

# Perceived Challenges, Interventions, and Numeracy Learning Gaps and Losses in Distance Learning in District III of Olongapo City, Philippines: A Basis for Intervention Programs

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**Abstract:** COVID-19 pandemic had caused change in the way of learning and instruction as governments decided to shut schools down and adapt distance learning due to health and safety concerns. This study intended to identify the perceived challenges in teaching numeracy ensuing the implementation of distance learning to serve as bases for the development of future intervention programs. To test the hypothesis, the researcher surveyed the randomly selected elementary teachers and Mathematics coordinators in eight (8) schools in District III of the Schools Division of Olongapo City. Findings suggested that the teachers often meet challenges in addressing learning gaps on numeracy and they always meet challenges in the accessibility to learning resources. It also suggested that teachers share the same challenges in teaching numeracy and always apply interventions to establish health and safety protocols, mitigate the number of non-numerates, prepare teaching materials, and increase collaboration with the stakeholders. Based on the findings, the researcher recommended that teachers in District III of Olongapo City may further pursue their studies. Teachers may also continue monitoring learners' progress and work in collaboration with parents and other stakeholders. Teachers may as well determine the best possible instructional strategy in terms of their present learning status such as remedial programs that provide learners with assistance necessary to meet academic needs. Other factors that influence teachers' challenges may also be identified to lessen the number of non-numerates.

**Keywords:** challenges in numeracy, gaps and losses in numeracy, learning interventions.

## 1. Introduction

In 2020, the COVID-19 pandemic caused disruptions in people's daily lives including education. It changed the way of learning and instruction as the governments of different countries around the world decided to shut schools down due to health and safety concerns. National government have had to take radical measures such as social distancing (social isolation), quarantine practices, marital law, travel, and education restrictions to control the spread of the outbreak (Bourouiba, 2020).

The threat brought about by the Covid-19 pandemic had

made a huge impact not only on the country's health and economic aspect, but it also hardly hit the education system of the world at large (Alvarez, 2020). According to Telli, Yamamoto, and Altun (2020), education is the sector mostly affected by Covid-19 after the health sector. The closure of schools and universities during the pandemic affected many students (Zhong, 2020). Moreover, the pandemic had caused our country's education system to shift and adapt to different modalities in distance learning including but not limited to online learning, digital learning, blended learning, and modular/printed learning. Educational inequalities have further exacerbated earlier existing differences (Dorn et al., 2020), as families have been more strongly involved in the education of their children (Bubb & Jones, 2020). In turn, children from less education and poor families (Engzell et al., 2021) and younger children (Tomasik et al., 2021) who need instruction in school readiness were more affected by the pandemic-related school closures. Hence, the implementation of distance learning was proposed to ensure the continuity of learning amidst the pandemic.

Distance education is considered as a promising innovation with its flexible learning environments (Allen et al., 2010). Distance learning or distance education is a computer-based teaching method in which the interaction between students and education practitioners is provided from a certain center in cases where classroom education cannot be performed due to limitations in general education and training process (Eygü & Karaman, 2013; Moore, Deane, & Galyen, 2011).

This study aimed to identify the perceived challenges in teaching numeracy to intermediate level (Grades 4, 5, and 6) learners in District III of the Division of Olongapo City ensuing the implementation of distance learning to serve as bases for the development of future intervention programs. This study also aimed to suggest ways on how these schools may enrich their existing teaching strategies to enhance the numeracy skills of the students which is found to be one of the detriments of their learning.

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Table 1  
Frequency and distribution of the respondents

Elementary Schools	Total Population	Frequency of Elementary Teachers	Frequency of Elementary Math Coordinators
Asinan	24	4	1
Banicain	24	4	1
East Bajac-Bajac	19	3	1
Gordon Heights I	79	10	1
Ilalim	17	4	1
Kalalake	63	10	1
SPED-G	17	3	1
Tapinac	26	4	1
<b>Total</b>	<b>269</b>	<b>42</b>	<b>8</b>

Table 2  
Reliability test for instrument

Perceived Challenges Met in Teaching Numeracy	Cronbach's Alpha	No. of Items
Changes in Teaching and Learning Environment	.824	5
Learners' Readiness	.733	5
Accessibility to Learning Resources	.729	5
Availability of Support System	.819	5
Interventions Applied in Teaching Reading	Cronbach's Alpha	No. of Items
Establishing Health and Safety Protocols	.898	5
Mitigating the Number of Non-Numerates	.864	5
Preparation of Teaching Materials	.725	5
Increasing Collaboration with Stakeholders	.738	5

