

## *Performing Arts: Assessment of Learning in Grade 7 Mathematics*

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### **Abstract**

This descriptive-developmental study determined the effect of performing arts as an assessment in Grade 7 Mathematics in the academic achievement of the Grade 7 students at Bicol University College of Education Integrated Laboratory School, the school year 2019-2020. It focused on the developed lessons with performing arts as assessment, performing arts presented by the students during the assessment of the lessons, mathematical concepts evident in the performing arts performed by the students, and the effect of the developed lessons on students' conceptual understanding, 21<sup>st</sup> century skills, and motivation in learning mathematics. The researcher employed a pre-experimental research design particularly a pretest-posttest design. Both qualitative and quantitative methods were utilized in analyzing the results in the lesson implementation. The qualitative data were obtained from the students' journals and teachers remarks on the observation sheets. In the quantitative method, data were obtained from the juror's evaluation on the developed lessons in Grade 7 Mathematics with performing arts as an assessment, and the pretest and posttest scores of the students. The results revealed that students' conceptual understanding, 21<sup>st</sup> century skills, and motivation in learning mathematics were enhanced and improved. Based in the teacher-observers, the students participated actively in the class discussions and performed well during the assessment of the lesson. With these, the students' 21<sup>st</sup> century skills such as communication, collaboration critical thinking, and creativity were developed and enhanced through performing arts in the assessment of the lessons for Grade 7 Mathematics.

Keywords: Assessment, Performing Arts, Conceptual Understanding, 21<sup>st</sup> Century Skills, Motivation in Learning

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## **Introduction**

To be mindful on how the students learn best and to satisfy the needs of diverse students has always been a great challenge to every educator. New teaching strategies and approaches are used by the teachers to make teaching-learning effective. Also, changes in the way teachers conduct classroom assessment is seen as one of the methods to meet present's curriculum goals. In the changes brought about by the K to 12 Curriculum, classroom assessment is emphasized as an integral part of curriculum implementation. Relatively new assessment concepts and strategies such as the alternative assessment or performance-based assessment are given much weight in the K-12 grading system. Performance-based assessment measures students' ability to apply the skills and knowledge learned from a unit or units of study and challenges the students to use their higher order thinking skills to create a product or complete a process (Chun, 2010). Thus, it enables students to demonstrate specific skills and competencies by performing or producing something and it also rates students' learning process.

On the implementation of performance-based assessments, the teachers are required to plan a performance task. Performance tasks are any learning activity or assessment that asks students to perform and/or demonstrate their knowledge, understanding and proficiency (McTighe, 2015). Students do not passively receive/s concepts and knowledge, but also actively apply and demonstrate learning. Students yield a tangible product and/or performance that serve as evidence of their learning. Students have more of an ability to create and share learning with others. Everybody should understand that in the process of sharing others through assessment, a ton of learning happens (Couros, 2018). Students can show their learning through different mediums in the process. Students can create a podcast so you can hear how they speak languages. They can also make videos of themselves showing how to solve different mathematics problems, etc. When teachers limit students to all doing test or project, learning is restricted through the assessment process. This study focused on assessment of learning to measure students' ability to apply the skills and knowledge learned from a unit or units of study and utilize performing arts to demonstrate these learnings.

In the pedagogical process, having a new variation in teaching and assessing students' learning in Math is a necessity especially when addressing the needs of varied students. Students differ in their profile, interests, learning styles, cognitive and affective development, and abilities. Having diverse learners inside a classroom is not a new scenario in the country. However, the problems involved in it are yet to be solved. Learning styles and preferences were not given attention; thus, learning becomes difficult and ineffective. According to the theory of Howard Gardner's multiple intelligence, all people have different kinds of intelligences. Gardner (1983) theorizes that people do not have just an intellectual capacity but have many kinds of intelligence including visual-spatial, linguistic-verbal, logical-mathematical, bodily kinesthetic, musical, interpersonal, intrapersonal, and naturalistic intelligences (Cherry, 2018). Students have their own strengths, and to maximize learning, teaching and assessment should be focused on the strengths of the students. Thus, this study focused on students' performance showcasing their skills and talents in assessing their learning.

