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THINK SOLVE PAIR SHARE IN AN ONLINE MODALITY: A STRATEGY IN ENHACING STUDENT PERFORMANCE IN SCIENCE 7

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ABSTRACT

This research focused on enhancing of cognitive engagement and performance of Science 7 learners through think solve pair share strategy in an online modality. This study used the descriptive method research of design. The descriptive method was used to determine the effect of Think-Solve-Pair-Share in the enhancement of cognitive engagement and performance of Science 7 learners. In this study, the respondents consist of Grade 7 students from Sta. Catalina National High School Extension. To get the desired sample, the researcher subjectively selected Grade 7 students from the same school who are under online distance learning approach. Moreover, the instrument used in the study is a survey questionnaire-checklist and data obtained from the questionnaire-checklist were then treated with statistical tools such as frequency, percentage, arithmetic mean, standard deviation and t test. Based on the data, it is shown that there is a significant difference between learners' pre-test and post-test at 0.05 level of significance. It shows that the null hypothesis stating that "There is no significant difference between learners' pre-test and post-test" is rejected, it can infer that there is "significant" difference between them. This implies a significantly better performance in the post test since there is an increase from pre-test to post test result. This also indicates that there is an improvement when the think solve pair share was utilized in teaching science. Based on the drawn conclusions resulted to the following recommendations: It may be recommended that the effort to create change through this conceptualization of student engagement should be especially targeted toward new and experienced sheltered instruction teachers. It is these professionals who in many schools are charged with helping struggling learners. A realization that despite the complexity and difficulty of academic content, students need to be meaningfully engaged in it. A new commitment to the idea that teachers such as the Think-Solve-pair-Share must do what it takes to ensure that children are cognitively engaged; and A strong desire for sustained support from their schools to help them meet the challenge of teaching learner adolescents who often have been disengaged and ill prepared.

INTRODUCTION

Creating a school that works, provides and sustains the needs of every student would be successful if teachers are aware to help their students. Cognitive engagement in the classroom can be characterized as a psychological state in which students put in a lot of effort to truly understand a topic and in which students persist studying over a long period of time. With these, student engagement is a prerequisite of student learning, and for learning to be truly meaningful, students should be cognitively engaged.

The current situation of the education system amidst pandemic made instructional leaders challenged for students' success. As such, it is important that teachers align instructions with principles and practices for cognitive engagement as it is the glue, or mediator that links important contexts to students and in turn, to outcomes of interest. On the other hand, even though it serves as mediator, some students find ways to become actively disengaged. Many are respectfully but passively disengaged. Often students are sitting looking at the teacher, but in reality, are miles away far from being actively and cognitively engaged. Unfortunately, too often students choose to respond to the boredom and disengagement by simply not attending online classes or dropping out of school entirely.

In line with the above discussion, it is necessary that instructional leaders apply teaching techniques that allow teachers to get evidence of active participation and cognitive engagement from all students at the same time especially with online distance learning as teaching modality. These techniques are important because they let teachers take advantage of the amount of learning that all students are involved instead of just three or four students.

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With this in mind, the researcher wants to employ Think Solve Pair Share in online science classes in Sta. Catalina National High School Extension. These techniques will help the teachers get all the students participates in the teaching learning process because they will focus on the learning tasks. This way, students feel successful because they can be part of the lesson.

In addition, Think Solve Pair Share provide teachers with immediate feedback as many of the strategies used provide teachers with on the spot evidence about which students understand and which ones don't.

With the importance of students' cognitive engagement and performance, this study aims to provide an alternative to stand-and-deliver teaching to enhance the cognitive engagement and performance of science learners through Think-Solve-Pair-Share as teaching strategy.

RESEARCH METHODOLOGY

The researcher used the quantitative/ descriptive survey method of research. Quantitative methods emphasize objective measurements and the statistical, mathematical, or numerical analysis of data collected through polls, questionnaires, and surveys, or by manipulating pre-existing statistical data using computational techniques. Quantitative research focuses on gathering numerical data and generalizing it across groups of people or to explain a particular phenomenon (Wadsworh, 2017). The method involved range from the survey which described the status quo, the correlation study which investigated the relationship between variables, to developmental studies which seek changes over time (Key, 2017).

