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Improving the Mastery of Grade Six Learners on Enumerating the Ways of Separating Liquid Mixtures Using Dr. Separatio and Miztizque

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Abstract:- This classroom-based action research explored on improving the mastery of grade six learners on the Science least learned competency, Enumerating the Ways of Separating Liquid Mixture, using Dr. Separatio and Miztizque a Science Strategic Intervention Material (SIM). This research was conducted in Davao Central District, Division of Davao City, with a School ID of 129555 during the first semester of School Year 2022-2023. One learner was the key participant of the study. Baseline data were gathered to assess his performance. The SIM Dr. Separatio and Miztizque was used as the tool in helping the learner master the competency. Also, an interview was conducted to validate the results of the quantitative findings. Data were analyzed and presented using tabular presentation for result's comparison. The findings revealed that the learner's mastery after the intervention was administered had recorded significant increase. Similarly, he claimed that he had fun answering the worksheets as the instructions were clear. In addition, he stated that the SIM is effective in addressing his needs thus, helped him improved his mastery on the learning competency. Hence, Dr. Separatio and Miztizque may be utilized by teachers who have the same least learned competency recorded.

Keywords:- *Improve, Mastery, Least Learned Competency, Intervention, SIM, Dr. Separatio and Miztizque.*

I. CONTEXT AND RATIONALE

My primary concern as a Science teacher for my learners is for them to explicitly understand Science concepts and develop Scientific skills and processes, in short, achieved Scientific literacy, from the four walls of the classroom, to applying these Science concepts, skills, and processes to their everyday lives.

Upon administering the summative test, which served as my baseline test for this research, on the competency of Enumerating the Ways of Separating Mixtures – Solid Mixtures, Liquid Mixtures, and Solid-Liquid Mixtures – I was saddened by the result of the Mean Percentile Score which was Low Mastery Level. Coincidentally, based on the Division of Davao City Least Learned Report in the 1st Quarter of the School Year 2018 -2019, Enumerating the Ways of Separating Mixtures (S6MTId-f-2) is one of the least learned competencies.

Upon careful investigation, the problem stemmed from the jampacked competencies in the quarter and the minute time allotted for those competencies for completion (the age-old problem of competency versus mastery) in addition, the scarcity of localized worksheets.

Since the competency of Enumerating the Ways of Separating Mixtures is a broad topic, my research is focus on Enumerating the Ways of Separating a Liquid Mixtures as it is the least learned competency over the other two ways of separating mixtures.

I used Dr. Separatio and Miztizque, a Strategic Intervention Material (SIM) for my intervention. Dr. Separatio and Miztizque is a compilation of localized and simplified worksheets that can be utilized by the learners for 30 minutes, every day, for five days. This SIM is of 5 parts that can be done individually or in groups with minimal supervision of the teacher.

I know that this problem is not exclusively my own, and I also know that I can help my learners improve their mastery of the competency, by way of improved test scores, and improve their grades in turn if this SIM is utilized. Teachers may also use the SIM or replicate their own if their plight is the same as mine, penultimately, address the issue of mastery versus competency.

Sixth-grade Filipino school learners are inquisitive which makes Science an ideal subject for them to satiate their queries. Science allows learners to become explorers, wanderers, and discoverers all at once because of the vast and diverse competencies that Science covers, one of which is separating mixtures. For these to bear fruition, learners must be provided with indigenous learning materials like laboratory works, experimentations, and hands-on activities, suited to Filipino learners to manipulate, in order to nurture and develop their inquisitive nature. However, there lies the challenge of providing these indigenous learning materials as these materials are either scarce or ill-fitting which this SIM can answer.

It is imperative that this challenge be addressed so that Filipino learners can achieve scientific literacy, or else lose a generation of Filipino learners who think and act scientifically.

II. ACTION RESEARCH QUESTIONS

The purpose of this action research is to evaluate and justify the mastery of the grade 6 learners on the least learned competency of Enumerating the Ways of Separating Liquid Mixtures using Dr. Separatio and Miztizque.

Specifically, it seeks to answer the question below:

- Can I improve the mastery of the grade 6 learners on the least learned competency of Enumerating the Ways of Separating Liquid Mixtures using Dr. Separatio and Miztizque?

III. INNOVATION, INTERVENTION AND STRATEGY

A mixture is a physical combination of substances thus it only requires physical processes to separate (Causey, 2014). There are different ways to separate a mixture. Hand-picking, sieving, winnowing, and using magnets are ways to separate a solid mixture; decantation and filtration are ways for separating a solid and liquid mixture; and for this research, evaporation, and distillation, the ways of separating a liquid mixture.

Evaporation is a technique that is used in separating a mixture, usually a solution of a solvent and a soluble solid (e.g., seawater, salt solution). In this method, the solution is heated until the organic solvent evaporates where it turns into a gas and mostly leaves behind the solid residue. On the other hand, when a mixture consists of two or more pure liquids (e.g., crude oil) then distillation is used. Here, the components of a liquid mixture are vaporized, condensed, and then isolated. The mixture is heated and the component which is volatile vaporizes first. The vapor moves through a condenser and is collected in a liquid state (https://byjus.com/chemistry/methods-of-separation/).

