Differentiated Teaching Style towards Improving Students' Performance through IDI and Students' Behavior through ODI: A Case of Mathematics in Primary 6 at Saint Gabriel's College

Kittirat Sirithanapipat

An Action Research Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Management
in Organization Development and Management
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Major	Master of Management in Organization Development and Management MM (OD)
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Academic Year	2/2010

The Graduate School/Faculty of Graduate School of Business, Assumption University, has approved this action research as a partial fulfillment of the requirements for the Master of Management in Organization Development and Management MM (OD).

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ABSTRACT

In the past; most people believed that learning Mathematics needed formula recognition, law, and follow the example. But at the present time, instructional Mathematics must focus on learning for students to understand, the students have mathematics skill, encourage students to do the analysis and synthesis, encourage students to see and realize that Mathematics is in the nature. So, now the duties of Mathematics teachers should be to raise awareness and encourage the students to understand that mathematics is valuable, it is around us, and Mathematics knowledge can be useful in the real life. It is an opportunity for students to join the debate. The students will have more understanding and appreciation of Mathematics as well.

The purpose of the study in this research geared towards the initial impact of IDI/ODI on teaching style, students' performance, and students' behavior in primary 6 at Saint Gabriel's College in Thailand. This study aimed to achieve four main objectives including; 1) To analyze and describe the current situation of Mathematics Primary 6 in terms of the teaching style, Students' performance, and Students' behavior in primary 6 room 1 and 2, 2) To determine the appropriate IDI/ODI to improve teaching style, students' performance, and students' behavior in Mathematics primary 6 room 1, 3) To analyze and find out the initial impact of IDI/ODI on teaching style, students' performance, and students' behavior in Mathematics primary 6 room 1, 4) To compare the difference between the pre IDI/ODI and the post IDI/ODI of primary 6 room 1 and 2 in terms of teaching style, students' performance, and students' behavior in Mathematics.

For the research methodology, the researcher focused on questionnaire, observations, interviews, and pre-post test which were applied for gathering primary data. In the research, the participants were 117 students. The research design used descriptive analysis and referred to an

approach that attempts to describe the data. The appropriate tools applied to conduct this study were questionnaires and observation survey, the statistical package software program was used to analyze the data.

From the findings, the researcher could conclude that Mathematics teaching style had the good result with students' performance and students' behavior. Based on the research results, the researcher used several interventions in three areas of the organization, which are classroom field and instructional field. After intervention, the researcher collected the data to check the impact of IDI on teaching style, students' performance and ODI on students' behavior. The results showed there were positive feedbacks in teaching style, students' performance, and students' behavior areas. Therefore; based on the research hypotheses, it can be concluded that there is a significant difference between the Pre and the Post IDI/ODI and IDI/ODI that bring impact on teaching style, students' performance, and students' behavior.

Acknowledgments

The completion of this research has been made possible because of the assistance and support of many people. I would like to acknowledge the aid and support of those people who have guided, assisted and provided support during the writing of this research.

Firstly; I would like to convey my sincere and deep gratitude to the school director, Brother Anusak nidhibhardrabhorn for giving me a great opportunity to learn on the Master of Management in Organization Development and Management at Assumption University. This is my time to improve my abilities, knowledge, skill, classroom management, and English language to be a great teacher in the future.

Secondly; I would like to express my most sincere gratitude to Dr. Salvacion E.Villavicencio, my research advisor, for her remarkable contribution to this work. Without her guidance, friendly advice, encouragement, patience, valuable comments and caring support, this research would not have been possible. I would like to extend special thanks to Dr. Perla Rizalina M. Tayko, Dr. Sirichai Preudhikulpradab, and Dr. Kittikorn Dowpiset, for serving as members of the research committee and for their interest, support and many helpful comments and suggestion.

Thirdly; I also would like to offer sincere thanks to all respondents for their kind cooperation and support in providing me with useful information for this research. I am also grateful for my colleague Ms. Mondhana Pandee for her help by giving me enormous support and many suggestions in getting the research done.

Finally; I am eternally grateful to my dear parents who gave me life not once, but countless time especially during the course of this study. Their wholehearted and unquestioning support has served as my inspiration in the completion of this research.

Any mistakes that remain despite the wise counsel of my colleagues are solely the responsibility of the author.

Kittirat Sirithanapipat

DEDICATION

All of the benefits and the best things reaped from this action research that I accomplished, the researcher desire to offer to my Sirithanapipat family and the kind people around me.

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CHAPTER 1

The Problem/Potential Challenge for Change

Background of the Study

The first chapter refers to about the Global context, Asian context, and Thai context of education at the present time and merges into one organization. The background of education and one organization, which are selected for this case study and together with their people issue and situation, are presented for a better understanding of the background for this research. The research objectives, statement of the problem, research question, research hypothesis, significance of the study, even the scope and delimitation of the study are also presented in this chapter. The one part of this chapter includes definition of terms used throughout the paper is done to ensure common understanding of concepts and processes of the study.

1.1 Global Context

Mathematical principles and concepts have become a part of almost every area of work. Mathematics principles will help students succeed in both school and work. Mathematics study skills can help the students learn the mathematical concepts, skills, and principles so important to other parts of students' life. Additionally, math study skills are tools that can serve you well in college, work, and other learning subject.

In our daily life, mathematics is part in which students and teachers interact in ways that allow students to have an opportunity to maximize how much they learn. There are a variety of ways in which students and teachers interact in teaching style, students' performance and students' behavior. Some interactions results in teaching style of mathematics teacher have very much effect on student learning. Classroom discussions; mathematics teacher and student initiated questions, small groups work, and mathematics activities are instructional strategies that provide a measure of two-way communication in which information about what is taught and what is learned is exchanged between two people or teacher with students.

There are instructional strategies in which students sit passively in classrooms where there is one-way communication – from teacher to students. The didactic lecture is the modal way of teaching. Although the lecture is an efficient method for transmitting information from a teacher to a large group of students, telling information to someone does not mean that learning takes place. So; to determine whether learning is occurring – in fact, to ensure that learning is taking place, there must teacher-students and assessment interactions along the instruction. Evaluation between students and teachers occur when teachers gather information about student performance and behavior of students' better understanding concepts and principles and applying knowledge.

Jasmine Y. Ma and Marcy Singer-Gabella (2011), indicated in the Journal of Teacher Education, Vol. 62, 1: pp. 8 – 22 that;

> "Starting from the assertion that traditional and reform mathematics pedagogy constitute two distinct figured worlds of teaching and learning, the authors explore the initiation of prospective teachers into the figured world of reform mathematics pedagogy. To become successful teachers in reform-oriented classrooms, prospective teachers must learn more than pedagogical tools and moves: They must understand what it is to participate in the figured world of reform pedagogy, develop models of identities for participants in this world, and negotiate new constructions of mathematics. In this article the authors present three episodes from an elementary mathematics teacher education class where positions of "teacher" and "child" were offered by instructors in activities designed to approximate practice in the reform figured world. Students negotiated new models of identity and conceptions of mathematics as they took up these positions in varying ways."

1.2 Asian Context

Brian A. Bottge, Timothy S. Grant, Ana C. Stephens, and Enrique Rueda (2010), presented in The Journal Mathematical Education, NASSP Bulletin, vol. 94, 2: pp. 81 – 106 that;

> "While curriculum specialists and committees often decide how mathematics is taught, it is ultimately principals who influence the extent to which these initiatives are carried out. The overall goal of this article is to provide school leaders with classroom-based research that describes one way of improving the math skills of middle school students. The study employed a randomized pretest-posttest comparison group design to examine the effects of two versions of Enhanced Anchored Instruction (EAI) and a Business as Usual (BAU) condition on the math skills of middle school students in technology education classrooms. Results showed that both EAI conditions were effective at improving the math skills of students over those of students in the BAU classes. The findings suggest that technology education teachers can make important contributions in helping students develop their computation and problem-solving skills."

And John Woodward, Yumiko Ono, (2004) define in The Journal of Learning Disabilities, vol. 37, 1: pp. 74 – 82, that;

> "Japanese education has been the subject of considerable research and educational commentary in the United States over the last 20 years. Since the early 1990s, there has been increased interest in Japanese methods for teaching mathematics, and the Third International Mathematics and Science Study has accelerated American interest in Japanese methods. Observational studies, teacher and student surveys, and analyses of classroom videotapes have provided a rich picture of how the Japanese teach the whole class. However, little has been written about how academically low-achieving math students fare in Japanese schools. This article briefly summarizes Japanese methods for teaching mathematics and describes how the educational system addresses academic diversity. It concludes with a description of a method for teaching mathematics that some Japanese mathematics educators feel has promise for students with learning disabilities."

1.3 Thai Context

Reuters News article about Thailand's system of education published on May 30, 2011; there has been a growing discussion about the future of education in Thailand although so far much of this is in the English and not the Thai language press who seemingly has failed to pick-up this story. According to government figures, Thailand is one of the countries in Southeast Asia that allocates the highest education budget in its National Plan.