The researcher used this method to quantify the problem by way of generating numerical data or data that can be transformed into usable statistics. It is used to quantify defined variables and to generalize results from a larger sample population. The researcher proceeded with the descriptive survey research through the use and distribution of questionnaires to the respondents in the selected public high school in Sta. Catalina National High School Extension.

A questionnaire was a research instrument consisting of a series of questions and other prompts for the purpose of gathering information from the respondents. In addition, pre-test and posttest were done to measure the students' performance in science.

The survey questionnaires were divided into two parts. Part 1 the Strategical Approach composed of think-solve-pair-share. The questionnaire for the strategical approach as perceived by the respondents is a researcher made questionnaire composed of 10 items. Part 2 uses a five (5) point scale as follows to measure the level of students' cognitive engagement: For Scale 5 with interval of 4.20-5 the verbal description is very high, in scale 4 with interval of 3.4-4.19 the verbal description is high, in scale 3 with interval of 2.6-3.39 the verbal description is moderate high, in scale 2 with interval of 1.8-2.59 the verbal description is low and for scale 1 with interval of 1-1.79 the verbal description is very low. Finally, pretest and post were employed to measure science students' performance.

Mean and standard deviation were used to determine the level of perception of students on the use of think solve pair share and level of cognitive engagement. Frequency and percentage were used to determine the students' performance in pretest and posttest. On the other hand, t-test was utilized to measure the difference on the students' performance before and after employing think-solve-pair-share.

Statistical Treatment

The following statistical tools were used in treating the data gathered by the researcher.

Statement of the Problem	Statistical Treatment
1. What is the respondents' perception in the utilization of think-solve- pair- share?	Weighted Mean and Standard Deviation
2. What is the respondents' perception in the utilization of think-solve- pair- share in terms of: 2.1. Self-Regulation as to; 2.1.1Learning Behavior; 2.1.2Peer Collaboration; and 2.1.3Academic Motivation?	Weighted Mean and Standard Deviation
3. What is the level of students' performance in terms of: 3.1. pre-test; and 3.2. post-test?	Weighted Mean and Standard Deviation
4. Is there a significant difference between the learners' pretest and posttest?	Paired T-test

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RESULTS AND DISCUSSIONS

Table 1. Respondents' Perception on Think-Solve-Pair- Share.

Statements	Mean	SD	Remarks
The students can reflect on an idea.	4.35	0.77	Strongly Agree
The students can listen to the ideas presented by others.	4.47	0.77	Strongly Agree
The students can create, share and construct new ideas with the help of others.	4.36	0.70	Strongly Agree
The students consider the ideas of other to come up of a much better idea.	4.37	0.85	Strongly Agree
The students think individually but works as a group.	4.39	0.96	Strongly Agree
The students have the ability to think/solve individually about a topic or answer to a question.	4.25	0.76	Strongly Agree
The students share ideas eventually building better oral communication skills.	4.32	0.80	Strongly Agree
The students are focused and engaged to comprehend a topic.	4.37	0.70	Strongly Agree
The students have an opportunity to converse with their peers, something that can drastically improve language acquisition.	4.29	0.90	Strongly Agree
The students have time to think about an answer that activates their prior knowledge	4.39	0.72	Strongly Agree
Weighted Mean: SD	**4.35**	**0.796**	
Verbal Interpretation	**Very High**		

Legend	Range	Verbal Interpretation
5	4.21-5.00	Very High
4	3.41-4.20	High
3	2.61-3.40	Moderately High
2	1.81-2.60	Low
1	1.00-1.80	Very Low

Table 1 present the perception of the respondents about the utilization of think- solve- pair- share in teaching Science 7. Students strongly agree that think -solve-pair-share can motivate them to listen to the ideas presented by others (M=4.47, SD= 0.77). The students think individually but works as a group (M= 4.39, SD=0.96). The students have the ability to think/solve individually about a topic or answer to a question (M=4.25, SD=0.76)

The (WM= 4.35 and SD= 0.796) imply the respondents' perception in the utilization of Think-Solve-Pair-Share was very high and help them to improve the cognitive skill and improve their language acquisition since students were given opportunity to converse with others.