In this study, the focus is on the assessment of learning in mathematics using performing arts. Elver (2014) performing arts provide a creative escape for children, introducing them to the imaginative worlds of theatre, music and dance. Exposure to the performing arts at an early age provides fond memories that children will cherish for a lifetime. More importantly, an introduction to the performing arts initiates the development of invaluable life skills in children. Performing arts can have a great effect on students' performance in mathematics. Students performed to demonstrate their knowledge, understanding and proficiency of the lesson that has been discussed through their abilities and interests. Performing arts include performing music, dance, and drama and the skills in these performing arts are mostly common to students. This can be of great advantage to use performance-based assessment and use performing arts as a mean to assess students' learning.

Performing arts is said to be one of the certain disciplines in which performance tasks are routinely used. A performance task is any learning activity or assessment that asks students to perform to demonstrate their knowledge, understanding and proficiency. Performance tasks yield a tangible product and/or performance that serve as evidence of learning. Performance task presents a situation that calls for learners to apply their learning in context. Since performance tasks establish authentic contexts that reflect genuine applications of knowledge, students are often motivated and engaged in meaningful learning (McTighe, 2015). When used as assessment, performance tasks enable teachers to gauge student understanding and proficiency with complex processes (e.g., research, problem-solving, and writing/creating), not just measure discrete knowledge. They are well suited to linking content knowledge with the 21<sup>st</sup> century skills such as critical thinking, creativity, collaboration, and communication. And that is why this study implements performing arts as performance task in the assessment - to improve learning the concepts, develop 21<sup>st</sup> century skills, motivate students and impact their overall achievement.

The study was conducted at Bicol University College of Education Integrated Laboratory School. The institution offers a complete set of programs starting from elementary, junior, and senior high school. In the high school department, there are a maximum of two regular sections per grade level. Each section contains an average of 30 students. Although the school is known for providing quality education, it cannot be denied that some students are academically challenged, especially in Mathematics. Since the subjects of this study were Grade 7 students, there was no guarantee that they grasped and understood basic mathematical concepts in elementary which are very essential to learning higher mathematics. Teachers in the said school utilize different strategies to teach the students, and some of those are through singing, acting, dancing, etc. That is why this study took the opportunity to include and use this as assessment since these types of techniques are introduced to students because it is used in instruction. Through this, not only students' performance in math will improve, but also their talents and skills will be enhanced.

## **Research Methods**

This study employed a descriptive-developmental research method to describe the development of the lessons with performing arts as assessment and determine its effect on students' learning. Pre-experimental research design was used by the researcher in this study. This design contains a single group which is often studied but

no comparison between an equivalent non-treatment group is made. This study also required a pretest and posttest design that measures the dependent variable once before and after the intervention was implemented. The design was used in order to evaluate the effect of the lessons using performing arts as assessment on students' conceptual understanding, 21<sup>st</sup> century skills, and motivation in learning mathematics. The respondents in this study were given a test prior and after the implementation of the developed lessons. The change between the scores of the students in the two tests was attributed to the effect of the lessons with performing arts as assessment in grade 7 mathematics.

This study utilized both quantitative and qualitative methods in the analysis of the data. The researcher gathered the quantitative data using results from the pretest and posttest and from the juror's evaluation of the developed lessons with performing arts as assessment. The qualitative data were gathered from the students' performing arts presented during the assessment of the lesson, teacher-observers' remarks, and students' responses in their journals.

## **Results and Discussion**

There were twelve (12) lesson plans developed for Integers and Rational Numbers based on the competencies included in the Curriculum Guide. The learning competencies include : (1) representing the absolute value of a number on a number line as the distance of a number from 0, (2) performing the fundamental operations on integers, (3) illustrating the different properties of operations in the set of integers, (4) expressing rational numbers from fraction form to decimal form and vice versa, (5) arranging rational numbers on a number line, and (6) performs operations on rational numbers.

The lessons developed utilized a performance-based assessment which enables the student to demonstrate the knowledge, skills, and/or material that they have learned. This type of assessment measures how well a student can apply or use what he or she knows, often in real-world situations. Research has shown that performance-based assessment provides a means to assess higher-order thinking skills and helps teachers in supporting students to develop a deeper understanding of content. Because performance-based assessment requires students to demonstrate their knowledge and skills with the concepts that they have learned, this assessment requires them to create a product or response, or to perform a specific set of tasks.

