

Indonesia University of Education: UPI

Summary Report

Republic of Indonesia

Verification Survey with the Private Sector
for Disseminating Japanese Technologies
for Strengthening of Children's
Mathematical Ability by e-Learning
through University-Industry Collaboration

October 2017

Japan International Cooperation Agency

SuRaLa Net Co., Ltd.

Photos



First Counterpart Meeting
(April 2015)



Seminar on OGO Method
(April 2015)



Interview Survey to Parents at Pilot School 1
(February 2016)



Teacher's Training at Pilot School 1
(February 2016)



Parents Meeting at Pilot School 1
(February 2016)



e-learning class at Pilot School 2
(August 2016)



Follow-up Teacher's Training at Pilot School 2
(October 2016)



Pilot after-school tutoring Class in UPI
(February 2017)



Endline Survey at Pilot School 1
(April 2017)



Parents Meeting for Pilot School 1
(May 2017)



Joint Seminar with Bandung City Government
(August 2017)



Meeting with UPI Rector for Cooperation
Agreement (August 2017)

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1. BACKGROUND

In Indonesia, the public education has been significantly improved quantitatively, but still has challenges in terms of quality improvement such as academic achievement. Although mathematics is the basis of school learning and quite important, it is one of the poorest subjects for many students. This has been the longstanding common issue for educationists, teachers and parents in the world, including Indonesia.

From July 2012 to July 2013, the project called "Preparatory Survey on BOP Business on Strengthening of Children's Mathematical Ability through After-School Tutoring" was implemented in Surabaya by two key members in this Survey Team. At that time, the project provided approximately 600 students from Grade 1 to 3 with after-school tutoring for nine months by applying the paper-based 'OGO Method', invented by Mr. Masaru OGO, a mathematics master teacher. The Endline Survey showed a significant improvement of academic achievement in mathematics. For example, the average score of subtraction increased from 19.8 to 75.2 marks.

Having this remarkable result, this Project applies 'OGO Method' to e-learning system so that the impact on the mathematics education can be significant and also the efficiency and effectiveness can be verified.

2. OUTLINE OF THE PILOT SURVEY FOR DISSEMINATING SME'S TECHNOLOGIES

(1) Purpose

To strengthen students' mathematical ability by means of introducing e-learning 'OGO Method' in pilot schools and after-school tutoring class, verify its efficiency and effectiveness, and formulate the plan to disseminate e-learning for general improvement of basic mathematics

(2) Activities

There were three major activities listed below:

- I. To develop e-learning OGO Method in Bahasa Indonesia, covering mathematics from Grade 1 to 4 at the primary school level
- II. To implement pilot activities at schools and after-school tutoring class to examine impact by e-learning OGO Method
- III. To develop the plan to disseminate e-learning OGO Method both in the public and private sectors

(3) Information of Product/ Technology to be Provided

E-learning system: Student-centered and interactive animation e-learning program with various functions such as monitoring, achievement measure and administrative works

OGO method: A number of simple but powerful methods including 100-box calculation to strengthen calculation skills of four operations of mathematics which were developed by Mr. Masaru Ogo through his over 30-year teaching experiences. The key concept is to acquire quick and accurate calculation skills not by finger counting but by composition and decomposition method,

(4) Counterpart Organization

The counterpart organization: Indonesia University of Education (UPI)

(5) Target Area and Beneficiaries

Target Area: Mathematics of Grade 1 to 4 at the primary school level

Beneficiaries:

1) Students to participate in the pilot activities at the following two primary schools and one after-school tutoring class in UPI, as they improve their academic achievement in mathematics:

The pilot school 1: SD Laboratorium-Percontohan UPI Bumi Siliwangi

The pilot school 2: SD Laboratorium-Percontohan UPI Cibiru

2) UPI's academic staff to participate in the Project as the counterpart team members, as they acquire skills and know-how on the e-learning system, and learn the method of teacher's training, class management, monitoring and evaluation

