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CONTEXTUALIZED STRATEGIC INTERVENTION MATERIALS IN GRADE 9 MATHEMATICS

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Abstract

This pre-experimental study developed ten (10) Contextualized Strategic Intervention Materials (CSIMs) for the third quarter least mastered Grade 9 Mathematics competencies. The developed CSIMs were based on the generalized least mastered skills of a High School for SY 2015 – 2018. The three (3) least mastered skills were: prove theorems on the different kinds of parallelogram (rectangle, rhombus, square); solve problems involving parallelograms, trapezoids and kites; and solve problems that involve triangle similarity and right triangles. The CSIMs developed addressed the above-cited least mastered skills integrating features of: Bicol culture, use of language learning strategies, and awareness of Disaster Risk Reduction and Management. Students' significant learning experiences in, and the effect of CSIMs on students' conceptual understanding were also tackled. Five (5) teachers each for the three features, using DepEd's LRMDS for SIM, evaluated and rated the CSIMs very evident (at mean 4.73 of 5). Further, the CSIMs under each focus area were evaluated excellent (mean of 4.78 of 5). Students' significant learning experiences were extracted from the students' journal entries, teachers' observation, and Focus Group Discussion responses. The significant learning experiences of Grade 9 students in using the CSIMs were: (a) gained new experiences and developed into independent learners, (b) learned effectively and found the topics easy to understand, (c) became more interested in learning Math topics, (d) appreciated problem solving, and (e) enjoyed and felt

comfortable in learning Math topics using the CSIM. Students' conceptual understanding improved and were significantly different ($p < 0.05$) for the formative and summative assessments. The set of Contextualized Strategic Intervention Materials (CSIMs) is recommended for: use to promote meaningful learning; further improved by considering other features and subject areas; replication to validate the reliability of the results and expand the learning experiences of students; and collaboration among teachers is encouraged for the development of CSIMs.

Keywords

Contextualized Strategic Intervention Materials, Significant Learning, Conceptual Understanding

1. Introduction

Mathematics is the pillar of all knowledge showing its relevance to all disciplines (Ayinla, 2011). Despite the relative importance of Mathematics, students' performance in the subject has remained poor (National Mathematical Center, 2009). Similarly, Geometry which is a branch of Mathematics that deals with the study of different shapes or figures and their properties was considered one of the least performed by students. Geometry plays a significant role in primary and secondary schools Mathematics curricula in the Philippines and other countries. Volderman (1998) expressed that geometry provides a complete appreciation of the world we live in. Geometry appears naturally in the structure of the solar system, a geological formation, rocks and crystals, plants and flowers, and even in animals and humans. Geometry has so many importance in life. In spite of its importance, geometry was identified as one of the branches of Mathematics in which students have not been performing satisfactorily. Trends in International Mathematics and Science Study (2003) reported that findings of research and studies conducted stated that geometry had been perceived as the most difficult mathematics subject, especially the proving part and the problem solving.

Additionally, Ogena et al. (2010) reported the performance of Philippine High Schools with Special Science Curriculum in the "2008 Trends in International Mathematics and Sciences Study" (TIMSS – Advanced). In the study, a special TIMSS was conducted among students with advanced preparation in science and mathematics in ten (10) countries including the Philippines. Algebra, Geometry and Calculus were the content domains while knowing, applying and reasoning were the targeted cognitive domains. The results showed that, in general, Philippines performed least among the participating countries overall and as well as in specific content areas and cognitive domains. Of the released items on Geometry, the item with the lowest percent correct is on area of properties of geometric figures.

In the K – 12 Curriculum, the Grade 9 curriculum was the most congested in terms of contents in Geometry. The third and the fourth quarter of Grade 9 curriculum are on Geometry while on other grade level of the secondary curriculum, only one quarter covers Geometry. To address the problem on the low performance of students in Geometry as reported in 2003 Trends in International Mathematics and Sciences Study (TIMSS 2003) and 2008 Trends in International Mathematics and Sciences Study (TIMSS - Advanced), the researcher purposively chose the third quarter of Grade 9 Mathematics which contents matched the reported low performed areas in Geometry. The study of Braza and Supapo (2014) claimed the shortcomings that can affect the students' achievement in mathematics especially in Geometry and these are: lack of mastery of the basic concepts and skills, lack of problem solving and critical thinking skills, and students' lack of connections to the topic they are studying. To resolve these issues, teachers can provide various learning materials that will cater the needs of students.