## 2. Methods

*Research Design:* The study used the combination of Qualitative and Quantitative research design since it focused on the perceived challenges of teachers in teaching numeracy following the implementation of distance learning. Fraenkel & Wallen (2009) defined Quantitative research as an inquiry into a social problem, explaining phenomena by gathering numerical data that are analyzed using mathematically based methods e.g., in particular statistics. In this study, the researcher will utilize an evaluation checklist for measuring the instrument in collecting data for the respondent's profile and perspectives. It is much easier to identify and assess using a survey questionnaire. According to the Government Design Service Manual (2016), Qualitative research is exploratory or interrogative research and tries to get "under the surface". It is an inquiry process of understanding based on distinct methodological traditions of inquiry that explore a social or human problem (Creswell, 2014).

*Respondents:* Among the total participants, 42 were chosen to answer the prepared evaluation checklists of the researcher. The study also included 8 Mathematics Coordinators who were also asked to answer an eight-question evaluation questionnaire related to the perceived challenges and interventions addressing the learning gaps and losses in numeracy following the implementation of distance learning. All the teacher respondents were public school teachers who were from the same chosen elementary schools in District III of the Division of Olongapo City, Zambales, Philippines including Asinan, Banicain, East Bajac-Bajac, Gordon Heights I, Ilalim, Kalalake, SPED-G, and Tapinac.

*Instrument:* A researcher-made questionnaire was utilized by the researcher for the data gathering process to get qualitative and quantitative data. The questionnaire was used to determine the perceived challenges in teaching reading numeracy following the implementation of distance learning. Respondents' profiling was gathered to support the researchers'

data. A four-point scale was used to which the respondents will be asked to check whether the statements happen or are true to them always, sometimes, rarely, and never. Open-ended questions were also given to the 8 Mathematics Coordinator participants to solicit their answers.

The survey questionnaires were all subjected to validation before submission to the panel of examiners. Upon the approval, the questionnaires were administered to all the intended respondents of the study. The result of the reliability test for the instrument is presented in Table 2.

It can be seen on Table 2 that the Cronbach's alpha coefficient in all of the variables have values that are greater than 0.7 which indicates consistency and intercorrelation among the items in each of the variables; hence reliability of the instrument. This prompted the researcher to use the instrument for actual data collection.

## 3. Results and Discussion

*Profile of Teachers:* Profile variables were hypothesized in this study to influence the teachers' perceived challenges in teaching numeracy to the learners. Table 3 presents the frequency and percentage distribution of teacher respondents in terms of age, sex, highest educational attainment, grade level handled and length of teaching service.

Greater proportions (23.81% or 10 out of 42) of the teacher respondents belong to both age ranges 29 – 34 and 35-40 while five (11.90%) are 23 – 28 years old. The mean age 38.60 years indicates that the respondents are middle adults. This is in accordance to Paretts (2018) who updated that mid-adulthood stage ranges from age 31 – 50. Majority (73.81% or 31 out of 42) of the teacher respondents are female and there were 9 (10.47%) male. This indicates that the teachers in District III Olongapo City are mostly represented by female educators. This finding adheres to the findings of Ladea (2021) that teacher population in Olongapo is mostly represented by female educators. Majority (71.43% or 30 out of 42) of the teacher respondents are bachelor's degree level and two (4.76%) of

Table 3  
Frequency distribution and percentage of teacher respondents

Variable	Category	Frequency	%
Age in years (Mean=38.60)	23 – 28	5	11.90
	29 – 34	10	23.81
	35 – 40	10	23.81
	41 – 46	9	21.43
	47 and above	8	19.05
Sex	Male	11	26.19
	Female	31	73.81
Highest Educational Attainment	Baccalaureate Degree	30	71.43
	Masteral Degree	10	23.81
	Doctoral Degree	2	4.76
Grade Level Handled	Grade IV	13	30.95
	Grade V	16	38.10
	Grade VI	13	30.95
Length of Teaching Service	1 – 10	23	54.76
	11 – 20	10	23.81
	21 – 30	7	16.67
	31 – 40	2	4.76

