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Activity-Based Strategy in Teaching Earth Science among Junior High School Students in Philippines

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***Abstract* - The world has improved a lot. The vision to make people's lives enjoyable came faithfully through the efforts of scientists in developing technologies that will help people's work easier. This study determined the effectiveness of Activity-Based Strategy in teaching science to Grade 7 high school students in a national high school in the Philippines. The method used in this study was a quasi-experimental design with control and experimental groups. The experimental group was taught using an activity-based strategy, while the control group used the teacher-centered approach. Pre-test and post-test methods were used to measure the level of academic performance of the students in both groups. This study revealed that the pre-test performances of the control and experimental group were low, but the post test of both groups increased. Also, there is a significant difference in the post test performances of both groups in Earth Science. The study concluded that science teaching for Grade 7 students could be enhanced by using the activity-based strategy, a better alternative to improve students' performances. Activity-based strategy in Science 7 increases the students' motivation in terms of mastery of the concepts skills, stimulating positive learning and interest, and love for science.**
***Keywords:* Teaching Science, Activity-Based Strategy, High School Science**

I. INTRODUCTION

In the conduct of the teaching-learning process, particularly in teaching science, the motivation and interest of the students must be channelled to the lessons making them enjoyable and informative. Teaching becomes challenging and stimulating with the current global educational trends, such as interactive and cooperative learning. There are endless questions in the students' minds, and science is the field that is very relevant to daily living. The students are mere listeners in the routine lecture method, and many are inattentive. Consequently, it affects knowledge acquisition, retention, and recall, particularly academic performance.

The new curriculum challenges the educators to teach scientific ways of thinking, actively involve students to develop a conceptual framework, develop problem-solving skills, promote student discussion and group activities, and help students experience science in varied, engaging, and enjoyable ways. Yet, there is no universal best way to teach, experience shows that some general principles in pedagogy help students learn science better and more efficiently.

Teachers battled with 21st-century learners to gain positive academic performances, particularly teaching and learning. The 21st-century learners are enveloped with various technologies that capture their attention and even choose to use and enjoy the technologies. Consequently, negative issues have arisen. It seems that going to school is only a requirement for them to just be in with style and forget its real purpose. Computers and cellular phones are just a few gadgets that corrupted learners' attention and purpose in education, leading learners' study habits to drop, have poor interest in studies, and have low retention of the lessons discussed.

Moreover, the National Career Assessment Examination (NCAE) showed poor academic results in science (Sugano & Mamolo, 2021; Tan & Balasico, 2018). This is a challenge to a teacher indeed. A teachers' role is to guide, lead, direct, and maneuver every student's road to success. Uplifting science education in the Philippines is one of every Filipino science teacher's dream (Laguatan & Abad, 2019; Rogayan, 2018; Cruz, 2017).

Teachers are known to be very innovative. In this sense, teachers must resolve technologies' negative results to learners. Teachers need to upgrade the teaching strategies to encourage every 21st-century learner to be actively involved in the teaching-learning process. Educators are challenged to produce activities in the classroom that will arouse every learner's attention to participate and enjoy the class in gaining meaningful learning actively. Through group activities, learners are encouraged to talk, brainstorm, to think critically in addressing every question. Collaboration is also developed. The learner's imagination will keep moving in, looking for the best solution. Macro skills will be developed; this can also improve communication and interpersonal social skills, enhance leadership skills, increase creativity, and improve writing skills.

With this awareness, the researchers feel that using the activity-based teaching strategy will facilitate the teaching and learning process, and the value of Earth Science in human existence will be appreciated.

The researchers conducted this study to investigate the effectiveness of the activity-based strategy in teaching Grade 7 Science and its influence on the students' academic performance.

II. REVIEW OF LITERATURE

This study is anchored in three theories that emphasize different aspects of learning: Social Development of Lev Vygotsky, Observational Learning of Albert Bandura, and Experiential Learning of Carl Rogers.

