities such as the use of ICT and the use of the other audio visual materials to motivate students and to build highly interesting science lessons.

Technology oriented resources were also often used in differentiating basic features and importance of photosynthesis as indicated by the weighted mean of 3.69. This result indicates that this learning competency also require technology resources due to the fact that it can be easily taught with the help of several video films in order to motivate students and be involved in the lesson. It conforms with the findings of Madeja [16] that science films were effective to motivate students' interest in the subject and can stimulate them to think objectively, that results to a meaningful teaching-learning process.

Illustrating how energy from volcanoes maybe tapped for human use obtained the weighted mean of 3.63. This competency very often required the use of technology oriented resources. This means that ICT resources are useful for successful understanding of learners on these concepts. This finding support the concepts of Petrosino[3] that it is beneficial to use ICT in science education because it can help teachers to explores effective ways of teaching science concepts and help students to have successful educational activities.

Describing the location of genes in chromosomes, describing how the Bohr model of the atom improved Rutherford's atomic model, and explaining properties of metals in terms of their structure are other competencies which very often required the use of technology oriented resources. These obtained weighted means ranges from 3.63 to 3.57. This means that teachers really needs technology resources in every science lessons such as genes, atomic models and metal structures to have clear and accurate way of thinking of the learners. Teachers believe that when technology will be integrated on these concepts, it can easily be understood by the students. Concepts will be integrated correctly if new technologies can be applied. This supports the study of Perez [18] that new technologies can help to increase student motivation, facilitate clearer thinking and develop interpretation skills.

It was disclosed that constructing a model to demonstrate that heat can do work got the lowest weighted mean of 2.97. As revealed to the interview of science teachers, they prefer to perform simple experiment to demonstrate how heat really do work rather than the used of simulations or other technology oriented resources. Their students find the topic interesting when done through experimentation. It affirms with the findings of Atienza that teachers frequently employed experimentation and demonstration methods in some cases to easily develop the desired competencies

The composite mean of 3.40 showed that these learning competencies in Grade 9 required technology oriented resources. Results suggest that schools administrators should provide the necessary technology oriented resources for the teachers to modify their teaching style to match the learning style of the students. This is in line with the idea of Petrosino [3] that teachers' teaching style promotes effective learning and strengthens the less developed abilities of the students, thus making them better scholars and scientists. He posited that science education should offer the students a new kind of learning that provides real value throughout their entire life. Therefore, teachers should work together and jointly with the administrators to build up a unifying set of targets and goals.

Table 4 shows the learning competencies requiring technology oriented resources for Grade 10.

Table 4: Learning Competencies in Grade 10 that RequireTechnology Oriented Resources

LEARNING COMPETENCIES	WI	VI
1. Enumerate the lines of evidence that support plate movement.	3.69	VO
2. Explain the operation of a simple electric motor and generator.	3.66	VO
3. Describe the different types of plate boundaries.	3.60	VO
4. Describe the distribution of active volcanoes, earthquake epicentres, and major mountain belts.	3.57	VO
5. Enumerate the lines of evidence that support plate movement.	3.51	VO
6. Describe the parts of the reproductive system and their functions.	3.51	VO
7. Predict the qualitative characteristics (orientation, type, and magnification) of images formed by plane and curved mirrors and lenses.	3.43	O
8. Investigate the relationship between volume and pressure at constant temperature of a gas, volume and temperature at constant pressure of a gas and explains these relationships using the kinetic molecular theory.	3.40	O
9. Recognize the major categories of biomolecules such as carbohydrates, lipids, proteins, and nucleic acids.	3.40	O
10. Explain the effects of EM radiation on living things and the environment.	3.37	O
11. Explain how protein is made using information from DNA.	3.31	O
12. Explain how species diversity increases the probability of adaptation and survival of organisms in changing environments.	3.31	O
13. Explain the occurrence of evolution.	3.26	O
Composite Mean	**3.45**	**O**

Legend: WM=Weighted Mean VI= Verbal Interpretation VO= Very Often O= Often

To explain the operation of a simple electric motor and generator obtained a weighted mean of 3.66 indicating that this competency also very often required technology oriented resources. This is not surprising since lessons on electric motor and generator operation can be best introduced using computers. There are lots of simulations and videos available in the internet that explains and simulate how motors and generators really work. With the use of computers students can visualized its proper operations. This is in line with Salkind [19] idea that computers as problem solving tools change the way they teach. They move from behavioural approach to a more constructivist approach. Students who are engaged in their learning using these powerful tools can become creators and critics instead of just consumers.

With a weighted mean of 3.60, the competencies in describing the different types of plate boundaries very often required technology oriented resources. This maybe because teachers find it difficult for their student to comprehend and differentiate the different types of plate boundaries if they did not present picture or videos showing the different plate boundaries and how they occur. It is hard for the learners to just imagine what the teacher is explaining. This can be done by showing videos on how plate boundaries are formed. In this way, learners easily describe the different types of plate boundaries.

To describe the distribution of active volcanoes, earthquake epicenters and major mountain belts obtained a weighted mean of 3.57 indicating that this competency also very often required technology oriented resources. It seems that teachers find it challenging for their learners to describe the distribution of active volcanoes, earthquake epicenters and major mountain belts. It is hard for the students to describe something if they are not aware of it. This can be done by using simulations when viewed using technology resources. Through this, learners can have the

general view and eventually describe the distribution of distribution of active volcanoes, earthquake epicenters and major mountain belts. This finding support the idea cited by Rigor [12] that using simulations teachers can simulate interest, simplify, clarify subject matter and increase understanding and motivate the learner to learn.

The competency on explaining the occurrence of evolution often required technology oriented resources. This obtained the lowest weighted mean of 3.26. This is an indication that aside from using technology in this competency teacher also used other resources or strategies. From the interview conducted teachers revealed that occurrence of evolution is somewhat historical in nature and discussion method can also be fitted in understanding history with evolution. According to Clavillas [2], discussion is one way of teaching whereby students express and share ideas with others as they undertake scientific study.

The composite mean of 3.45 showed that Grade 10 science learning competencies often required technology oriented resources. This is an indication that integration of technology will provide learners meaningful learning with the use of application softwares, powerpoint presentations and etc. Supplementing regular lessons by a large variety of technology motivates learners and they become active participants, displaying the required competencies for them. This finding agrees with the study of Perez [18] that new technologies may help increase student motivation,

5. Conclusion

The learning competencies in secondary science often require the use of technology-oriented resources.

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