Table 4  
Changes in teaching and learning environment

Indicators	Wt. Mean	Qualitative Interpretation
I find no problem in preparing my classroom for the transitioning of classes from distance to face-to-face learning.	3.12	Often
I can easily comply with the needed requirements stated in the safety guidelines for classroom validation.	3.55	Always
I can effortlessly create a space that can match the age, level, and needs of my students.	3.24	Often
I can easily manage my classroom to accommodate even a large number of students who transitioned from distance to face-to-face learning.	3.33	Often
I find my classroom more conducive for the learners than the other distance learning platforms.	3.74	Always
<b>Composite</b>	<b>3.39</b>	<b>Often</b>

Table 5  
Learners’ readiness

Indicators	Wt. Mean	Qualitative Interpretation
I find that the students are physically, emotionally, and mentally ready for the transitioning of the classes from distance to face-to-face learning.	3.17	Often
I see the need for the implementation of psychosocial education at the beginning of the school year.	3.48	Often
I can observe that the students are performing in class according to their age and grade level.	3.29	Often
I can observe that the scores of the students in numeracy assessments matches the supposed scores for their age and grade level.	3.10	Often
I see that some students are still adjusting on the new way of lesson delivery after the transition of classes.	3.33	Often
<b>Composite</b>	<b>3.27</b>	<b>Often</b>

them already are doctoral degree holders. This indicates that the math teachers in the district needs to pursue graduate program courses. Greater proportion (38.10% or 16 out of 42) of the teacher respondents handle grade five levels and there are equal proportion (30.95% or 13 out of 42) of teachers that teaches grade four and grade six. Majority (54.76% or 23 out of 42) of the teacher respondents have been the teaching for 1-10 years while two (4.76%) of the teachers have been in the teaching service for 31 – 40 years.

*A. Perceived Challenges in Addressing the Learning Gaps in Numeracy*

*Changes in Teaching and Learning Environment:* Table 4 presents the mean analysis on the perceived challenges in terms of changes in teaching learning environment.

It can be seen on Table 4 that the teachers garnered the highest mean rate of 3.74 which indicates that they Always find their classrooms more conducive for the learners than the other distance learning platforms. This supports the study findings of Zinsser, et al. (2023) indicating that teachers continually strive to create positive classroom environment that are conducive to learning. They had the lowest mean rate of 3.12 which indicates

that they Often find no problem in preparing their classrooms for the transitioning of classes from distance to face-to-face learning.

The composite value 3.39 indicates that the teachers Often meet the challenges in addressing the learning gaps on numeracy in terms of the changes in teaching learning environment. They often can effortlessly create a space that can match the age, level, and needs of their students and easily manage my classroom to accommodate even a large number of students who transitioned from distance to face-to-face learning.

*Learners’ Readiness:* This refers to the ability of a learner to acquire knowledge and initiate in behavior change which lead to effective and successful learning outcomes. Table 5 presents the mean analysis on the challenges met in teaching numeracy in terms of learners’ readiness.

The teachers Often (3.48) see the need for the implementation of psychosocial education at the beginning of the school year. They garnered a lowest rating of 3.10 which indicates that they Often observe that the scores of the students in numeracy assessments matches the supposed scores for their age and grade level. The composite value 3.27 indicates that the

Table 6  
Accessibility to learning resources

Indicators	Wt. Mean	Qualitative Interpretation
I have to prepare new sets of instructional materials for teaching numeracy aligned the suggested Most Learning Competencies	3.62	Always
I find it necessary to provide more suitable materials for teaching reading to Non-numerates, Nearly Numerates, and Numerates learners.	3.64	Always
I craft additional materials to supplement the need for inadequacy of teaching materials.	3.55	Always
I can easily have access to the prescribed materials available online through LRMDs.	3.40	Often
I can directly have access on the available materials from the school’s Learning Resource Center (LRC)	3.55	Always
<b>Composite</b>	<b>3.55</b>	<b>Always</b>