According to the same article, Thailand is already among the world's top education spenders relative to its size, allocating roughly 20 percent of its annual budget to education, according to the central bank. The country spent the equivalent of 4 percent of GDP on education in 2009, above Singapore 3.1 percent, according to the Swiss-based Institute of Management Development (IMD), but Singapore ranks 13th and Thailand 47th in education performance. So, Thailand 47th in education performance; "As a member of UNESCO, Thailand has attempted to develop its provision of education for all according to the Jomtien Declaration. The concept of Education for All has been well recognized and translated into action. As a consequence, our National Education Scheme of 1992 was designed to assure continuous and life-long learning for individuals so as to promote their wisdom, spiritual, physical and social development, and their contribution towards the progress of the nation under a constitutional monarchy. However, there were some major problems calling for urgent reform. Main causes of the problem could be identified as : -

- Over centralization;
- Lack of unity in educational administration;
- Lack of efficiency in quality assurance and desirable standards;
- Lack of public participation;
- Lack of systematic and continuous policy development; and

• Lack of coordination among the ministries with major responsibilities for education (Ministry of Education, Ministry of University Affairs, and the Office of the National Education Commission)."

(http://www.ibe.unesco.org/International/ICE/natrap/Thailand.pdf)

Primary education in Thailand aims at developing the quality of life of learners, so that they can properly serve society, assuming their roles and responsibilities as good citizens under a democratic constitutional monarchy. To achieve this goal, each student is to be equipped with the basic knowledge and skills necessary for: daily living; adjustment to social changes; good physical and mental health; effective work and happy, peaceful living.(*Kiat Ampra and Chadjane Thaithae, 1995)*

(http://www.ibe.unesco.org/curriculum/Asia%20Networkpdf/ndrepth.pdf)

1.4 Organization Profile

Background of Saint Gabriel's College

Saint Gabriel's College is a private Catholic school located in Bangkok, Thailand. The school was founded by the Brothers of Saint Gabriel in 1920 and is regarded as one of the leading schools in Thailand.

The school provides education for students from grade 1 through 12. Admitting only approximately 400 students per year, the school entrance especially in the first grade is highly competitive.

In 1918, after the First World War ended, the demand for schools and education in Bangkok sharply increased. At that time, the Brothers of Saint Gabriel had established only one school in Bangkok, the Assumption College. As a response to this increasing demand, Brother Martin de Tours proposed an idea to open a new school in Bangkok. He accepted a plot of land offered by Father Brozat of the nearby Saint Francis Xavier Churchas the site for his vision.

The construction began in 1920, the chief engineer being Mr. Be'quelin. The main building is designed entirely by Brother Martin de Tours himself. The construction of the building, which cost approximately 100,000 baht, completed in February 1922 and the building, painted in light red, is called "Tuk-Daeng" or "Red Building", which literally means "the red building" from then on.

In 1920, while the construction was still taking place, Brother Martin de Tours and his teaching staffs began teaching temporarily at Mr. Berli's House. There were 141 students enrolled in the first year. On February 6th,

In 1922 the building was first used. From past to present St Gabriel's College has been continually developed by many generations of Brothers of St Gabriel both foreigners and Thais. Accordingly, the institute has had a very good reputation and has taught youngsters to enter Thai society who, upon entering, have worked in various professions.

Philosophy

1. The purpose of man's existence is to know the Truth, to love and to search for it, which is the source of life and all knowledge.
2. The belief that a man justifies himself and his existence by the nobility of his work. This is expressed by the school motto: **Labor Omnia Vincit.**

Objectives

1. Preparing pupils through the acquisition of knowledge and skills related thereunto, at primary and secondary levels, which will be a good foundation for their future and further quest for more knowledge in the concept of life-long education.
2. Inculcating in the pupils' minds, right attitudes, right precepts of religion and moral principles, which will help guide them in their world of reality, in order that they may be able to make decisions with intelligence and wisdom, and know how to solve

conflicts and problems through peaceful means, as responsible members of society and the world at large.

Policies

To reach the above objectives, the Brothers' schools have the following policies...

1. The development of the whole man the physical intellectual, emotional, mental and moral development.
2. The inculcation of respect for the Three Institutions of the Nation: Religion, Country, and King; and, a democratic way of life.
3. Academic excellence through hard work and practical application, the fluency of languages, the ability to grasp mathematics and science, which will enable pupils to have logical thinking, self-discipline and broadmindedness.
4. The emphasis on the practicing and fostering of Christian values: respect for others as persons, creativity, solidarity and interiority for the common good of society of which they are members.

Mission: academic years, 2551- 2555

Saint Gabriel is responsible for following the guidelines prescribed in its vision:

1. Promote learner desirable feature, full 5-D is the emotional and psychological well being, spirit, physical health and social intelligence.

2. Promote learners with skills that will allow them to work with others and become good leaders in the future.

3. Developing their course, 75 percent of the cumulative grade point average of at least 3.00 with the knowledge and skills required for a course.

4. Encourage students to use language for communication in everyday life and acquire self-knowledge more effectively in at least two languages.

5. Promote the knowledge of its teachers as knowledgeable teachers will be more effective in preparing young learners.

6. To promote and develop teachers' ability to manage learning effectively.

7. Promotion of ethics, executives has the ability to efficiently manage education.

8. Development of the school's quality of education under ministerial regulations, Compliance Education Foundation of Saint Gabriel in Thailand and international standards.

9. Promote the school curriculum and processes that focus on student learning as stressed.

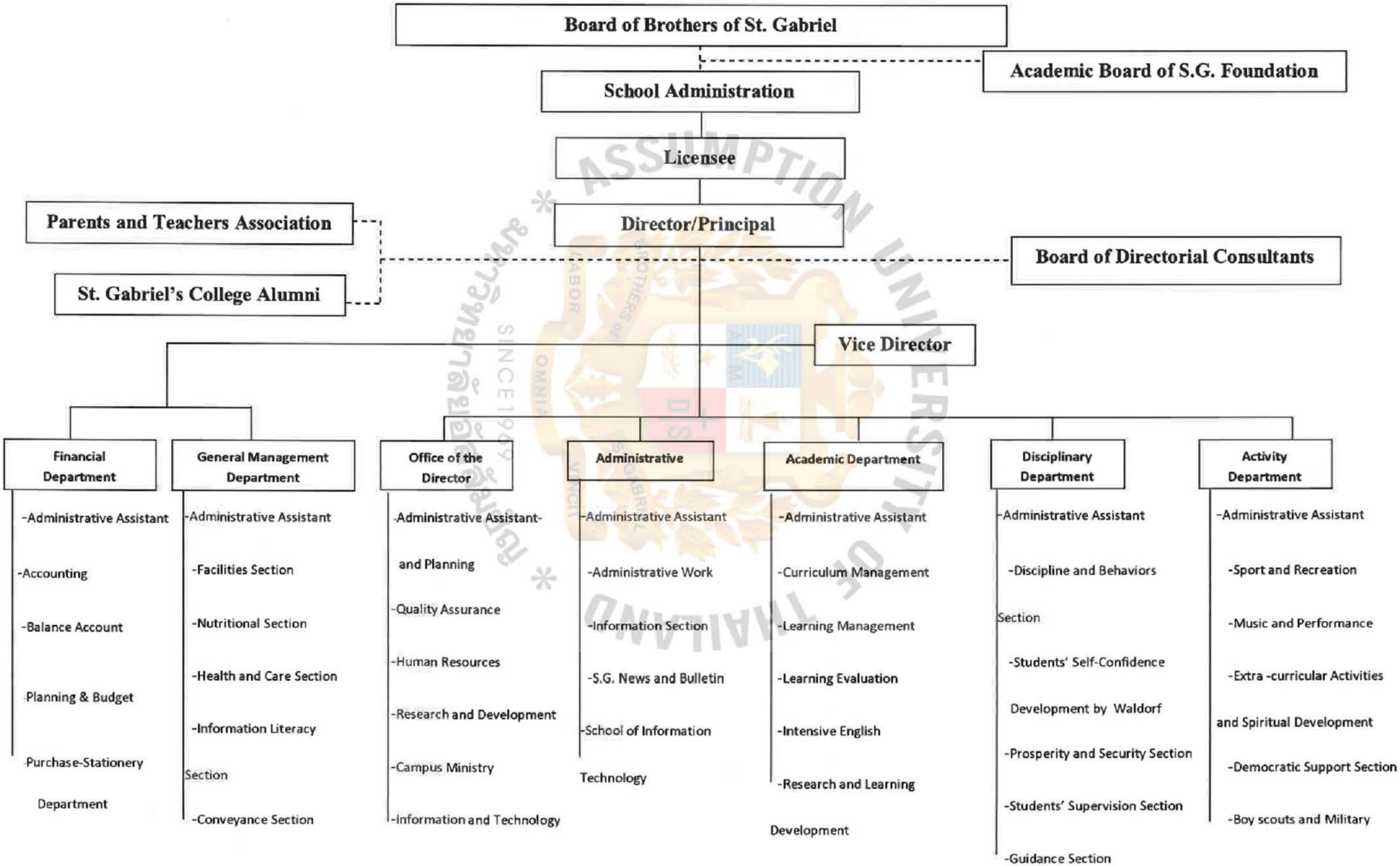
10. Promote school activities and service environment that is conducive to student learning.

11. Promote the school to receive assistance from alumni, parents and outside community organizations in the development and management of the school.