(6) Duration

April 2015 to November 2017, 2 years and 8 months

(7) Progress Schedule

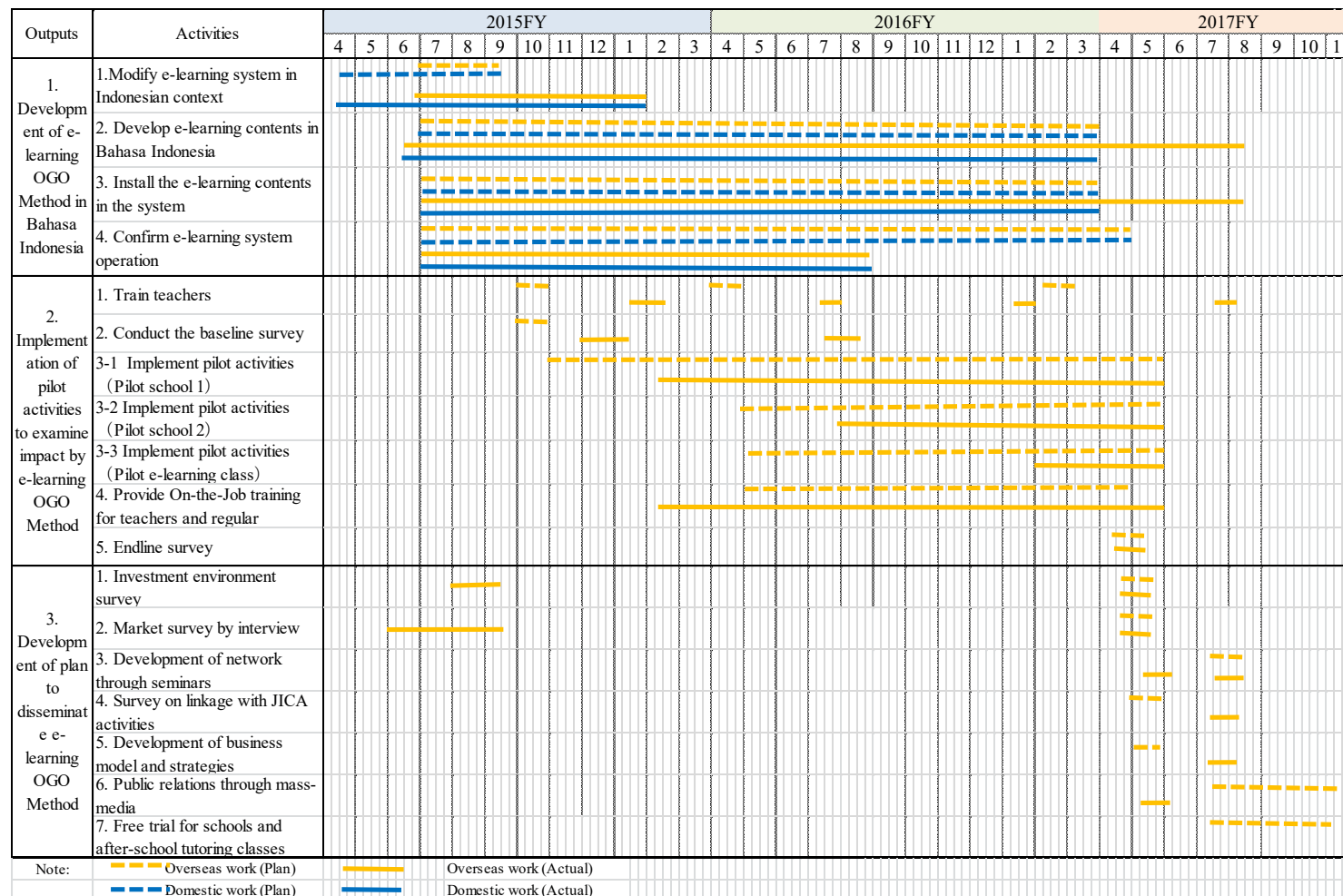


Figure 1 Progress Schedule

(8) Manning Schedule

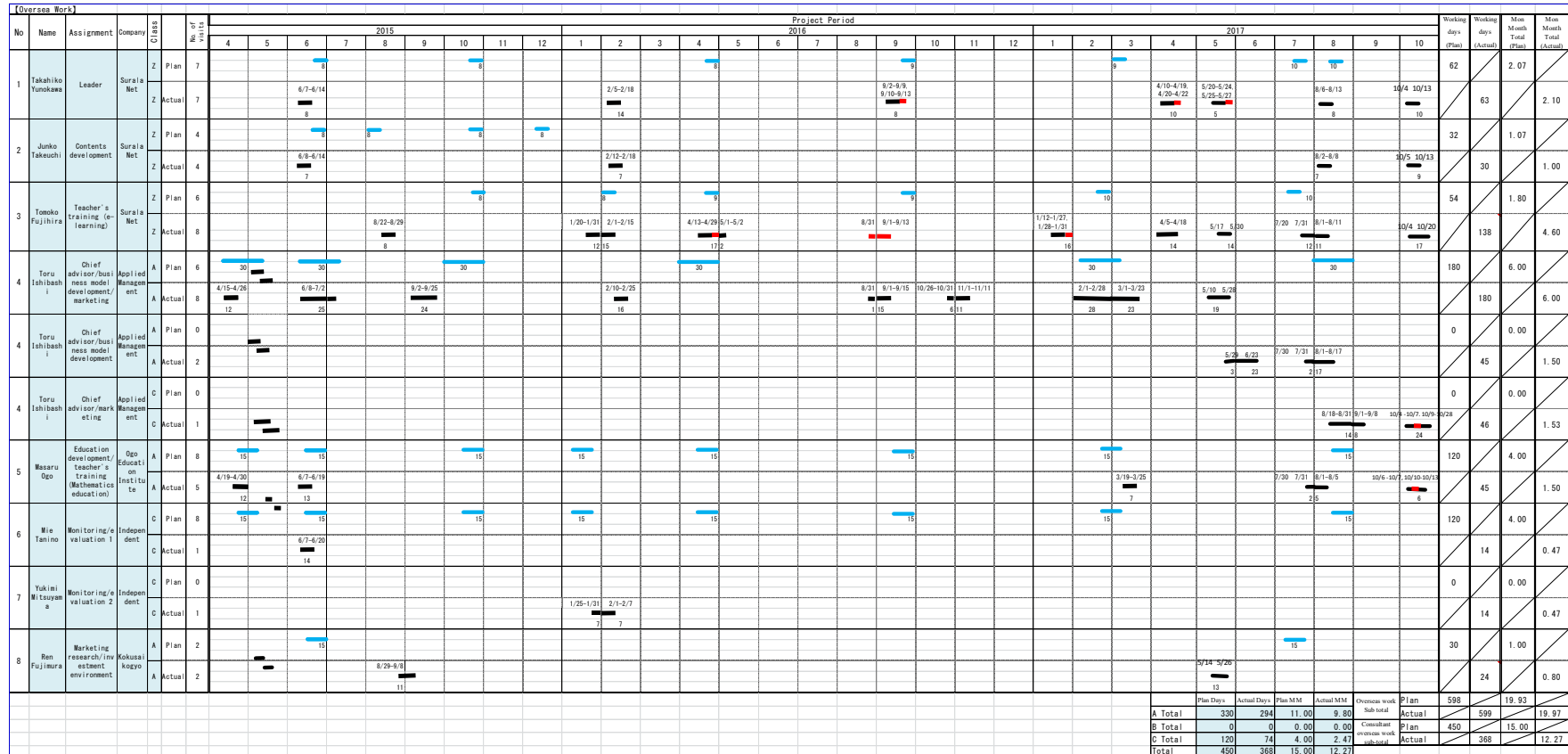


Figure 2 Manning Schedule: Overseas Work

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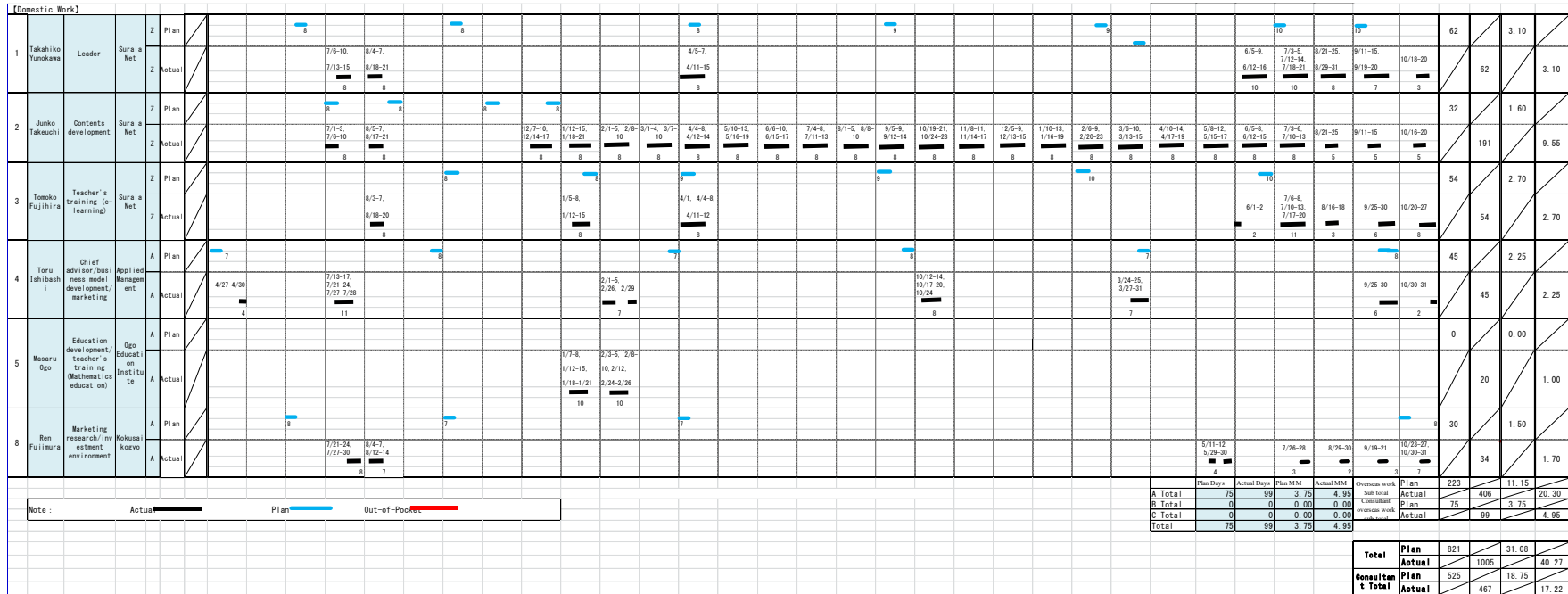


Figure 3 Manning Schedule: Domestic Work

(9) Implementation System

The pilot activities were conducted at two Elementary Laboratory Schools attached to UPI, namely, Bumi Siliwangi Campus and UPI Cibiru Campus. In addition, the pilot activities were conducted within UPI campus as a trial of after-school tutoring classes. The implementation structure is illustrated in Figure 4.

