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Contextualized Mnemonics Instruction Strategy: Enhancing the Processing Skills of Pupils in Teaching Science

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Abstract: *In This study, the researcher investigated the engagement levels in the classroom of students with a specific interest in the importance and effectiveness of contextualized mnemonics in learning Science. This study used an experimental research design. A sample of 100 Grade 6 pupils chosen purposively was divided equally into two for the experimental and control group. A researcher-made test assessment was created for the pre-test and post-test which undergone validity and reliability test before the actual implementation of the experiment. With the use of Microsoft Excel, the result of the experiment was analyzed and interpreted. The study found that the experiment showed promising results. The use of contextualized mnemonics as a strategy in teaching science works. In conclusion, this strategy can be a useful tool in teaching Science subjects. Based on the findings, it is therefore recommended that seminars, training, and workshops with a particular focus on contextualized mnemonics instruction strategies should be conducted to retool teachers and help learners improve their processing skills.*

Keywords—contextualized mnemonics; instruction strategy; processing skills; Science subject

1. INTRODUCTION

Teachers hold primarily the direction of every teaching-learning process whether inside or outside the classroom. Teachers still hold the key to learning through the organized content knowledge they impart to the learners. Notwithstanding, the K to 12 Basic Education Program is learner-centered. As educators, teachers in the 21st century are expected to have a great deal of professional and personal qualities (Asio & Riego de Dios, 2018; 2019). All classroom settings along the process govern specific details for learners to follow through. Explicit teaching holds their back towards the "I do, We do, and You do" theme wherein there is a gradual release of responsibility that includes demonstration, prompt, and practice (Levy, 2007).

The "now or never" scope, after it has been done, will be an assessment that is either formative or summative (PPST, 2017) because, in every teaching, there must always be an assessment. Furthermore, teachers are duty-bound to provide assessment activities to identify learners' learning status and create appropriate instructional decisions. Assessments can be either formative which identifies misconceptions, struggles, and learning gaps during the teaching and learning processes that deem in closing such gaps (Trumbull & Lash, 2013) or summative which evaluate student learning, knowledge, proficiency, or success at the end of an instructional period like a unit, course or program (Theall & Franklin, 2010). This is to check the objectives if they were met or not. Consequently, whatever the result of the learners' performance reflects mainly, none other than, to the teachers! This reason requires every teacher to reflect on everything they made inside their teaching-learning strategy/ies (PPST, 2017) and even plan to meet just expectations on what they do.

Teaching Science lessons in elementary especially in the sixth grade already needs a higher form of teaching techniques and strategies. Thus, professional skills and development are essential for a teacher to possess (Asio et al., 2019; Asio, 2020; Asio & Jimenez, 2020) On part of the pupils, they could be either perplexed or confused as to how to handle the lessons in the subject as some of the terminology/ies is/are already higher or deeper in meaning and they need to look for advance materials to understand. Primarily, this is due to their hardship in making links in-between or among terms (Banerjee, 2016). The reason behind this can be attributed to some factors like interest in the subject matter, many school activities, and study habits. It can be seen as there is lacking interest in the subject as it is not on their perspectives (Adams et al., 2014) due to the academic burden that the subject has. In a Science class, a disciplined mode must be given maximum importance for they have to perform critical works and there should be no lousy movements while performing it, like an experiment.

Process skills describe students' thinking activity and require reasoning (Fiel, et al., 1995). This includes planning experiments, predicting, classifying, interpreting, measuring, inferring, applying concepts, creating graphs, and communicating data. All of these activities in the process skills governed the ladder of success in the Revised Bloom's Taxonomy of Learning which primarily starts in the remembering level to proceed to the next level up to the top.

According to the American Institute for Research (2004) learning something new is like adding a thread to a web for students with memory challenges or processing disorders, a mnemonic device becomes a tool to build threads from new to old ideas. Likewise, giving the students these tools helped them retain information and connect the concepts in other subject areas, such as language arts, science, and math.

Furthermore, mnemonic strategies were used in a general education setting by college undergraduates learning foreign language vocabulary (Scruggs & Mastropieri, 1989). Later research extended the use of such instruction into classrooms of younger students and among students with learning disabilities. In a recent study, college students used a mnemonic strategy to study and recall painting-to-artist matchings. All four experiments of the study repeatedly showed that those students who used mnemonics substantially outperformed those who did not use them on tests that required recall of artists and their paintings according to Carney & Levin (1991). After reviewing the research from the four experiments, they proved that mnemonics was a definite aid in the retention of factual information.