Vision

Saint Gabriel's college is a leader of education in Thailand. Their standard of education is comparable to international standards and has received assurance from the office of standards and quality assessment. Personal quality of management education, virtues, ethics, skilled in using modern technology in teaching learning various subjects in English and emphasizing the importance of learning in the atmosphere and work together by the principles of democracy. Students have a good personality, learn responsibility and leadership quality. The students develop fully the mental, physical, emotional, social and intellectual.

Administrative Chart of Saint Gabriel's College, Bangkok



1.5 Classroom Background

In primary 6, there are 7 rooms, 475 students in total and 21 teachers. In each classroom, there are about 66-68 students. The students must learn 14 subjects and mathematics is taught as a main subject. They study Mathematics for 4 periods per week. The scores are divided into 2 parts: 70 and 30. 70 marks come from classroom test and classroom assignments and 30 marks come from the final exam. It takes 4 and a half month for the first semester and 4 month for the second one. 2 instructions are provided in each class. They may be from the same or the different department. Most primary 6 don't like Mathematics and often get low score because Mathematics must be analyzed, synthesized, imagined and applied for the students' daily lives.

1.6 Current Classroom Situation

Mathematics is a basic subject and very important for teaching and learning at both Primary level and Secondary level. Nowadays, Primary 6 level is extended to and contains about 58 – 60 students per class. For my case study, I have chosen primary 6 room 1 with 60 students and primary 6 room 2 with 57 students. Mathematics is taught 4 periods per week, per class.

Teaching style; Most Mathematics teacher's use *"Teacher centered"* teaching style, hardly use Mathematics media and rarely provide Mathematics activities in class.

Students' performance; Most students have trouble with Mathematics problem solving. Some of them forget multiplication tables and have not enough skill in division. They also don't understand the Mathematics concept and theory so they have less Mathematics learning ability.

Students' behaviors; After the Mathematics teacher gives an assignment, the students don't submit it on time. They have no obedience and are not responsible for the class assignment.

1.7 SOAR Analysis

Figure 1.1: SOAR Framework

SOAR stands for: **S**trengths, **O**pportunities, **A**spirations, and **R**esults.

Stavros, J. (2009) presented; Why SOAR makes an impact: SOAR is SWOT refashioned and updated for 21st Century organizations who are seeking to create workplaces which have greater employee engagement, collaboration, community, meaning, purpose, creativity and energy. SOAR conversations not only achieve strategic outcomes, they also contribute to achieving many other business objectives necessary for creating sustainable workplaces. Using Appreciative Inquiry, SOAR, or any other varieties based on the principles of AI works with any person, no matter what role or level they hold in or outside an organization. These are very inclusive approaches that work well for everyone. No matter what the level or skill, each participant had a voice that is valued and recognized. It is truly collaborative and consultative. Stavros, J. (2009).

(http://positivepsychologynews.com/news/amanda-horne/2010090313242)

Table 1.1 SOAR analysis

Strengths (S):	Opportunities (O):
• Mathematics teachers have lot of experience • High technology (ex. Wi-Fi in class, Projector for animation, etc.) • Intensive academic • Good relationship between teachers and students • Intensive curriculum iPSLE (International Primary School Learning Examination) for guarantee	• Most parents can by support school • Good location to learning • Students have opportunities to go abroad for improving their knowledge • Students have opportunities to join International mathematics contest
Aspirations (A): • The Saint Gabriel's College top five in Asia • The students can improve knowledge from mathematics activities room • the students use Mathematics formula expertly • The students can function as self coach • The Saint Gabriel's College become the modern media center	**Results (R):** • Mathematics teachers have a lot of activities in lass • Students can increase mathematics skill • Students have good attitude and like to learn more mathematics • Students have high mathematics score • Students can problem solving improve. • Students are skillful in solving mathematics problem • Students submit on time • Students enjoy mathematics formula in class • Students love school

As shown in table 1, the researcher work at the primary 6 Mathematics department and the researcher focus on Teaching style, Students' performance and Students' behavior. Sometime the researcher can find the good method and the researcher think how the researcher can apply to the students to help them improve their Mathematics skill. The researcher wishes they can use this knowledge in their routine practices and compete with other schools when they graduate from primary 6. Therefore, the researcher analyzes the problem in my class, Mathematics department and school by using **SOAR** tool that is shown below;

- **Strengths (S);**

Saint Gabriel's College has extensive vision of education. The Mathematics department has strong academic programs because the school has intensive curriculum, Mathematic Intensive English program and International Primary School Learning Examination (iPSLE) standard. In the classroom there are a lot of new methods and technology to teach students. The Mathematics teachers have a lot of experience and good relationship between teachers, students and their parents. Also, they can improve their English with the foreign teachers and Thai teacher who teach in English subject. In the afternoon there is a special program to teach the students who are in mathematics.

- **Opportunities(O);**

Saint Gabriel's College has many opportunities from Saint Gabriel's foundations, parents, and teachers associates and alumni associates. The Brother Director has vision to develop teachers to be international teachers to teach the students by sending teachers to learn and find new experiences from abroad. Especially, school has scholarship to give students to go abroad to get the experiences. Thailand has a lot of Mathematics contests. So, Saint Gabriel's College has good instruction and suitable location to go to the competition in any contest including international Mathematics contest. Therefore, the parents want to send their sons to study in Saint Gabriel's College and always support school in many activities.

- **Aspirations(A);**

Aspirations of Saint Gabriel's College must become top five in Asia as the school has intensive curriculum and highly experienced Mathematics teachers. So the students can improve the knowledge from Mathematic activities room. Sometime Mathematics activities room helps the students use formula expertly. The students of Saint Gabriel's College can self coach and participate with Mathematics teachers to produce Mathematics media for media center.

- **Results(R);**

Saint Gabriel's College needs to bring about these result; the students love their own school. Mathematics teachers have a lot of activities in class. Most the students can increase Mathematics skill, good attitude with Mathematics, like to learn more Mathematics, solve Mathematics problem solving and be skillful. Therefore, the students will submit their work on time, have high Mathematics score and enjoy Mathematics formula in class.

So, the researcher choose to conduct case study about Teaching style, Students' performance and Students' behavior because of Mathematics teachers observe Students' behavior in class, Mathematics teachers would know that Teaching style is effective for Students' performance in class and outside class.

1.8 Research Objectives

1. To analyze and describe the current situation of Mathematics Primary 6 room 1 and room 2.in terms of the Teaching style, Students' performance and Students' behavior.

2. To determine the appropriate IDI/ODI to improve teaching style, Students' performance and students' behavior in Mathematics Primary 6 room 1.

3. To analyze and find out the initial impact of IDI/ODI on Teaching style, Students' performance and Students' behavior in Mathematics Primary 6 room 1 before and after IDI/ODI.

4. To compare the difference between the pre IDI/ODI and post IDI/ODI of Primary 6 Room 1 and Room 2 in terms of Teaching style, Students' performance and Students' behavior in Mathematics.

5. To compare the difference between the post IDI/ODI of Mathematics Primary 6 room 1 with intervention and room 2 without intervention in terms of Teaching style, Students' performance and Students' behavior.

1.9 Statement of the Problem

The main purpose of this case study is to find out the impact of Instructional Development Intervention (IDI) and Organization Development Intervention (ODI) on Teaching style, Students' performance and Students' behavior in Mathematics Primary 6 room 1 at Saint Gabriel's College Bangkok of Thailand. This study would also determine the difference between room 1 with intervention and room 2 without intervention.

1.10 Research question

1. What are the current situation of Teaching style, Students' performance and Students' behavior in Mathematics Primary 6 room 1 and room 2 at Saint Gabriel's College Bangkok of Thailand?

2. What are the appropriate Instructional Development Interventions (IDI) and Organization Development Intervention (ODI) for Teaching style, Students' performance and Students' behavior in Mathematics Primary 6 room 1 at Saint Gabriel's College Bangkok of Thailand?

3. What is the initial impact of IDI/ODI on Teaching style, Students' performance and Students' behavior in Mathematics Primary 6 room 1 at Saint Gabriel's College, Bangkok of Thailand?

4. What are the differences between the pre IDI/ODI and post IDI/ODI of Primary 6 Room 1and Room 2 in terms of Teaching style, Students' performance and Students' behavior?

5. What are the differences between the post IDI/ODI of Primary 6 room 1 with intervention and room 2 without intervention in term of Teaching style, Students' performance and Students' behavior?

1.11 Hypothesis

Ho1: There is no initial impact of IDI/ODI on Teaching style, Students' performance and Students' behavior in Mathematics Primary 6 room 1.

Ha1: There is initial impact of IDI/ODI on Teaching style, Students' performance and Students' behavior in Mathematics Primary 6 room 1.

Ho2: There is no difference between in the pre IDI/ODI and post IDI/ODI on Teaching style, Students' performance and Students' behavior in Mathematics Primary 6 room 1 and room 2.

Ha2: There is difference between in the pre IDI/ODI and post IDI/ODI Teaching style, Students' performance and Students' behavior on Mathematics Primary 6 room 1 and room 2.

Ho3: There is no difference the post IDI/ODI between of Mathematics Primary 6 room 1 with intervention and room 2 without intervention in terms of Teaching style, Students' performance and Students' behavior.