With Think-Solve-Pair-Share, students will be knowledgeable to distinguish what is a solvable problem as well as developing a grit, a trait that successful students routinely display. Students who learn how to solve problems have a deeper understanding of cause and effect. Teachers often urge students to look for patterns or make predictions. The Solve intervention, then, boost reflective, critical thinking (Amber, 2018).

Table 2 presents the level of students' cognitive engagement in terms of self-regulation.

Result showed that student strongly agree in the statement "Underlying abilities that allow students to be successful is evident in social interactions and learning" (M= 4.45, SD= 0.69) . The students were able to understand and manage their own behavior and reactions (M= 4.43, SD= 0.57). Being sensitive to other's feelings have a profound effect on how they do well in school (M= 4.14, SD=0.92).

Table 2. Level of Students' Cognitive Engagement in Terms of Self-Regulation.

Statements	Mean	SD	Remarks
Students were able to understand and manage their own behavior and reactions	4.43	0.57	Strongly Agree
Student's learning and social skills were improved	4.31	0.81	Strongly Agree
Students are open to talk, express and give their opinions, ideas and feelings.	4.41	0.57	Strongly Agree

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Students were encouraged and their minds won't wander unnecessary ideas.	4.31	0.66	Strongly Agree
Underlying abilities that allow students to be successful is evident in social interactions and learning.	4.45	0.69	Strongly Agree
Students are aware on how they can communicate their needs, wants and thoughts verbally.	4.21	0.94	Strongly Agree
Students has a sustaining attention and is being enthusiastic and curious in various new activities	4.38	0.62	Strongly Agree
Students are capable of inhibiting impulsivity and following necessary directions	4.21	0.73	Strongly Agree
Being sensitive to other's feelings have a profound effect on how they do well in school.	4.14	0.92	Agree
Students has the ability to understand and manage their own behavior and reactions	4.31	0.81	Strongly Agree
Weighted Mean: SD	**4.31: 0.737**		
Verbal Interpretation	**Very High**		

Legend	Range	Verbal Interpretation
5	4.21-5.00	Very High
4	3.41-4.20	High
3	2.61-3.40	Moderately High
2	1.81-2.60	Low
1	1.00-1.80	Very Low

The (WM= 4.31 SD= 0.737) with verbal interpretation of very high being implied that the students' cognitive engagement in terms of Self-Regulation help them to improve the social interaction or communication with others, manage own behavior and reaction, sustain attention and being enthusiastic in various activities that fallow necessary direction.

Self-regulation in the classroom is something that can be modeled and taught—not just in the "ideal window" of early childhood but throughout a student's schooling (Boekaerts, 2018). Students' ability to manage their "thoughts, behaviors, and emotions in order to successfully navigate their learning experiences" is known as self-regulated learning.

Table 3 presents the students' cognitive engagement in terms of self-regulation as to learning behavior.

Table 3. Level of Students' Cognitive Engagement in Terms of Self-Regulation as to Learning Behavior.

Statements	Mean	SD	Remarks
Students understands and manages their emotions	4.31	0.71	Strongly Agree
Students establishes and maintains positive relationships with others	4.28	0.70	Strongly Agree
Making responsible decisions are essential life skills of students.	4.38	0.73	Strongly Agree
Students were interested and understands what and when they are required to accomplish something	4.38	0.68	Strongly Agree
Awareness and Discipline of students were evident regardless of any situation.	4.31	0.76	Strongly Agree
Students are expressing their ideas in a way that others can also understand	4.31	0.81	Strongly Agree
Students are capable to obtain information and enhance their own understanding of a topic	4.40	0.68	Strongly Agree
Students focus on the expectations of a new task, what they expect the upcoming task's outcomes to be, and the interest they place on a task.	4.34	0.67	Strongly Agree
Being active in class improves the students' critical and higher-level thinking skills	4.38	0.73	Strongly Agree
Students respond to and reflect on the task and its outcomes.	4.38	0.68	Strongly Agree
Weighted Mean: SD	**4.34: 0.705**		
Verbal Interpretation	**Very High**		