Table 7  
Availability of support system

Indicators	Wt. Mean	Qualitative Interpretation
I can ask support from the administration for the needed materials necessary for teaching numeracy.	3.45	Often
I can easily ask for assistance with my co-teachers in executing learning practices with the students.	3.52	Always
I receive additional support from the school’s community stakeholders and other LGUs.	3.05	Often
I could easily communicate with the parents and guardians regarding the progress of the learners.	3.52	Always
I seek the active support of the parents and guardians in the implementation of the learning recovery programs.	3.52	Always
<b>Composite</b>	<b>3.41</b>	<b>Often</b>

Table 8  
ANOVA on perceived challenges met in teaching numeracy after the implementation of distance learning across profile variables

Profile Variables	Changes in Teaching and Learning Environment		Learners’ Readiness		Accessibility to Learning Resources		Availability of Support System	
	F	Sig.	F	Sig.	F	Sig.	F	Sig.
Age ( <i>df</i> =4, 37)	1.572	.202	.441	.778	.237	.916	.626	.647
Sex ( <i>df</i> =1, 40)	.071	.792	.183	.671	.482	.492	.083	.775
Highest Educational Attainment ( <i>df</i> =2, 39)	.131	.877	.508	.606	.118	.337	.084	.920
Grade Level Handled ( <i>df</i> =2, 39)	.601	.554	1.450	.247	.290	.750	.802	.456
Length of Teaching Service ( <i>df</i> =3, 38)	.519	.672	.727	.542	.810	.496	.829	.486

teachers often meet challenges in addressing learning gaps in numeracy considering the readiness of the learners. They often find that the students are physically, emotionally, and mentally ready for the transitioning of the classes from distance to face-to-face learning and see that some students are still adjusting on the new way of lesson delivery after the transition of classes. These support the findings of Atweh, et al. (2023) in their study stating that disruptions may give rise to opportunities for imagining thinking about purposes of mathematics education, its teaching and learning, and the preparation of teachers.

*Accessibility to Learning Resources:* Table 6 shows the mean analysis on the challenges met by the teachers in addressing learning gaps in numeracy in terms of accessibility to learning resources.

The teachers garnered a highest mean rate of 3.64 which indicates that they Always find it necessary to provide more suitable materials for teaching the non-numerates, nearly numerates, and numerates learners. They had a lowest rating of 3.40 indicating that they Often can easily have access to the prescribed materials available online through LRMDs. The composite value 3.55 indicates that the teachers Always meet challenges in addressing learning gaps in numeracy. They must prepare new sets of instructional materials for teaching numeracy aligned the suggested most learning competencies and craft additional materials to supplement the need for inadequacy of teaching materials.

Math Coordinator #1 stated that *“there are limited instructional resources and self-learning modules or materials.”*

Math Coordinator #3 added that *“there is a big challenge in encountered in using devices such as laptops and computers because of the lack of technical skills among the math teachers in creating materials in teaching numeracy.”*

Math Coordinator #8 further stated that *“the distance education offered individual educational environments that are independent from time and space with the support web-based platforms and technologies. The difficulties I noted and observed was in catering different learning level and styles, lack of effective communication especially to parents for follow-up on the given lessons. It is also difficult for the teachers to engage and motivate the learners holding them accountable to the materials provided.”*

*Availability of Support System:* Table 7 shows the mean analysis on the challenges met in terms of availability of support system.

The teachers had the highest mean rate of 3.52 which indicates that they Always can easily ask for assistance with my co-teachers in executing learning practices with the students, communicate with the parents and guardians regarding the progress of the learners and seek the active support of the parents and guardians in the implementation of the learning recovery programs. The lowest mean rate 3.05 indicating that they Often receive additional support from the school’s community stakeholders and other LGUs.

The composite value 3.64 indicates that the teachers Often meet challenges in addressing the learning gaps in numeracy in terms of the availability of support system. They often can ask support from the administration for the needed materials

Table 9  
Establishing health and safety protocols

Indicator	Wt. Mean	Qualitative Interpretation
I ensure the establishment of the safety and health protocols in class as well as the posting of all signage in the room.	3.88	Always
I see to it that the implemented health and safety protocols in class are being followed by all the learners.	3.79	Always
I create a more conducive learning environment by providing a learning corner suitable for honing the numeracy skills of the learners.	3.74	Always
I always check the availability of classroom supplies and materials for the use of the students.	3.79	Always
I incorporate new innovations in my classroom to support the development and honing of students' numeracy skills.	3.67	Always
<b>Composite</b>	<b>3.77</b>	<b>Always</b>