Bureau of Secondary Education (BSE) addressed this concern by issuing Memorandum No. 117 s. 2005 directing the conduct of training workshops on Strategic Intervention Materials (SIMs) for successful learning to enhance teachers' skills in test analysis and interpretation, and capacitate them in developing various intervention materials for remediation and enrichment of learning since SIMs was identified as one of the instructional materials that will address the declining quality of educational system of the country in general and the performance of the secondary schools in particular. These notions gave the researcher the idea of helping teachers and students from the upland and rural schools by developing a set of Contextualized Strategic Intervention Materials that will be used in teaching and remediation.

Contextualized Strategic Intervention Material or CSIM is a Strategic Intervention Material (SIM) that has been contextualized. The contextualization of this intervention material is in accordance to Republic Act 10533 or Enhanced Basic Education Act of 2013, which states that "the curriculum shall be contextualized and global" and "the curriculum shall be flexible enough to enable and allow schools to localize, indigenize, and enhance (the curriculum) based on their respective educational and social contexts." DepEd Order No. 32, s. 2014 define contextualization as an educational process of relating the curriculum to a particular setting, situation or area of application to make the competencies relevant, meaningful, and useful to all learners.

One way of contextualizing learning is by considering the learners own cultural background. Culture is what students bring when they go to school. According to Zakhartchouk (1999) integrating cultural content in school will not just allow students to relate to the lessons but will also enable them

to construct their identities and be empowered. Villegas (2007) also added that approaching student's education in culturally responsive ways have the potentials of engaging all students in learning. This will open doors to students to be partners in the teaching and learning process, making them more involved and a big part of the instruction. This will increase the engagement, motivation, understanding and interest of students by acknowledging and infusing the context of the students' culture into school curriculum. Moreover, this will allow students to make meaningful connections between what they have learned inside and outside the four corners of the classroom, empowering the new generations by applying cultural connections.

Teaching students to manage their own learning will also help them develop meaningful learning and be successful in the future. Research said that for learners to be successful in Mathematics, it requires students to have a deep knowledge of both the language of instruction and the subject matter (Park, 1997). Strategies on learning language will help learners acquire, store, and retrieve Math concepts. And Lai (2009) thought "training students in using learning strategies and assisting them in developing their own unique ways of learning would make them independent and effective learners".

The High School which was the setting of this study was described in this undertaking. This school was located in an upland barangay in the city of Tabaco, province of Albay, Philippines. Being located in the eastern seaboard of the country, Albay is vulnerable to the effects of the Pacific Jinx (Espinas 2013). Geologic hazards such as earthquakes and volcanic hazards and hydrometeorologic hazards such as typhoons, floods, landslides, lahar, and mudflow abound in the province. In fact, in the past until the late 80s, the province used to "experience frequent weather disturbances, sometimes experiencing as much as 18 typhoons in one year" (GOVPH n.d). Last year, 2018, Albay experienced a tremendous series of eruptions that lasts for more than two months, from January 14 to April 3, 2018. Based on the report, there were 23, 786 families or 91, 055 persons in 61 barangays in Albay were affected by the phreatomagmatic eruption of Mayon Volcano (Government of the Philippines, 3 April 2018) and the school is near from the 8 kilometer extended danger zone. In view of this, an integration of the disaster risk reduction and management in the school curriculum in accordance to Republic Act No. 10121 or "Philippine Disaster Risk Reduction and Management Act of 2010" will be helpful to its residents.

