STRENGTHENING COMPUTATIONAL SKILLS IN GRADE 9 ECONOMICS THROUGH READ ANALYZE DISCUSS APPLY REACT (RADAR) APPROACH

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Strengthening Computational Skills in Grade 9 Economics Through Read Analyze Discuss Apply React (RADAR) Approach

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Abstract

Learners' performance when it comes to computations has been a major concern, especially during this time of pandemic wherein modular mode of learning is the most convenient way for many. Without the presence of teachers to guide them in their tasks, learners have difficulty grasping salient skills. The study was conducted to determine the effectiveness of Read, Analyze, Discuss, Apply, and React (RADAR) to the computational skills in Araling Panlipunan Economics. The study utilized a quasi-experimental research design which was participated by 54 Grade 9 learners. The pretest and post-test were analyzed using a scale and t-test. The level of computational skills for the quantity of supply, demand, and price of the learners before the intervention is "beginning" that improved after the implementation of the intervention in the experimental group to "advance" which means the learner shows mastery of the given competency; and "proficient" indicating the learner has developed knowledge and skills needed for the competency in the control group. However, for the computation skill on the elasticity of supply and demand, the level remained to be "beginning" which means the learner struggles to understand the competency. Subsequently, there is a significant difference between the pre-test and post-test scores of learners in the experimental group. Moreover, a significant difference in the post-test scores between the control group and experimental group manifested. Therefore, alternative ways of delivering the lesson, such as modular with RADAR approach helped both the learner and teacher accomplish the lesson targets.

Keywords: demand, supply, elasticity, price, economics lesson

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mdg

Context and Rationale

With all aspects of life affected by the COVID-19 pandemic, education systems around the world became one of the early casualties. According to the report by the UNDP (2020), 94 percent of the learners from pre-primary to higher education were affected worldwide. Many missed learning opportunities, social interaction (UNICEF, 2020). Because of the situation, pandemic response meant to curtail the negative effects of COVID-19 to education resulted in unintended consequences (McDonald, 2021).

In the Philippines, there was a major overhaul in the entire education system. Basic education is heavily affected as schools are not allowed to conduct face-to-face classes to protect the health, safety and wellbeing of learners, teachers and school personnel. With this, in response to the basic education challenges caused by COVID-19, the Department of Education (DepEd) through the DepEd Order 12 s. 2020 developed and adopted the BE-LCP for the S.Y. 2020 – 2021. To alleviate major problems, distance learning modalities were introduced. Among which are the following: online, blended, and modular. However, distance learning can be considered a sudden transition of the education system to a new state of crisis (Korolkov et.al., 2020).

In rural areas, modular learning is implemented due to difficulties in internet connectivity and most families do not have digital televisions for blended learning. The advantage of the modular teaching approach is that learners can independently study the proposed program, including goals, objectives, theoretical information, practical exercises and final tests (Bashmakova, 2014). On the other hand, significant negative effects may be felt if classes are not done under direct supervision of the teacher. Modular learning may cause self- isolation, lack of personal and social contacts, and no physical interaction between teachers and students which can eventually also cause inability to master some competencies and skills (Korolkov et.al., 2020). For academically challenged learners who need explanation from teacher, they would just give up solving or learning. In worst scenarios, these may cause depression and even suicide (Rosenbaum, 2021).

Economics is one of the subjects with difficult competencies. One of the salient skills in the subject involved computational skills. As with the other subjects that require computational skills, it is always observed that students have low performances when it comes to dealing with numbers (URT,2008). Even with the presence of teachers available to teach, the low performances are reflected in scores. In this time of pandemic that there is no physical presence from the teachers to teach, this gave the researcher the realization that new approaches to teaching and learning must be done to address this gap.

In the school, the teachers are always getting feedback from both parents and students. Because of the difficult competencies, a request of visit from the teachers are suggested so to have them explain the lesson to the learners. However, given the quarantine status of the community, face-to-face is not yet allowed. There is a need to think of a way on how to better communicate with the learners while letting them grasp competencies needed for the lesson. Thus, the research is conducted to determine an approach that could address the problem on computational skills of learners.