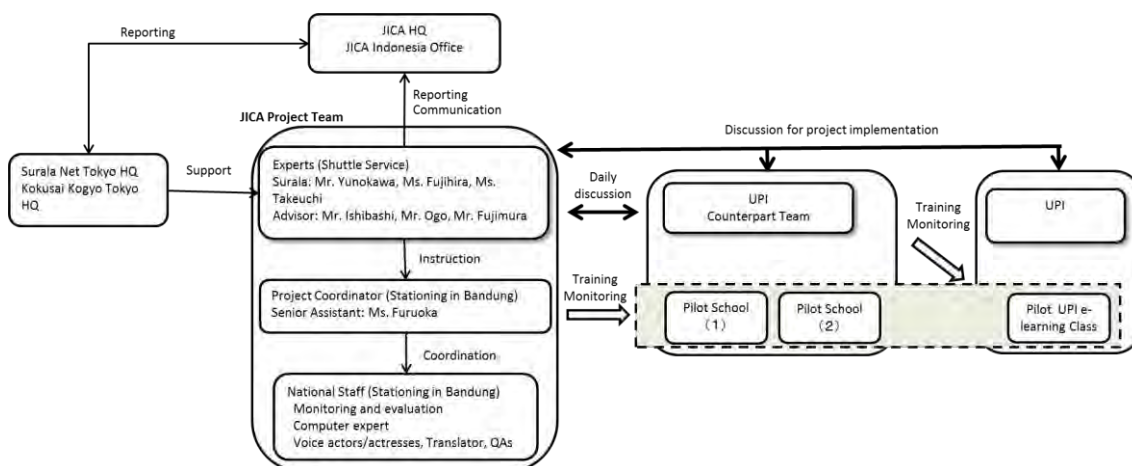


Figure 4 Implementation Structure

3. ACHIEVEMENT OF THE SURVEY

(1) Outputs and Outcomes of the Survey

Besides academic improvement, the survey achieved various outputs and outcomes through the pilot activities. Those include:

- Training sessions for teachers/facilitators of pilot schools and after-school tutoring class in UPI to understand not only how to use the e-learning program named “Surala Ninja!” but also e-learning class management
- Parents’ briefing sessions before the pilot activities to understand the concepts and benefits of Surala Ninja! and after the pilot activities to inform the remarkable results of academic achievement and obtain consensus to continue Surala Ninja!
- Joint seminars with Education Department of Bandung City Government by inviting representative of public and private schools in order to explain the remarkable results of academic achievement obtained through learning with Surala Ninja! and to promote Surala Ninja! as a business
- Questionnaire survey to students, parents and teachers participated in the pilot activities with the following positive responses:
 - 93% of students replied “Yes very much” or “Yes” for a question of “Did you enjoy studying with Surala Ninja! ?”.

- 100% of students replied “Yes very much” or “Yes” for a question of “Do you think your calculation speed became faster?”.
- 100% of students replied “Yes very much” or “Yes” for a question of “Do you think mathematics became your favorite subject?”.
- 97% of parents replied “Yes very much” or “Yes” for a question of “Do you want your children to continue studying with Surala Ninja! ?”.
- 100% of teachers replied “Yes very much” or “Yes” for a question of “Do you think your students should continue studying with Surala Ninja! ?”.
- 76% of teachers said that the students became more self-independents.
- 74% of teachers said that the students became more disciplined.
- 59% of teachers said that the students became to have stronger sense of responsibility.
- 56% of teachers said that the students became more confident.

As for academic improvement, which is the main outputs and outcomes of the survey, the baseline and endline surveys were conducted and analyzed in comparison to the control schools with the significant favorable results. The details are summarized below:

1) General

In order to understand the current situation of mathematics achievement at elementary schools, the first baseline survey was conducted in December 2015. The survey was implemented at one pilot school called SD Laboratorium-Percontohan UPI Bumi Siliwangi (Pilot 1) and two control schools (Control 1 and Control 2). Both are located in the central area of Bandung.

In addition, the second baseline survey was conducted for Pilot school 2 called SD Laboratorium-Percontohan UPI Cibiru (Pilot 2) from July to August 2016. The survey was implemented at the pilot school and one control school (Control 4). Both are located in the suburb of Bandung. As Pilot school 2 has 7 classes at each grade, 3 classes in each grade were selected as Pilot 2 and other 4 classes which do not participate in pilot activities are considered as Control 3.

In these baseline surveys, Academic Achievement Tests (AAT) and 100 Box Calculation Tests for addition, subtraction, multiplication and division were used for students in Grade 1, 2, 3 and 4.

At the end of the Project, the endline survey was conducted at the same pilot and control schools in April and May 2017. The impact by the Project was examined in comparison of the improvement of mathematics achievement between the pilot and control schools.

2) Levels of e-Learning Contents and Students' Study Progress

Figure 5 shows the structure of Surala's e-learning contents and the levels and lessons which majority of the students of pilot schools have studied at the time of endline survey.

			School	Pilot 1				Pilot 2				
			Grade	2	3	4	5	1	2	3	4	
Contents Structure												
Calculation	Level	Lesson	Contents									
Addition	1	1	Numbers from 1 to 10									
		2	Composition and decomposition									
		3	Additions (answers number below 10)									
	2	1	Numbers from 11 to 20						↓			
		2	Addition with no carrying (answers number below 19)									
		3	Addition with carrying (1 digit + 1 digit)									
		4	Additions (answers number below 20)									
	3	1	Large numbers									
		2	Addition (2 digits + 2 digits)	↓								
		3	Addition (3 digits + 3 digits)									
4		Addition (4 digits + 4 digits)										
Subtraction	4	1	Subtraction without carrying down									
		2	Subtraction without carrying down (Box calculation)							↓		
		3	Subtraction with 3 numbers									
	5	1	Subtraction without carrying down (2 digit - 1 digit)									
		2	Subtraction with carrying down (2 digit - 1 digit)									
		3	Subtraction Box calculations									
	6	1	Subtraction of 2 digits									
		2	Subtraction of 3 digits									
		3	Subtraction of 4 digits	↓							↓	
		4	Subtractions With Big Numbers									
Multiplication	7	1	Multiplication and multiplication table				↓				↓	
	8	1	Multiplication of 2-4 digits by 1 digit									
		2	Multiplication of 2-4 digits by 2 digits									
Division	9	1	Divisions without remainders									
		2	Divisions with remainders									
	10	1	Division of 2 digits by 1 digit (Answer: 1 digit)									
		2	Division of 3 digits by 1 digit (Answer: 2-3 digits)									
Mixed calculation	11	1	(Under preparation)									

Figure 5 Levels Which Students have Studied at the Time of Endline Survey

3) Improvement of average marks in comparison with Control Schools

Table 1 shows the overall results of AAT and 100-box calculation tests for each grade in comparison between pilot and control schools.

As for Bumi Group, Figure 6, 7, 8, 9 and 10 show improvement of average marks of AAT, addition, subtraction, multiplication and division of Grade 5 students from the baseline to the endline survey in comparison between pilot and control schools, respectively. Figure 11, 12 and 13 show improvement of subtraction of Grade 4 students, subtraction of Grade 3 students and addition of Grade 2 students, respectively.

As for Cibiru Group, Figure 14, 15, 16, 17 and 18 show improvement of average marks of AAT, addition, subtraction, multiplication and division of Grade 4 students from the baseline to the endline survey in comparison between pilot and control schools, respectively. Figure 19 and 20 show improvement of subtraction of Grade 3 students and addition of Grade 2 students, respectively.

The following findings are observed:

- The significant improvement of average marks is observed for addition and subtraction in all grades of both groups. This implies that the approaches of Surala Ninja! are correct and efficient, which include 1) the composition and decomposition method to stop the finger counting, 2) the daily practice by 100-box calculation measuring calculation time and marks, 3) the gamification approach in which Ninja characters teach mathematics in friendly manner and encourage students to study. In addition, the regular monitoring activities by the project staff and the periodical discussions to share ideas and problems among teachers function well.
- The significant improvement is observed for AAT in most cases. This is because the significant improvement of calculation capabilities in addition and subtraction positively affect AAT.
- The significant improvement is observed only in some cases in multiplication and division. This is because most of the pilot students have just started multiplication at the time of the endline survey.