The school was established on January 1, 2003, 16 years from now. Within 16 years, the school participated to a number of national achievement tests which established their performance. Results of National Achievement Test from 2012 – 2013, 2013 – 2014, and 2014 – 2015 as released by DepEd

Central Office showed that the school's performance was fluctuating with the NAT rates of 55.02, 67.2 and 52.4 respectively. The school did not participate to the latest NAT, S.Y. 2016 – 2017 and 2017 – 2018. Based from their latest NAT result, S.Y. 2014 – 2015, Mathematics had the lowest MPS of 44.8 among the six areas – English, Filipino, Math, Science, Araling Panlipunan and Critical Thinking. The result suggests an additional intervention that will address the low performance of students in Math. This notion gave the researcher an idea of helping the school and their students by developing an intervention material in Math that will not only address the least mastered skills of students but will also help students connect their learning in the real world by considering their own frames of references (their own environment, experiences, inner memory and response) in the learning material. With this, the study was purposively conducted in an upland barangay high school because of its rural profile and susceptibility to disasters.

2. Methodology

2.1 Research Design

The study used a pre-experimental research design, specifically the single group pretest – posttest study and was focused on remediation. Remediation is the process of providing help to students who are experiencing difficulties so that they can understand and master the concept with which they are struggling. There were three sections or classes in Grade 9. However, the researcher focused only on one group or one class in this study. Furthermore, the selection of one group respondents was done through administering a pretest to the three classes. The class with the lowest performance level (PL) served as the group of respondents in this study. Since remediation is the process of assisting students who did not meet the expected competencies or skills, the researcher conducted a formative pretest (a 10 – item test with a specific learning competency) to identify students who will be needing remediation and will serve as the remedial class. In the 10 – item pretest, the students who got a score which are 7 and below or less than 75% were subjected to remedial class while the students who got a score of 8 and above or greater than 75% will not be part of the remedial class. The group of students who will be subjected to remedial class varies depending on their scores in every formative pretest. The formative pretests were based on the three (3) least mastered skills or competencies given by the school but these three least mastered competencies were divided into ten (10) specific learning competencies in order to create ten (10) formative pretest, ten (10) formative posttest and ten (10) Contextualized Strategic Intervention Materials (CSIMs). The developed CSIMs

were implemented to determine the significant learning experiences of students and its effect to their conceptual understanding.

2.2 Respondents

The respondents of the study were the Grade 10 – Bravery students for the pilot testing and for the actual conduct of the study, the respondents were the Grade 9 - Cobalt students of a High School for the school year 2018 – 2019. There were three sections in Grade 9 but only one section served as the one group respondents of this study. The selection of one group respondents was based on the result of the pretest. The class or group with the lowest performance level (PL) in the pretest was chosen as the one class respondents. The class was heterogeneous and composed of 38 students.

2.3 Instruments

The study utilized five (5) research instruments to gather data and these are juror's evaluation sheet, students' journal guide, teacher's observation guide, focus group discussion guide, and pre - posttests. An imperative instrument of this study are the evaluation sheets for the developed CSIMs. The study utilized the rubric for Strategic Intervention Material (SIM) or the LRMDS (Learning Resources Management and Development System) Evaluation Tool of the Department of Education for SIM and the adapted three (3) evaluation sheets for the features of the developed CSIMs. Another instrument that was developed by the researcher before the implementation of CSIMs was the identical summative test for the pretest and posttest. To assure the appropriateness of the test for the research study, the validity, reliability, practicability and utility of the test was evaluated by three (3) jurors. Furthermore, the reliability of the test was computed using the KR21 test of reliability. The computed test reliability (r) was 0.72. Based from the reliability list this means that the researcher-made test is good for a classroom test and that there are probably a few items which could be improved. Hence, the test is reliable to use for the study. Aside from the instruments developed to measure the effect of Contextualized Strategic Intervention Materials on the students' conceptual understanding, the researcher also used instruments to gauge the students' significant learning experiences in using the CSIMs. These are the student's journal, teacher's observation guide and Focus Group Discussion with the students.

2.4 Procedures

To achieve the research goals, the researcher requested first for a generalized Least Mastered Competencies of Grade 9 students of the school for the past three consecutive years, S. Y. 2015 – 2018. Out of the identified least mastered skills or competencies for the third quarter of Mathematics 9, the researcher developed 10 Contextualized Strategic Intervention Materials with the aid of the K – 12

Grade 9 Curriculum Guide, learner's module and other Geometry books. After developing the intervention materials, the researcher asked permission from the School Division Superintendent (SDS) of the Tabaco City Division in seeking help and approval to use the rubric for Strategic Intervention Material (SIM) or an evaluation tool for SIM from the LRMDS (Learning Resources Management and Development System), Department of Education. Also, the researcher requested twenty - one (21) jurors to evaluate the developed materials using the LRMDS evaluation tool for SIM.