The findings of the study could be used by teachers in teaching economics or as basis for identifying strategies or approaches in teaching their lesson. The school can use the result to benchmark best practices in distance learning, interventions, remediations and enhancement programs. It can also be used by the district and division in adapting different approaches to learning delivery.

Action Research Questions

The study aimed to enhance the computational skills of Grade 9 learners of Atok National High School in Araling Panlipunan particularly on lessons in Economics using the RADAR approach. Specifically, this study sought answers to the following questions:

1. What is the level of computational skills of learners before and after the intervention along computation of:

   a. quantity of supply, quantity of demand and price

   b. elasticity of supply and elasticity of demand

2. Is there a significant difference in the level of computational skills of learners in the experimental group in the pretest and post-test?

   H_O: There is no significant difference in the level of computational skills of learners in the experimental group in the pretest and post-test.

3. Is there a significant difference in the level of computational skills of learners between the control group and experimental group in the post-test?

   H_O: There is no significant difference on the level of computational skills of learners between the control group and experimental group in the post-test.

Innovation, Intervention, and Strategy

The intervention RADAR is an approach in the learning of the students. “R” stands for “read”, “A” for “analyze”, “D” for “discuss”, “A” for “apply” and “R” stands for “react”. This approach was used in the following competencies for the second grading period: a) Natatalakay ang mga konsepto at salik na nakaaapekto sa demand sa pang araw-araw na pamumuhay; b) Natatalakay ang mga konsepto at salik na nakaaapekto sa suplay sa pang araw-araw na pamumuhay; and c) Naipapaliwanag ang interaksyon ng demand at suplay sa kalagayan ng presyo at ng pamilihan.The RADAR approach is described as to the following steps:

R- The learners need to read the topics given before the scheduled phone/video call with the teacher so they can start jotting down queries.

A- The students need to analyze concepts given using the guide questions provided. According to the Foreign Languages Curriculum Review, guide questions will give focus and direction for students in answering essential questions (Regional World Language Leader, n.d.). These questions will serve as the springboard for the discussion portion with the teacher.

D- After reading and analyzing the content of their module, they will be discussing with their teacher via phone call/ video call (for those with internet connectivity) queries about the topic. The learners will be allotted a time in a day where the can communicate with the teacher. This part is where the teacher can make complex concepts to make it easier for the learner to understand.

A- This part is simultaneous with the discussion portion. While the teacher is guiding them, the learners will apply their learnings through answering the activities provided in the module. When teachers provide guidance, they will be able to see the learner's strengths and weaknesses and can provide assistance to those who are behind (Nair, 2021).

R- After finishing the given task, the learners will now give their oral feedback to the teacher. They may give comments on the lesson, the process that has been done or how they felt doing the activity. As stated by Faragher (2016), oral feedback allows pupils to clarify misconceptions immediately.

Two sections were used as participants of this study. One section was identified as the control group while the other section was the experimental group. Both groups were subjected to the modular mode of learning delivery. The RADAR was applied to the experimental group which was integrated in their modular learning. Unlike the usual scenario where they text the teacher and wait for a reply, the approach was to encourage the learners to have open communication with the teacher using mobile phones and other available means of live communication. This gave the learners the opportunity to raise questions