There are already wider perspectives of improving every tangible weakness/es of every learner. Addressing their multi-intelligence/s (Gardner, 1995) is now tantamount towards giving the best possible care to every learner which means no one will be left behind. The No Left Behind Policy on 2002 significantly embraced by every nation in the world to utilize every possible effort and product of its people, particularly on the students, not to let them hover through the sour world and embark liability to the government, but to let them become responsible and able citizens (No Filipino Left Behind Policy, 2008). If teachers could address purposively the intelligence of every learner in their respective teaching-learning camp, there will be a greater chance/s of every learner to move through their learning styles. This will also lessen the context of students bullying teachers (Asio, 2018; 2019, Asio & Gadia, 2019). This is because the present model of the teaching-learning process does not come anymore from teachers but to the learners, Jimenez (2020a, 2020b) enumerated the different factors that motivate teachers in developing supplementary learning materials and contextualization of e-learning resources. They must use differentiated instructions and pay attention to the needs of their learners as to how each of them can significantly

The importance of the learners' creativity has given most freedom by the Revised Blooms Taxonomy (Krathwohl, 2002) where they are not only evaluating as a mere learner, but comes above the pyramid of creating their product of knowledge and concepts through the ladder of success starting from what they have remembered, understood, applied, analyzed, and evaluated. Additionally, looking at the base of the pyramid comes the remembering which can be inferred as the largest part that may objectively foresee as apart not to be omitted or ignored because it is the most basic parcel. Removing or taking it aside can largely compromise the whole learning process of the learners but not an aspect of debate as to whether it is the most important thing to do by every learner, only this is the first and foremost to be learned by every learner to successfully move to the next ladder and finally achieve the vision of every educator on every learner – Creating. Mnemonic instruction provides a visual or verbal prompt for students who may have difficulty retaining information which furthermore follows the premise that as children learn, they are building a web of knowledge (Dunlosky, et al., 2013). Hence, they can make connections to the outside world to retain the new information and connect the key concepts to their schoolwork.

This action research helped us determine the effectiveness of the contextualized mnemonics instruction strategy in the enhancement of the processing skills in the Comprehension Test Scores of Grade 6 pupils in Pandayan Elementary School during the Second Grading Period, the School Year 2018 – 2019.

Statement of the Problem

The main purpose of this action research was to know the effectiveness of the contextualized mnemonics instruction strategy in the enhancement of the processing skills in Comprehension Scores of Grade 6 pupils in an elementary school for the school year 2018 – 2019.

The following research questions were asked to provide a guide for the study.

1. What are the results of the pre-test scores in terms of:
   a. Experimental group;
   b. Control group?
2. What are the results of the post-test scores in terms of:
   a. Experimental group;
   b. Control group?
3. Is there a significant difference between the two groups in the post-test of Grade 6 learners in the implementation of contextualized mnemonics instruction strategy in the enhancement of the processing skills Science lesson?

2. METHODOLOGY

2.1 Research Design

This research has employed the true experimental type wherein two groups were considered forming an experimental and control group. The experimental group has undergone the contextualized mnemonics instruction strategy while the control group did not.

2.2 Respondents of the Study

The respondents of this study were the one hundred (100) Grade 6 pupils of the two heterogeneous sections from a public elementary school where the researcher is currently working. Since they were both heterogeneous sections and the level of their processing skills were almost at the same level according to their Pre-test scores, one section served as the experimental group while the other remaining section served as the control group. Both groups were composed of fifty (50) pupils each to assure an equal number of variables as well as equality in their groups. Thus, the purposive sampling technique was utilized in getting the respondents in the study.

2.3 Instrument of the Study

A Research – made Test Assessment in Science for pre-test and post-test aligned with the given learning

competencies in the K to 12 Curriculum Guide in Science 6 was designed and undergone a test of validity and reliability by peer-experts. After the validation from the Master Teachers and Subject Teachers, the school principal has approved the instrument.

The researcher has carried out a dry run to recheck some questions too hard to be answered by the respondents. There, the actual 20 – item Post-test and Pre-test questions have made it possible.

The process skills comprehension questions of the pre-test and post-test were composed of twenty (20) items which the learning competencies are aligned with the Curriculum Guide in Science Grade 6 for the 5th and 6th weeks lessons in the second quarter. Additionally, parallel questions for the pre-test and post-test were utilized in the study.

2.4 Data Collection Procedure and Ethical Considerations

The researcher sought permission from the Principal to administer the pre-test and post-test in the school. Soon after notifying the concerned teachers and pupils, the pupils were given the pre-test. The pre-test result was encoded, tallied, and analyzed immediately after retrieval. The researcher retrieved all completed questionnaires through the assistance of the advisers.

After the pre-test, the contextualized mnemonics instruction strategy was used in re-teaching the experimental group while it was not taught in the control group for the lessons covered in the 5th and 6th weeks during the second grading period. After re-teaching the lessons, the post-test questionnaire was given to both groups.