The developed lessons with performing arts as an assessment focused on how the students would learn the concepts and at the same time develop performances or outputs through performing arts by working as a group. Lessons developed were incorporated with a guided-inquiry approach, cooperative learning, and experiential learning strategy to give the students the opportunity to learn effectively and work cooperatively with their groups. All the lessons that were developed give the students the chance to conduct group discussions, brainstorming, and sharing of ideas as the students accomplish the activities and create performing arts that demonstrate mathematical concepts that have learned.

Table 1 presents the summary of the developed lessons with performing arts as assessment. The table presents the topics of the twelve lessons developed. The

learning competencies which are to be achieved by the students are also given together with the performance tasks that need to be accomplished in each competency. The performing arts which includes music, dance, and drama performances which are expected to be created and presented after each lesson is also projected in the table. This presents the possible outputs and presentations of the music, dance, and drama group during the assessment of the lesson.

Table 1. Summary Table of the Lessons with Performing Arts as Assessment

Lesson/ Topic	Learning Competency	Performance Task	Performing Arts		
			Music	Dance	Drama
Absolute Value of a Number	The learner represents the absolute value of a number on a number line as the distance of a number from 0.	Students present performing arts to demonstrate learning on the absolute value of a number.	Students are expected to present song/s that convey the mathematical concepts involved in the lessons. They are expected to compose lyrics and may adopt tunes of their favorite songs, nursery rhymes, or any music of their choice in which they are comfortable with. Or can also arrange and create their own tune for their song.	Students are expected to present dance choreography that represents mathematical concepts involved in the lessons. They may create or adopt dance steps that can represent the concepts and may use any music for the tempo and beat of their dance.	Students are expected to present drama/plays that show the mathematical concepts involved in the lessons. They are free to choose their own topic or theme for their plays as long as it is suitable and acceptable for their age and the audiences'.
Addition of Integers	The learner performs fundamental operations on integers	Students present performing arts to demonstrate learning on the fundamental operations on integers.			
Subtraction of Integers					
Multiplication of Integers					
Division of Integers					
Properties of Operations on the Set of Integers	The learner illustrates the different properties of operations on the set of integers.	Students present performing arts to demonstrate learning on the properties of operations on integers.			
Conversion of Rational Numbers	The learner expresses rational numbers from fraction form to decimal form and vice versa.	Students present performing arts to demonstrate learning on the conversion of rational numbers.			
Rational Numbers on a Number Line	The learner arranges rational numbers on a number line.	Students present performing arts to demonstrate learning on rational numbers on a number line.			
Addition of Rational Numbers	The learner performs operations on rational numbers.	Students present performing arts to demonstrate learning on the operations on rational numbers.			
Subtraction of Rational Numbers					
Multiplication of Rational Numbers					
Division of Rational Numbers					

During the assessment of the lesson, the students are expected to perform and present performing arts in which mathematics concepts are evident. In the lessons, the students are tasked to present performing arts – music, dance, and drama to demonstrate learning in each of the lesson. Students identified their skill and group through the performing arts inventory. The inventory is divided into three sections. Section one describes skills and interests for music, section two – drama, and section three – dance. The instrument has sentences and descriptions that will be rated by students as to how often it is applied to them. Students will rate 4 if it always applies to them, 3 – sometimes applies to them, 2 – seldom applies to them, and 1 – never applies to them. The section that has the highest score will determine students’ skill and group. Twelve students belonged to the music group, eight students belonged to the drama group, and ten students belonged to the dance group. Throughout the twelve lessons, the groupings of the students are fixed and steady

Table 2 presents the summary of the performing arts created the students during the assessment of the lesson. In each lesson, music, dance, and drama group performed songs, dance, and plays demonstrating what they have learned in the discussions. The groups were given enough time to discuss what to perform and how to put the concepts into performance. While creating performances, students developed skills in communication, collaboration, critical thinking, and creativity. On the first lessons, and performances, students encountered different challenges as they are adjusting to a different method implemented in mathematics. But as they go through it, they put greater effort and enjoyed it.