Table 1 Summary of Average Marks

Pilot School 1: Bumi vs Control 1 & 2																	
Grade	School	No. of student	Baseline					Endline					Improvement				
			7 Dec 2015					2-5 May 2017					(Endline - Baseline)				
			AAT	(+)	(-)	(x)	(±)	AAT	(+)	(-)	(x)	(±)	AAT	(+)	(-)	(x)	(±)
2	P1 Bumi Siliwangi	81	42.0	13.2	na	na	na	66.4	52.2	na	na	na	24.3	39.0	na	na	na
	C1 Control 1	25	40.5	10.0	na	na	na	60.9	26.6	na	na	na	20.4	16.6	na	na	na
	C2 Control 2	57	45.1	12.1	na	na	na	58.7	28.3	na	na	na	13.6	16.2	na	na	na
3	P1 Bumi Siliwangi	82	25.5	31.1	16.1	na	na	59.2	84.8	53.3	na	na	33.7	53.7	37.2	na	na
	C1 Control 1	39	20.4	26.4	12.8	na	na	37.6	37.7	23.7	na	na	17.2	11.3	10.9	na	na
	C2 Control 2	59	11.4	27.4	12.5	na	na	29.4	37.7	21.8	na	na	18.1	10.2	9.4	na	na
4	P1 Bumi Siliwangi	64	29.1	51.1	31.5	36.3	28.4	39.1	89.7	77.8	52.5	40.6	10.1	38.6	46.3	16.2	12.1
	C1 Control 1	38	17.2	43.5	21.1	23.6	17.7	27.9	61.9	31.7	40.4	27.7	10.7	18.4	10.7	16.8	10.0
	C2 Control 2	52	16.6	37.2	16.1	9.0	11.4	24.0	55.2	27.6	31.7	18.8	7.5	17.9	11.5	22.8	7.4
5	P1 Bumi Siliwangi	48	29.1	52.8	30.1	43.6	26.3	44.8	97.9	90.5	67.6	45.8	15.7	45.1	60.4	24.0	19.5
	C1 Control 1	41	20.1	47.9	21.3	18.5	12.7	28.4	64.2	36.9	43.1	26.2	8.4	16.3	15.6	24.6	13.6
	C2 Control 2	37	22.1	48.5	24.6	22.9	15.0	27.8	66.6	40.2	42.6	22.6	5.7	18.1	15.6	19.6	7.6

Pilot School 2: Cibiru vs Control 3 & 4																	
Grade	Class	No. of student	Baseline					Endline					Improvement				
			28-29 July 2016					25-26 April 2017					(Endline - Baseline)				
			AAT	(+)	(-)	(x)	(±)	AAT	(+)	(-)	(x)	(±)	AAT	(+)	(-)	(x)	(±)
1	P2 Cibiru pilot classes	67	34.1	na	na	na	na	53.6	na	na	na	na	19.4	na	na	na	na
	C3 Control 3	86	37.1	na	na	na	na	52.3	na	na	na	na	15.2	na	na	na	na
	C4 Control 4	61	37.6	na	na	na	na	51.4	na	na	na	na	13.8	na	na	na	na
2	P2 Cibiru pilot classes	84	22.3	29.2	14.9	na	na	41.0	65.8	28.7	na	na	18.7	36.6	13.8	na	na
	C3 Control 3	92	18.6	17.0	7.7	na	na	31.6	37.3	17.8	na	na	13.0	20.3	10.2	na	na
	C4 Control 4	72	24.6	26.4	12.2	na	na	32.2	37.4	19.3	na	na	7.6	11.0	7.2	na	na
3	P2 Cibiru pilot classes	77	24.5	40.0	21.0	23.3	19.4	37.1	85.4	62.6	54.0	34.5	12.7	45.4	41.7	30.7	15.1
	C3 Control 3	90	20.7	41.3	18.3	16.1	13.1	29.9	57.2	31.2	40.7	25.6	9.3	15.9	12.9	24.5	12.5
	C4 Control 4	68	23.3	40.8	26.2	23.6	15.3	34.2	67.4	42.3	61.0	40.5	10.9	26.6	16.1	37.4	25.3
4	P2 Cibiru pilot classes	70	33.1	63.1	41.2	57.2	41.8	52.9	97.4	84.2	83.3	69.5	19.8	34.3	43.0	26.1	27.7
	C3 Control 3	107	26.3	50.5	31.2	39.7	27.5	30.4	65.4	42.5	49.1	33.3	4.0	14.9	11.2	9.4	5.9
	C4 Control 4	69	31.1	57.8	35.0	63.4	36.4	35.9	74.5	51.7	64.3	50.9	4.9	16.7	16.7	0.9	14.5