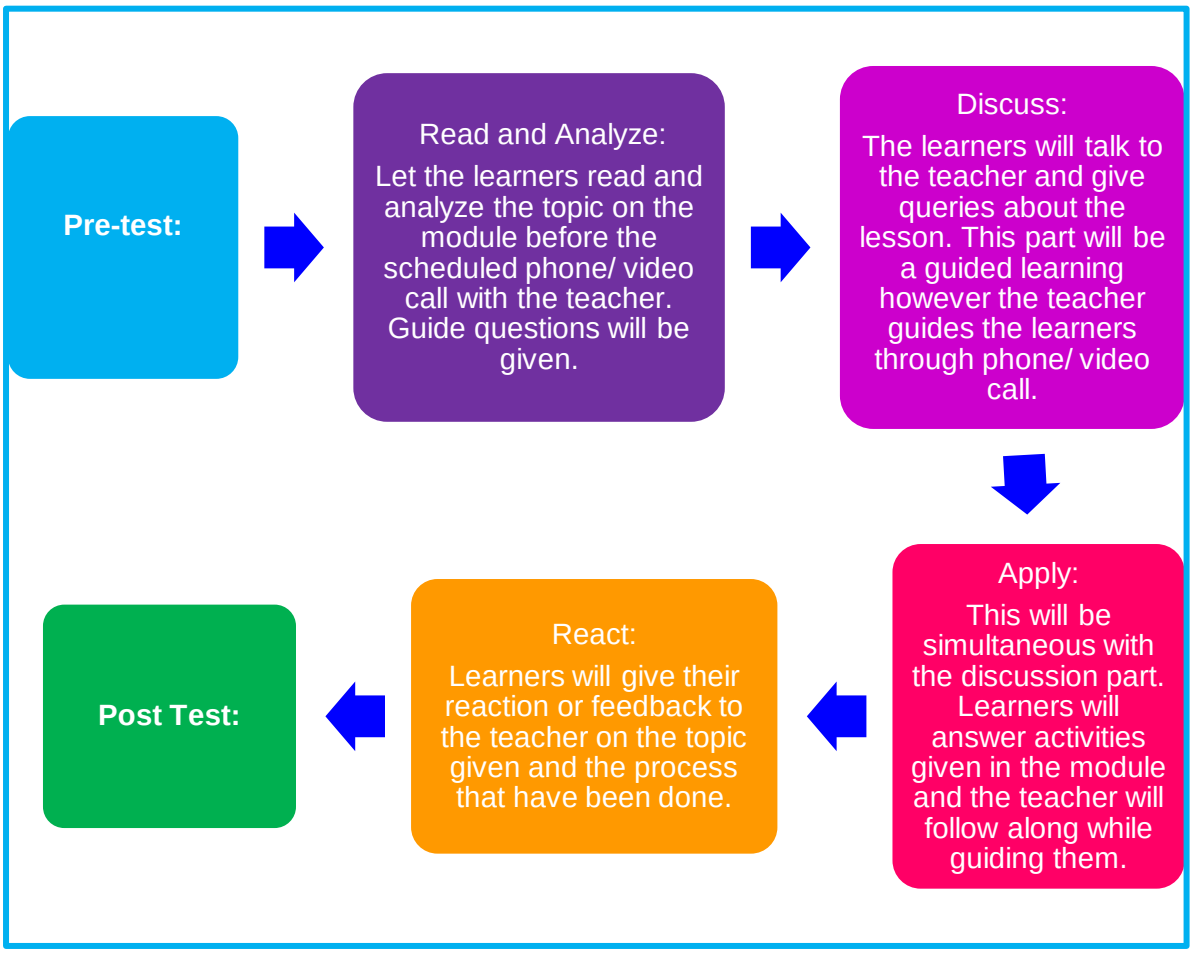
regarding the lesson and expect an academic supplemental support from the teacher while they are doing their tasks or exercises.

The learners were given guide questions to prepare them for the discussion portion, which was not the case with the control group. Furthermore, the experimental group was given a schedule for learning sessions in which the teacher and the learners will follow along with the activities to be answered in the module and assist the learners in answering. This was also be the time for the teacher and the learner to ask how they are doing during this time of pandemic.

Also, the teacher listened and took notes of their reactions or reflections given. It is important to note that the teacher really pledged her time to listen to the learners along the process. When the modules were collected, the tasks and exercise found in the module were assessed by the teacher to determine the learners' performance, particularly in their computational skills. Feedback was written in the modules to be returned was discussed again during the next schedule of phone call/ video call with the learners. This was conducted for the duration of second grading period of SY 2021-2022.

Figure 1

The R.A.D.A.R Approach



Action Research Methods

Research Design

This study utilized the quasi- experimental design which aims to establish a cause and effect relationship. It is used to evaluate the RADAR as an intervention in enhancing the computational skills of learners. The participants were grouped into control group and experimental group. Both groups were subjected to pre-test and post-test.