Dr. Separatio and Miztizque is an intervention material anchored on the principles and methodologies of SIM. Bunagan (2012) defined Strategic Intervention Material as meant to re-teach the concepts and skills which are least mastered. It is a material given to learners to help them master competency-based skills that they were not able to develop during regular classroom teaching. It consists of both learning strategies (for learners) and content enhancement (for teachers). It is a multifaceted approach to help learners to become independent and successful.

This intervention material is divided into 5 parts and each part can be done independently or collaboratively.

The parts and brief description of each part are the following:

- Guide Card: provides a brief introductory concept or information on the least learned competency.
- Activity Card: provides activities for learners to work-on on the least learned competency.
- Assessment Card: provides activities for learners to gauge their level of understanding of the least learned competency.
- Enrichment Card: provides activities for learners to deepen their understanding of the concepts learned.
- Reference Card: provides opportunities for learners to further their understanding of the least learned competency.
- This SIM can be administered every day for 30 minutes, for five days, during the learners' vacant time.

SIM is an instructional material prescribed by the Department of Education to improve learners' performance in Science subjects. DepEd Memorandum No. 117, series of 2005 provided the teachers the training and workshop on how to prepare SIM to promote successful learning in the field of Science subjects in both elementary and secondary public schools. As part of promoting the wide use of the material, the Department of Education included SIM making that is open to all Science teachers as one of the contests in the yearly Science fair in the school, division, region, and national level competitions.

A learner can be classified based on the learning approach the learner adopts. Learners will take different approaches on how they learn depending on the perceived objectives of the lesson they are studying. The learners learning approach could be divided into two distinct groups, those who took an understanding approach to learning or deep learners and those who took a reproduction approach to learning or the surface learners. The original work on learning approach was carried out by Marton and Saljo as mentioned in Miguel (2012). The use of SIM enhances the academic performance of learners regardless of learning approach adopted (Aranes, Espinosa, Salviejo, 2014).

The SIM is effective in teaching competency-based skills (Santos, 2018), it can also improve millennial learners' test scores and academic performance (Sinico, 2020 and Suarez, and Casinillo, 2020).

The use of SIM is not only effective in elevating the academic performance level of the learners, but also their performance tasks, and can also motivate them to learn and apply concepts and skills learned into real life situations (Bonitez, 2021).

In any grade level and in any competencies, SIM can improve the mastery of the learners (Glaiza, 2019, and De Jesus, 2020).

SIM is not exclusively for Science competencies alone, but it can also address the problems of low mastery in the competencies in Mathematics (Alboruto, 2017).

IV. ACTION RESEARCH METHOD

➢ *Participants, Other Sources of Data, and Information*

The key participant of this research was a learner of a school with low mastery of the competency of Enumerating the Ways of Separating a Liquid Mixtures, as evidenced by the result of his summative test scores, which served as the baseline data of the research, with a School ID number of 129555 in Davao Central District, Division of Davao City.

He was chosen based on the low scores of his summative test during the first quarter. Before, during, and after observations were utilized as main sources of data and information in the entire duration of the study. The study was conducted in the First Quarter of the School Year 2022-2023, in August 2022.

➢ *Data Gathering Methods*

In conducting the study, I wrote a letter of permission to the school head to gain her approval and support. Upon approval, informal interviews with the learner's parents were conducted. Parental consent was also secured before the conduct of the study. Learner's scores in the activity sheets were recorded to monitor his progress. Finally, the data obtained before, during and after the implementation of the intervention were compared and analyzed. I observed ethical guidelines in the conduct of the study following the study protocol assessments particularly in managing the participant and data such as, but not limited to privacy and confidentiality, informed consent process, risk, benefits, and biosafety.

➢ *Data Analysis Plan*

This section presents the tabular presentation of scores before and after the intervention material has been administered to the learner. Firstly, the discussion denotes the baseline performance of the learner before the implementation of the strategy. Secondly, the results during the implementation of the intervention material. Lastly, a comparison of the baseline test and the results after the administration of the intervention material which served as the concluding stage of the analysis was made.

V. DISCUSSION OF RESULTS

This section presents the tabular presentation of scores before and after the intervention materials had been administered to the learner. Firstly, the discussion denotes the baseline performance of the learner before the implementation of the strategy. Secondly, the discussion denotes the learners' performance during the implementation. Lastly, a comparison of the baseline test and the results after the administration of the intervention material which served as the concluding stage of the analysis was made.