Ha3: There is difference in the post IDI/ODI between Mathematics Primary 6 room 1 with intervention and room 2 without intervention in terms of Teaching style, Students' performance and Students' behavior.

1.12 Definition of terms

This part presents definition of key words that are used in this study as the following;

Teaching style; characteristic the individual way that Mathematics teaching behaves in class primary 6.

Problem Solving; engaging in a task for which the solution method is not know in advance.

Media; materials that explain the data in any form or that the picture to presentation through them, including paper, transparencies, hard disk, floppy and optical discs, magnetic tape, wire, cable and fiber for clear content in class.

Mathematics activities; the multi activated of Mathematics that is arithmetic, geometry, and algebra in primary 6, activities are related to analysis, synthesis, and apply in real life.

Mathematics; the study or use of numbers and shapes to calculate, represent, or describe things, Mathematics includes arithmetic, geometry, and algebra in primary 6.

Students performance; the outcome and results of the students' learning against specific objectives.

Concepts; the student understands solution of mathematics and ideas then deep understand.

Skill; the student can perform the mathematical routine or technique correctly.

Problem Solving; the ability of students to apply appropriate skills and concepts, and reason mathematically. Students solve increasingly complex situations by formulating, implementing and drawing conclusions from the problem solution.

Mathematics problem; the process of finding solutions of Mathematics problem by using Mathematics skills.

Assignment; the work that the students are required to do as part of a course of study or as part of mathematics.

Students' behavior; the students demonstrate in Mathematics class primary 6 such as; interest, disregard, disobey, and Irresponsible. etc.

Students' attitude; Feeling or mentality in Mathematics instruction.

1.13 Significance of the Study

In conducting this action research study, I have been inspired by the following expectations separated in three different parts of topics.

Firstly, this action research study will be on teaching style for the students to learn, such as; Mathematics teacher as teacher and coach in class especially student center then students can self coach. Mathematics teachers try to find the new technique and different sources to apply the lesson plan that can help the students to improve fast or understand fast. Forasmuch sometimes Mathematics is very difficult to understand; they can't use imagination, they have to perform or practice more. So, Mathematics media, Geometer's Sketchpad Program (GSP), Mathematics game online, etc. The Mathematics teachers should use communication and the information to introduce how students can use all of sources and select the best. After that the teacher should set the activity that can help the student to understand and improve their base skills because in Mathematics they have to understand and analyses then apply in daily life more than recitation. If they can't understand that means the students can't participate with the teacher and can easy to teach or improve the student learning.

Secondly, the Mathematics teachers will know about students' performance by observation learning, answer, action, reaction, participation, and communication of the students in class. Sometimes group activities and presentation Mathematics project in Mathematics primary 6 students can show Mathematics teacher how to develop students' performance. In this solution will find the students' performance and try to solve problem and let them improve their performance. Then the teachers will adapt new method to transfer the essential or integrate to teach in their class to help them to make understand more Mathematics theory and can improve their Mathematics skills very fast.

Finally, the Mathematics teacher should know the behavior of the students and promote good behavior in class such as; submit assignment on time, obedient and responsible. The researcher thinks the primary 6 students must have increased academic and have good behaviors. This would provide for them the best tool or weapon to compete with other schools when they want to do the test or examination. Researcher hopes they would win and have good morality. They can succeed in achievement by teaching innovation.

1.14 Scope and Delimitation of the Study

The scope of this research studies the initial impact of Instructional Development intervention on Teaching style, Students' performance and Students' behavior in Mathematics Primary 6 room 1 and room 2 at Saint Gabriel's College Bangkok of Thailand. However, there are some limitations of the study in this research which are as follows;

The target groups of this study will are primary 6 students at Saint Gabriel's College of Thailand. Because they have a lot of students in one class (60students/class), there are different ability and Performance in learning that comes from the school mixing together with the high, average, and low scores of pre-test at the first time when they come to school. The research study was limited only to Teaching style, Students' performance and Students' behavior in Mathematics Primary 6 room 1 and room 2.

Chapter 2

Review of Related Literature

This research focused on Teaching style, Students' performance and Students' behavior in Mathematics Primary 6 room 1 and room 2. Many authors studied the valuable theories, concepts and ideas of Teaching style, Students' performance and students' behavior in Mathematics Primary 6 room 1 and room 2 as well as shown the correlation among them. Therefore; this chapter reviews the related studies of these variables.

The literature presented in this chapter is classified in to 6 sections. The first section is Organization as a System, the second section is organization development intervention, the third section is change management, the fourth section is Teaching Style, the fifth section is Students' Performance, and the sixth section is Students' Behavior. These literatures will principally broaden the concepts and ideas of the organization development and management to specifically intensify in the particular variables of the study and conceptual framework respectively.

2.1 Organization as a System

"A system is a whole made up of parts. Each part can affect the way other parts work and the way all parts work together will determine how well the system works. This is a fundamental challenge to traditional management thinking. Traditionally we have learned to manage an organization by managing its separate pieces (sales, marketing, production, logistics, service, etc.). Managing in this way always causes sub-optimization; parts achieve their goals at the expense of the whole. Only changing the system solves the problem." (John Seddon, *Vanguard...The Toyota System for Service Organizations)*

Curry (1992) indicated that "the following identifies several key concepts of change theory that are crucial to implementation of a new and innovative approach. A description of the concept with reasons why they are crucial is provided. For example, change theories include provisions to deal with inevitable resistance to change. Ways to address this and other factors related to change are presented with an illustration of why the key concepts are crucial."

Deming and Juran, (2000) demonstrated that people's behavior is governed by the system they work in. It was a finding which went against the accepted wisdom of their time and remains outside prevailing management thinking. Yet this is the single, common cause of the failure of programmers' of change. Change in performance requires a change to the system. (http://www.modernanalyst.com/Resources/Articles)

Schein, (2005) explained Lewin's theory of change, which includes three steps in the change process: unfreezing, changing, and refreezing. Thus, unfreezing is a key and important concept; a company must be awakened to the new reality and disengage from the past, understanding that the old way of doing things is no longer acceptable. Disengagement is another critical concept that is accomplished through an understanding of the need for change as well as driving and resisting forces.
(http://www.lotsofessays.com/viewpaper/1712923.html)

2.2 Organization Development

W. Warner Burke, (2010). Presented in the Journal of Applied Behavioral Science, vol. 47, 2: pp. 143-167 that;

> "Essentially, and perhaps arguably, there has been no innovation in the social technology of organization development (OD) since appreciative inquiry originated in 1987. It is as if the creative work of OD is done. Moreover, it is as if the mission of OD—to loosen tightly coupled systems, think large bureaucracies—has largely been achieved. Decentralization,

involvement, and autonomy on the job are commonplace in many organizations. There is a paradox, however. The need for expertise in organization change has never been greater, and OD has so much to contribute, yet the failure rate for organization change efforts is around 70%, and for mergers and acquisitions the failure rate is even larger. The premise of this article is that there is much work yet to be done. We who identify ourselves with the field of OD have unfinished business. As research on the Zeigarnik effect showed, we tend to remember things undone more than we remember things that have been completed. A purpose of this article is to create a Zeigarnik effect. Four domains of unfinished business in the field are identified and explored. There are no doubt many other domains, but these four definitely need attention. We need to know much more than we now know about how to (a) work with loosely coupled systems, (b) change the culture of an organization, (c) identify and deal with perceived resistance to change more effectively, and (d) get leadership development right—it is not about training."

Myungweon Choi and WendyE.A.Ruona, (2010). Explained in the Journal of Human Resource Development Review, vol. 10, 1: pp. 46-73, that

"Individual readiness for organizational change reflects the concept of unfreezing proposed by Lewin (1947/1997b) and is critical to successful change implementation. Understanding the conditions conducive to individual readiness for organizational change, instead of the more traditional focus on resistance to change, can be useful for designing and implementing effective human resource and organization development (HROD) interventions. In this conceptual article, we examine the concept of individual readiness for organizational change as well as its relationship to change strategies and organizational culture. A review of literature on change strategies and a learning culture suggests that individuals are more likely to have higher levels of readiness for organizational change when (a) they experience normative-reductive change strategies and when (b) they perceive their work environment to have the characteristics associated with a learning culture."

2.3 Change Management

Jeanne Dininni, (2008) presented that "the management theory of John Kotter has won widespread acceptance in the years since he first presented his leadership model clarifying the dynamics of effective corporate leadership. More recently, Kotter has further developed his companion theory, the Kotter theory of change management, which works hand in hand with his earlier leadership principles to create a culture of success within a company. Kotter himself has stated, "The fundamental purpose of management is to keep the current system functioning. The fundamental purpose of leadership is to produce useful change." When properly used, Kotter's theory can help a business owner or manager overcome resistance to change within the company, and thereby facilitate organizational transformation.

"Kotter's (2009) change management theory identifies a number of characteristics that stand in the way of healthy organizational change. Until management takes the appropriate steps to eliminate these obstacles, effective change cannot occur. As you learn more about the role of the John Kotter theory in transformational change, you'll be better equipped to eliminate the following obstacles from your own organization: 1. Complacency, driven by arrogance; 2. Self-protective immobilization, driven by fear; 3. Defiance, driven by anger; and 4. Hesitancy, driven by pessimism."