Table 10  
Mitigating the number of non-numerates

Indicator	Wt. Mean	Qualitative Interpretation
I schedule learning recovery practices to the learners especially for those identified as Non-Numerates and Nearly Numerates.	3.55	Always
I apply new strategies in teaching numeracy to the learners.	3.60	Always
I incorporate innovative approaches in the delivery of my lessons.	3.52	Always
I allot time extensions for learning recovery practices to ensure the inculcation of learning to students.	3.60	Always
I try to discover new ways of effective teaching numeracy to different levels of learners through online trainings and seminars.	3.71	Always
<b>Composite</b>	<b>3.59</b>	<b>Always</b>

necessary for teaching numeracy.

*Difference on Teachers' Challenges Met in Teaching Numeracy when Grouped According to Profile Variables:*

At .05 level, the researcher hypothesized the influence of the profile variables of teachers on their perceived challenges in teaching numeracy after the implementation of the distance learning modality. Table 12 presents the summarized analyses of variances on teachers' perceived challenges met when they are grouped according to profile variables.

It can be seen on Table 8 that in terms of all the perceived challenges in terms of the changes in teaching and learning environment, learners' readiness, accessibility to learning resources and availability of support system, all of the profile variables have significance values that are greater than the set alpha level. This signifies acceptance of the null hypothesis; hence, there are no significant differences on the challenges that teachers met in teaching numeracy after the implementation of the distance learning modality when they are grouped according to profile variables. It implies that teachers of different age meet the same challenges in teaching numeracy. Additionally, teacher of different sex groups does not vary in their perceived challenges in teaching numeracy. Furthermore, the educational attainment, grade level handled, and the length of teaching service does not influence teachers' perceived challenges in addressing the learning gaps in numeracy.

*Interventions Applied in Teaching Numeracy:*

*Establishing Health and Safety Protocols:*

It can be seen on Table 9 that the teachers had the highest mean rate of 3.88 which indicates that they Always ensure the establishment of the safety and health protocols in class as well as the posting of all signage in the room. The lowest mean rate 3.67 indicates that they Always incorporate new innovations in my classroom to support the development and honing of students' numeracy skills.

Math Coordinator #2 stated: "... we develop plans for learners to keep them engaged and making sure learners follow the protocols all the times.

"... we enforced social distancing, temperature check and wearing of face mask at all times and provide hand washing stations, and proper ventilation of the rooms, as well setting up physical barriers, markers and signages." - Math Coordinator #5 added.

The composite value of 3.77 indicates that the teacher Always maintain establish the health and safety protocols while teaching numeracy.

They create a more conducive learning environment by providing a learning corner suitable for honing the numeracy skills of the learners and always check the availability of classroom health and sanitation supplies and materials for the use of the learners.

*Mitigating the Number of Non-Numerates:* Table 10 presents the intervention that teachers apply to mitigate the number of non-numerates in their classes.

It can be seen on Table 10 that the teachers had the highest mean rate of 3.71 which indicates that they Always try to discover new ways of effective teaching numeracy to different levels of learners through online trainings and seminars. The lowest mean rate 3.52 indicates that they Always incorporate innovative approaches in the delivery of my lessons. The composite value of 3.59 indicates that the teachers Always apply the interventions needed to mitigate the number of non-numerates. They schedule learning recovery practices to the learners especially for those identified as non-numerates and nearly numerates and allot time extensions for learning recovery practices to ensure the inculcation of learning.

*Preparation of Teaching Materials:* Table 11 presents the interventions applied by the teachers in terms of preparation of teaching materials.

The teachers had the highest mean rate of 3.64 which indicates that they Always ensure the conduct of assessment to students to gauge their learning progress while under the implementation of the LRP. The lowest mean rate 3.21 indicates that they Often propose projects connected with improving the numeracy skills of our learners.