➢ *Baseline Data Observation*

Table 1 shows the tabular presentation of results before the administration of the intervention material to the learner. The 30-item, multiple choice summative test, comprised of 10 items per three ways of mechanical ways to separate mixtures, served as baseline test to assess the mastery level of the competency. The second column of the table showed the baseline test score of the learner, which is 2 (20%), indicative of a Low Mastery Level as shown in the Qualitative Description in the third column.

Table 1. Tabular Presentation of Results Before the Implementation

	Baseline Test Score (in %)	Qualitative Description
Learner	2 (20%)	Low Mastery Level

➢ *Data Observation During Implementation*

Table 2 shows the perception of the learner regarding the level of difficulty in finishing the Activity Card, Assessment Card, and Enrichment Card of the SIM, which he perceived as "Easy." When the learner was asked the reason for the answer, he shared; "The instructions were easy and understandable The activities were alive and colorful and easy that is why I love answering my activities. I am also happy finishing my activities. (*Dali lang masabtan ang mga instructions. Sadya pa gyud ang mga activities kay colorful ug sayon lang pa gyud anseran. Mao ng ganahan ko mo-anser kay nalipay man ko samtang naga-perform.*) Thus, the improved performance of the learner. (Aranes, Espinosa, Salviejo 2014).

Table 2. Tabular Presentation of the Perception of the Learner During Implementation

	Activity Card	Assessment Card	Enrichment Card	Qualitative Description
Learner	1 – Easy	1 – Easy	1 – Easy	Easy
	2 – Easy	2 – Easy	2 - Easy	Easy

➢ *Post Data Observation*

Table 3 shows the tabular presentation of results before the administration of the intervention material to the learner. The 30-item, multiple choice summative test, comprised of 10 items per three ways of mechanical ways to separate mixtures, served as baseline test to assess the mastery level of the competency. The second column of the table showed the baseline test score of the learner, which is 2 (20%), indicative of a Low Mastery Level as shown in the Qualitative Description in the third column. The third column of the table showed the posttest score of the learner, which is 10 (100%), indicative of a Mastered Level, as shown in the Qualitative Description in the fourth column. I based my Qualitative Description on the fourth column on the National Achievement Test Percentile Ranking. When I asked the learner the reasons why he had difficulty understanding the lesson, he quipped: "The discussions are fast paced. It's like the teacher is in a hurry to finish the discussion, and the lessons are too many and are confusing to me." (*Paspas man gud nahuman ang lessons, murag nagdali si Teacher. Daghan pud ug lessons, makalibog*.) His tone changed when asked about how he felt after the administration of the intervention material: "I love doing the activities Sir gave me, the instructions were clear and the activities itself are easy, too." (*Ganahan ko mo-answer sa mga activities nga gihatag ni Sir kay dali ra masabtan ang mga directions, pati ang mga activities dali ra pud masabtan ug anseran*.) The result of the research corroborates with the study of Glaiza (2019) and De Jesus

(2020) that using SIM as an intervention material can improve the learner's mastery of the competency.

Table 3. Tabular Presentation of Results Before and After the Implementation

	Baseline Test Score (in %)	Posttest Score (in %)	Qualitative Description
Learner	2 (20%)		Low Mastery Level
		10 (100%)	Mastered Level

VI. REFLECTION

In retrospect, every learner can learn fully in their own timeline at their own pace. The happy and contented face I saw after he finished each task is enough of a reward for me. The stronger academic performance, improved posttest scores, and increased grades after the intervention are just icing on the cake.

Times are changing in more complex and modern ways, and needless to say, so with teaching. Teaching should be at par with change or better yet, spearheads that change or lose a whole lot of generations who think and act scientifically and critically. Millennial learners have multi-intelligence, and this SIM will answer those needs since the activities provided by this SIM is multi-sensory, has clear instructions, multi-faceted and interesting, and most importantly, fun. It also follows Bloom's Taxonomy of Learning. This SIM not only helps the learners achieve academic growth but also helps the teacher save time and effort in making intervention materials of the least learned competency.

The assessment result of the learners after finishing the SIM is promising and I hope to continue it with another SIM, another competency. As I always say, teachers' work is never done. And though learners learn in their own timeline at their own pace, they do need a careful nod, a gentle push in the right direction, and sustained their interest, and this SIM is a tool for that.

VII. RECOMMENDATIONS

Achieving all these promising results, I intend to communicate the results of using Dr. Separatio and Miztizque, as an intervention material to learners with low mastery of the competency, to the School Head and grade 6 Science teachers to ensure the validity and veracity of the results and to get support on the utilization and implementation of the SIM in the school. This undertaking must not only be restricted inside my classroom but to be shared and utilized by the grade 6 teachers teaching Science who are experiencing the same least learned competency; to replicate and reproduce this SIM through School Learning Action Cell (SLAC) sessions; to disseminate the efficacy and efficiency of the SIM through forum or symposium; to offer this SIM, and produce another SIM, as a solution to the problem of least learned competencies; to use SIM as part of the teaching-learning process and not as an intervention material, and lastly, peddle SIM to a wide audience through participating a SIM contest.

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