(http://www.business.com/guides/management-theory-of-john-kotter-6774)

June Kaminski, (2011) explained that Kurt Lewin's change management theory is based on a model of unfreezing, changing, and refreezing. For many who practice the art of "organization development." Kurt Lewin's change management framework has been a theoretical foundation upon which change theory has been evolved over time from theorizing about "planned change" to thinking about such processes more as "managed learning."

Lewin's change theory is a 'planned change' guide that consists of three distinct and vital stages:

- Unfreezing Stage
- Moving to a New Level or Change Stage
- Refreezing.Stage

Unfreeze ⟶ **Change** ⟶ **Refreeze**

(http://www.businessresourcecenter.ca/change_management_theory.htm)

2.4 Teaching Style

Jan Giles, DanielA.J. Ryan, George Belliveau, Elizabeth De Freitas, and Ryan Casey. (2006), presented in the Journal 0f Active Learning in Higher Education, vol. 7, 3:pp. 213 – 225, that;

> "Education research over the last few decades has focused on the debate over which classroom pedagogies best encourage learning: teacher-center or student-center. Although research appears to support the philosophy that student-center teaching provides for better learning, the supporting research is frequently limited to observational studies or limited in experimental design. Despite this, the trend has been to encourage teachers to adopt a more student-center approach both in the teaching of the course material and as a model for future teachers. A pilot study was conducted in an introductory university statistics course using a Latin Square Design to experimentally collect both quantitative and qualitative data pertaining to student performance. The purpose of this study was to examine the impact of teaching style on learning, assess these approaches in quantitative courses, and establish protocols for such studies using a statistically controlled design."

Gerunda B. Hughes. (2009), indicated in Mathematics Teaching – Research Journal online, vol.3 N2, that;

> "An effective mathematics learning environment is one in which students and teachers interact in ways that allow students to have an opportunity to maximize how much they learn. There are a variety of ways in which students and teachers interact in a learning environment. Some interactions result in student learning, however, others have very little effect on student learning. Classroom discussions, teacher and student initiated questions, cooperative group work, peer tutoring and a host of other feedback systems such as assignments, examinations and electronic response systems such as the personal response system (PRS) and the personal data assistant (PDA) are instructional strategies that provide a measure of two-way communication in which information about what is taught and what is learned is exchanged between two people."

Altering the Teaching Style to Create Teacher-student Style Matching

Hinkelman and Pysock , (1992) indicated that "In all academic classrooms, no matter what the subject matter, there will be students with multiple learning styles and students with a variety of major, minor and negative learning styles." An effective means of accommodating these learning styles is for teachers to change their own styles and strategies and provide a variety of activities to meet the needs of different learning styles. Then all students will have at least some activities that appeal to them based on their learning styles, and they are more likely to be successful in these activities, for example; have demonstrated the effectiveness of a multimedia methodology for vocabulary building with Japanese students. This approach is effective in tapping a variety of learning modalities. By consciously accommodating a range of learning styles in the classroom in this way, it is possible to encourage most students to become successful language learners.

(http://iteslj.org/Techniques/Zhenhui-TeachingStyles.html)

Christine Smith-Mitsuhashi, (2002) explained about;

Teaching Style Categories

Formal Authority

Teachers who have a formal authority teaching style tend to focus on content. This style is generally teacher-centered, where the teacher feels responsible for providing and controlling the flow of the content and the student is expected to receive the content. Teachers with this teaching style are not as concerned with building relationships with their students nor is it as important that their students form relationships with other students. This type of teacher doesn't usually require much student participation in class. "Sage on the stage model."

Demonstrator or Personal Model

Teachers who have a demonstrator or personal model teaching style tend to run teacher-centered classes with an emphasis on demonstration and modeling. This type of teacher acts as a role model by demonstrating skills and processes and then as a coach/guide in helping students develops and apply these skills and knowledge. Instructors with this teaching style are interested in encouraging student participation and adapting their presentation to include various learning styles. Students are expected to take some responsibility for learning what they need to know and for asking for help when they don't understand something.

Facilitator

Teachers who have a facilitator model teaching style tend to focus on activities. This teaching style emphasizes student-centered learning and there is much more responsibility placed on the students to take the initiative for meeting the demands of various learning tasks. Teachers typically design group activities which necessitate active learning, student-to-student collaboration and problem solving. This type of teacher will often try to design learning situations and activities that require student processing and application of course content in creative and original ways.

Delegator

Teachers who have a delegator teaching style tend to place much control and responsibility for learning on individuals or groups of students. This type of teacher will often give students a choice designing and implementing their own complex learning projects and will act in a consultative role. Students are often asked to work independently or in groups and must be able to maintain motivation and focus for complex projects. Students working in this type of setting learn more than just course specific topics as they also must be able to effectively work in group situations and manage various interpersonal roles.
(http://members.shaw.ca/mdde615/tchstyles.htm)

2.5 Students' Performance

Dr. Ken Gu – SEA. (2009), **New Standards Reference Exam (NSRE) - Mathematics:** The mathematics performance of students in high school is assessed at the school and state levels, 8 and 10, with a mathematics reference exam aligned with Vermont's Framework of Standards and Learning Opportunities. The mathematics reference exam measures and reports on the percentages of students meeting or exceeding a performance level (standard) in three areas;

(1) Concepts: Showing that the student understands mathematical processes and ideas.

(2) Skills: Showing that the student can perform the mathematical routine or technique correctly.

(3) Problem Solving: Showing that the student can choose and apply appropriate skills and concepts, and reason mathematically. Students solve increasingly complex situations by formulating, implementing and drawing conclusions from the problem solution.

The School Report shows the percentage of students in the highest two performance levels - Achieved the Standard and Achieved the Standard with Honors. It also shows the number of students' valid results for each assessment.

(http://www.eride.ri.gov/reports/dacView.asp?dacID=32)

Syed Tahir Hijazi1 and S.M.M. Raza Naqvi2. (2006), indicated in Bangladesh e-Journal of Sociology. Volume 3. Number 1, that;

> "Introduction measuring of academic performance of students is challenging since student performance is product of socio-economic, psychological and environmental factors. For the last 20 years, education in Pakistan is growing as a profitable industry with prime objective of maximizing profit by delivering high quality education that produces well-educated, skilled, mannered students according to needs and requirements of the dynamically growing market. That's why the scope of research is always there to find out what are the factors that affect the performance of the students. There are two groups of students as generally perceived i.e. those who improve and those who don't improve. This study can contribute to find out the factors, which are responsible for student's inelastic behavior towards study along with identifying those factors, which help a student to make progress in his studies. This study focuses on investigating the factors affecting performance of 3rd and 4th year college students equal to Europeans standard K-12 and K-14. A survey was conducted to collect information and responses of students, regarding factors affecting their performance."

2.6 Students' Behavior

Participation, the behavioral component, includes basic behaviors such as the student's acquiescence to school and class rules, arriving at school and class on time, attending to the teacher, and responding to teacher-initiated directions and questions. Noncompliant behavior--for example, inattentiveness, disruptive behavior, or refusing to complete assigned work--represents a student's failure to meet these basic requisites. Other levels of participation include initiative-taking on the part of the student (initiating questions or dialogue with the teacher, engaging in help-seeking behavior), and participation in the social, extracurricular, and athletic aspects of school life. Identifications, the affective component, refers to the student's feelings of belonging in the school setting (sometimes called school membership) and valuing the outcomes that school will provide, for example, access to post-school opportunities.

Finn & Rock, (1997) explained to the extent that "it has been studied; the relationship of specific engagement behaviors with academic performance is strong and consistent across populations defined by background characteristics and grade level. These studies also have shown that positive engagement behaviors explain why some students perform well in school in spite of the adversities they face as members of high-risk populations; that is, they are academically resilient."

(http://www2.ed.gov/pubs/ClassSize/practice.html)

Jongho Shin, Hyunjoo Lee, and Yongnam Kim, (2009) indicated in the Journal School Phychology International, vol. 30, 5: pp. 520-537, that;

> "The purpose of the study was to comparatively investigate student- and school-level factors affecting mathematics achievement of Korean, Japanese and American students. For international comparisons, the PISA 2003 data were analyzed by using the Hierarchical Linear Modeling method. The variables of competitive-learning preference, instrumental motivation and mathematics interest were used as student-level predictors on mathematics achievement. The variables of student-teacher relationship and school disciplinary climate were also used as school-level variables. The results of the study showed that different patterns of the relations between student- and school-level predictors and mathematics achievement were present among the three countries. Specifically, the predictor of competitive-learning preference was significant on mathematics achievement in Korea and Japan, but not in the US. For Korean and Japanese students, unexpectedly, mathematics interest was a stronger predictor than was instrumental motivation; in contrast, the pattern was the reverse for American students. For school-level predictors, school disciplinary climate was a significant predictor on the achievement differences in all three countries; however, the variable of student-teacher relationship turned out to be significant only in Japan. Implications of the results are discussed from the comparative perspectives of cultures and educational contexts of the three countries."

This figure is the Instructional Teaching of Learning Process Framework. Satellite is the Mathematics teachers have good lesson plan for instruction, when the Mathematics demonstrate and give the small groups have participate in class by using two way pattern. The arrows have two head mean the good communication to understand correctly. The stars are the small group and have the students' center; in each group can be change ideas, creative, solution, etc. Between groups can be cooperating in Mathematics activities or Mathematics games. Especially; small groups have colorful, it means each group has various idea but knowledge of Mathematics teachers explain is the main concept in class simultaneously. And around there are stars and colorful; it means knowledge or other skill of the students can be applied then the students were students center.