Table 11  
Preparation of teaching materials

Indicator	Wt. Mean	Qualitative Interpretation
I propose projects connected with improving the numeracy skills of our learners.	3.21	Often
I craft my own supplementary materials for teaching numeracy based on the assessed level of my students.	3.60	Always
I seek advice from my colleagues on which materials are better to use in teaching numeracy.	3.57	Always
I ensure the conduct of assessment to students to gauge their learning progress while under the implementation of the LRP.	3.64	Always
I develop my own monitoring sheet to continuously observe the needs and progress of the learners.	3.52	Always
<b>Composite</b>	<b>3.51</b>	<b>Always</b>

Table 12  
Increasing collaboration with stakeholders

Indicator	Wt. Mean	Qualitative Interpretation
I give updates to the parents and guardians regarding the progress of their children.	3.79	Always
I keep record on the development of my learners' progress and ensure its availability whenever it's asked for checking.	3.64	Always
I involve the community in my proposed projects for developing the numeracy skills of the learners.	3.45	Often
I make an honest reporting on the observed and assessed improvements of the learners.	3.71	Always
I include parental training and seminars in teaching numeracy for their children as part of my proposed project in developing and honing the numeracy skills of the learners.	3.31	Often
<b>Composite</b>	<b>3.58</b>	<b>Always</b>

The teachers had the highest mean rate of 3.64 which indicates that they Always ensure the conduct of assessment to students to gauge their learning progress while under the implementation of the LRP. The lowest mean rate 3.21 indicates that they Often propose projects connected with improving the numeracy skills of our learners.

The composite value of 3.51 indicates that the teacher Always prepare their teaching materials to address the learning gaps in numeracy. They craft their own supplementary materials for teaching numeracy based on the assessed level of my students and develop their own monitoring sheet to continuously observe the needs and progress of the learners.

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*Increasing Collaboration with Stakeholders:* Table 12 presents the interventions applied by the teachers in increasing collaboration with stakeholders.

It can be seen on Table 12 that the teachers had the highest mean rate of 3.79 which indicates that they Always give updates to the parents and guardians regarding the progress of their children. The lowest mean rate 3.31 indicates that they Often include parental training and seminars in teaching numeracy for

their children as part of my proposed project in developing and honing the numeracy skills of the learners. The composite value of 3.58 indicates that the teachers Always implement interventions to increase collaboration with the stakeholders.

Math Coordinator #5 stated: *"...we build interest and motivation and explaining to them during PTA and homeroom assembly that school needs climate improvements for the learners in a positive force and we develop family friendly policies and laws to encourage participation by diverse families. provide training for stakeholders and parent.*

Moreover, the teachers always keep record on the development of their learners' progress and ensure its availability whenever asked for checking and make an honest reporting on the observed and assessed improvements of the learners.

Math Coordinator #8 added: *"...we provide stakeholders with the data information they need to be productive partners around students' achievement, traditional involvement such as parent training, homework assistance, and general volunteering and we create reliable communication channels between school and home to communicate with families about school program and student progress.*

**4. Conclusion**

From the findings of the study, the researcher draws the following conclusions: *First*, a typical teacher in the public elementary schools of District III Olongapo City is a mid-adult female, a graduate of bachelor's degree handling grade five level who had been in the teaching service for at least a decade. *Second*, the teacher often meets challenges in addressing learning gaps on numeracy on the changes in teaching and learning environment, learners' readiness and availability of support system and they always meet challenges in the accessibility to learning resources. *Third*, the teachers share the same challenges in teaching numeracy regardless of age, sex, educational attainment, grade level handled and length of teaching service. *Fourth*, the teachers always apply interventions to establish health and safety protocols, in

mitigating the number of non-numerates, in the preparation of teaching materials and in increasing the collaboration with the stakeholders.

#### Recommendation:

From the findings and conclusions drawn, the researcher recommends following actions.

1. The teachers in District III Olongapo City may pursue graduate program degrees in order to acquire advancement professionally.
2. Teachers may continue to monitor learners' progress after the conduct of math practices and form them with a habit of solving math problems.
3. Other factors that influence the teachers' challenges in addressing the learning gaps in numeracy may be identified in order to minimize and eliminate these factors and consequently, lessen the number of non-numerates.
4. The teachers may continuously work in collaboration with parents and other stakeholders for an effective implementation of the programs addressing the learning gaps in numeracy after the distance learning modality.
5. They may continue to determine the best possible instructional strategy for learners in terms of their present learning status such as remedial programs that provide learners with assistance necessary to meet academic needs.
6. A follow-up study on the learning gaps in numeracy may be conducted to validate the result of this research.

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