In the Social Development Theory of Lev Vygotsky, students learn if they will interact with peers or their environment rather than through direct instruction (Blake, 2015). Students who are actively involved in the learning process tend to gain and remember more knowledge than those who are not. They can learn best using authentic activity, which is a significant factor that affects the students' ability to create their learning (Shin, 2018; Duschl & Osborne, 2002).

Vygotsky claims that a child will not develop unless he undergoes or experiences social learning (Berk, 2014). He believes that the construction of knowledge is done through the culture and social environment. In other words, the society where children belong determines the knowledge that children learn about the world and how this knowledge is learned (Gholami *et al.,* 2016).

Vygotsky's theory promotes learning contexts where students play an active role in learning. Therefore, the roles of the teacher and student are shifted. Teachers should collaborate with their students to help facilitate meaning construction in students (Baangud *et al.,* 2020; Wang & Liu, 2020). Learning, therefore, became a reciprocal experience for the students and teachers (Thirusanku & Yunus, 2014).

The Observational Learning of Albert Bandura also supports this study. Learning takes place by observing the conduct of others. This form of learning does not need reinforcement to occur but instead requires a model. A social model can be a parent, sibling, friend, or teacher, but in childhood, a model is someone of authority or higher status (Bandura, 2021; Horn & Williams, 2004). A social model is essential in observational learning because it facilitates cognitive behavior. It helps learners encode what they observe and store it in memory for later imitation.

Observational learning arises in the absence of reinforcement to the observers, thereby speeding up the acquiring new behaviors. These ideas expressed disagreement with accepted views, which stated that learning results from direct reinforcement (Zimmerman & Schunk, 2003).

Bandura claims that children continually learn desirable and undesirable behaviour through observational learning. Observational learning suggests that an individual's environment, cognition, and behaviour all integrate and ultimately determine how the individual functions (Schunk & Usher, 2012). Bandura further said that four-component sub-functions govern observational learning. These sub-functions, or processes, are necessary before an individual can successfully model another. The processes include attention, retention, motor reproduction, and motivation.

The third theory is the Experiential Theory of Carl Rogers, which is concerned with the process, not the product; personal needs, not the subject matter; and psychological meaning, not cognitive scores. Rogers established counselling procedures and methods for facilitating learning. Children's highly individualistic perceptions influence their learning and behavior in class.

Personal change and growth are synonymous with experiential learning. Rogers believes that all humans have an inherent desire to learn, and that the teacher's responsibility is to support that learning. This includes settling a positive climate for learning, clarifying the purpose of the learners, organizing and making learning resources available, balancing the intellectual and emotional aspects of learning, and expressing feelings and thoughts with learners without dominating them (Culatta, 2019).

Experiential learning is not a new technique; it is, without a doubt, as old as learning itself (Drummond, 2003). It is the active process in which students learn information through discovery and exploration. It is a student-centered approach, addressing each student's wants. Learning happens from successes and mistakes and helps students develop new skills, attitudes, and problem-solving techniques (Wolsk, 2003). Experiential learning occurs when a person interacts with the environment, including the people, animals, and situations involved. It is learning by doing and may occur during a short time, such as during a workshop or regularly scheduled sessions. It promotes personal exploration of feelings and behavior in an educational format.

Learning style is how a person processes, internalizes, and studies new challenging materials (Aliakbari & Soltani, 2009; Kolb & Kolb, 2009; Hawk & Shah, 2007). The different learning styles are presented according to five groups of stimuli: environmental-which covers lighting, sound, temperature, and seating arrangement; the emotional-which consider the motivation, persistence, responsibility, and structure; the sociological – which consider the association with other people, i.e., peer; physiological-which consider the hemispheric, impulsive or reflective, and global versus analytic. Learners from all over the world love to work in a relaxed setting with soft lighting and comfortable seating (Fickes, 2013; Dunn *et al.,* 2009). Breaks, food, mobility, and sound are all necessary for those with this processing style. Analytic learners like working in a setting with plenty of natural light and formal chairs. They function best when there are few or no interruptions, the environment is peaceful, and there is little or no snacking.