Participants and/or Other Sources of Data and Information

This study was carried out during the second grading period of the school year 2021 – 2022, from December 2021 to February 2022, the quarter in which computational skills were required for the subject. The researcher used cluster sampling where the two sections of the Grade 9 classes were determined as the participants of the study. There were 54 learners from the two sections and were all considered as participants of the study.

Table 1

Distribution of Participants

Group	No. of learners	Percentage
Control Group	26	48.15%
Experimental Group	28	51.85%
Total	54	100%

Data Gathering Methods

The main instrument in gathering data is the multiple-choice test that served as the pre-test and post-test. Letter of consent was given to participants and parents. A pre-test was administered to the two groups before the introduction of lessons assigned in the second grading period. Learning tasks and exercises' outputs were checked and recorded as usual. The post-test was conducted a week after the second grading ends to assess the improvement in the computational skills of learners in both groups. The pre-and post-tests consisted of 25 multiple choice items each covering the competencies on computation for the second grading. The questions for the pre-and post-test were adopted from 'Ekonomiks' books and self-learning modules.

Data Analysis

Frequency and percentage were used to determine the computational skills of learners in the experimental group. Proficiency scale with assigned statistical limits were used to describe the scores of the learners in the pre-test and post-test (Table 2). To determine the difference in the mean scores of the pre- and post-tests of the experimental

group, paired t-test was used. Independent t-test was used to determine the difference in the post-test scores between the control and experimental group.

Table 2

Proficiency Scale

Points Range (quantity of demand, supply, price)	Level of Computational Skills	Definition
15 - 21	Advance	The learner at this level shows mastery of given competency.
10-14	Proficient	The learner at this level has developed knowledge and skills needed for the competency but needs little guidance throughout the tasks.
5-9	Developing	The learner at this level possesses the minimum knowledge and skills, but needs help throughout the tasks.
0-4	Beginning	The learner at this level struggles with his/ her understanding on the competency.

Points Range (elasticity)	Level of Computational Skills	Definition
4	Advance	The learner at this level shows mastery of given competency.
3	Proficient	The learner at this level has developed knowledge and skills needed for the competency but needs little guidance throughout the tasks.
2	Developing	The learner at this level possesses the minimum knowledge and skills, but needs help throughout the tasks.
0-1	Beginning	The learner at this level struggles with his/ her understanding on the competency.

Ethical Issues

DepEd guidelines and proper protocol in conducting research were strictly observed by the researcher. A written permission to conduct the study was prepared and approved by the school principal. The researcher also sought permission from the school head for the conduct of the study. After the approval of the school head, parents' and learners' consent was sought. Parents and learners were oriented that their participation was voluntary and they were free to withdraw. Names or identity of the participants and other information gathered were not divulged and were treated with utmost confidentiality. These data and information gathered were solely used for the purpose of the study only. Moreover, the study was properly explained to the participants. Any questions raised by the participants regarding the study were answered by the researcher.

Discussion of Results and Reflection

Level of Computational Skills of the Learners

Table 3 presents the computational skills of learners in the control and experimental group as reflected in their pre-test and post-test. It shows that there was an improvement of students' computational skill after they were subjected to RADAR intervention strategy as manifested in the pre-test and post-test result. The data shows that in the pre-test, students in general obtained an average indicating that their computational skill was in the beginning level while only a few were in the developing level. This implies that majority of the students were not proficient in their computational skill in quantity of supply, demand, price and elasticity since the lessons covering these skills have not yet been delivered to them. This may also be attributed to their no exposure to the learning activities since they were not yet introduced to the new lessons. It should be noted that the skills they mastered in the lower grades were more information based, whereas in grade 9, they were introduced to economics lessons which entail computational skills.

The same table shows the result of students who underwent the RADAR approach to learning computational skills by the students. It reveals that students generally gained an

advance level as gleaned in the average. These is a validation of the positive effect in using RADAR approach to learning computational skill in quantity of supply, demand and price. According to Ausubel's Theory on Meaningful Reception Learning, information can be made more meaningful by using various techniques so that it can be better understood.