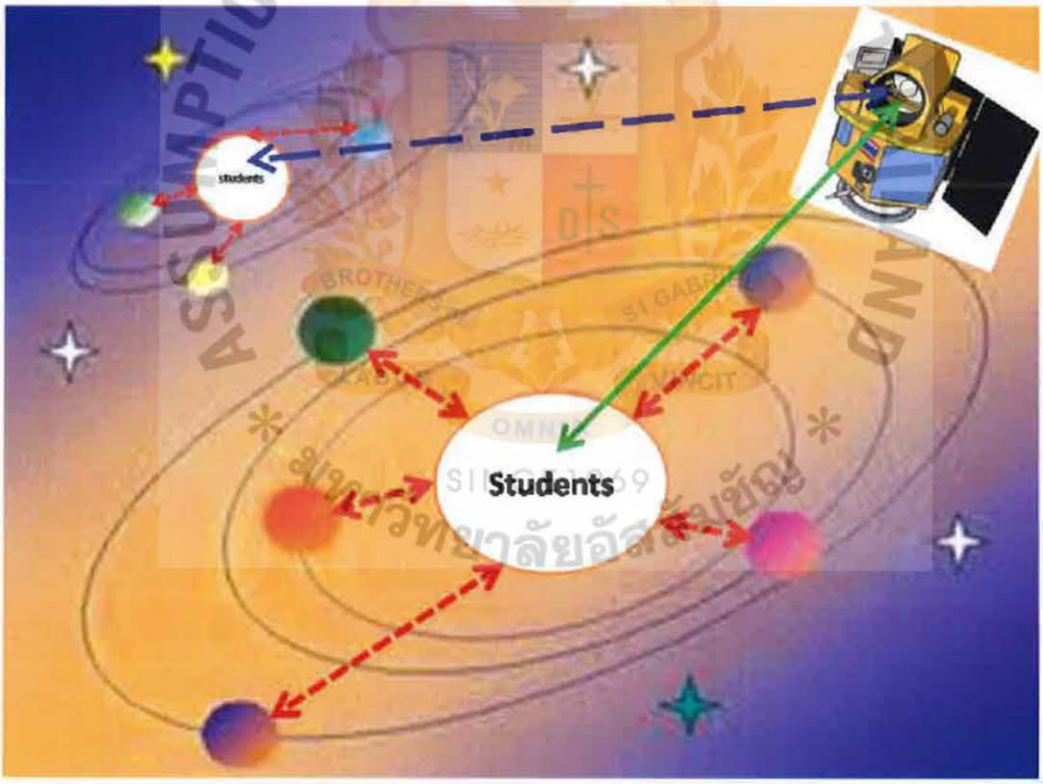


Figure 2.1: Instructional Teaching of Learning Process Framework.

Table 2.1 Conceptual Framework

PRE IDI	IDI	POST IDI
Teaching Style		
• Teacher centered ❖ **Formal Authority** ❖ **Demonstrator or Personal Model**	• Teachers have to change methods of teaching new by using Demonstrator or Personal Model style. Together with the reasons of thinking. If students dare show anyone, as well as teachers and student-centered learning. So students should participate in every class period.	• Student centered
• Students' didn't pay attention	• 1. Teachers should be taught using media, especially Mathematics. 2. Media should be simple and readily available. 3. Teachers should create a simple media.	• Most the students pay more attention
• Negative attitude	• 1. Teachers should have added more activities to Mathematics. 2. Students practice using mathematical games. 3. Recommended Math Games website and use the activity in class. 4. Activities should be skill analysis, synthesis, understanding, etc.	• Mathematics activities can help students to have a good attitude and to like to learn more mathematics.

PRE IDI	IDI	POST IDI
Students' Performance		
• Trouble with performance of mathematics. ➢ Concept ➢ Skill ➢ Problem solving	• Researcher analyzes students with problems solving. I prepare small group of students. I explain problems and how to solve the problem. And Give the problems to students to solve.	• Students' have higher performance (concept, skill and problem solving.)
• Forget Multiplication table	• 1. Let Students orally present the multiplication table twice a day, the morning and noon with teacher every day. 2. Give the worksheets of multiplication table practices. 3. Other teacher can help these students. 4. Improve the multiplication skill continuously.	• Able to memorize to multiplication table for further multiplication problem.
• Lack of Mathematics division skill	• 1. Researcher chooses students who are concerned with the division and divided into small groups. 2. Teacher explains division skill. 3. Give worksheets of division practices. 4. Planning with other teacher to take care of students. 5. Improve the Mathematics division skill.	• Able to skillfully solve the division problems.

PRE ODI	ODI	POST ODI
Student's Behaviors. • Do not submit assignment on time.	• 1. The teachers should have the instruction way that to makes students excited. 2. Find "Why the student don't summit assignment on time and suggest good way." 3. Warning. 4. Reduce one's marks. 5. Inform parents.	• Students submit assignment on time and become more responsible

Teaching style

1. Teacher centered

➢ **PRE IDI**; "Teacher instructional centered" Most Mathematics teachers have method for teaching style by explaining only. So teaching style as "one way" and the students cannot understand some content, until some students may not like Mathematics.

➢ **IDI**; Teachers have to change teaching style, methods of teaching new by using Demonstrator or Personal Model style. Together with the reasons of thinking. If students dare show anyone, as well as teachers and student-centered learning. So students should participate in every class period.

➢ **POST IDI;** "Student centered" Mathematics teachers change teaching style from teacher only in class to be as a coach/guide in helping students develop and apply these skills and knowledge. Therefore, most students would be interested to learn more in class.

2. Student didn't pay attention

➢ **PRE IDI;** "Mathematics media" Mathematics media is very important to demonstrate and clear imagine for true content. But Mathematics of primary level lacks Mathematics media to explain content clearly. Therefore, most students have the problem about content in Mathematics.

➢ **IDI;** Mathematics teachers should be taught using media, especially Mathematics. Mathematics media should be simple to use. Every year there should be new simple Mathematics media for using next year and practice using Mathematics media then evaluate Mathematics media for next development.

➢ **POST IDI;** Use Mathematics media demonstrated in class. Therefore, most students would understand and pay more attention.

3. Negative attitude

➢ **PRE IDI;** Mathematics activities can help the students understand more but inasmuch location unfavorable therefore have less Mathematics activities in class. Most periods in class will use lecture only.

➢ **IDI;** Mathematics teachers should have added more Mathematics activities and Mathematics games can be found skill the students. Sometimes Mathematics teachers should recommend Math Games website and use some Mathematics activities in class. Most Mathematics activities can develop analysis, synthesis, and application skills.

➢ **POST IDI;** When students have a good attitude and like to learn more Mathematics, the Mathematics teachers would be easy to teach in class.

Students' Performance

1. Trouble with performance of mathematics.

➢ **PRE IDI;** "Performance of mathematics" It is important in Mathematics. Most students cannot analyze Mathematics problems. If the students found long information, they will not be interested to do it and sometimes they thought it is difficult to do.

➢ **IDI;** Mathematics teacher will search problem of the students in class, such as why the students cannot solve Mathematics problems. Sometimes Mathematics teachers divide as small group and must, analyze Mathematics problem and demonstrate problem solving of Mathematics go side by side with the students in class together. Give the Mathematical problems for students to practice.

➢ **POST IDI;** Students are able to solve the Mathematics problem more. Mathematics teachers and students have happiness in class. Most students are interested and like Mathematics more.

2. Forget Multiplication table

➢ **PRE IDI;** Multiplication table is important factor to the use in calculating Mathematics. Most the students can memorize Multiplication table but cannot answer immediately. So in Mathematics it is considered incomplete.

➢ **IDI;** Mathematics teachers let the students orally present the multiplication table twice a day, the morning and noon with the teacher every day. Give the worksheets of multiplication table practices. Take turn with other teacher to take care of students. Improve the multiplication skill.

➢ **POST IDI;** The students must memorize multiplication table for further multiplication problem. The students can use it with next lesson continuously. Mathematics teachers' are able to teach to next level comfortably.

3. Lack of division skill

➢ **PRE IDI;** Most the students cannot find answer of division because the division will need the use of multiplication table for calculation. The division skills depend on practicing frequently.

➢ **IDI;** Mathematics teachers choose students who are concerned with the division and divided into small groups. When the students get division from explanations in class, teachers give Mathematics worksheets to practice division. Mathematics teachers should plan with other teacher to take care of students and improve the division skill always.

➢ **POST IDI;** The students must be able to skillfully solve the division problems, and then the students would apply to use with next level.

Student's Behaviors.

1. Do not submit assignment on time.

➢ **PRE ODI;** There are most students who don't submit assignment on time because they are lazy to do homework and don't pay attention in class. Some students to be absent-minded to study in class form lecture. So they don't understand content, how to do homework, and when to submit assignment.