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4	3.41-4.20	High
3	2.61-3.40	Moderately High
2	1.81-2.60	Low
1	1.00-1.80	Very Low

Result showed that student strongly agree in the statement "The students are capable to obtain information and enhance their own understanding of a topic" with (M= 4.40, SD= 0.68) based on the students' cognitive engagement in terms of Self-Regulation as to Learning Behavior. Making responsible decisions are essential life skills of students, they were interested and understands what and when they are required to accomplish something, active in class improves the students' critical and higher-level thinking skills and they reflect on the task and its outcomes (M= 4.38, SD= 0.73, 0.68). Students establishes and maintains positive relationships with others (M= 4.28, SD=0.70).

The (WM=4.34, SD=0.705) with verbal interpretation of very high being implied that the students' cognitive engagement in terms of Self-Regulation as to Learning Behavior help them to improve in acquiring information, critical and higher level thinking skills, reflect and have interest in required task and improve positive relationships with others.

Chambers (2019) stated that underpinning the learning behavior premise is a new set of knowledge and skills, collectively referred to as a futures orientation and which attempts to prepare the mindsets and skillsets of teaching graduates for conditions of social change that pervade local and global societies.

Table 4 presents the level of students' cognitive engagement in terms of self-regulation as to peer collaboration.

Result showed that student strongly agree in the statement "The students have the opportunity to express her or his ideas and being heard can give the feeling of importance and value" (M= 4.45, SD= 0.63) based on the students' cognitive engagement in terms of Self-Regulation as to Peer Collaboration.

Table 4. Level of students' Cognitive Engagement in Terms of Self-Regulation as to Peer Collaboration.

Statements	**Mean**	**SD**	**Remarks**
Educational experiences of students that are active, social, contextual, engaging, and student-owned lead to deeper learning	4.24	0.69	Strongly Agree
Working together as an effective team harnesses the best out of two or more individuals together	4.31	0.66	Strongly Agree
Students were encouraged to learn from one another and to articulate course content in their own words	4.28	0.65	Strongly Agree
Learning from each other increases comprehension of students through cooperation.	4.34	0.67	Strongly Agree
Enhancement of the student's own depth of knowledge in a specific topic were improved	4.34	0.61	Strongly Agree
Students learn to relate to their peers and other learners as they work together in group	4.34	0.67	Strongly Agree
Efforts coordinated by each student in a group makes them equipped to think more and better	4.24	0.79	Strongly Agree
Students are able to hear different opinions and learn more about one's opinions and insights.	4.38	0.62	Strongly Agree
Students have different skills, passions, and knowledge that if shared, can come up of a better idea than one brain alone.	4.41	0.68	Strongly Agree
Students has the opportunity to express her or his ideas and being heard can give the feeling of importance and value.	4.45	0.63	Strongly Agree
Weighted Mean: SD	**4.33: 0.662**		
Verbal Interpretation	**Very High**		

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2	1.81-2.60	Low
1	1.00-1.80	Very Low

The students have different skills, passions, and knowledge that if shared, can come up of a better idea than one brain alone (M= 4.41, SD= 0.68). Educational experiences of students that are active, social, contextual, engaging, and student-owned lead to deeper learning and efforts coordinated by each student in a group makes them equipped to think more and better (M= 4.24, SD=0.69, 0.79).

The (WM=4.33 and SD=0.662) with verbal interpretation of very high being implied that the students' cognitive engagement in terms of Self-Regulation as to Peer Collaboration help them to improve the passion and knowledge that the learners share to others, collaboration by express the ideas, opinions and learned more about one's insights and to improve comprehension of students through cooperation.

Students that regularly participate in class are constantly involved with the material and are more likely to remember a greater portion of the information (Ken, 2019). Active class participation also improves critical and higher-level thinking skills and students who participate in class have studied the material well enough to introduce new concepts to their peers.

Table 5 presents the level of students' cognitive engagement in terms of self-regulation as to academic motivation.