Additionally, the researcher also developed an identical pre and posttest based on the identified least mastered skills in the third quarter of Mathematics 9. The researcher requested three experienced and expert Grade 9 Math teacher to evaluate the test using an adapted evaluation sheet (Buendicho, 2015). After the pre and posttests were evaluated, the researcher asked for an approval from the principal of one school to conduct her dry run to the middle class of Grade 10. This was followed by the item analysis and test for reliability to come up with a 50 – item pre and posttests. Another set of pre and posttests were developed by the researcher; these were the formative pretests and formative posttests which are 10 – item parallel tests and were used along the remediation process. These tests were scrutinized by the Mathematics teacher of the one group respondent (class) of this study. The researcher used the pre and post - test to gauge the effect of the developed Contextualized Strategic Intervention Materials on the student's conceptual understanding. Aside from the students' conceptual understanding, the researcher also gauged the significant learning experiences of students in using the CSIMs. The instruments used to gauge the students' significant learning experiences were student's journal, teacher's observation guide and focus group discussion questions. These instruments were examined and edited by three (3) math teachers who were also a statistician and researcher.

After developing all the instruments needed in this study, the researcher asked permission from the Office of the Superintendent to allow her to conduct the study on the Grade 9 students of the said school. This was followed by sending a communication letter to the school to ask for the approval of the school principal before the conduct of study. After seeking the approval from the said institutions, appropriate courtesy was also observed in implementing the study. The researcher coordinated with the Mathematics teachers and advisers of three (3) Grade 9 classes to ask permission to administer a pretest. The researcher administered the pretest to the three (3) classes and computed their performance level (PL) to identify the one group respondent of this study. The one group (class) respondent of this study was the class with the lowest PL in the pre – test, the Grade 9 - Cobalt. After identifying the one group respondent, the researcher distributed the parents permit to the Grade 9 - Cobalt. The researcher

asked consent from the students' parents to allow them to be respondents for the study. After seeking the approval from the parents, the researcher implemented the developed materials - CSIMs.

After all the CSIMs were implemented, the researcher administered the 50 – item posttest (summative test) to the class. The raw scores of the students from the tests were tabulated, compared and analyzed. The results were interpreted and discussed revealing the effects of using the Contextualized Strategic Intervention Materials on the students' conceptual understanding. The researcher divided the class into six (6) groups for the Focus Group Discussion. All the students were given a chance to express themselves regarding their significant learning experiences in using the CSIMs. The students' responses together with their journal entries and teacher's observation were collected and summarized to gauge their overall significant learning experiences.

2.5 Data Analysis

The data were examined by weighted mean, standard deviation, mean gain, performance level and paired t – test. The weighted mean was used to generalize the overall rating of the evaluators for the researcher - made test and developed intervention materials. The statistical tool was also used to present the students' average pre and post - test scores before and after implementing the material. The standard deviation was used to present how scattered the scores of the students are before and after the implementation period under conceptual understanding. Likewise, this tool presents if the used approach has filled the gap between diverse types of students by showing less dispersed scores. Mean Gain was used to determine if the approach gave a positive or negative difference between the pre and post - test mean scores. This showed if the Contextualized Strategic Intervention Materials has positively or negatively affected the students' conceptual understanding. Paired t – test was used to determine the effect of Contextualized Strategic Intervention Materials in improving the students' conceptual understanding. Performance level is the percentage of the mean scores gained by the students. Simply computed from the quotient of the mean scores and the total number of items. The students' performance level before and after the remediation was also presented and compared. The table used for identifying the performance level of the students before and after implementing the intervention materials was shown below and was adopted from DepEd.