Utmost confidentiality of any given data from the pupil-respondents was held confidential to prevent untoward effects to them and their families. Likewise, all research procedures were duly permitted by the school management as well as the parents of the respondents through the Assent and Consent Form for the pupils and parents.

2.5 Data Analysis

After a month, which was equivalent to four (4) weeks, a post-test was conducted. The data gathered was encoded in Microsoft Excel for easier and faster access and computed through appropriate statistical analysis, t-test of independent means, for the findings and interpretation.

Finally, the post-test scores were compared following the same statistical treatment wherein the p-values less than 0.05 were considered statistically significant.

3. Results and Discussion

Pupils' Process Skills Comprehension pre-test scores

A 20-item Process Skills Comprehension pre-test was administered on September 24, 2018, among the 40 pupils of the controlled group as well as the 40 pupils of the controlled group. Their test scores were almost identical confirming that their capabilities were equal.

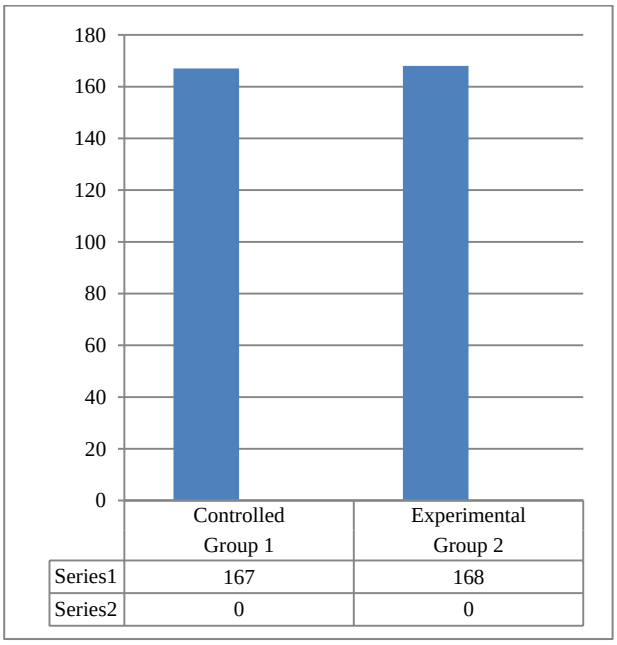

Figure 1. Pre-Test Scores of Controlled and Experimental Group

Figure 1 shows the controlled and experimental groups have almost equal total scores of 167 and 168, respectively. Thus, the two groups have the same competency.

To further test the equality of the populations, the F-test two sample for variances were applied wherein the computed p-value was 0.20 which is less than the F-critical value of 1.27. Thus, the two-population used was normal.

Table 1. Pre-Test Scores of Controlled and Experimental Group

	Controlled	Experimental
Mean	3.41	3.43
Standard Error	0.21	0.19
Median	3	3
Mode	3	3
SD	1.47	1.34
Sample Variance	2.16	1.79
Kurtosis	1.17	1.63
Skewness	0.72	1.22
Range	7	6
Minimum	1	2
Maximum	8	8
Sum	167	168
Count	49	49
Confidence Level (95%)	0.42	

Table 1 shows the controlled and experimental groups have means of 3.41 and 3.43, respectively, while

having standard deviation among the respondents' scores of 1.47 and 1.34. The range was identical at 7 and 6 while the frequently recurring scores were 3.

The results implied that with the same number of cases, both the sections of Grade 6 chosen as individual controlled and experimental groups have equal process skills comprehension in the pre-test.

Pupils' process skills comprehension post-test scores

After re-teaching the lessons, the respondents from both the controlled and experimental groups were given a twenty-item Process Skills Comprehension test served as a post-test in the study.