Result showed that student strongly agree in the statement "The students have a good study strategy and high study effort" (M= 4.62, SD= 0.56) based on the students' cognitive engagement in terms of Self-Regulation as to Academic Motivation.

The students can organize, analyze and access enormous amount of information all in one (M= 4.52, SD= 0.57). The learners have some control over the learning they consume (M= 4.14, SD=0.88).

The weighted mean of 4.38 and with supported value of standard deviation 0.697 with verbal interpretation of very high being implied that the students' cognitive engagement in terms of Self-Regulation as to Academic Motivation help them to improve the study habit, interest to learn more and know more, access enormous amount of information, and to improve the performance in reaching the learning goal.

Table 5. Level of Students' Cognitive Engagement in Terms of Self-Regulation as to Academic Motivation.

Statements	Mean	SD	Remarks
Students are interested to learn more and know more.	4.48	0.57	Strongly Agree
Students have a good study strategy and high study effort.	4.62	0.56	Strongly Agree
Students are persistent when they faced obstacles	4.34	0.67	Strongly Agree
The success of students can drive them in reaching their learning goal	4.41	0.68	Strongly Agree
Students learns to persist longer, produce higher quality effort, learn more deeply, and perform better in classes.	4.31	0.76	Strongly Agree
Learners have some control over the learning they consume	4.14	0.88	Agree
Ability of students to keep track of progress and ensure that they are meeting their performance milestones were evident	4.24	0.74	Strongly Agree
Students can organize, analyze and access enormous amount of information all in one	4.52	0.57	Strongly Agree
Students are flexible in understanding lessons regardless of the time it was taught.	4.38	0.73	Strongly Agree
Students inspires themselves to track their progress and performance in school.	4.38	0.73	Strongly Agree
Weighted Mean: SD	**4.38: 0.697**		
Verbal Interpretation	**Very High**		

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	1	1.00-1.80 Very Low

Level of Students' Performance

As students participate in class discussions, they receive immediate feedback in the form of instructor and student responses to their contributions. This type of feedback, however, may be ambiguous and indirect, leaving students uncertain as to the impact of their participation and how they might enhance their effectiveness. Table 6 shows the level of students' performance in terms of pre-test.

Table 6. Level of Students' Performance in Terms of Pre-test

Scores	**Frequency**	**Percentage**	**Descriptive Equivalent**
29 – 30	0	**0.00**	Mastered
26 – 28	0	**0.00**	Closely Approximating Mastery
20 – 25	0	**0.00**	Moving Towards Mastery
17 – 19	2	**6.67**	Average Mastery
5 – 16	27	**90.00**	Low Mastery
2 – 4	1	**3.33**	Very Low Mastery
0 – 1	0	**0.00**	Absolutely No Mastery
Total	**30**	**100.00**	
Weighted Mean	10.23		**Low Mastery**
Lowest Score	4		
Highest Score	18		
Standard Deviation	2.967		

Legend:

Scale	Remarks	Verbal Interpretation
96% - 100%	Mastered	Outstanding
86% - 95%	Closely Approximating Mastery	Very Satisfactory
66% - 85%	Moving Towards Mastery	Satisfactory
55% - 65%	Average Mastery	Fairly Satisfactory
15% - 54%	Low Mastery	Did not meet expectation
5% - 14%	Very Low Mastery	Did not meet expectation
0% - 4%	Absolutely No Mastery	Did not meet expectation

Table 6 shows the level of students' performance in terms of pre-test, out of 30 students, the scores "5 to 16" got the highest frequency of twenty-seven (27) or 90.00% of the sample population and with descriptive equivalent of Low Mastery. And the scores "17 to 19" got the frequency of two (2) or 6.67% of the sample population and with descriptive equivalent of Average Mastery. While the scores "2 to 4" got the lowest frequency of one (1) or 3.33% of the sample population and with descriptive equivalent of Very Low Mastery.

With the (WM=10.23, SD = 2.967) and with Lowest score = 4 and Highest score = 18 shows that the level of level of students' performance in terms of pre-test has a descriptive equivalent of Low Mastery.