Table 1: *Students' Performance Level and their Interpretations*

Performance Level	**Interpretation**
92 and above	Full Mastery
83% - 91%	Near Full Mastery
75% - 82%	Mastery
51% - 74%	Near Mastery
25% - 50%	Low Mastery
24% and below	No Mastery

3. Results and Discussion

3.1 Developed Contextualized Strategic Intervention Materials (CSIMs)

Ten (10) Contextualized Strategic Intervention Materials (CSIMs) based on the least mastered skills of Grade 9 students were developed, specifically on the third Quarter of Grade 9 Mathematics. The least mastered skills or competencies were generalized by the key teacher in Grade 9 Math. It was found out that the least mastered skills were prove theorems on the different kinds of parallelogram (rectangle, rhombus, square), solve problems involving parallelograms, trapezoids and kites and solve problems that involve triangle similarity and right triangles. The three (3) least mastered skills or competencies were divided into 10 specific learning competencies and served as the objectives of the developed ten (10) CSIMs.

The developed CSIMs of the researcher also provided significant information to students through its unique features namely integration of Bicol culture, use of language learning strategies (LLS) and awareness of Disaster Risk Reduction and Management (DRRM). Each CSIM integrated the three (3) features in its different parts. Moreover, each CSIM integrated different cultures in Bicol, used language learning strategies in different ways and contained various relevant information that made students aware of the strategies in disaster risk reduction and management. Table 1 presents the features of the developed CSIMs together with the title and objective.

Table 2: *Matrix of the Features of the Developed Contextualized Strategic Intervention Materials (CSIMs)*

Least Mastered Skill	CSIM No. / Title	Objective	Features		
			Integration of Bicol Culture	**Use of LLS**	**Awareness of DRRM**
Prove theorems on the different kinds of parallelogram (rectangle, rhombus, square). (M9GE-IIIc-1)	**CSIM 1** Dora and Friends at City of Love	The learner proves theorem on rectangle.	• Tabak Festival and its events • Rectangular malls of Tabaco (Guide Card, Activity Card and Enrichment Card)	Memory, Compensatory, Cognitive, Social and Affective Strategy (All except Reference Card)	Earthquake's Trivia and Safety Measures (Enrichment Card)
	CSIM 2 Chili Vs. Zombies	The learner proves theorem on rhombus.	• Concept of chili and other famous spicy foods of Bicol • Different tourist spots in Albay (Guide Card, Activity Card and Assessment Card)	Memory, Compensatory, Cognitive, Social and Affective Strategy (All except Reference Card)	Typhoon Preparedness Tips (Enrichment Card)
	CSIM 3 Luffy's Adventure Around Bicol	The learner proves theorem on square.	• Famous beaches of the six provinces of Bicol region • Old beliefs about monsters (Activity Card and Assessment Card)	Memory, Compensatory, Cognitive, Social and Affective Strategy (All except Reference Card)	Tsunami Safety Tips (Enrichment Card)
Solve problems	**CSIM 4**	The learner solves	• Native abaca products of	Memory, Compensatory,	Heat Safety Tips

involving parallelograms, trapezoids and kites. (M9GE-IIIe-1)	ABACAdabra!	problems involving parallelogram.	Bicol (Guide Card, Activity Card and Assessment Card)	Cognitive and Social Affective (All except Reference Card)	(Enrichment Card)
	CSIM 5 Epic of Ibalong	The learner solves problems involving trapezoids.	• Epic of Ibalong: the three heroes of Bicol Region. (Activity Card and Assessment Card)	Memory, Compensatory, Cognitive, Social and Affective Strategy (All except Reference Card)	Flash Flood Survival Tips (Enrichment Card)
	CSIM 6 Pili Hunters	The learner solves problems involving kites.	• Concept of Pili and other pili products of Bicol (Activity Card and Assessment Card)	Memory, Compensatory, Cognitive, Social and Affective Strategy (All except Reference Card)	Fire Safety Tips (Enrichment Card)
Solve problems that involve triangle similarity and right triangles. (M9GE-IIIj-1)	**CSIM 7** Bring me to the past!	The learner solves problems on triangle similarity involving AA, SAS and SSS similarity theorems.	• Some of the famous places of Albay • Religious beliefs like "Alay Lakad" (Pilgrimage) (Activity and Assessment Card)	Memory, Compensatory, Cognitive, Social and Affective Strategy (All except Reference Card)	Tornado Safety Measures (Enrichment Card)
	CSIM 8 The Journey of Moana at Pink Beach	The learner solves problems on triangle similarity involving Triangle Angle Bisector Theorem and Triangle	• Pink Beach of Matnog, Sorsogon (Activity Card and Assessment Card)	Memory, Compensatory, Cognitive, Social and Affective Strategy (All except Reference Card)	Lightning Facts and Safety Rules (Enrichment Card)