Table 2. Summary of the Performing Arts Presented by the Students

Lesson/Topic	Performing Arts		
	Music	Dance	Drama
1. Absolute Value of a Number	The students presented two songs in the tune of <i>Christmas in our Hearts</i> and <i>Mary had a Little Lamb</i> , containing the definition, concepts, and methods to find the absolute value of a number.	The students performed dance steps and a chant presenting some example of integers and their absolute values.	The students had a role playing of a teacher and the students inside the classroom discussing the absolute value of a number
2. Addition of Integers	The students presented two songs in the tune of <i>If you're Happy and you Know it</i> and <i>Row Row Row your Boat</i> , presenting the steps and rules in adding integers.	The students performed a song in the tune of <i>Sway</i> and dance along with it. The song presents the steps and rules in adding integers.	The students performed a scene of a mother who asked her son to buy salt and fish sauce and promised to give him the change. The performance demonstrates the application of adding integers in real life scenarios.
3. Subtraction of Integers	The students presented two songs in the tune of <i>Ang mga Ibon na Lumilipad</i> , presenting the Copy-Change-Change Rule, and <i>Row Row Row your Boat</i> , presenting the number line method.	The students performed a song in the tune of <i>Attention</i> and dance along with it. The song presents the two methods of subtracting integers and include some reminders and encouragement to learn the lesson better.	The students performed a play of two siblings who visited their grandpa in the hospital and were asked to buy medicine for their grandpa. The performance demonstrates the application of subtracting integers in real life scenarios.
4. Multiplication of Integers	The students performed a song in the tune of <i>Mary had a Little Lamb</i> , presenting the rules in multiplying integers.	The students presented a song in the tune of <i>Treat you Better</i> , presenting the rules in multiplying integers.	The students played a scene of a group of friends who went to a funfair to unwind after the examination. They applied multiplication of integers to compute for the payment of the tickets.
5. Division of Integers	The students presented two songs in the tune of <i>Stand by me</i> and <i>Twinkle Twinkle Little Star</i> , presenting the rules in dividing integers.	The students presented a song in the tune of <i>Itsy-Bitsy Spider</i> , presenting the rules in dividing integers.	The students performed a skit play of a family who went to theme park to bond and enjoy. The performance includes the application of division of integers in real life and some comical lines that added humor to their performance.
6. Properties of the Operations on Integers	The students performed a song in the tune of <i>What Makes you Beautiful</i> , presenting the six properties of the operations on integers and their descriptions.	The students presented a song in the tune of <i>Say you won't let go</i> , presenting the six properties of the operations on integers and their descriptions.	The students presented a dialogue/conversation among the six properties of the operations on integers. The description of each of the properties was related to different types of love.
7. Conversion of Rational Numbers	The students presented a song in the tune of <i>Jingle Bell Rock</i> , presenting the steps in converting decimal into fraction and vice versa.	The students presented a song in the tune of <i>Row Row Row your Boat</i> , presenting the steps in converting fraction to decimal form and vice versa.	The students performed a play of a mother and daughter who went to the market to buy meat. The performance demonstrates the application of the conversion of rational numbers in real life scenarios.
8. Rational Numbers on the	The students performed a song in the tune of <i>The Alphabet Song</i> .	The students presented a song in the tune of <i>London Bridge</i> , presenting the	The students had a role playing of a teacher and the students inside the classroom

Number line	presenting the steps in plotting and arranging rational numbers on number line.	steps in plotting and arranging rational numbers on number line.	discussing how to plot and arrange rational numbers on the number line.
9&10. Addition and Subtraction of Rational Numbers	The students presented a song in the tune of <i>The Alphabet Song</i> , presenting the steps in adding and subtracting rational numbers, particularly fractions.	The students performed a song in the tune of <i>Ako ay may Lobo</i> , presenting the steps in adding and subtracting rational numbers, particularly decimal numbers.	The students performed a play of a household preparing for the fiesta. The performance demonstrates the application of addition and subtraction of rational numbers in real life.
11. Multiplication of Rational Numbers	The students presented a sing in the tune of <i>Leron Leron Sinta</i> , presenting the steps in multiplying rational numbers: fractions and decimals.	The students performed a sing in the tune of <i>Baba Black Sheep</i> , presenting the steps in multiplying rational numbers: fractions.	The students performed a play about the preparation of a class for their Christmas party. Application of multiplication on rational numbers was demonstrated in the performance.
12. Division of Rational Numbers	The students performed a sing in the tune of <i>BINGO</i> , presenting the steps in dividing fractions.	The students presented a song in the tune of <i>Fly Fly Fly the Butterfly</i> , presenting the steps in dividing fractions.	The students performed a play about a group of friends who roam around the mall and applied the division of rational numbers to divide the cake evenly and the total cost equally among them.

