

## Improving Junior Secondary Students' Retention through Innovative Ways of Teaching Science: Learning Science the Odd Ways

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### *Abstract*

The researcher aimed to examine the effects of using different teaching interventions in learning science. It aimed to find out if teaching science using various approaches in different fields can improve student's interest, foster stimulation, self-activities, and increase retention ability. Moreover, it aimed to find out the student's perception on learning science with innovative ways of teaching. The respondents were Grade 8 students of Sibulan Science High School. They were introduced to different teaching strategies used in different fields of teaching such as English, MAPEH, and History. Evaluation of these strategies integrated in the class were done every after session, meeting, and discussion to examine if they had effects in the retention level of students. Using One-Way Anova Kruskal-Wallis (Non-Parametric) and Dwass-Steel-Critchlow-Fligner pairwise comparisons, a significant difference is found between each teaching method administered in class. Also, data obtained through structured questionnaire asking students of their perceptions towards the different methods in teaching sciences have an average of 3.91 with a verbal description of *All the Time*, which implies of the students favorable response to the intervention integrated in classes.

**Keywords:** *teaching interventions, retention, innovative ways of teaching and learning science, learning interest, stimulation*

### **Introduction**

Science education imparts a method of inquiry and a systematic way of processing knowledge about the physical world to the learners. For this reason, science education provides part of the foundation for any knowledge-based effort to improve health, nutrition, family planning, environmental, agriculture, and industry (Denyer in Osei-Himah, 1998). Students often see science as challenging to understand and its main ideas as abstract and remote from everyday life experiences. This means that more should be done to make science friendlier and more real to them.

A variety of science teaching methods can be drawn upon when helping students understand their world. While there are several approaches to try, the most important thing to remember is that our role as science educators is to help students understand how the scientific method actually works and why science impacts their lives. All science teaching methods come down to either teacher-centered or student-centered instruction. Both types of instruction have their place, however in practice have very different dynamics in the classroom (Braud *et al.*, 1999).

Furthermore, the teachers' mindset and feedback are crucial to instruction in the science classroom (Madu & Okebukola in Oyelekan *et al.*, 2017). Traditionally, there are different approaches and techniques for the science classroom, such as real-life scenarios that involve case studies and ways of analyzing current problems, peer-to-peer teaching, which involves students in their education, hands-on activities that engage students beyond the lecture and teach useful scientific concepts, and science projects, which teach the scientific methods of inquiry and experiment, lastly, field research journals, which are notes and other documentation of trusted science experiments or from the students in your classroom, including the most prevalent method of teaching, the 'talk and chalk' (lecture) method.

Nowadays, various innovative teaching strategies are borne out of the fact that there are different topics, subjects, fields, and courses to be taught and skills intended to be developed. Educators have developed many innovative strategies with a view to involving learners more in the teaching learning process. This is considered very important, and there is a need to get these strategies into the classrooms (Slavin, 2005; Leikin & Zaslavsky, 1997). For this to be done successfully, there is a need for teachers not only to be aware of other strategies but also to learn how to use these strategies

appropriately in the classroom (Nwosu, 2004), eliminating the factors contributing to low interest in science and hence expressed the need for a search for alternative instructional strategies that could stimulate students' interest and enhance their achievement (Ajaja, 2013)

There are various teaching tools that can be accessible to teachers from many backgrounds. The process of improvisation or innovation gives teachers the knowledge of creativity, manipulative skills, and critical thinking of students (Suchman, 1987). Studies have indicated that innovative strategies produced better result in terms of students' learning, and some could more facilitative than others when used in teaching which often depends on the subject or topic/concept being taught (Barbosa *et al.*, 2004; Longjohn, 2009; Umoren & Ogong, 2007).

### ***Statement of the Problem***

The researcher aimed to examine the effects of using different teaching interventions in learning science. The study also aimed to find out if teaching science using approaches in different fields can improve student's interest, foster stimulation, self-activities, and increase retention ability.

Specifically, the researcher aimed to answer the following:

1. What is the level of retention of students per strategy?
2. Is there a significant difference in the students' retention in using different science teaching interventions?
3. What is the students' perception on learning science using innovative ways of teaching?