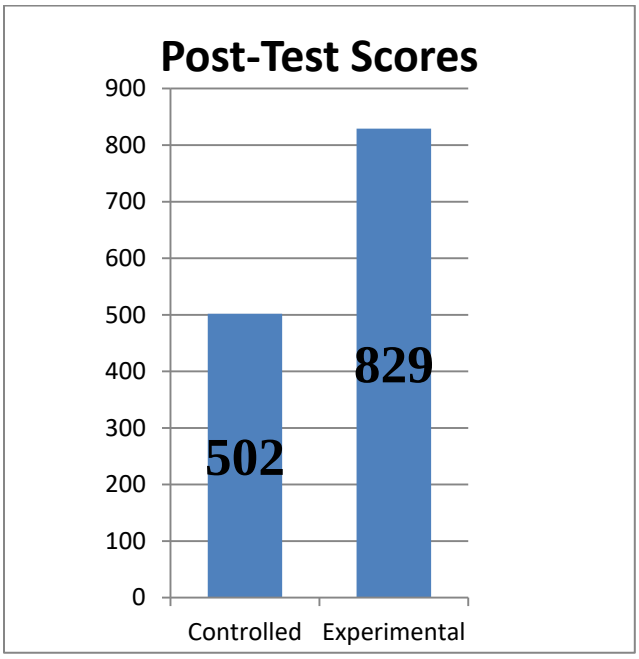

Figure 2. Post-Test Scores of Controlled and Experimental Group

Figure 2 showed that the post-test scores between the controlled and experimental groups both increased after the lessons have been carried out at 502 and 829, respectively. However, the experimental group garnered a significant increase compared with the controlled group. The F-test two sample for variances statistical method was used again which decently infer that the two individual groups were still normal wherein the computed p-value 0.43 still less than the F-critical value at 1.61.

Table 2. Post-Test Scores of Controlled and Experimental Group

	Controlled	Experimental
Mean	10.08	16.65
Standard Error	0.29	0.28
Median	10	17
Mode	8	18
SD	2.03	1.93
Sample Variance	4.12	3.73
Kurtosis	-1.36	0.70
Skewness	0.09	-0.97
Range	7	8
Minimum	7	12
Maximum	14	20
Sum	494	816
Count	49	49
Confidence Level (95%)	0.58	0.55

The results showed that at 0.05 alpha, the experimental group has a higher mean, with 16.65, than the controlled group's mean which is only 10.08. Their standard deviations have almost identical at 1.93 and 2.03, respectively. The mode in the controlled group was only 8 while the experimental group was at magnificent 18 while the range tracked identical at 7 and 8, respectively.

This implied that the process skills comprehension scores of the experimental group are significantly higher than the controlled group after re-teaching lessons and applying the intervention. The result was confirmed by Scruggs & Mastropieri (1989) that when learners can make concept connections by using letter strategies or any other means of mnemonic strategies, it can give students another tool to retain the new key concepts they have learned which can enhance their process skills in answering comprehension questions even with difficult concepts.

Table 3. Results of the t-test Two-Sample Assuming Equal Variances

	Controlled	Experimental
Mean	10.04	16.58
Variance	4.12	3.92
Observations	50	50
Pooled Variance	4.02	
Hypothesized Mean Difference	0	
df	98	
t-stat	-16.31	
P (T< = t) one-tail	5.66	
t critical one-tail	1.66	
P (T < = t) two-tail	1.13	
T critical two-tail	1.98	

The t-test for two samples assuming equal variances at 0.05 level of significance statistical analysis showed that the computed p-value 1.13 is lower than the critical value of two-tailed 1.98 at 0.05 level of significance. Hence, the Decision Rule is to Reject the Null hypothesis. This implies that the contextualized mnemonics instruction strategy has a significant effect on the process skills comprehension scores in the post-test of the experimental group compared with the

controlled group. The same aspect and ideas were applied in the study of Asio & Jimenez (2020) when they performed the same strategy regarding the effects of remediation activities on Grade 5 pupils.

The result was aligned with the study of Mastropieri, Scruggs, Levin, Gaffney, and McLoone (1985) which suggests that the reason comprehension scores are higher for students using mnemonic strategies was that the strategy increased their ability to recall the factual information needed to answer comprehension question. Through the use of mnemonic strategies, it is more likely that the students will be able to remember factual information, answer questions, and demonstrate comprehension. Students who need help understanding the concept will benefit from instruction in comprehensive strategies. Hence, the use of mnemonics is a highly effective way to help students (with and without disabilities) recall and retrieve the new information you teach. They're fun, easy to learn and use, and cost you nothing to implement. When mnemonics are used correctly, they can streamline the learning process, giving students access to broad amounts of information because they learn "bridges" to other information, less working memory is required

4. CONCLUSION

The findings suggest that contextualized mnemonics instruction strategy helps many students, but not all of them. However, almost all the students have fun learning a form of mnemonics to remember the concepts. Hence, the following conclusions have been drawn.

The process skills comprehension scores of the Grade 6 pupils from both the controlled and experimental groups before the conduct of the intervention were at the same level. It can be implied that they badly needed a new intervention strategy to be able to enhance their process skills in answering comprehensive questions.

With the aid of the new learning intervention to increase their process skills comprehension scores through the contextualized mnemonics instruction strategy, their post-test scores significantly increased which can be inferred that the new intervention employed to them can enhance their process skills.

5. RECOMMENDATIONS

In light of the findings drawn from the study, the following recommendations were hereby realized:

1. Seminars, training with workshops concerning the use of contextualized mnemonics instruction strategies to help learners be conducted to retool teachers;
2. Necessary context classification activities on the processing and analytical skills of learners especially in the Science subject at all levels should be given focus in the teaching-learning process.
3. Further study on a longer period to focus on a wider perspective of lessons in different subject areas and grade levels.

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