➢ **ODI;** Mathematics teachers should have the instruction way that is exiting. Give the students record assignment on student book and record homework book immediately. When the teachers used this way unsuccessfully, the teacher must find out why they don't summit assignment on time and suggest good solution for the assignment. Next step; if the students don't submit assignment on time, teachers will give warning. And last step; Mathematics teachers can reduce score, if the student don't submit assignment for the third time.

➢ **POST ODI;** Students submit assignment on time and become more responsible. Mathematics teachers can teach in class happily. In classroom there would be a good atmosphere and suitable to learn.

2. Lack of obedience and Irresponsible for the class assignment.

➢ **PRE IDI;** Nowadays; most students lack obedience because they have less time to live with their family. So they are irresponsible for the class assignment.

➢ **IDI;** The teachers should award the students with high responsibility with the extra score. Try to encourage and take a closer look at the problem students. Recommend for students who are irresponsible should be interested in class more. The teacher must suggest about responsibility for them. Let them have action in class. Mathematics teachers should use Mathematics psychology teaching style with students in class more. Recommend "What is right and moral for the students to follow"

➢ **POST IDI;** Students become responsible and Students obey the teacher's teaching and like to learn more mathematics.

Chapter 3

Methodology

Chapter 3 aims to explain the research processes. The research design can be the help as the metaphor; the Respondent, research instruments, data collection, data analysis as well as IDI/ODI technique and procedures for Teaching Style, Students' Performance and Students' Behavior are explained.

3.1 Research Design

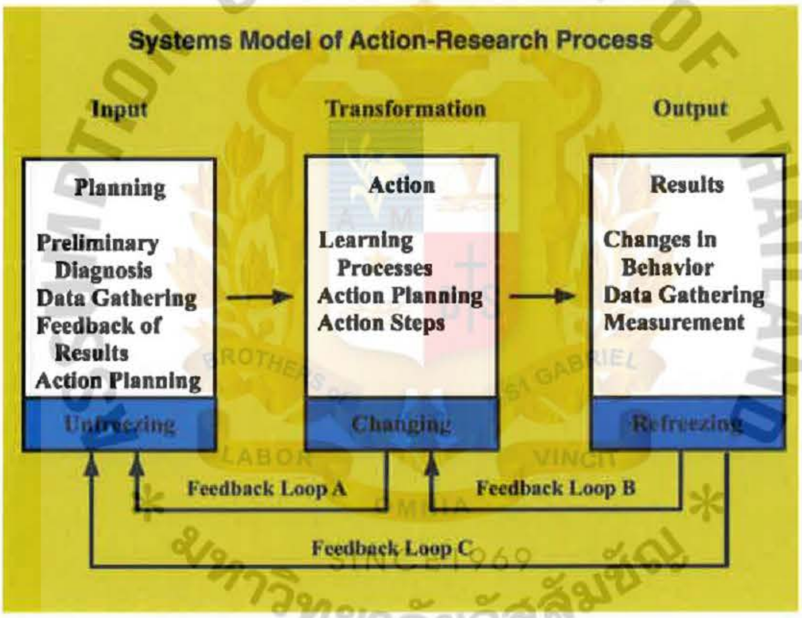


Figure 3.1: Action Research Model

The purpose of this action research project design is to compare the efficacy of two current research-based approaches related to the assessment of reading comprehension. Sarroub and Pearson, (1998) have commented that "the assessment of reading comprehension has witnessed numerous developments over the course of time as advances in reading theory were made. Generally, many reading programs are accessed via assessments developed for basal programs" and Holyer, (1998) has pointed out "many of these tests were viewed as biased against specific student populations for whom the contents of basal readers or curriculum may have been appropriate."

(http://www.lotsofessays.com/viewpaper/1706645.html)

This study is conducted in the context of an action research which covers three phases that are; Pre-IDI/ODI, IDI/ODI and Post-IDI/ODI. Moreover, this study also hoped to discover the advantages and disadvantages of the application of Group and individual work in learning Mathematics and then to determine which assessment system was more suitable and necessary. It is used a descriptive survey method covering qualitative analysis of findings on the study. Therefore; the researcher will use the 3 phases of IDI and ODI.

3.2 The Respondents

Table 3.1 The Respondents

Room	Implementation	Frequency
1	With IDI / ODI	60
2	Without IDI / ODI	57
Total		**117**

The subjects or respondents of this study are the students in *Room 1 and Room 2* of *Primary 6*, all together there are 117 students.

3.3 The instruments

This research used the pre test, post test, using of questionnaire, interview by using interview guide, attitude by use of attitude form, achievement test and observation by use of observation guide.

3.3.1 Questionnaire

Questionnaire is the part of instrument that is used to survey and gather data that are helpful in research study. The questionnaire will be developed by the researcher to determine the initial impact of IDI on Teaching Style, Students' Performance and Students' Behavior in Primary 6 room 1 and 2. This will be reviewed by experts who are proficient in both English and Thai languages. This will also be pre-tested for reliability. The questionnaires will be developed by the researcher and they consisted of two parts. The questionnaire used closed-ended (quantitative) alternative. All questionnaires are related with all sub variables in my research.

Part 1; this part the researcher designed the questionnaires to identify Teaching style. The questionnaire use 4 scales which are arranged from Strongly Agree = 4, Agree = 3, Disagree = 2 and Strong disagree = 1.

Part 2; this part the researcher designed the questionnaires to measure Students' attitude to identify Teaching style. The questionnaire use 4 scales which are arranged from Strongly agree = 4, Agree = 3, Disagree = 2 and Strong disagree = 1.

3.3.2 Interview Guide

The researcher used interview guide to conduce the students on individual respondent to collect data. The researcher will record the data to improve in three areas that are Teaching Style, Students' Performance and Students' behavior.

3.3.3 Observation Guide

The researcher used observation guide to observe class about Students' performance and Students' Behavior. The main Mathematics teachers and Co-teachers are spectators. This instrument will focus on the situation in math class.

3.3.4 Achievement Test

The researcher will prepare achievement tests that are used to determine Students' Performance. The Mathematics teachers compare pre–test scores and post-test score, achievement scores show the students have the severe difference in Concept, Skill and Problem solving that indicate the Students' performance.

3.4 Data Collection – Techniques

As for data collection techniques the researcher used four techniques of data collection to support the action research;

3.4.1 Questionnaire; research uses questionnaire in the pre IDI. The intervention can show result of the satisfaction to Teaching style and Students' attitude. After that using in post IDI then comparing "Teaching style and attitude" to consider for advantage of intervention.

3.4.2 Interview; the researcher would collect data about solution of Mathematics by interviewing by using interview guide. The researcher will communicate with the respondents to get information and data immediately. The questions would be created by researcher and would be organized to help the researcher gather the data needed in the study.

3.4.3 Achievement test is created by the researcher. It would be used for pre- IDI in both classes to know about the level of knowledge of students on same topic. After doing IDI, the researcher would use it again to get more data to compare between two groups of respondents.

3.4.4. Observation; the researcher used this technique to support action research. The observation would focus on the relation between Students' Behavior and Teaching style which has effect on Student's Performance.

3.5 Data Collection Procedure

The data collection procedure is step by step to get the data by using instruments. The flowchart below would show the steps of collecting data by using various tools of research.

Pre IDI / ODI;

- ✓ **Step 1;** The researcher designed action research by the pre-post test.

✓ **Step2;**The researcher designed the questionnaires about Teaching style and Students' attitude to check rating instruction characteristics in the form of the Formal Authority and Demonstrator or Personal Model.

✓ **Step 3;** The researcher gave the questionnaire to the students about to Teaching style and Students' attitude in learning Mathematics this style, In the questionnaire scale is used from Strongly agree = 4, Agree = 3, Disagree = 2, and Strongly Disagree = 1.

✓ **Step 4;** Conclude students' attitude about teaching style. The researcher and co-mathematics teacher must to do observation in class by use of observation guide.

✓ **Step 5;** Interview about Students' performance such as; Concept, Skill, Problem solving.

✓ **Step 6;** The researcher would analyze the data from questionnaire, Interview guide, Observation guide, Pre-Post test and Achievement test. And record all data to compare with data of post- IDI / ODI.

IDI / ODI;

✓ **Step 1;** Pre-test.

✓ **Step 2;** The researcher gave the questionnaires to check rating instruction characteristics form Formal Authority (Primary 6 Room 2) and Demonstrator or Personal Model (Primary 6 Room 1).

✓ **Step 3;** The researcher gave the questionnaire to the students about Students' attitude in learning Mathematics this style, In the questionnaire scale is used from Strongly agree = 4, Agree = 3, Disagree = 2, and Strongly Disagree = 1.

✓ **Step 4;**The researcher teaches from Formal Authority in Primary 6 room 2 only, Demonstrator or Personal Model in Primary 6 Room 1 only.

✓ **Step 5;** Interview about Students' performance such as; Concept, Skill, Problem solving in each room.

✓ **Step 6;** The researcher would analyze the data from questionnaire, Interview guide, Observation guide, Pre-test and Achievement test. And record all data to compare with data of post- IDI / ODI.

POST IDI / ODI;

✓ **Step 1;** Post-test

✓ **Step 2;** Analyze the data from questionnaire, Interview guide, Observation guide, and Teaching Style Intervention and Achievement test. Use the record of all data to compare with data between PRE- IDI / ODI and POST IDI / ODI.