Pretests help measure student learning over a period of time. The pretest marks a student's level of understanding before instruction while a final assessment or post-test measures student learning. A comparison of pre- and post-tests can provide a teacher with an opportunity to track student growth in one class or over several years (Berry, 2019).

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Table 7 shows the level of students' performance in terms of post-test, out of 30 students, the scores "20 to 25" got the highest frequency of fifteen (15) or 50.00% of the sample population and with descriptive equivalent of Moving Towards Mastery.
And the scores "26 to 28" got the frequency of nine (9) or 30.00% of the sample population and with descriptive equivalent of Closely Approximating Mastery. While the scores "17 to 19" got the lowest frequency of one (1) or 3.33% of the sample population and with descriptive equivalent of Average Mastery.

Table 7. Level of Students' Performance in Terms of Post-test

Scores	Frequency	Percentage	Descriptive Equivalent
29 – 30	5	**16.67**	Mastered
26 – 28	9	**30.00**	Closely Approximating Mastery
20 – 25	15	**50.00**	Moving Towards Mastery
17 – 19	1	**3.33**	Average Mastery
5 – 16	0	**0.00**	Low Mastery
2 – 4	0	**0.00**	Very Low Mastery
0 – 1	0	**0.00**	Absolutely No Mastery
Total	**30**	**100.00**	
Weighted Mean	25.00		**Moving Towards Mastery**
Lowest Score	19		
Highest Score	29		
Standard Deviation	2.804		

With the (Weighted Mean = 25.00, SD = 2.804) and with Lowest score = 9 and Highest score = 29 shows that the level of level of students' performance in terms of post-test has a descriptive equivalent of Moving Towards Mastery. The result means that the students had increase in their scores in posttest which indicates an increase in their performance as well

Also, for many true experimental designs, post-test designs are preferred method to compare participants' groups and measure the degree of change occurring as a result of the treatment or interventions. Pre-test and Posttest designs grew from simpler post-test only designs and address some of issue arising with the assignment bias and allocation of participant groups (Reyes, 2016).
Table 8 presents the difference between learners' pre-test and post-test.

Table 8. Difference Between the Learners' Pre-test and Post-test

Test	Mean	t-value	Critical value	p-value	Analysis
Pre-test	10.23				
Posttest	25.00	19.811	1.6716	0.0000	Significant

The data were statistically treated using the t-test. The pre-test are paired to the post-test scores of students using think solve pair share on the cognitive engagement and performance in Science 7.

The t-value of 19.811 is greater than the critical t-value of 1.6716 and supported with p-value of 0.0000, it can infer that there is an increase in the performance and the analysis is Significant.

Based on the data, it is shown that there is a significant difference between learners' pre-test and post-test at 0.05 level of significance. It shows that the null hypothesis stating that "There is no significant difference between learners' pre-test and post-test" is rejected, it can infer that there is "significant" difference between them. This implies a significantly better performance in the post test since there is an increase from pre-test to post test result. This also indicates that there is an improvement in performance when the think solve pair share was utilized in teaching science.

CONCLUSION

On the basis of the foregoing findings, the conclusion was drawn. Based on the data, it is shown that there is a significant difference between learners' pre-test and post-test at 0.05 level of significance. It shows that the null hypothesis stating that "There is no significant difference between learners' pre-test and post-test" is rejected, it can infer that there is "significant" difference between them. This implies a significantly better performance in the post test since there is an increase from pre-test to post test result. This also indicates that there is an improvement when the think solve pair share was utilized in teaching science.

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RECOMMENDATION

Based on the drawn conclusions resulted to the following recommendations:

1. It may be recommended that the effort to create change through this conceptualization of student engagement should be especially targeted toward new and experienced sheltered instruction teachers. It is these professionals who in many schools are charged with helping struggling learners.
2. A realization that despite the complexity and difficulty of academic content, students need to be meaningfully engaged in it. A new commitment to the idea that teachers such as the Think-Solve-pair-Share must do what it takes to ensure that children are cognitively engaged; and
3. A strong desire for sustained support from their schools to help them meet the challenge of teaching learner adolescents who often have been disengaged and ill prepared.

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