## Methodology

This study employed an experimental research design. The researcher used this design to determine the effects of different science teaching interventions to Junior High School students at Sibulan Science High School. Moreover, it determined the effectiveness of teaching in different interventions provided on the results of respondents' retention through teacher-made post-evaluation; and their perceptions on the innovative science strategies.

This research was conducted at Sibulan Science High School, particularly the Junior High School, and the respondents were students from Grade 8 section Mendaje. All students in the said class participated in the conduct of the study. The research was done during the whole duration of the practice internship, and class observation of the pre-service teacher at Sibulan Science High School.

A permission letter was sent to the Schools Division Superintendent of Negros Oriental Division and District Supervisor asking permission to conduct the research study at Sibulan Science High School, allowing the researcher to gather necessary data for this study. All data gathered was taken with utmost confidentiality and will be disposed in due time.

There were two processes that the researcher obtained the data needed. Firstly, students were able to experience interventions in different fields of core subjects in teaching science lessons. Then, the researcher collected the results from the students every after session, meeting, and discussion. Students took an evaluation quiz every after applying the different teaching approaches and strategies, where the results were collected by the researcher. Secondly, a follow-up questionnaire was provided. The

researcher administered questionnaires to respondents after a series of discussions using the different science teaching interventions. All questionnaires must be fully answered and returned. The researcher explained the purpose of the study and emphasized that all data gathered are taken with utmost confidentiality.

The researcher made use of three (3) different approaches in the fields of English, MAPEH and History. Firstly, the researcher was able to employ the strategy used by most English teachers in their field such as storytelling. Storytelling brings language learning alive and creates a participatory and immersive experience that allows learners to enjoy hearing the language in a dynamic, sometimes stylistic, and entertaining way. Participation using key vocabulary and phrases can create an awareness of rhythm and structure. The researcher made use of this teaching learning method in teaching science lessons by delivering topics through storytelling and emphasizing important points of the lesson to help the students retain these concepts. Secondly, the researcher also made use of another teaching method most commonly used in the field MAPEH, performance tasks. These performance tasks included various series of activities such as role playing, jingle or yell making, broadcasting, advertising and comedy making. In this kind of method, learning a new dance routine, song or script requires skills helps students focus their mind. Thus, helping in retaining ideas and lessons. These skills are developed through practice and performance and increased focus and concentration are needed in order to achieve the results we desire. Young people are encouraged to listen to each other's ideas and thoughts, enabling them to recognize the value of concentration - a skill they will use for life. Moreover, through these activities require group cooperation and students work together effectively

in order to achieve a common goal. Group singing brings people together and is great for bonding - studies have shown that people who sing in groups are more connected to one another than those participating in other classes. Performing arts classes give students the opportunity to create strong bonds with one another - laughing, learning, and growing together each week.

Lastly, the researcher was able to integrate the history mapping method which is commonly used and applied in the field of Social Studies and History. With students having so much to learn, it is important that they are able to focus on the most valuable information and retain it for exams. History Mapping usually focuses on the larger picture rather than just a succession of dates or facts, it can also be worthwhile adopting memory techniques to ensure that your child can reach for specific information if they need it.

Finally, to test if students were able to retain the concepts that they have learned using the different approaches used by the teacher, every after intervention, there was a prepared evaluation for them, where their scores were gathered and further used to analyze data.

The data that the researcher was able to gather was analyzed through One-Way Anova Kruskal- Wallis (Non-Parametric) Method. Furthermore, to be able to compare and contrast the differences between each teaching method administered in class, the researcher made use of the Dwass-Steel-Crichlow-Fligner pairwise comparisons. It was used by the researcher in testing the hypothesis to determine whether a process or treatment actually has an effect on the population of interest, or whether two groups are different from one another. Also, data obtained through structured questionnaire will be consolidated to ascertain the extent of the

effectiveness of using different teaching methods to Grade 8 students of Sibulan Science High School.

## **Results and Discussion**

The field of Science has introduced us to new ways of thinking and reasoning. Scientific knowledge helps to sharpen our intellect & promotes intellectual honesty. Furthermore, science education can develop positive attitudes like open-mindedness. Such positivity is helpful to an individual to understand, evaluate and solve many problems faced in life. In science education, various teaching tools can be accessible to teachers from many backgrounds. The process of improvisation or innovation gives teachers the knowledge of students' creativity, manipulative skills, and critical thinking (Suchman, 1987). In connection to such, the researcher aims to examine if these approaches can have an effect in students' retention in class and keeping in mind that the most important role as science educators is to help students understand how the scientific method works and why science impacts upon their own lives.