		Proportionality Theorem.			
	CSIM 9 The Theory of Mayon Volcano	The learner solves problems involving Right Triangle Similarity Theorem and Pythagorean Theorem.	• The Legend of Mayon Volcano (Assessment Card) • Height and base diameter of Mayon Volcano (Enrichment Card)	Memory, Compensatory, Cognitive, Social and Affective Strategy (All except Reference Card)	Volcano Safety Measures and its Danger Zones (Enrichment Card)
	CSIM 10 Hidden Treasures in Hoyop – hoyopan Cave	The learner solves problems on right triangles involving 45-45-90 and 30-60-90 Right Triangle Theorem.	• Hoyop – hoyopan Cave of Camalig, Albay (Guide Card, Activity Card and Assessment Card)	Memory, Compensatory, Cognitive, Social and Affective Strategy (All except Reference Card)	Landslide Safety Measures (Enrichment Card)

The ten (10) developed Contextualized Strategic Intervention Materials featuring the integration of Bicol culture, use of language learning strategies and awareness of Disaster Risk Reduction and Management were used by the researcher in addressing the least mastered skills of Grade 9 students in the third quarter of Mathematics 9. The development of contextualized SIM was supported by Republic Act 10533 which states that "the curriculum shall be contextualized and global" and "the curriculum shall be flexible enough to enable and allow schools to localize, indigenize, and enhance (the curriculum) based on their respective educational and social contexts."

In terms of integrating Bicol culture, this study was supported by the study of Samaupan (2018). She found out that the students' performances improved after integrating their own culture in teaching Mathematics. The use of language learning strategies (LLS) in the developed CSIMs was also supported by the findings and recommendation of Habok and Magyar (2018). They found out that integrating language learning strategies in teaching and learning material had a positive impact on the students' attitudes and performance. Thus, they highly recommend the use of LLS. In the study of

Occcidental (2011), he recommended teachers to integrate DRRM to make students aware of the different hazards and how to respond to them.

3.2 Students' Significant Learning Experiences in Using the Contextualized Strategic Intervention Materials (CSIMs)

The significant learning experiences of students were gathered from their journal entries, teacher's observation and their responses to the focus group discussion conducted by the researcher. After generalizing the data gathered from the said sources, the researcher found out that the students significant learning experiences were the following: (a) students gained new experiences and developed into independent learners; (b) students learned effectively and found the topics easy to understand because of the use of the CSIM; (c) students became more interested in learning Math topics because of the features of the CSIM; (d) students appreciated problem solving because they are able to relate to these (problems); and (e) students enjoyed and felt comfortable in learning Math topics using the CSIM.

3.3 Effect of Contextualized Strategic Intervention Materials on Students' Conceptual Understanding

Conceptual understanding is the ability of the students to use existing knowledge in generalizing new ideas as well as applying what they have learned to different situations. This is knowing more than isolated facts and methods (Fosnot, C.). With proper development of the students' conceptual understanding, they can apply their learning across different domains. For this study, the students' conceptual understanding was developed through the use of the developed 10 CSIMs. Within the researcher-made test, two types of pre and posttest were involved - the summative test and formative tests. The summative pretest was used to identify the one group respondents of the study from which the remediation process will focus while the summative posttest was used to compare the scores of students before and after the use of all the developed CSIMs. Additionally, the formative pre - posttests along the remediation process were also used to know the effect of CSIMs on the students' conceptual understanding. The summative pre - posttest was composed of 50 items and was conducted to students twice, before and after the implementation of all CSIMs while the formative pre - posttests were composed of 10 items each and was conducted to students before and after the remediation process. Table 2 presents the number of students (n) who undergone remediation in every session, the mean scores of the students' conceptual understanding and their performance levels on each learning competency before and after the use of CSIMs.