Since performance task asks students to perform and/or demonstrate their knowledge, understanding and proficiency - creating outputs and tangible products and/or performances served as evidence of students' learning. The discussion above and the table presented, clearly show that students successfully created performing arts during the assessment of the lesson to demonstrate their learnings in mathematics. Students learned not only the concepts in mathematics but also enhanced their skills in music, dance, and drama.

Students demonstrated their learning in Mathematics through performing music, dance, and drama presentations. To charge whether they learned the concepts, mathematical concepts must be evident in their performances, thus must be relevant to the lessons.

Table 4 presents the summary of the mathematical concepts evident in the performing arts created by the students. Students demonstrated the mathematical concepts which they have learned in lessons in the form of songs, dance, and plays. Performing arts, being used as an assessment, and is placed on the evaluation part of the lesson, must satisfy the objectives of the lesson. The performances and outputs created by the students satisfy the objectives and demonstrated mathematical concepts which are needed to achieve the competencies. Students include the steps and procedures in each competency which was presented correctly and coherently. Students also included the rules on the fundamental operations on integers and rational numbers, meaning, they really grasp the concepts. Students also include some examples and demonstrations that show how they really understood the lessons. And lastly, students were able to create performances that show scenarios in real life wherein these mathematical concepts are perceived to be useful. Having these evidence, it clearly shows that the performing arts created by the students, correctly demonstrates the mathematical concepts learned by the students.

Table 3. Summary of the Mathematical Concepts Evident in the Performing Arts Created by the Students

Lesson/Topic	Music	Dance	Drama
1. Absolute Value of a Number	The definition of absolute value of a number and the methods in finding the absolute value were presented in the lyrics of the song performed by the group.	Key terms about integers and sample of integers and their absolute value were presented in the lyrics of the chant and demonstrated in the dance steps performed by the group.	The definition of integers and the absolute value of a number were presented in the play performed by the group.
2. Addition of Integers	The steps/procedure and the rules in adding integers with the same and different signs were presented in the lyrics of the song performed by the group.	The steps/procedure and the rules in adding integers that are both positive, both negative, and have different signs were presented in the lyrics of the song performed by the group.	The steps/procedure and the rules in adding integers with the same and different signs and the application of adding integers in real-life were presented in the play performed by the group.