One of the reasons attributed to the student's academic performance is teaching. Teachers should improve their teaching methods and strategies, classroom management styles in teaching, and relationships with students. The teacher must be uplifted with the current trends in education such as reflective, integrative, interactive, inquiry-based, brain-based, and research-based teaching, constructivism, multiple intelligences, multicultural education, and authentic assessment.

One powerful, tried-and-true way to alter students' perceptions about the relationship between various disciplines is to create integrated, cross-curricular instruction between multiple subjects (Adams & Hamm, 2020; Pyöriä, 2020). The benefit is that students will start to understand knowledge as interrelated and connected rather than as separate entities an individual, isolated subject. Ultimately this better enables students to achieve higher-level critical thinking and collaborative skills.

Science teachers must possess genuine eagerness and capacity to learn and share scientific knowledge and gain and provide experiences for developing skills in the primary scientific processes (Windschitl, 2003). Teachers must have professional development and have a wide range of subject knowledge and skills in the lifelong process of the students and possess eagerness in his or her endeavour in the classroom environment (Akerson & Hanuscin, 2007).

According to Bandura (2009), Retention involves an active process of transforming and restructuring the information conveyed by modelled events into rules and conceptions for memory representation. Teachers can help students remember modelled behaviors by encouraging them to use various learning strategies. Examples of effective learning strategies include rehearsal techniques (repeating what needs to be learned over and over again); organizational methods (imposing structure on newly learned material); and elaboration strategies (connecting information to prior knowledge, making assumptions, and drawing inferences).

In general, the theories mentioned served as bases in the analysis and interpretation of the data of the present undertaking.

III. OBJECTIVES OF THE STUDY

The study determined the effectiveness of the activity-based strategy in Grade 7 Science in a national high school, Philippines. Specifically, it sought to answer the: 1] Pre-test performances of the control and experimental groups; 2] Post-test performances of the control and experimental groups; 3] Significant difference between the pre-test performances of the control and experimental groups; 4] Significant difference between the pre-test and post-test performances of the control and experimental groups; 5] Significant difference between the post-test performances of the control and experimental groups.

IV. METHODOLOGY

This study was conducted based on the quasi-experimental research design utilizing pre-test-post-test randomized group design. There were two groups of Grade 7 students, the experimental group of students exposed to activity-based strategy and the control group of students taught using the lecture teaching method. It was conducted in a national high school, facilitated by 131 teachers, and has a total population of 3,994.

The respondents of this study were two selected sections in Grade 7 handled by one of the researchers. There were 70 students considered respondents of the study; 35 students from Grade 7-Diamond belong to the experimental group and 35 students from Grade 7-Gold for the control group.

To establish that the groups were comparable, the pre-test performances of the students within the groups were compared. There was no significant difference in each performance, so this was the signal for the researcher to implement the desired intervention. Further, the researchers ensured that the students from the two groups did not differ significantly in their performance.

The matching of the subjects treated to activity-based strategy and traditional lecture method in their age and second quarter grades in Grade 7 Science. Both control and experimental groups' mean age was comparable at 12, respectively. The mean second quarter grades in both groups are 86. Statistically, the two groups were comparable. This technique distributes students fairly and evenly to the Activity-Based Strategy and Lecture Method. The data collected from the two groups were shown in pairs. The two groups were being tested using pre-test and post-test. Each group was given the same questionnaire.

It shows that the same teacher-researcher handled them. Grade 7 Science (Earth Science) was the subject matter of the two groups. The Grade 7-Gold was exposed to the traditional lecture method of teaching. The second group was the Grade 7-Diamond was treated as an activity-based strategy in conveying certain science concepts and principles. The first group was the control group and the second group was the experimental group. Both groups took the same pre-test and post-test of the topics.

The study utilized a 40-item researcher-made test that covered the topic in Earth Science, specifically on the layers of the atmosphere, greenhouse effect, global warming, and common atmospheric phenomena. The questions in the questionnaires were derived from some of the standardized test questions adopted from the Department of Education

Module for the K-12 curriculum and self-made questionnaires based on the curriculum guide. There were 35 Grade 7 students being tested for the validity and reliability of the tool. These students did not belong to the group of subjects. The questionnaire was approved and accepted with a value of Cronbach's Alpha score of 0.7655 (Reliable).