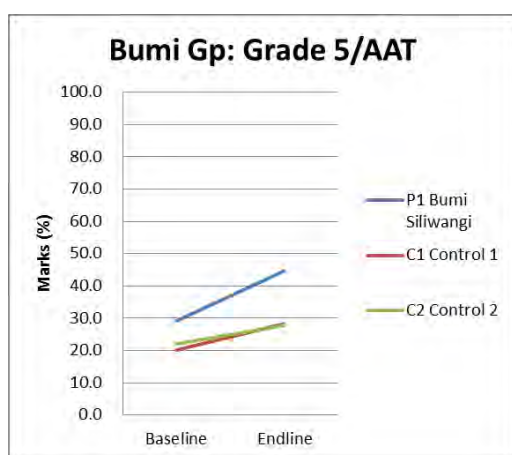


Figure 6 Average Marks of Bumi Group: Grade 5/AAT

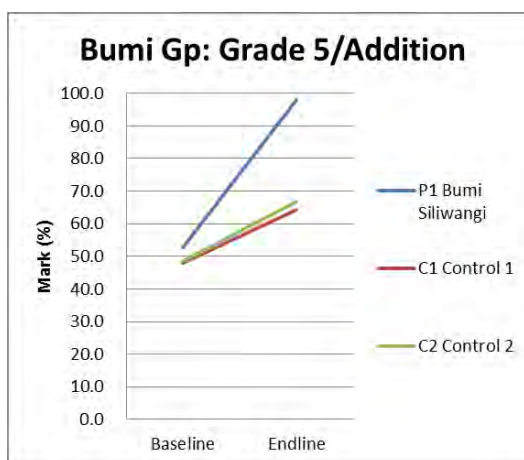


Figure 7 Average Marks of Bumi Group: Grade 5/Addition

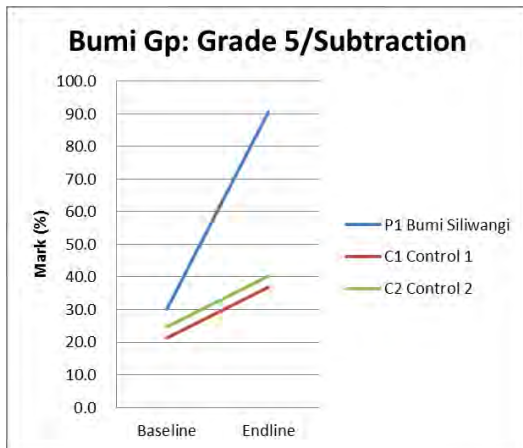


Figure 8 Average Marks of Bumi Group: Grade 5/Subtraction

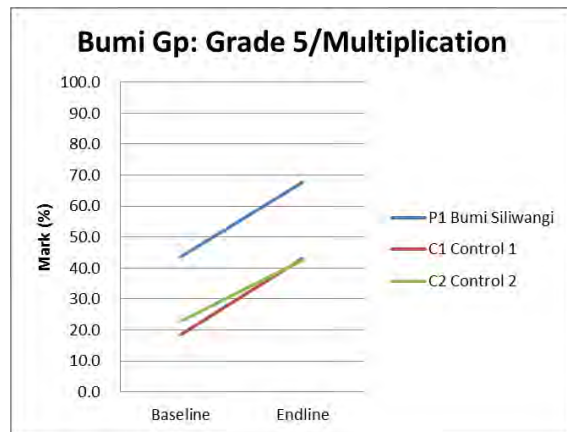


Figure 9 Average Marks of Bumi Group: Grade 5/Multiplication

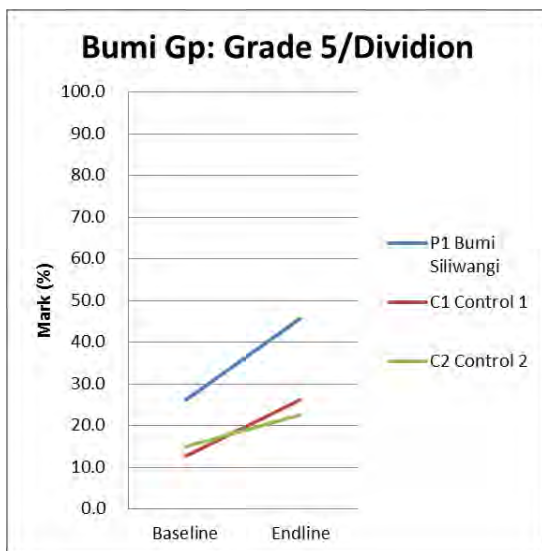


Figure 10 Average Marks of Bumi Group: Grade 5/Division

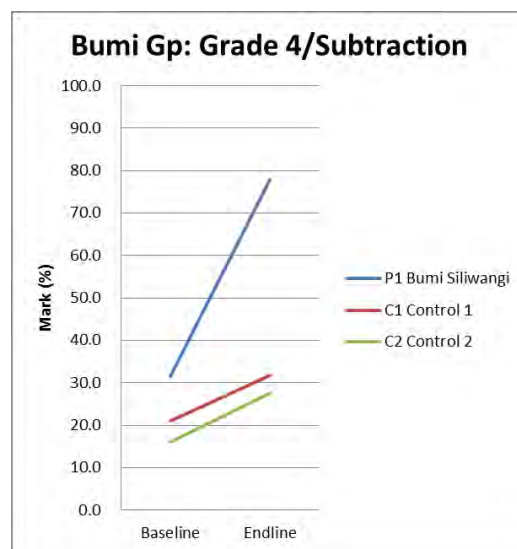


Figure 11 Average Marks of Bumi Group: Grade 4/Subtraction

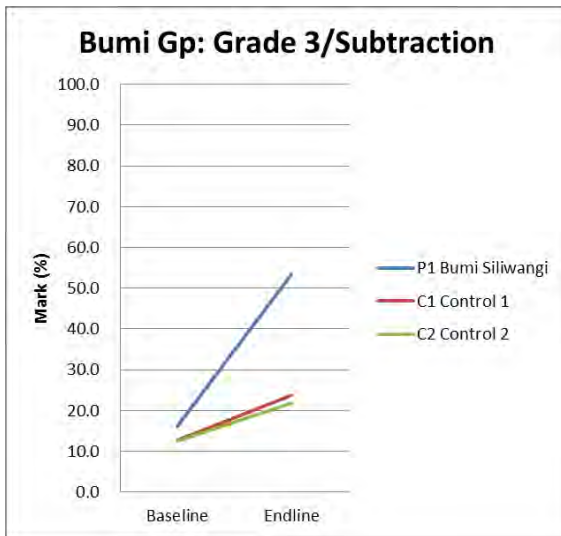


Figure 12 Average Marks of Bumi Group: Grade 3/Subtraction

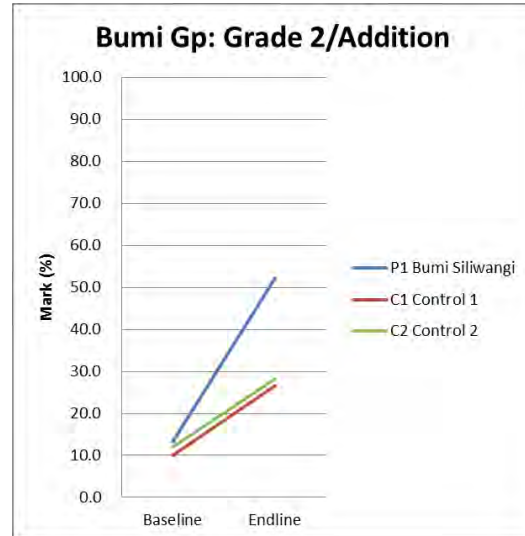


Figure 13 Average Marks of Bumi Group: Grade 2/Addition

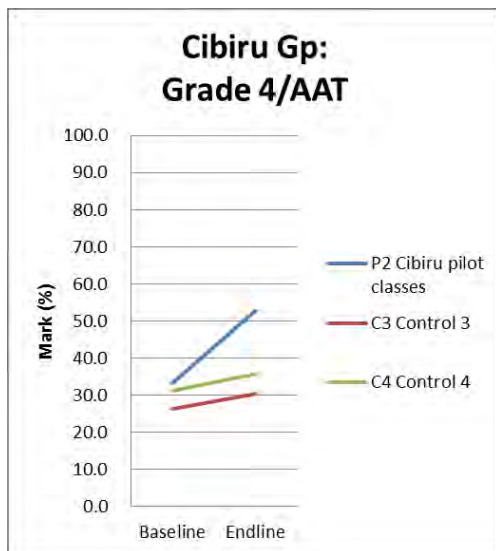


Figure 14 Average Marks of Cibiru Group: Grade 4/AAT

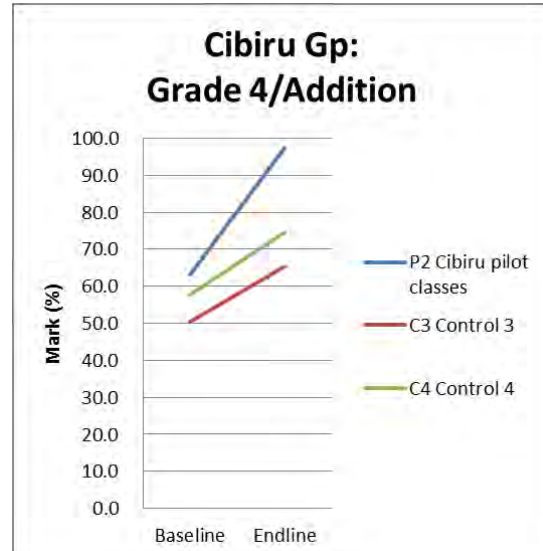
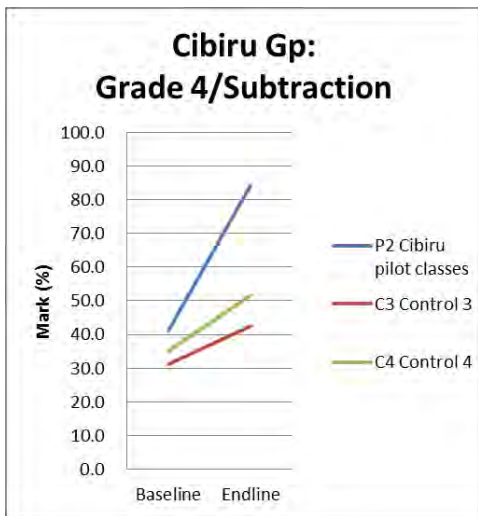
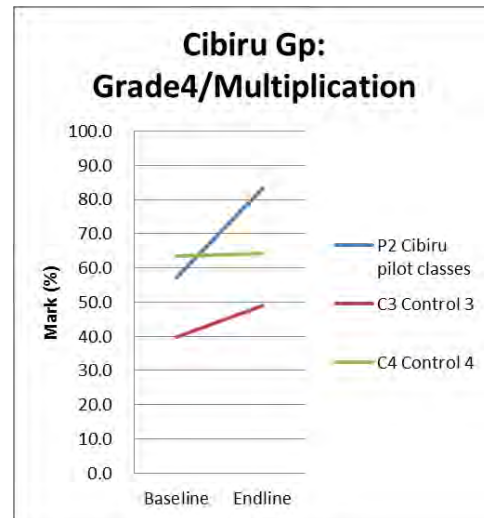


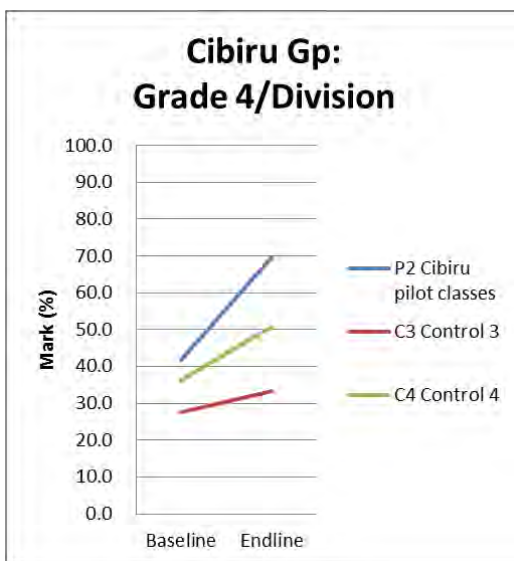
Figure 15 Average Marks of Cibiru Group: Grade 4/Addition