Table 3: *Results of Students' Performance in Formative Assessments along Conceptual Understanding*

CSIM No.	Learning Competency	n	Pretest				Posttest				Mean Gain
			$\bar{x}$	s.d.	PL		$\bar{x}$	s.d.	PL		
					%	Q_1			%	Q_2	
1	Prove theorems on rectangle. (10)	27	4.96	1.60	50	LM	7.59	1.08	76	M	2.63
2	Prove theorems on rhombus. (10)	20	5.50	1.60	55	NM	8.45	1.08	85	NFM	2.95
3	Prove theorems on square. (10)	13	5.69	1.55	57	NM	8.46	1.27	85	NFM	2.77
4	Solve problems involving parallelograms. (10)	11	6.27	0.90	63	NM	8.55	0.82	85	NFM	2.28
5	Solve problems involving trapezoids. (10)	17	5.76	1.20	58	NM	8.41	0.94	84	NFM	2.65
6	Solve problems involving kites.(10)	11	6.27	2.12	63	NM	9.45	0.69	95	FM	3.18
7	Solve problems on triangle similarity involving AA, SAS, and SSS similarity theorems. (10)	13	5.62	1.26	56	NM	8.62	0.96	86	NFM	3.00
8	Solve problems on triangle similarity involving Triangle Angle Bisector Theorem and Triangle Proportionality Theorem. (10)	11	5.91	0.94	59	NM	9.18	0.75	92	FM	3.27
9	Solve problems involving Right Triangle Similarity Theorem and Pythagorean Theorem. (10)	11	5.64	1.12	56	NM	9.45	0.69	95	FM	3.81
10	Solve problems on right triangles involving 45 - 45 - 90 and 30 - 60 - 90 Right Triangle Theorem. (10)	17	5.76	1.95	58	NM	8.88	0.93	89	NFM	3.12
	Total (100)		57.38	13.74	57	NM	87.04	9.16	87	NFM	**29.66**

The table shows that the students' mean scores on each learning competency have improved and were less disperse after using the CSIMs. The table also shows the number of students who took remediation in each learning competency. The number of students subjected for remediation varies depending on their scores in the formative pretest. Also, the table reveals the transitioned of students' performance level before and after the use of CSIMs.

Generalizing the students' performance in the formative assessments (pretest and posttest), the students' general mean score increased during the posttest that is from 57.38 (Near Mastery) to 87.04 (Near Full Mastery) with a mean gain of 29.66 and performance level of 87% (Near Full Mastery). The students' scores during the posttest were also less dispersed compared to their pretest scores that is from a standard deviation of 13.74 to 9.16. Based from these data gathered, we can conclude that the students have shown improvement under conceptual understanding after they use the developed Contextualized Strategic Intervention Materials. This implies that using the developed CSIMs, students can gain mastery of the identified least mastered skills or competencies. Likewise, gaps among the students conceptual understanding performance can diminish using this material. This claim was supported by the study of Gregorio (2011) that developed contextualized SIM has a positive effect on the students' conceptual understanding and performance. Cernechez (2014) found in her study that there was an increase in the students' understanding and improvement in the competency level of students in Math after the implementation of SIM. Also, Rañada (2011) found out that his SIMs were effective as remediation instructional materials and has a positive effect on addressing the students' least mastered competencies or skills in Math. Furthermore, Maniscan (2018) affirmed that the use of contextualized material resulted to a higher performance level (PL) of students.

To further support these findings under conceptual understanding, the results of the summative assessments (pretest and posttest) were computed, analyzed and interpreted. Table 3 presents the mean scores of the student's conceptual understanding in each learning competency before and after the implementation of the developed CSIMs. The table also includes the dispersion of the students' scores.