The researchers submitted a permission letter to the school's principal to conduct the study and the participation of the Grade 7 Science Class students as research subjects. Another letter was also sent to the schools' division superintendent for the conduct of the study. After the approval of the study, the researchers proceeded.

The teaching procedure and activities of the control group were performed using the traditional lecture method, and the experimental group was performed utilizing an activity-based project strategy. The lesson covered almost two weeks of implementation. After the data were gathered, analyzed, and interpreted using frequency, percentage, mean, and t-test for two independents.

V. RESULTS AND DISCUSSION

A. Pre-Test Performances of Both Groups

TABLE I PRE TEST PERFORMANCES OF THE CONTROL AND EXPERIMENTAL GROUPS

Scores	Control [n = 35]		Experimental [n = 35]		Performance Level
	f	%	f	%	
31 - 40	0	0.00	0	0.00	Very Good
21 - 30	7	20.00	2	5.71	Good
11 - 20	27	77.14	33	94.29	Fair
1 - 10	1	2.86	0	0.00	Needs Improvement
Mean	17.14		17.03		
St Dev	3.21		2.49		

Legend: 31-40 Very Good; 21-30 Good; 11-20 Fair; and 1-10 Needs Improvement

It shows that most students have fair performance both in the control and experimental groups. Out of 35 respondents in the control group, there were seven or 20 percent with good performance, 27 or 77.14 percent with fair performance, and one or 2.86 percent needs improvement, while in the experimental group. Also, there were two or 5.71 percent good performance and 33 or 94.29 percent fair performance.

This means that both the control and experimental groups have a fair performance in science. However, it revealed that the control group's performance is higher than the experimental group, as it showed in the mean score of 17.14 for the control group while 17.03 for the experimental group.

It indicates that prior to introducing the new strategy, the respondents are not used to adopting the activity-based strategy as their means of learning science, as it shows in the result that the traditional lecture method is higher than the activity-based strategy result. The overall pre-test Science 7 performance is fair.

B. Post-Test Performances of Both Groups

TABLE II POST TEST PERFORMANCE OF THE CONTROL AND EXPERIMENTAL GROUPS

Scores	Control [n = 35]		Experimental [n = 35]		Performance Level
	f	%	f	%	
31 - 40	4	11.43	7	20.00	Very Good
21 - 30	24	68.57	26	65.71	Good
11 - 20	7	20.00	2	14.29	Fair
1 - 10	0	0.00	0	0.00	Needs Improvement
Mean	23.46		26.09		
St Dev	4.35		5.16		

Legend: 31-40 Very Good; 21-30 Good; 11-20 Fair; and 1-10 Needs Improvement

It shows that the post test result majority of the students in control and experimental groups have a good performance in science using the activity-based strategy. The traditional lecture method showed that in the control group, four (11.43 %) respondents got a score range between 31- 40, 24 (68.57 %) scored between 21- 30, seven (20%) scored between 11-20. While on the experimental group, seven (20%) respondents had a score range between 31- 40, 26 (74.29 %) scored between 21- 30, two (5.71 %) scored between 11-20. This means that students have a good performance towards Science. The experimental group that used activity-based strategy showed a higher mean score of 26.71 than the traditional lecture method, with a mean score of 23.46 (control group). This indicates a positive impact on the activity-based strategy to students.

The study of Anwer (2019) determined the effects of activity-based teaching on student motivation and academic achievement. It showed that most students' scores increased in the experimental group compared to the control group. The mean value indicated that participants from the experimental group showed more achievement in the post test. The post-lesson survey showed that most students found activity-based teaching more interesting than lecture-based teaching.

C. Difference between Pre-Test Scores of Both Groups

Table III presents the difference between the pre-test scores of the control and experimental group of the Grade 7 students on the fourth grading topics in science, namely: Layers of the atmosphere, greenhouse effect, global warming, and common atmospheric phenomenon.