Subsequently, the same table displays students' computational skill along elasticity. The data shows that students are still in the beginning level both in their pre-test and post-test. Nevertheless, there was a gradual improvement in their computational skill, as evidenced by their post-test. The findings imply that when RADAR was integrated into students' modular learning, their computational skill along elasticity improved.

As posited by Samortin, M. (2020), there are alternative ways to deliver a lesson and impart knowledge to the students, such as modular and online classes that could help both the students and the teachers accomplish the lesson's target objectives. As such, the integration of RADAR approach is one of the options to help develop the students' computational skills even at home. This pedagogical approach serves as a support in teaching and learning in this new normal situation.

Discussion and monitoring of activities is also significant in the learning process of students, especially on lessons that entail computation. This can be accomplished by balancing the need to constantly monitor learners' progress in completing their activities by giving them time to seek assistance from their teachers on topics which they need to be enlightened to understand.

Table 3

Level of Computational Skills of Experimental Group in Pre-Test and Post-Test Scores

	Experimental Group				Control Group			
	Pretest		Post test		Pretest		Post test	
	No.	%	No.	%	No.	%	No.	%
A. quantity of supply, demand and price								
Advance (15-21 points)	0	0%	24	85.71%	0	0	17	65.38
Proficient (10 -14 points)	0	0%	4	14.29%	0	0	3	11.54
Developing (5-9 points)	1	3.57%	0	0%	3	11.53	5	19.23
Beginning (0-4 points)	27	96.43%	0	0%	23	88.46	1	3.85
Average	1.3 (Beginning)		17.8 (Advance)		2.1 (Beginning)		14.8 (Proficient)	
B. Elasticity								
Advance (4 points)	0	0%	2	7.14%	0	0	0	0
Proficient (3 points)	0	0%	7	25.00%	0	0	3	11.54
Developing (2 points)	1	3.57%	6	21.43%	1	3.85	4	15.38
Beginning (0-1 point)	27	96.43%	13	46.43%	25	96.15	19	73.08
Average	0.2 (Beginning)		1.6 (Beginning)		0.3 (Beginning)		0.9 (Beginning)	

Difference in the Computational Skill of Experimental Group as Reflected in the Pre-test and Post-test Scores

Table 4 presents the comparison between the computational skills of students as reflected in their pre-test and post-test scores. Majority of the learners obtained a beginning and developing level. This implies that majority of learners in the experimental group were unfamiliar with the lessons and are groping with their computational skills. It should be noted that pre-tests are used to determine what the students know and which lessons are new to them. Michaels (2002) emphasized, as cited by Berry (2008), the use of pre-tests does not predict final grades and are generally administered prior to each topic. In addition, the pre-test measures student growth over time through a comprehensive assessment. It can show

a student's level of understanding before instruction, while instruction is still happening (Kelly, 2019). This finding means that the assessment of students' level of understanding should be done frequently to monitor improvement.

On one hand, learners' post-test scores improved dramatically. This indicates that the majority of the students understood the economics lessons, which helped them improve their computational skills.

The hypothesis that there is no significant difference between the pretest and post-test scores of the learners in the experimental group is rejected. It should be noted that the difference is significant indicating a very evident improvement in the post-test score of learners implying that their computational skills in economics improved after they were able to learn the lessons and underwent the RADAR intervention approach.

The result corroborates with the findings of Seaman and Fellenz (1989) as cited in StudyCorgi (n.a. 2022) stating that teachers can assist students in acquiring additional information, ideas, skills, values, ways of thinking, and ways of learning. Teaching is an effort made by teachers to assist students in carrying out their learning activities and the goal of teaching is to increase the efficiency and effectiveness of the learners' learning activities.