3. Subtraction of Integers	The steps/procedure in subtracting integers using the number line and the copy-change-change rule were presented in the lyrics of the song performed by the group.	The steps/procedure in subtracting integers using the number line and the copy-change-change rule were presented in the lyrics of the song performed by the group.	The steps/procedure in subtracting integers using the copy-change-change rule and the application of subtracting integers in real-life were presented in the play performed by the group.
4. Multiplication of Integers	The rules in multiplying integers with the same and different signs were presented in the lyrics of the song performed by the group.	The rules in multiplying integers with the same and different signs were presented in the lyrics of the song performed by the group.	The rules in multiplying integers with the same and different signs and the application of multiplying integers in real-life were presented in the play performed by the group.
5. Division of Integers	The rules in dividing integers with the same and different signs were presented in the lyrics of the song performed by the group.	The rules in dividing integers with the same and different signs were presented in the lyrics of the song performed by the group.	The rules in dividing integers with the same and different signs and the application of dividing integers in real-life were presented in the play performed by the group.
6. Properties of the Operations on Integers	The properties of the operations on integers: closure, commutative, associative, distributive, inverse and identity property were presented in the lyrics of the song performed by the group.	The properties of the operations on integers: closure, commutative, associative, distributive, inverse and identity property were presented in the lyrics of the song performed by the group.	The properties of the operations on integers: closure, commutative, associative, distributive, inverse and identity property were presented in the play performed by the group.
7. Conversion of Rational Numbers	The steps/procedure in converting rational numbers from fraction to decimal form and vice versa were presented in the lyrics of the song performed by the group.	The steps/procedure in converting rational numbers from fraction to decimal form and vice versa were presented in the lyrics of the song performed by the group.	The steps/procedure in converting rational numbers from fraction to decimal form and vice versa and its application in real-life were presented in the play performed by the group.
8. Rational Number on the Number line	The steps/procedure in plotting and arranging rational numbers: fraction and decimals on the number line were presented in the lyrics of the song performed by the group.	The steps/procedure in plotting and arranging rational numbers: fraction and decimals on the number line were presented in the lyrics of the song performed by the group.	The steps/procedure in plotting and arranging rational numbers on the number line and example and demonstration of plotting and arranging them on a number line were presented in the play performed by the group.
9&10. Addition and Subtraction of Rational Numbers	The steps/procedure in adding and subtracting similar and dissimilar fractions were presented in the lyrics of the song performed by the group.	The steps/procedure in adding and subtracting decimal numbers were presented in the lyrics of the song performed by the group.	The steps/procedure in adding and subtracting rational numbers and its application in real-life were presented in the play performed by the group.
11. Multiplication of Rational Numbers	The steps/procedure in multiplying fractions and decimal numbers were presented in the lyrics of the song performed by the group.	The steps/procedure in multiplying fractions were presented in the lyrics of the song performed by the group.	The steps/procedure in multiplying rational numbers and its application in real-life were presented in the play performed by the group.
12. Division of Rational Numbers	The steps/procedure in dividing fractions were presented in the lyrics of the song performed by the group.	The steps/procedure in dividing fractions were presented in the lyrics of the song performed by the group.	The steps/procedure in dividing rational numbers and its application in real-life were presented in the play performed by the group.

Students correctly demonstrated mathematical concepts on the twelve lessons developed in their performances. From the analysis of the concepts and the results of the scoring rubric on the outputs and performances of the students, it can be concluded that students understood and learned the concepts during the implementation of the developed lessons using performing arts as assessment.

The effects of the Performing Arts to the students in terms of conceptual understanding was assessed using the researcher-made test. The test was a multiple-choice type test with a total of 50 items. The table of specifications follows the revised Bloom's Taxonomy of Cognitive Domain.

Table 4 presents the statistical data gathered from the pretest posttest results of the group. Mean, mean gain, standard deviation and t-test for paired observations were the statistical treatment used. The individual competency was also presented to show the areas in which the conceptual understanding of the students shows progress or no improvement at all. The performance level was also included for comparison purposes.

Table 4. Conceptual Understanding Results Summary Statistics

Learning Competency	Mean of the Pretest	Performance Level		Mean of the Posttest	Performance Level	
		%	Descriptive Equivalence		%	Descriptive Equivalence
Represents the absolute value of a number on a number line as the distance of a number from 0.	1.33	66.67	Near Mastery	1.53	76.67	Mastery
Performs fundamental operations on integers	6.77	48.33	Low Mastery	11.03	78.81	Mastery
Illustrate the different properties of operations on the set of integers.	1.87	31.11	Low Mastery	3.8	63.33	Near Mastery
Expresses rational numbers from fraction form to decimal form and vice versa.	1.53	38.33	Low Mastery	3.33	83.33	Near Full Mastery
Arranges rational numbers on a number line.	1.43	35.83	Low Mastery	2.57	64.17	Near Mastery
Performs operations on rational numbers.	6.83	34.17	Low Mastery	12.7	63.5	Near Mastery
<b>Mean</b>	19.77	42.41	Low Mastery	34.97	71.63	Near Mastery
<b>Standard Deviation</b>	7.94			9.26		
<b>Mean Gain</b>	+15.2					
<b>p-value</b>	0.00					
<b>Significance</b>	Significant ( $\alpha=0.05$ )					

Table 4 shows that there was a significant difference between the students' pretest and posttest scores ( $p < 0.05$ ). This means that the students' performance in the posttest was better than their performance in the pretest. In addition, the scores of the group become more varied after the implementation period. The mean scores of the group have increased from 19.77 to 34.97 (+15.2). It was evident that the mean scores of the students in the posttest were higher than the mean scores in the pretest. The result implies that the students' conceptual understanding in mathematics 7 has improved through Performing Arts.