TABLE III TEST OF DIFFERENCE BETWEEN THE PRE TEST PERFORMANCE OF THE CONTROL AND EXPERIMENTAL GROUPS

Group	Mean	t-value	Critical Value	Decision on Ho	Interpretation
Control	17.14	0.166	1.995	Ho Accepted	Not Significant
Experimental	17.03				

@0.05 level of significance

The respondents' performance on pre-test shows no significant difference existed between the pre-test and post-test performances of the respondents with the computed t-value of 0.166 is smaller than the critical t-value of 1.995. The assumption that there is no significant difference between the pre-test performances of the students in the control and experimental groups is valid that both direct instruction and sports-based strategy have a positive effect in teaching science, as revealed on the pre-test result.

D. Difference between the Pre Test and Post Test Scores Both Groups

TABLE IV TEST OF DIFFERENCE BETWEEN THE PRE TEST AND POST TEST SCORES OF THE CONTROL AND EXPERIMENTAL GROUPS

Group	Mean	Computed t-value	Critical t-value	Decision on Ho	Interpretation
A. Control					
Pre-test	17.14	6.730	2.032	Ho Rejected	Significant
Post-test	23.46				
B. Experimental					
Pre-test	17.03	12.060	2.032	Ho Rejected	Significant
Post-test	26.71				

@0.05 level of significance

Table IV presents the difference test in the pre-test and post-test performances of the control and experimental groups.

The control group shows significant differences between the respondents' pre-test and post-test performance with a computed t-value (6.731) is higher than the critical t-value of 2.032. This implies that the assumption that there is no significant difference between the pre-test and post-test performances of the students in the control group is not valid because it rejects the null hypothesis.

The experimental group shows a significant difference between the respondents' pre-test and post-test performance with a computed t-value (12.060) is higher than the critical t-value (2.032). This indicates that the assumption that there is no significant difference between the students' pre-test and post-test performances in the experimental group is not true because it rejects the null hypothesis.

The results showed that the teacher greatly impacted the student's learnings in the two strategies used the traditional teaching method and activity-based strategy, resulting in increased performance. Appropriate teaching methodologies and instructional materials improve performance and increase interest in and enthusiasm for learning. The study of Khan *et al.,* (2012) concluded that there was a positive impact of activity-based teaching in developing cognitive skills in science students at the secondary level. This teaching method is more effective for developing higher-order thinking skills in the students.

E. Test of Difference between the Post Test Scores of Both Groups

Table V presents the test of difference in the post test performance of the control and experimental groups of respondents.

TABLE V TEST OF DIFFERENCE BETWEEN THE POST TEST SCORES OF BOTH GROUPS

Group	Mean	t-value	Critical Value	Decision on Ho	Interpretation
Control	23.46	3.107	1.995	Ho Rejected	Significant
Experimental	26.71				

@0.05 level of significance

The respondents' post-test performance in the control and experimental group has a computed t-value of 3.107 and a critical t-value of 1.995 since the t-computed value was more significant than the critical t-value. This implied a significant difference in the post test performance of the control and experimental group of respondents. The activity-based strategy was very effective for students' learning process and mastery of the concepts. It showed that the more the learners were involved in the teaching-learning process, the more likely they would remember and utilize the materials they have learned.

The study's findings confirmed that the strategy isa critical variable in determining the academic achievement of Filipino students (Bernardo, 2003). According to Armbruster *et al.,* (2009), there is a need to be innovative and student-centered in one's pedagogy to ensure active learning.

Furthermore, the goal of education includes cognitive or intellectual education. It involves personal growth and the development of creativity and self-directed learning. They are by nature curious, exploratory, desirous of discovery, knowing, and experiencing. Much significant learning is acquired through doing. Experiential involvement with practical or real problems promotes learning. With this, learning is facilitated when the student participates responsibly in the learning process. Learning becomes significant when the students choose their objectives and directions, formulate their problems, discover their resources, decide on and follow their course of action.

Models as learning devices are effective scientific learning aids in increasing students' performance in concepts and acquiring new abilities and cultivating a favorable attitude toward science (Akınoğlu & Tandoğan, 2007). It also develops the students' sense of responsibility, teamwork, cooperation, satisfaction, and intellectual interest.