Table 4

Comparison in the Computational Skill as Reflected in the Pre-test and Post-test of Experimental Group

Computational Skill Scale	Experimental			
	Pre-test	%	Post test	
Advance (18-25 points)	0		22	78.57%
Proficient (12- 17 points)	0		4	14.29%
Developing (6 - 11 points)	2	7.14%	2	7.14%
Beginning (0- 5 points)	26	92.86%	0	0%
p-value = 0.00	**alpha-value= 0.05**		****Highly Significant**	

Significant Difference in the Post-test Scores Between the Learners in the Experimental Group and Control Group

Table 5 shows the difference in post-test scores between learners in the control and experimental groups. It is noted that the control group received traditional modular learning delivery, whereas the experimental group received RADAR intervention while undergoing a modular learning model.

As shown in the table, there are more learners in the experimental who were able to attain advance level. The difference is also manifested in the percentages of students who are still in the beginning level. The result shows that the control group's computational skills had improved somehow through the conventional modular mode of learning, however, the improvement in more evident in the experimental group.

The hypothesis that there is no significant difference in the post-test scores between the learners in the control group and experimental group is rejected. The finding further implies that integration of RADAR approach is effective in improving the computational skills of learners. This shows that if the post-test results were high, it reveals the strength of the approaches used in delivering the instructions (Kuehn, 2019). The result means that the RADAR approach integrated in the modular mode of learning for the experimental group was satisfactory.

In general, a learning design framework such as RADAR provides support to the learning experience for students, with an added psychosocial support during this time of pandemic. The framework ensures an improvement in learners' learning experiences through greater structure in their learning and clarity about expected engagement.

RADAR will be used well beyond the COVID-19 pandemic, but will be highly relevant for a successful distance learning. The most successful learning experiences are flexible, well-paced, designed with learning outcomes in mind, and mainly asynchronous (Troconis & Perez, 2019).

Table 5

Significant Difference in the Post-test Scores Between the Learners in the Control Group and Experimental Group

Post Test	Control		Experimental	
	No.	%	No.	%
Advance (18-25 points)	12	46.15%	22	78.57%
Proficient (12- 17 points)	7	26.92%	4	14.29%
Developing (6 - 11 points)	4	15.39%	2	7.14%
Beginning (0- 5 points)	3	11.54%	0	0%
Total number of learners	26		28	
p-value= 0.01	**alpha-value = 0.05**		***Significant**	

Reflections

The findings of the study showed a significant result on the use of RADAR in improving the computational skills of learners on quantity of demand, supply, price, elasticity of demand and supply. As a teacher, there are alternative ways to deliver a lesson and impart knowledge to the students, such as modular accompanied with RADAR approach that could help both the students and the teachers accomplish the lesson's target objectives. As such, the RADAR approach is one of the options to help develop the students' computational skills even at home. As a researcher, the study has paved ways to discover more strategies and approaches and at the same time appreciate research as a way of contributing to change.

The support of the parents and interests of learners to learn more has greatly contributed to the success of the study. The effort and time given are highly appreciated.

To help improve future implementation of the project, it would be better if parents will also monitor their children's performances since the success of RADAR lies in the commitment of parents as learners' support system. The family members can participate in the learning activities using the RADAR approach. Future researchers are encouraged to conduct a similar study or a qualitative and mixed-method study in a bigger population.

Nevertheless, there were also some difficulties and problems encountered by the researcher during the implementation of the study. Some learners in the experimental group could not attend to the calls of the teacher during their scheduled time since they are helping their parents but the teacher was determined to make follow-up until development on the part of the students had taken place. This was done by rescheduling the call done by the teachers on weekend, that is on Saturday and Sunday. Therefore, these difficulties and problems were not used as reasons in not implementing the RADAR integration on the part of the researcher.

Conclusions and Recommendations

Conclusions

Based from the findings, the following conclusions were derived.

1. The level of computational skills of the learners for the competency on the quantity of supply, demand, and price before the intervention is “beginning” which means the learner struggles to understand the competency. After the intervention, the experimental group’s level of computational skills improved to “advance” which means the learner shows mastery of the given competency; and the control group improved to “proficient” indicating that the learner has developed knowledge and skills needed for the competency. On the other hand, the level of computational skills of the learners for the competency on elasticity on supply and demand before and after the intervention is “beginning” which means the learner struggles to understand the competency.