To find out the level of retention of students per strategy administered to the students, the teacher was able to use the data gathered, such as student's scores every after integrating the intervention. A total of three (3) quizzes were given to students per intervention. Their scores were analyzed and were able to come up with an average score per strategy.

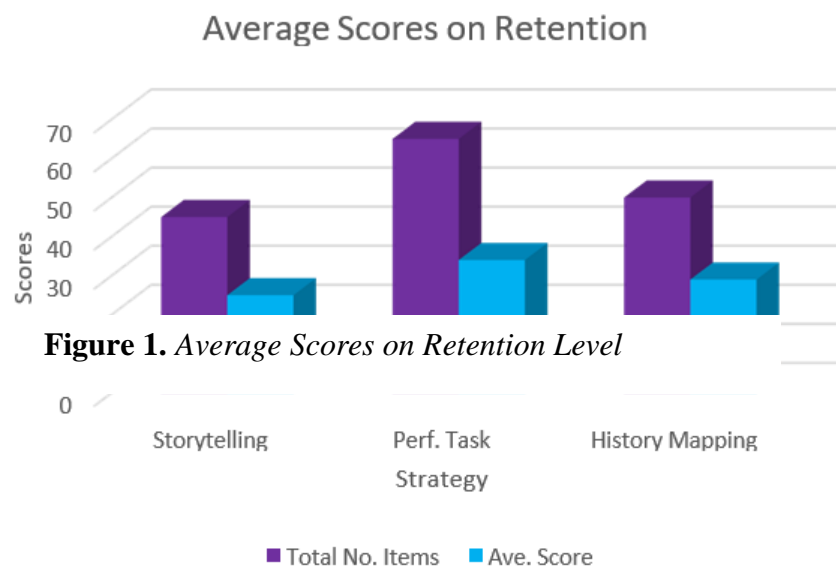
**Table 1:** *Scores of Students Administered with the Different Teaching Methods*

No. of Students	Strategy 1					Strategy 2					Strategy 3				
	Q1	Q2	Q3	Total	Ave.	Q1	Q2	Q3	Total	Ave	Q1	Q2	Q3	Total	Ave
1	13	9	18	40	13.33	14	17	14	45	15	19	15	15	49	16.33333
2	13	8	18	39	13	19	20	22	61	20.333	0	15	14	29	9.666667
3	13	6	17	36	12	14	18	15	47	15.667	15	15	14	44	14.66667
4	13	9	18	40	13.33	16	19	24	59	19.667	20	15	15	50	16.66667
5	13	10	20	43	14.33	17	4	20	41	13.667	15	14	13	42	14
6	13	7	16	36	12	15	9	20	44	14.667	16	14	11	41	13.66667
7	13	8	18	39	13	13	8	19	40	13.333	15	14	12	41	13.66667
8	13	9	18	40	13.33	17	6	25	48	16	19	14	15	48	16
9	13	10	0	23	7.667	16	18	20	54	18	17	14	0	31	10.33333
10	13	8	16	37	12.33	14	18	15	47	15.667	19	14	14	47	15.66667
11	13	9	17	39	13	19	13	25	57	19	19	14	14	47	15.66667
12	13	9	19	41	13.67	14	18	25	57	19	16	14	13	43	14.33333
13	12	9	15	36	12	17	18	16	51	17	20	15	12	47	15.66667
14	10	8	17	35	11.67	17	12	23	52	17.333	19	15	13	47	15.66667
15	13	8	19	40	13.33	17	18	25	60	20	19	15	15	49	16.33333
16	13	9	15	37	12.33	15	18	25	58	19.333	20	15	14	49	16.33333
17	15	9	15	39	13	17	16	25	58	19.333	20	15	15	50	16.66667
18	15	7	19	41	13.67	17	10	15	42	14	18	15	14	47	15.66667
19	0	8	19	27	9	16	8	25	49	16.333	10	10	12	32	10.66667
20	15	8	16	39	13	17	18	25	60	20	19	15	12	46	15.33333
21	15	10	17	42	14	19	20	16	55	18.333	18	14	12	44	14.66667
22	15	7	17	39	13	15	20	13	48	16	16	14	15	45	15
23	15	8	18	41	13.67	16	20	18	54	18	15	15	15	45	15
24	15	8	18	41	13.67	18	12	21	51	17	20	14	12	46	15.33333
25	10	10	17	37	12.33	17	18	23	58	19.333	16	14	11	41	13.66667
26	15	8	19	42	14	18	18	25	61	20.333	18	15	13	46	15.33333
27	15	8	19	42	14	18	12	22	52	17.333	19	15	12	46	15.33333
28	13	8	18	39	13	12	18	25	55	18.333	20	15	11	46	15.33333
29	14	9	18	41	13.67	12	18	25	55	18.333	20	15	15	50	16.66667
30	15	9	16	40	13.33	13	18	24	55	18.333	20	0	11	31	10.33333
31	15	10	15	40	13.33	15	19	25	59	19.667	20	15	15	50	16.66667
32	15	10	19	44	14.67	16	18	18	52	17.333	19	14	13	46	15.33333
33	0	9	18	27	9	15	17	21	53	17.667	20	15	11	46	15.33333
34	15	9	19	43	14.33	16	16	25	57	19	20	15	13	48	16
35	15	9	17	41	13.67	16	14	25	55	18.333	20	13	13	46	15.33333
Ave	12.8	8.57	16.4			15.9	15.5	21.4			17.6	14	12.8		