VI. RECOMMENDATIONS

It is highly recommended that an activity-based strategy be utilized to enhance the science learning of Grade 7 students. Also, the researchers recommend that future research conduct studies in the a] application of active-learning and inquiry learning for Grade 7 Science, and b] varied materials for teaching Grade 7 Science with activity-based strategy applications.

The proposed action plan was designed for both teachers and learners to apply activity-based strategy in Science teaching. The training program will also help science teachers use the strategy to encourage students to learn enthusiastically and motivate them to study more in their subject, leading hopefully to improved performance.

VII. CONCLUSION

The activity-based strategy is an effective tool to facilitate student learning in science. The said strategy promotes conceptual understanding and increases the motivational interest of the learners because of their authentic and genuine learning perspective.

REFERENCES

[1] Adams, D., & Hamm, M. (2020). *Shaping the future with STEM instruction: Integrating science, technology, engineering, and mathematics.* Rowman & Littlefield Publishers. Retrieved from https://bit.ly/3p3xaRP.

[2] Akerson, V. L., & Hanuscin, D. L. (2007). Teaching nature of science through inquiry: Results of a 3-year professional development program. *Journal of Research in Science Teaching: The Official Journal of the National Association for Research in Science Teaching, 44*(5), 653-680. Retrieved from https://bit.ly/3sVSBW3.

[3] Akınoğlu, O., & Tandoğan, R. Ö. (2007). The effects of problem-based active learning in science education on students' academic achievement, attitude, and concept learning. *Eurasia journal of mathematics, science, and technology education, 3*(1), 71-81. Retrieved from https://bit.ly/3JWAgiD.

[4] Aliakbari, M., & Soltani, N. (2009). Variation of learning styles among Iranian EFL learners: Effects of culture, language background and gender. *In Proceedings of the 16th Conference of Pan-Pacific Association of Applied Linguistics*, 200-209. Retrieved from https://bit.ly/3H3FgzO.

[5] Anwer, F. (2019). Activity-based teaching, student motivation and academic achievement. *Journal of Education and Educational Development, 6*(1), 154-170. Retrieved from https://bit.ly/3h0hZEu.

[6] Armbruster, P., Patel, M., Johnson, E., & Weiss, M. (2009). *Active learning and student-centered pedagogy improve student attitudes and performance in introductory biology. CBE—Life Sciences Education, 8*(3), 203-213. Retrieved from https://bit.ly/3I6uAlx.

[7] Baanqud, N. S., Al-Samarraie, H., Alzahrani, A. I., & Alfarraj, O. (2020). Engagement in cloud-supported collaborative learning and student knowledge construction: A modeling study. *International Journal of Educational Technology in Higher Education, 17*(1), 1-23. Retrieved from https://bit.ly/3JCtYEz.

[8] Bandura, A. (2021). *Analysis of modeling processes. In Psychological modeling*, 1-62. Routledge. Retrieved from https://bit.ly/3LM qAbZ.

[9] Bandura, A. (2009). *Social cognitive theory of mass communication.* In Media effects, 110-140. Routledge. Retrieved from https://bit.ly/3oWYuRy

[10] Bernardo, A. B. (2003). Approaches to learning and academic achievement of Filipino students. *The Journal of Genetic Psychology, 164*(1), 101-114. Retrieved from https://bit.ly/ 3s3AA96.

[11] Blake, B. (2015). Developmental psychology: Incorporating Piaget's and Vygotsky's theories in classrooms. Retrieved from https://bit.ly/3sNsXme.

[12] Cruz, D. D. D. (2017). *Positive discipline in everyday teaching primer: A teacher's viewpoint*. Retrieved from https://bit.ly/3I307ET.

[13] Culatta, R. (2019). *Creating a shared vision. Educational Leadership, 76*(5), 26-29. Retrieved from https://bit.ly/3JG4sy9.

[14] Drummond, C. N. (2003). *Carl Rogers and the origin of experiential learning. Journal of Geoscience Education, 51*(5), 0-2. Retrieved from https://bit.ly/3BxAQQO.