2. There is a significant difference in the level of computational skills of learners in the experimental group in the pretest and post-test.

3. There is a significant difference in the level of computational skills of learners between the control group and experimental group in the post-test.

Recommendations

To further uphold the purpose of the study, the following recommendations are given.

1. Since the country is still in the pandemic situation, enhancement in the conduct of RADAR in the modular mode of learning shall be endorsed to the school heads for a recommendation of its implementation.

2. Teachers should pursue more initiatives on enhancing the computational skills of learners as this is seen as a major concern, especially at this time of pandemic.

3. Curriculum developers and policy-makers should give emphasis to frameworks that focus on arithmetic as a salient skill.

4. Further study is recommended specifically on the experiences of learners who are exposed to RADAR approach.

Action Plan

With the result of study, the researcher will present the findings to colleagues and stakeholders through different sessions like school learning action cells, in-service trainings and PTA meetings. After sharing the importance of the study, trainings will be conducted to teachers who will utilize the RADAR approach in their subjects. Monitoring and evaluation will be done to strengthen the use of the approach.

Program Title: Integration of RADAR in Distance Learning

Proponent: Mhie D. Gayudan

Objectives	Activity/ Task	Success Indicators	Persons Responsible	Time Frame	Budgetary Requirements
A. Dissemination					
To present the findings of the study	• LAC session to be participated by the teachers • PTA General Meeting to be participated by parents. • Massive information drive in the importance of RADAR through parent consultation	Well informed teachers and parents on the effectiveness of RADAR to the academic learning of learners	School Principal Coordinators/ Teachers	November, 2022	none
B. Utilization					
To conduct training to teachers who will use RADAR in their subject	• Forge a training design on the use of RADAR in modular mode of learning • Propose inclusion of funds from MOOE	A well-constructed training design on the use of RADAR	School Principal Teachers	November, 2022	Php 5,000
C. Expansion					
To strengthen the use of RADAR by teachers.	• Prepare calendar of activities that integrates activities in promoting the use of RADAR • Constant monitoring and submission of work track in the use of RADAR	A comprehensive calendar of activities which includes activities in promoting the use of RADAR	School Principal Teachers	November, 2022	none

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Financial Report

A. Supplies and Materials							
Activity	Item	Unit	Quantity	Estimated Cost	Total	**Actual Cost**	**TOTAL ACTUAL COST**
Implementation of the study and Preparation of Research Papers, Instructional Materials/Worksheets, and other documents	A4 Bond Paper	ream	10	250.00	2,500.00	250	2,500.00
	A4 Folder Tagboard with fastener	pc	20	20.00	400.00	25	500
	Printer Ink Black	bottle	10	300.00	3,000.00	320	3,200.00
	Printer Ink Cyan	bottle	2	300.00	600.00	320	640
	Printer Ink Magenta	bottle	2	300.00	600.00	320	640
	Printer Ink Yellow	bottle	2	300.00	600.00	320	640
	USB Flash Drive	pc	1	1,000.00	1,000.00	1,200	1,200
B. Domestic Travel Expenses							
Submission of First Tranche Deliverables with wet signatures (CE,MOA,WFP)	Private Vehicle		1	300.00	300.00	500	500
C. Food and other incurred expenses during the conduct of research							
D. Reproduction, Printing, and Binding Cost							
E. Communication Expenses for the Implementation / Conduct of the Study							
Validation of Instruments (guide questions)	Load of Validators/ Experts	card	5	300.00	1,500.00	310	1,550.00
Implimentation of the study - Data Gathering /Collection, Preparation and submission of research papers and other documents	Regular Load of proponent	card	6	500.00	3,000.00	500	3,000.00
	Internet Load of proponent	card	6	500.00	3,000.00	500	3,000.00
	Cellphone load of students	card	29	200.00	5,800.00	205	5,945.00
F. Other Expenses					22,300.00		**23,315.00**
Prepared by:							
MHIE D. GAYUDAN							
Research Proponent							