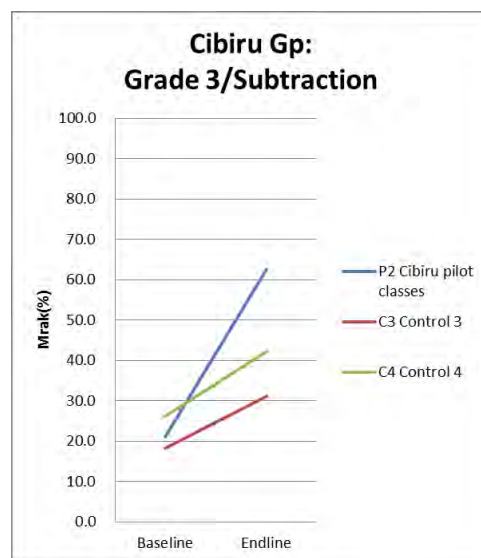
**Figure 16 Average Marks of Cibiru Group:
Grade 4/Subtraction**



**Figure 17 Average Marks of Cibiru Group:
Grade 4/Multiplication**



**Figure 18 Average Marks of Cibiru Group:
Grade 4/Division**



**Figure 19 Average Marks of Cibiru Group:
Grade 3/Subtraction**

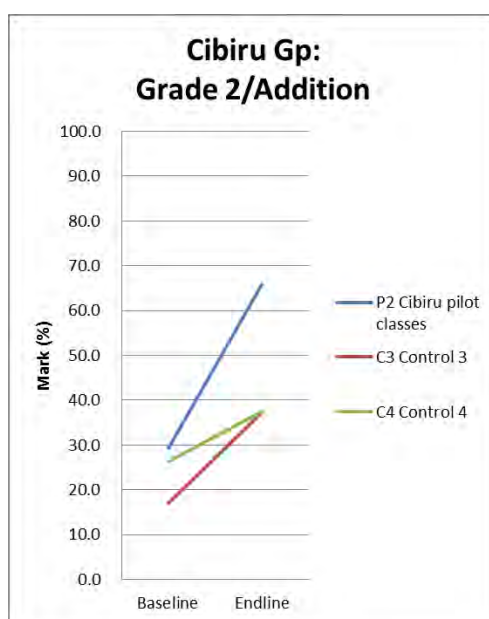


Figure 20 Average Marks of Cibiru Group: Grade 2/Addition

4) Distribution of Individual Marks

Table 2 and 3 show the distribution of individual student's marks of addition and subtraction in the endline survey in comparison with the baseline survey for Pilot 1 and 2, respectively.

Figure 21 and 22 show the distribution of individual students' marks of addition and subtraction for Grade 5 at the pilot 1. Figure 23 and 24 show the distribution of individual students' marks of addition and subtraction for Grade 4 at the pilot 2.

The following findings are observed:

- The distribution shapes in addition and subtraction in both pilot schools remarkably shifted to the right and the significant reduction of students' numbers with lower marks are observed.
- In Pilot 1, the proportion of students who obtained over 81 marks significantly increases from 8.3% to 95.8% in addition and from 2.1% to 85.4% in subtraction.
- In Pilot 2, the proportion of students who obtained over 81 marks significantly increases from 18.6% to 95.7% in addition and from 2.9% to 67.1% in subtraction.

Table 2 Distribution of Individual Students' Marks in Pilot 1: Grade 5

Grade 5	Addition			
	%		No of students	
Marks	Baseline	Endline	Baseline	Endline
0 to 20	8.3%	0.0%	4	0
21 to 40	14.6%	0.0%	7	0
41 to 60	45.8%	0.0%	22	0
61 to 80	22.9%	4.2%	11	2
81 to 100	8.3%	95.8%	4	46
Total	100.0%	100.0%	48	48

Grade 5	Subtraction			
	%		No of students	
Marks	Baseline	Endline	Baseline	Endline
0 to 20	43.8%	0.0%	21	0
21 to 40	37.5%	6.3%	18	3
41 to 60	8.3%	6.3%	4	3
61 to 80	8.3%	2.1%	4	1
81 to 100	2.1%	85.4%	1	41
Total	100.0%	100.0%	48	48

Table 3 Distribution of Individual Students' Marks in Pilot 2: Grade 4

Grade 4	Addition			
	%		No of students	
Marks	Baseline	Endline	Baseline	Endline
0 to 20	1.4%	0.0%	1	0
21 to 40	8.6%	0.0%	6	0
41 to 60	41.4%	0.0%	29	0
61 to 80	30.0%	4.3%	21	3
81 to 100	18.6%	95.7%	13	67
Total	100.0%	100.0%	70	70

Grade 4	Subtraction			
	%		No of students	
Marks	Baseline	Endline	Baseline	Endline
0 to 20	18.6%	0.0%	13	0
21 to 40	38.6%	2.9%	27	2
41 to 60	24.3%	12.9%	17	9
61 to 80	15.7%	17.1%	11	12
81 to 100	2.9%	67.1%	2	47
Total	100.0%	100.0%	70	70