The researcher gathered the average scores on retention of the different teaching methods used in the classroom such as Storytelling, Performance Task and History Mapping. The average scores of the students in the 3 teaching methods of different fields have, more or less, obtained half of the total score per strategy as shown in the graph below.



Lastly, in examining if there is a significant difference in the student's retention in using different science teaching interventions, the researcher made use of the One-Way ANOVA (Non-parametric) and Dwass-Steel-Critchlow-Fligner pairwise comparisons.



**Table 2.** *Significant Difference of the 3 teaching methods applied***One-Way ANOVA (Non-parametric)**

Kruskal-Wallis

	$\chi^2$	df	p	$\epsilon^2$
SCORES	65.7	2	< .001	0.631

**Dwass-Steel-Critchlow-Fligner pairwise comparisons**

Pairwise comparisons - SCORES

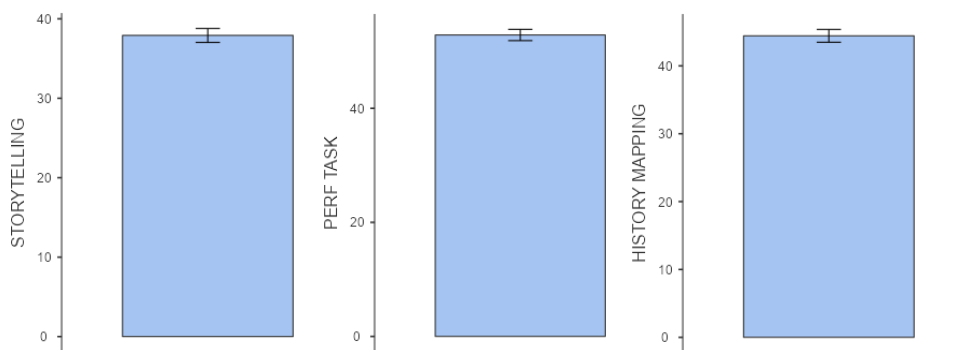
		W	p
ST	PF	9.75	< .001
ST	HM	7.62	< .001
PF	HM	-7.19	< .001

Furthermore, the researcher found out the student's perception on learning science with innovative ways of teaching through asking students to answer questionnaires after a series of discussions using the different science teaching interventions. The researcher was able to find averages of the 10 questions answered by 33 students, with 2 absents with an average of 31.91, which has a verbal interpretation of *All the Time* as stated in scale, which implies the student's favorable response to the intervention integrated in classes, as presented in *Table 2* below.