[15] Dunn, R., Dunn, K., & Price, G. E. (2009). Learning style. *Journal of Education Strategies, 82.* Retrieved from https://bit.ly/3p0slZA.

[16] Duschl, R. A., & Osborne, J. (2002). *Supporting and promoting argumentation discourse in science education*. Retrieved from https://bit.ly/3BAWLq9.

[17] Fickes, M. (2013). Flipping classrooms. *School Planning & Management, 52*(6), 16-21. Retrieved from https://bit.ly/3oZABss.

[18] Hawk, T. F., & Shah, A. J. (2007). Using learning style instruments to enhance student learning. Decision Sciences *Journal of Innovative Education, 5*(1), 1-19. Retrieved from https://bit.ly/3I4uLhf.

[19] Horn, R. R., & Williams, A. M. (2004). *Observational learning. Skills acquisition in sport: Research, theory, and practice*, 175-203. Retrieved from https://bit.ly/3I3CbRz.

[20] Khan, M., Muhammad, N., Ahmed, M., Saeed, F., & Khan, S. A. (2012). Impact of activity-based teaching on students' academic achievements in Physics at secondary level. *Academic Research International, 3*(1), 146. Retrieved from https://bit.ly/3LLtnSR

[21] Kolb, A. Y., & Kolb, D. A. (2009). *The learning way: Meta-cognitive aspects of experiential learning. Simulation & Gaming, 40*(3), 297-327. Retrieved from https://bit.ly/3s PUcwp.

[22] Laguatan, R. P., & Abad, B. D. (2019). *Science teacher's qualities: The basis for a faculty sustainability program. Online Submission, 8*(7), 232-249. Retrieved from https://bit.ly/3p0YzDS.

[23] Pyöriä, J. (2020). Improving students' critical reading and multiliteracy skills: A material package. Retrieved from https://bit.ly/3sUe7dz.

[24] Rogayan Jr., D. V. (2018). Why young Filipino teachers teach? *Asia Pacific Higher Education Research Journal (APHERJ), 5*(2). Retrieved from https://bit.ly/3h4qjTu.

[25] Schunk, D. H., & Usher, E. L. (2012). Social cognitive theory and motivation. *The Oxford Handbook of Human Motivation, 2*, (11-26). Retrieved from https://bit.ly/3LMe Oyd.

[26] Shin, M. H. (2018). Effects of Project-Based Learning on Students' Motivation and Self-Efficacy. *English Teaching, 73*(1), 95-114. Retrieved from https://bit.ly/3JEE zP9.

[27] Sugano, S. G. C., & Mamolo, L. A. (2021). Analysis of students' aptitude and academic performance: Input to curriculum enhancement. *Anatolian Journal of Education, 6*(2), 51-62. Retrieved from https://bit.ly/33y6NvE.

[28] Tan, D. A., & Balasico, C. L. (2018). Students' academic performance, aptitude, and occupational interest in the national career assessment examination. PUPIL: *International Journal of Teaching, Education and Learning, 2*(3), 01-21. Retrieved from https://bit.ly/3H5AMJ7.

[29] Thirusanku, J., & Yunus, M. M. (2014). *Status of English in Malaysia. Asian Social Science, 10*(14), 254. Retrieved from https://bit.ly/3I3dHYY.

[30] Wang, Y., & Liu, Q. (2020). Effects of online teaching presence on students' interactions and collaborative knowledge construction. *Journal of Computer Assisted Learning, 36*(3), 370-382. Retrieved from https://bit.ly/3L LQwok.

[31] Windschitl, M. (2003). Inquiry projects in science teacher education: What can investigative experiences reveal about teacher thinking and eventual classroom practice? *Science Education, 87*(1), 112-143. Retrieved from https://bit.ly/3p 2JWQl.

[32] Wolsk, D. (2003). Experiential knowledge. *New Directions for Teaching and Learning, 94*, (89-95). Retrieved from https://bit.ly/3v 49Ebe.

[33] Zimmerman, B. J., & Schunk, D. H. (2003). Albert Bandura: The scholar and his contributions to educational psychology. Retrieved from https://bit.ly/3LOtWvh.