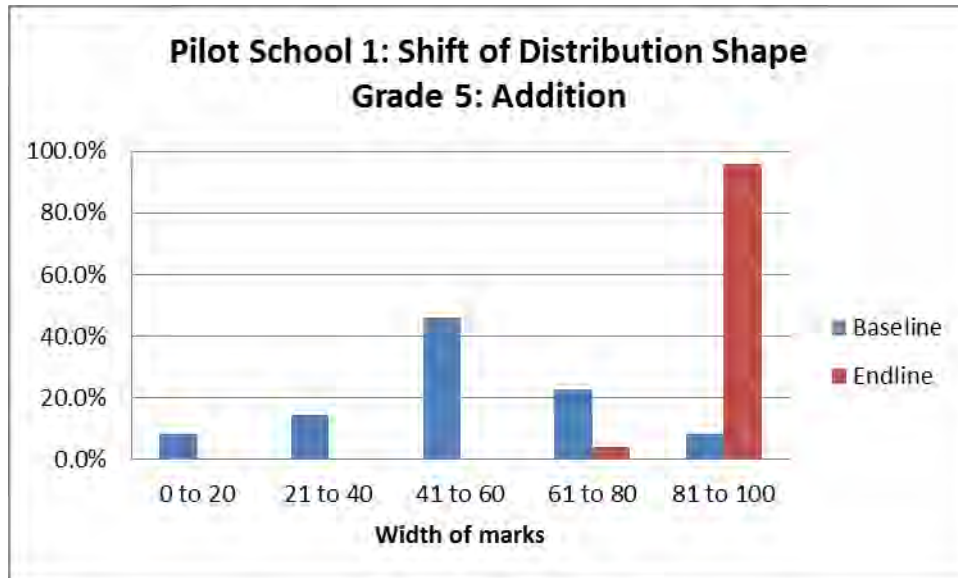


Figure 21 Distribution Shape of Students' Marks of Pilot 1: Grade 5/Addition

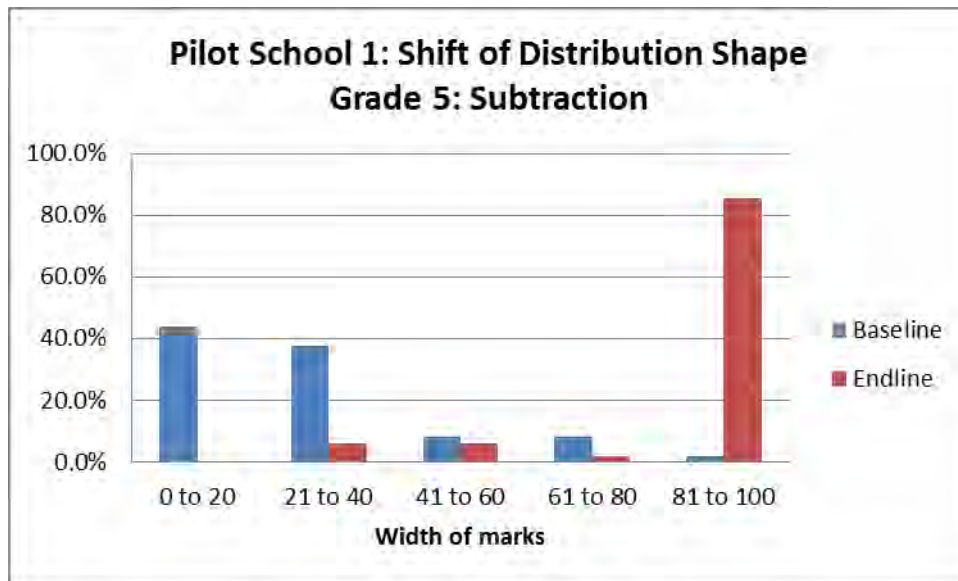


Figure 22 Distribution Shape of Students' Marks of Pilot 1: Grade 5/Subtraction

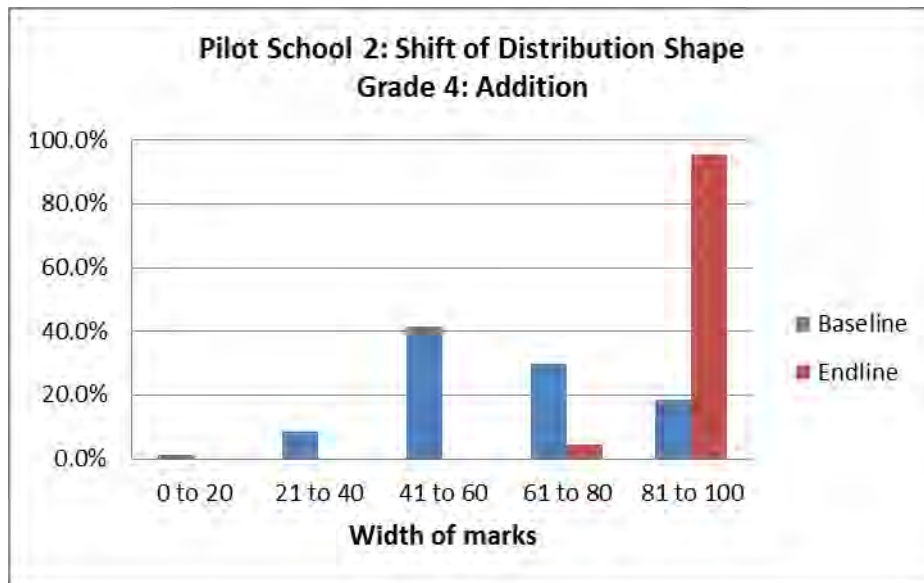


Figure 23 Distribution Shape of Students' Marks of Pilot 2: Grade 4/Addition

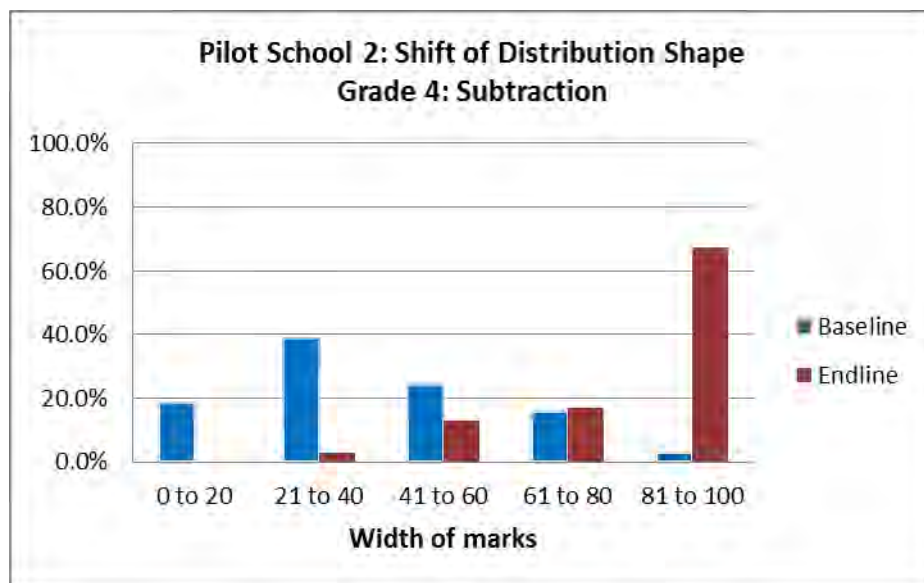


Figure 24 Distribution Shape of Students' Marks of Pilot 2: Grade 4/Subtraction

5) Conclusions

The conclusions are summarized below:

- The Surala e-learning produced remarkable impact on strengthening students' mathematical ability at two pilot schools. This is mainly due to the successful change of the students' calculation method from the finger counting to the composition and decomposition method.

- Under the current situation, most of students in Indonesia have difficulties in basic calculation as proven in the baseline survey. The difficulties are mainly caused by the finger counting and a lack of daily lessons on the basic calculation.
- It was proved that the impact by Surala e-learning is outstanding in addition and subtraction.
- It is particularly notable that the number of slow learners dramatically decreased in two pilot schools. It is considered that Surala Ninja! is designed particularly for slow learners in which students can repeatedly learn mathematics by the small step approach.
- Due to the limited time to implement the pilot activities, the endline survey could not clearly proved the improvement of multiplication and division, as most of the students have had just started multiplication by Surala Ninja! at the time of the endline survey. Observing the remarkable results in addition and subtraction this time, however, it is certain that the significant results in multiplication and division would be expected after the students complete learning in those sections.¹
- As strengthening basic calculation skill by Surala e-learning will certainly contribute to help students understand advanced mathematics in their future, Surala e-learning is of significance to solve one of the critical national issues, that is, improvement of quality of education.

(2) Self-reliant and Continual Activities to be Conducted by Counterpart Organization

Based on the remarkable results in the endline survey, two pilot schools decided to continue the Surala class after completion of the project. UPI lecturers learnt the operation skills and know-how for Surala class through joining training sessions and monitoring activities and, therefore, they become confident to operate the after-school tutoring class in UPI and decided to continuously operate the after-school tutoring class in UPI.

¹ At the end of the Project, the second Endline Survey was conducted in 25 and 27 September 2017 for Grade 5 of Pilot School 1 and for Grade 4 of Pilot School 2, respectively, in order to examine the improvement of multiplication calculation skill. Compared to the first Endline Survey, the average scores of multiplication of 100-Box Calculation improved from 69.4 to 82.4 for Pilot School 1 and from 83.4 to 91.8 for Pilot School 2. This implies that Surala Ninja! can also help students strengthen their multiplication calculation skills.

Under these favorable situation, Surala Net made a decision to start-up the e-learning business in Indonesia with the brand name of Surala Ninja!. In this regard, a new company will be registered before the end of November 2017, after which the new company will start collecting ID fee² from the schools.

In this regard, Surala Net is planning to make a cooperation agreement with UPI in order to disseminate Surala Ninja! in Indonesia by utilizing UPI's channels to Ministry of Education and Culture, education departments in local governments, other education universities and schools. Therefore, UPI is expected to be self-reliant and continue activities after the survey.

The marketing mechanism and business model in cooperation with UPI can be summarized below:

1) Marketing mechanism

The marketing mechanism is illustrated in Figure 25 with the following features:

- It is the most efficient marketing strategy to organize the joint seminars in cooperation with Education Department in Bandung City Government, which supervises both public and private schools located in Bandung City. This was materialized through arrangement by UPI. It is expected that the same approaches to Education Departments in other local governments also can be done through UPI's channel.
- In the joint seminars with local governments, the marketing staff to be dispatched from Surala Net in Japan will make presentation. In addition, representatives of Education Department in local governments and UPI will also make presentation, by which reputation of Surala Ninja! will go up.