Table 4: *Results of Students' Performance in Summative Assessments along Conceptual Understanding*

Learning Competency	Pretest				Posttest				Mean Gain
	$\bar{x}$	s.d.	PL		$\bar{x}$	s.d.	PL		
			%	Q_1			%	Q_2	
Prove theorems on the different kinds of parallelogram (rectangle, rhombus, square). (15)	4.66	1.86	31	LM	13.92	1.36	93	FM	9.26

Solve problems involving parallelograms, trapezoids and kites. (18)	4.71	2.20	26	LM	14.55	1.95	81	M	9.84
Solve problems that involve triangle similarity and right triangles. (17)	4.03	2.10	24	NoM	11.95	2.66	70	NM	7.92
Total (50)	13.40	4.54	27	LM	40.42	4.29	81	M	**27.02**

The table shows that the students' mean scores on each learning competency have improved and were less disperse after using the CSIMs. The table also reveals that the students transitioned from having low mastery (31%) on the first learning competency to full mastery (93%). While from having low mastery (26%) on the second learning competency the students gained mastery (81%). Lastly, from having no mastery (24%) on the third learning competency the students have transitioned to having near mastery (70%). Furthermore, the students' general mean increased during the posttest that is from 13.40 to 40.42 with a mean gain of 27.02 and performance level of 81% (Mastery). Wherein four (4) or 11% of the students gained "Full Mastery" under conceptual understanding, 12 or 32% gained "Near Full Mastery", 13 or 34% gained "Mastery", and 9 or 24% gained "Near Mastery".

The students' scores during the posttest were also less dispersed compared to their pretest scores that is from a standard deviation of 4.54 to 4.29. The table shows that the standard deviation of scores on the first and second learning competencies have improved and were less disperse after using the CSIMs. However, in the third learning competency, the standard deviation had increased from 2.10 to 2.66. This implies that the students' scores in the posttest became more dispersed. This result showed that there were students who got a very high score in the posttest while there were also students who got very low score in the posttest. The increased of the standard deviation may be attributed to the low retention level of some students especially posttest covers all the topics and were given at the last day of implementation period. The performance level (PL) of students in the third learning competency was also supported by this result. Fortunately, despite the increased in the dispersion of scores in the posttest, the students' performance level still increased from 24% (No Mastery) to 70% (Near Mastery). Additionally, based on the result of paired t - test, there is a significant difference between tabulated data in the pretest and posttest ($p>0.05$). This implies that the materials used helped in improving the students conceptual understanding. Furthermore, by analyzing the summative pretest and posttest scores of students who undergone the remedial process for more than 6 sessions, it was found that there was an improvement in their conceptual understanding and performance level after they undergone a series of remediation. The performance level (PL) of Student

4 who consistently undergone remediation for 10 sessions transitioned from having no mastery (12%) to having near full mastery (90%). Also, for 2 students (student 1 and 28) who undergone the remedial process 7 times, there was also an evident improvement in their performance level. Student 1 transitioned from having no mastery (12%) to having mastery (82%) while Student 28 transitioned from having no mastery (14%) to having full mastery (94%).

This improvement implies that the process of remediation using the developed CSIMs helped low performing students to gain mastery of the learning competency. This claim was supported by the study of Aydeniz and Pabuccu (2011). They investigated the effect of remediation using formative tests on the students' conceptual understanding and found that formative tests led to significant learning gains and had a positive impact on students' conceptual understanding.

4. Conclusion and Recommendation

Based from the results of the study, it can be concluded that the used of Contextualized Strategic Intervention Materials (CSIMs) developed by the researcher have improved the students conceptual understanding based on the results of the formative and summative assessments. Also, the students gained significant learning experiences in using the CSIMs. This claim was supported by the students' responses in their journal, focus group discussion responses and teacher's observation. With this results, future researchers can develop more Contextualized Strategic Intervention Materials (CSIMs) however they must consider first the students' context so that the material will be more meaningful to students.

In accordance with the findings and conclusions drawn from the study, the following are recommended: (a) 1. Teachers may use the developed Contextualized Strategic Intervention Materials (CSIMs) featuring the integration of Bicol culture, use of language learning strategies and awareness of Disaster Risk Reduction and Management to address the least mastered skills of students in Math and promote meaningful learning, (b) developed intervention materials can be further improved by considering other features and subject areas, (c) study may be replicated to validate the reliability of the results and find more significant learning experiences of students in using the intervention materials, (d) teachers should be given an allotted time to make their own or collaborate with their co – teachers in coming up with Contextualized Strategic Intervention Materials having suitable features that can help students improve their concept formation, (e) teachers may be encouraged to attend more trainings in developing a student friendly learning material, and (f) future researchers should formulate

more contextualized intervention materials in addressing students' least mastered skills and exploring effects of other variables.

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