The performance level of the group has also increased from 42.41% (low mastery) to 71.635 (near mastery). The students gained the highest performance level on the competency under expressing rational numbers from fraction form to decimal form and vice versa. The pretest is only 38.33% which was interpreted as "Low Mastery" and the posttest is 83.33% which was interpreted as "Near Full Mastery". This shows that the implementation of the developed lessons with performing arts as assessment, the students developed a greater understanding on this competency.

Overall, the results suggest that the students' conceptual understanding was enhanced. The students learned the different concepts on Integers and Rational numbers. The result implies that performing arts as an assessment of learning helped the students gain knowledge in the twelve lessons.

For the effect of the developed lessons on students' 21<sup>st</sup> century skills and motivation in learning mathematics, qualitative data were utilized in this study. Students' journal entries and responses in the questionnaires, and teacher-observers' remarks were the sources of these data. 21<sup>st</sup> century skills are the skills that the students need in order to succeed in today's fast-changing world. Educators and workforce experts alike often warn that our children need improved 21st century skills. Without these skills, they will not be able to successfully participate in the global economy. They will not be

adequately prepared for college and work. This is also known as the four C's (4C's) namely: communication, collaboration, critical thinking, and creativity. These skills are crucial for deep and effective learning that enables the students to thrive at present and in the future.

In this study, the effect of the performing arts to students' communication skills was assessed and identified through their responses on their journals. By reading and analyzing their responses, there are seven (7) major effects of the performing arts identified. Performing arts affected communication skills of the students in terms of (1) Friendliness, (2) Confidence, (3) Patience, (4) Listening, (5) Open-mindedness, (6) Critical thinking, and (7) Teamwork. Collaboration, according to the journal entries, improved students' relationships. It helped in clearing up misunderstanding and helped them to develop trust. It also taught them to understand and respect differences in capabilities, weakness, and views. Data from students' journals and teachers' observations were also used to identify the effect of performing arts in the critical thinking skill of the students. Most students responded that performing arts enhanced their thinking skills and intelligence. It helped them in being aware of what is happening and to think faster and efficient. Teachers said that performing arts led students to developing their skills such as higher level of concentration, more in-depth analytical abilities, and improved thought processing. These, being demonstrated by the students, confirmed that performing arts developed students' critical thinking skill. On the effect on creativity, performing arts caused student to think deeper and to be creative. Students learned to solve problems creatively, to think outside the box, and to try something that they have not tried before. It also helped them finding and learning new skills like creating songs, dance, and drama plays.

Qualitative data were also used to identify the effects of performing arts to students' motivation in learning mathematics. Students responded that performing arts, made them excited in learning the lessons. They also had fun in creating and presenting performances that they love to do. It also helped them to understand the lesson easier and be motivated to study and learn more. They also included that their performances helped them to retain information because they presented what they have learned from their own understanding of the lesson.

The overall findings of this study on the effects of the developed lessons using performing arts as assessment, in the students' conceptual understanding, 21<sup>st</sup> century skills, and the motivation in learning mathematics suggest that the intervention enhanced their academic performance under each criterion. The impact of the developed lessons has been proven as an aid to reckon with in the context of teaching mathematics.

## **Conclusion**

Twelve (12) lessons under Competency 5 (Absolute Value of a Number), Competency 6 (Fundamental Operations on Integers), Competency 7 (Properties of Operations on the Set of Integers), Competency 8 (Conversion of Rational Numbers), Competency 9 (Rational Numbers on the Number Line), and Competency 10 (Fundamental Operations on Rational Numbers) of the K to 12 Curriculum Guide for Grade 7 Mathematics were developed. The implementation of performing arts enhanced students' music, dance, and drama skills. Students understood and learned

the concepts during class discussions and successfully demonstrated these concepts through performing arts. And the developed lessons in Grade 7 Mathematics was effective in developing and enhancing students' conceptual understanding, communication skills, collaborative skills, critical thinking skills, creative skills, and motivation in learning.

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