² ID fee is the fee to be paid to Surala Net for use of Surala Ninja!.

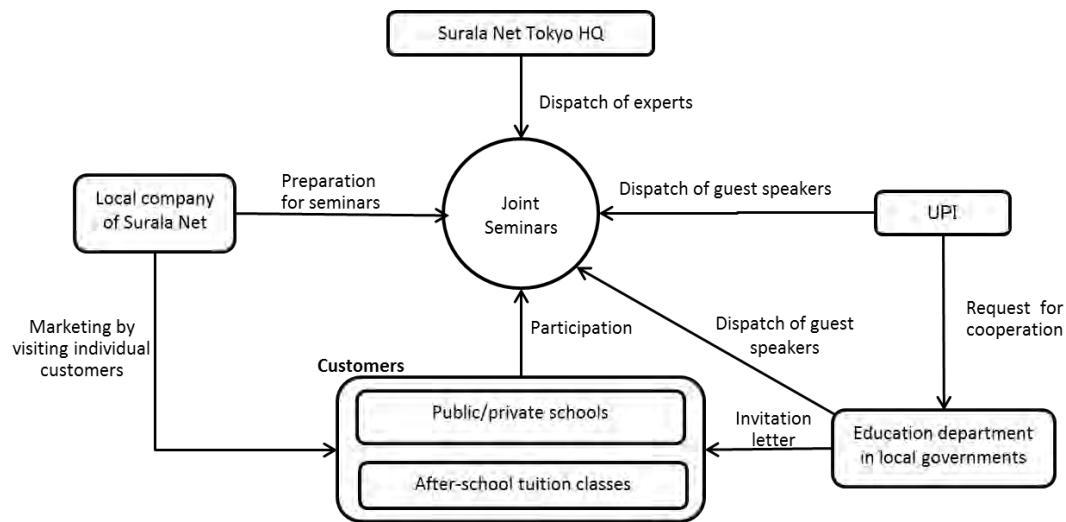


Figure 25 Marketing Mechanism

2) Business model

The business model is illustrated in Figure 26 with the following features:

- The local company to be established by Surala Net will provides the customers of schools and after-school tutoring classes with comprehensive consultation services to introduce Surala Ninja!, including teacher's training, students' IDs and passwords, various tools to operate Surala classes, monitoring and evaluation of academic achievement.
- Based on the cooperation agreement, UPI will provide the lecturers for teacher's training, monitoring and evaluation of academic achievement as fee-based service.
- Pilot schools 1 and 2 and pilot after-school tutoring class will function as model schools and after-school tutoring class by receiving visits of potential customers.

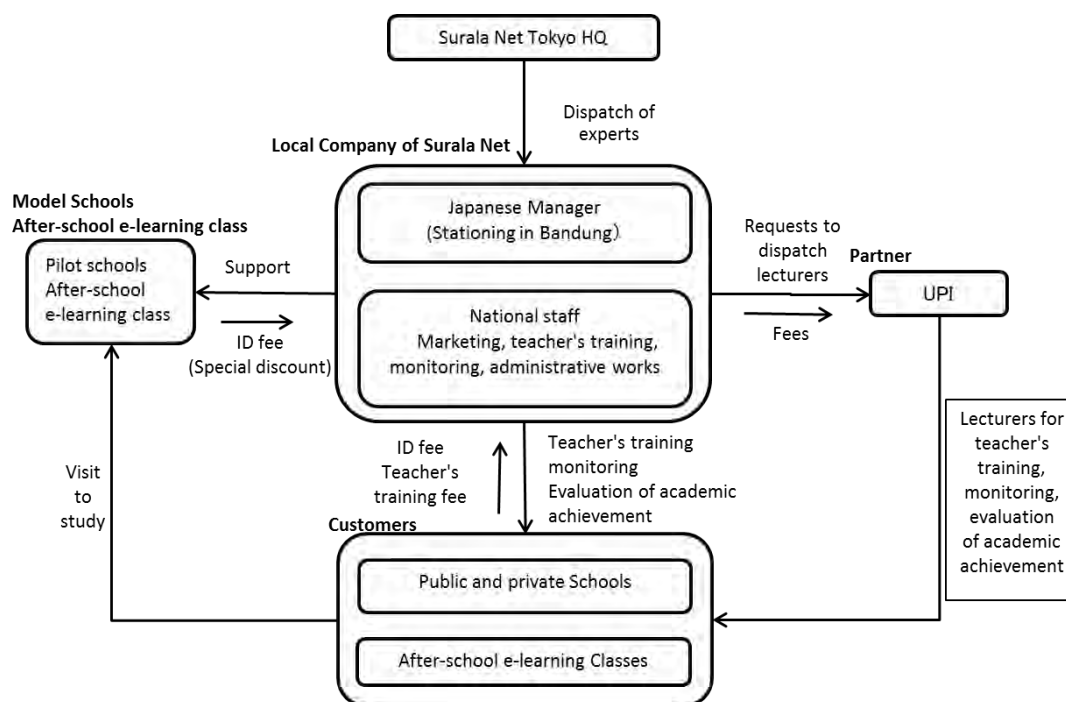


Figure 26 Business Model

4. FUTURE PROSPECTS

(1) Impact and Effect on the Concerned Development Issues through Business Development of the Product/ Technology in Indonesia

Why do many students fear mathematics? This has been the longstanding common issue for educationists, teachers and parents in the world. The mathematics academic achievement in Indonesia is particularly serious. In the Trends in International Mathematics and Science Study (TIMSS) 2011 for 8th Grade students, Indonesia was ranked 38th out of 42 countries. This is caused by the weak basic calculation skills, as the students learn only the finger counting method. Surala Ninja! can solve this significant issue, as proved by the pilot activities.

The important point is that Ninja characters can provide lectures on how to calculate by using composition and decomposition method, not by finger counting. This means that, if computer and Internet are given, students can efficiently and equally learn mathematics whether they are living in remote area or whether they do not have quality teachers. Through business expansion, Surala Ninja! can generate a significant impact on mathematics education in the country for a vast number of students who have been suffering from mathematics for years.

(2) Lessons Learned and Recommendation through the Survey

The lessons learnt through the survey can be summarized in the following way:

- In order to achieve a sufficient level of academic achievement, teachers should have enough capacity so that students keep concentration and enjoy studying with Surala Ninja!.
- The students' discipline is an important key success factor. This includes punctuality, hand-wash before using PC, file handling by students themselves and target setting of individual students.
- The placement test is useful for students who are in higher grades or fast learners, by which those students can skip lessons/units that they have already understood. Otherwise, those students become boring and lose concentration. As one of the comparative advantage of e-learning is that students can learn by their own learning speed, and, therefore, teachers should individually provide students with their lesson schedule in order to maximize learning efficiency.
- In the start-up business period, Surala Net should focus on the market segment on the schools, not on after-school tutoring classes, as recruitment of students and collection of tuition fee to manage after-school tutoring classes need much effort. On the other hand, once schools make contracts with Surala Net to introduce Surala Ninja!, all students regularly study with Surala Ninja! and, therefore, the improvement of academic achievement is surely achieved with good reputation, which is most important for the business start-up time.

The recommendation through the survey can be summarized in the following way:

- From a viewpoint of Surala Net, one of the efficient marketing strategies is collaborative marketing activities with universities with faculty of education like UPI, as they have vast channels to relevant government organizations and schools. Since education universities can learn the cutting edge technologies of e-learning through working with Surala Net, this collaboration can achieve the win-win situation.
- UPI, as a leading education university in Indonesia, should play an important role by providing Ministry of Education and Culture with knowledge and know-how learnt through the survey, including 1) 100-box calculation and composition and decomposition method for fast and accurate calculation skills, 2) comparative advantages of e-learning and 3) class management and discipline.

ATTACHMENT: OUTLINE OF THE SURVEY