**Table 3.** *Computed Weighted Mean of the Students' Perception on the Intervention*

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
1	0	0	0	0	0	0	0	0	0	0
2	0	0	1	0	2	0	1	0	0	0
3	1	0	2	1	2	1	5	4	1	1
4	32	33	30	32	29	32	27	29	32	32
CF	131	131	132	128	131	126	131	125	128	131
WM	3.96	3.96	4	3.87	3.96	3.81	3.96	3.78	3.87	3.96

The researcher also made use of the data gathered to examine the ranges of scores that students got after the intervention that was employed. Researcher was able to compute the scores of students every after evaluation and found out that students have a close range when it comes to their scores in the three (3) methods that the researcher did as shown in *figure 2* below.



**Figure 2.** *A Comparison on the Scores ranges of Students*

### Conclusions and Recommendations

There are a variety of science teaching methods that can be drawn upon when helping students understand their world. While there are several approaches to try, the most important thing to remember is that our role as science educators is to help students understand how the scientific method actually works and why science impacts their lives. Through this research study, the researcher found that it is possible to use different techniques to teach science, which are deemed effective in retaining concepts and ideas from the topic discussed. Also, the teachers' mindset and feedback are crucial to instruction in the science classroom. This is considered very important, and there is a need to get these strategies into the classrooms. During the conduct of this study, the researcher was able to identify that there a there is need for teachers not only to be aware of other strategies but also to learn how to use these strategies appropriately in the classroom and explore various ways to keep students active in learning.

Furthermore, the researcher found out that students have different ways of retaining the topics they have discussed. Also, students find using different approaches in teaching and learning science more fun and engaging. They get to be more participative in class and engage with their classmates more with the activities given to them by their teacher. They get to think of new science ideas in class, which results in retaining the topics. Moreover, students find science concepts better to understand with the new ways their teachers employed in class and generally retain the science concepts. Finally, these innovative teaching methods guided students to be successful in achieving learning objectives in class.

Based on the results, this study recommends the following:

**For teachers.** Teachers should reflect on their ways in delivering the lessons to students. Sometimes, students would prefer a new method over the usual way that they have been used to. Teachers must think of ways to have their students get involved in class discussions which further can result to satisfactory ratings in their quizzes if employed correctly.

**For students.** Students should find inspiration and must be motivated to explore methods employed by the teacher because it can help them improve their thinking skills and cognitive abilities, hence, can contribute to their academic performance.

**For administrators.** Science Field Administrators and teachers may review the current curriculum and can use this research study basis for implementing an improved curriculum and learning process that can help students in retaining science lessons and concepts.

**For researchers.** Future researchers may use this study to serve as a reference and guide for their future studies. Also, researcher may also employ pre-test and post-test to see the difference between employing the intervention, and after.

**References:**

- Osei-Himah, V., Parker, J., & Asare, I. (2018). The Effects of Improvised Materials on the Study of Science in Basic Schools in Aowin Municipality – Ghana. *Research on Humanities and Social Sciences*. Retrieved from [41980-45232-1-PB.pdf](#)
- Braud, H., Walczyk, J.J., Kelly, K.E. & Meche, S.D. (1999). Time Limitations Enhance Reading Comprehension. *Contemporary Educational Psychology*. Retrieved from <https://doi.org/10.1006/ceps.1998.0992>
- Oyelekan, O.S., Igbokwe, E.F., Olorundare, A.S. (2017). Science Teachers' Utilization of Innovative Strategies for Teaching Senior School Science in Ilorin, Nigeria. *Malaysian Online Journal of Educational Sciences*. Retrieved from [EJ1142454.pdf \(ed.gov\)](#)
- Tarim, K. & Akdeniz, F. (2004). The Effects of Cooperative Learning on Turkish Elementary Students' Mathematics Achievement and Attitude towards Mathematics using TAI and STAD methods. *Educ Stud Math*. Retrieved from <https://doi.org/10.1007/s10649-007-9088-y>
- Nwokolo, C., (2009). Counseling Teachers towards the Effectiveness on New Trends in Educational Sciences. *World Conference on Educational Sciences 2009*. Retrieved from [Counseling teachers towards the effectiveness of new trends in educational sciences \(sciencedirectassets.com\)](#)
- Tohir, L. (2017). Motivation in a foreign Language Teaching and Learning. *Vision: Journal for Language and Foreign Language Learning*. Retrieved from [\(PDF\) Motivation in a Foreign Language Teaching and Learning \(researchgate.net\)](#)