✓ **Step 3;** Summarize

✓ **Action plan**

Table 3.2 Action plan

STEP	2011											
	JULY				AUGUST				SEPTEMBER			
	WEEK				WEEK				WEEK			
	1	2	3	4	5	6	7	8	9	10	11	12
1. Pre-test	↔											
2. Questionnaire • **Teaching style** • **Students' attitude**	↔									↔		
3. Teaching Style (Demonstrator or Personal Model)		↔	↔	↔		↔	↔	↔				
4. Observation • **Students' behavior**		↔		↔		↔		↔				
5. Analyze		↔					↔				↔	
6. Interview • **Students' performance**			↔				↔				↔	
7. IDI		↔	↔	↔	↔	↔	↔	↔	↔			
8. Post-test												↔

3.6 Data Analysis

This study shows quantitative and qualitative results. For quantitative result the researcher will use the statistics as follows;

1. The students 'behavior use the observation guide and the researcher would use the score with statistical means ($\overline{X}$), SD., and One sample T-test by using SPSS software (Statistical Package for the Social Sciences).

2. The teaching Style use the questionnaire and achievement test then the researcher will use the statistics to compare means ($\overline{X}$), and SD., One sample T-test and Independent-Sample T-test by using SPSS software.

3. The Students' performance use the achievement test then the researcher would use the statistics to compare means ($\overline{X}$), and SD., One sample T-test and Independent-Sample T-test by using SPSS software.

In the qualitative results the researcher would focus to measure about Students' performance by using Pre-post test and achievement test. This result will use the grouping of the data for measurements and which will be described later.

Table 3.3 The standard to calculate the average of Mean in 4 levels

Average of score	Levels
1.00 – 1.75	Strongly Disagree
1.76 – 2.51	Disagree
2.52 – 3.27	Agree
3.28 – 4.00	Strongly Agree

The table above shows the average of score of the learning style levels into 4 levels by calculating the lengths of the rank by:

$$\text{The length of the rank} = \frac{Highestscore - Lowestscore}{Rank}$$

Chapter 4

Presentation and Analysis of Data

This chapter contains discussion of the results and findings on the action research process of organization development in three phases; Pre IDI / ODI, IDI / ODI, and Post IDI / ODI. There were 117 students and questionnaires were distributed to students in primary 6 room 1 and 2 to find out the impact of IDI / ODI on Teaching style, Students' performance and Students' behavior. It presents diagnosis process, a discussion, and result of the case study derived from analysis of data in quantitative and qualitative terms based on research questions and hypotheses stated.

4.1 Demographic Profile of the Respondents

The frequency was used to analyze personal characteristics or demographic of respondents including classroom and average point.

Table 4.1 Demographic Profile of the Respondents

Room	Implementation	Frequency
1	With IDI / ODI	60
2	Without IDI / ODI	57
Total		**117**

Table 4.1 shows the frequency of classroom of the respondents. There were 60 respondents who come from room 1, 57 respondents who come from room 2.

4.2 Pre IDI / ODI

The pre IDI / ODI phase focused on the current situation of the school which was divided into three main areas; 1) Teaching Style, 2) Students' Performance, and 3) Students' Behavior. Referring to the research question in chapter one, Question1. "What is the current situation of Teaching style, Students' performance and students' behavior in Mathematics Primary 6 room 1 and room 2 at Saint Gabriel's College, Bangkok of Thailand?"

The researcher used descriptive statistics to find out the current situation of the variable topic above. The researcher used the descriptive rating as informed in chapter three to define results. In this chapter was the process to identify the problems in organization and appropriate IDI activities to develop current situation. Moreover, this part was provided to answer the first research question. The data was mainly collected from the primary 6 source, such as questionnaire, observation, and interviews. So, the current situation analysis in Mathematics Primary 6 room 1(60 students) and room 2(57 students) in terms of Teaching style, Students' performance and Students' behavior was collected from the primary data.

4.2.1 Quantitative Data Analysis.

This part presents quantitative data by using average means ($\overline{X}$) and Standard Deviation (S.D.) on Teaching style, Students' performance, and Students' attitude on Primary 6 students from room 1 and 2.

Table 4.2 The Average means ($\overline{X}$) and Standard Deviation (S.D.) of *Teaching Style* without IDI of Primary 6 Room 1

Events		Level			
		N	$\overline{X}$	S.D.	Degree
Concept	1. The teacher has to build up knowledge.	60	3.25	0.60	Agree
	2. Teacher has to develop the child's deeper understanding of mathematics.	60	3.13	0.75	Agree
	3. Good teaching, easy understand and use multimedia.	60	3.20	0.78	Agree
	4. Content in Mathematics suitable for the students.	60	3.15	0.69	Agree
Total		60	**3.18**	**0.70**	**Agree**
Skill	5. Have to develop the child's capacity to think and reason.	60	2.93	0.69	Agree
	6. Have mathematics activity and present in class.	60	2.93	0.73	Agree
	7. Have the step for thinking and writing.	60	3.01	0.67	Agree
	8. Develop skill ability of the students continuously.	60	3.00	0.74	Agree
	9. Give the wide solution skill and develop basic mathematics skills.	60	2.80	0.82	Agree
	10. Use mathematics game to develop mathematics skill.	60	3.05	0.75	Agree
Total		60	**2.95**	**0.73**	**Agree**
Problem solving	11. Suggest the solution for Solving.	60	2.93	0.76	Agree
	12. Give opportunity to the students to present new method.	60	3.23	0.83	Agree
	13. Have the solution for problem solving Mathematics clearly.	60	2.78	0.80	Agree
	14. Develop the child's self-confidence.	60	2.80	1.00	Agree
	15. Set the real situation for the students to solve the problem.	60	2.20	0.66	Disagree
Total		60	**2.79**	**0.81**	**Agree**

The perception of respondents toward the Teaching Style without IDI of Primary 6 Room 1, table 4.2 shows that the highest average mean of *Concept* was 3.25 for "The teacher has to build up knowledge", the standard deviation was 0.60, and the lowest average mean of *Concept* was 3.13 for "Teacher has to develop the child's deeper understanding of mathematics", the standard deviation was 0.75. The level of the degree was all Agree. The highest average mean of *Skill* was 3.05 for "Use mathematics game to develop mathematics skill." the standard deviation was 0.75, and the lowest average mean of *Skill was* 2.80 for "Give the wide solution skill and develop basic mathematics skills." the standard deviation was 0.82. The level of the degree was all Agree. The highest average mean of *Problem Solving was* 3.23 for "Give opportunity to the students' present new method." the standard deviation was 0.83, and the lowest average mean of *Problem Solving was* 2.20 for "Set the real situation for the students to solve the problem", the standard deviation was 0.66. The level of the degree was all Agree.

Table 4.3 The Average means ($\overline{X}$) and Standard Deviation (S.D.) of *Teaching Style* without IDI of Primary 6 Room 2

Events		Level			
		N	$\overline{X}$	S.D.	Degree
Concept	1. The teacher has to build up knowledge.	57	2.18	0.66	Disagree
	2. Teacher has to develop the child's deeper understanding of mathematics.	57	2.19	0.61	Disagree
	3. Good teaching, easy understand and use multimedia.	57	2.47	0.83	Disagree
	4. Content in Mathematics suitable for the students.	57	2.37	0.91	Disagree
Total		57	**2.30**	**0.75**	**Disagree**
Skill	5. Have to develop the child's capacity to think and reason.	57	2.26	0.88	Disagree
	6. Have mathematics activity and present in class.	57	3.18	0.66	Agree
	7. Have the step for thinking and writing.	57	2.04	0.73	Disagree
	8. Develop skill ability of the students continuously.	57	2.18	0.69	Disagree
	9. Give the wide solution skill and develop basic mathematics skills.	57	2.26	0.75	Disagree
	10. Use mathematics game to develop mathematics skill.	57	2.18	0.93	Disagree
Total		57	**2.35**	**0.77**	**Disagree**
Problem solving	11. Suggest the solution for Solving.	57	2.33	0.85	Disagree
	12. Give opportunity to the students to present new method.	57	2.26	0.92	Disagree
	13. Have the solution for problem solving Mathematics clearly.	57	2.51	0.95	Agree
	14. Develop the child's self-confidence.	57	2.16	0.65	Disagree
	15. Set the real situation for the students to solve the problem.	57	2.49	0.71	Disagree
Total		57	**2.35**	**0.82**	**Disagree**

The perception of respondents toward the Teaching Style without IDI of Primary 6 Room 2, table 4.3 shows that the highest average mean of *Concept* was 2.47 for "Good teaching, easy to understand and use multimedia.", the standard deviation was 0.83, and the lowest average mean of *Concept* was 2.18 for "The teacher has to build up knowledge.", the standard deviation was 0.66. The level of the degree was all Disagree. The highest average mean of *Skill* was 3.18 for "Have mathematics activity and present in class." the standard deviation was 0.66, and the lowest average mean of *Skill was* 2.04 for "Have the step for thinking and writing." the standard deviation was 0.73. The level of the degree was all Disagree. The highest average mean of *Problem Solving was* 2.51 for "Have the solution for problem solving Mathematics clearly." the standard deviation was 0.95, and the lowest average mean of *Problem Solving was* 2.16 for "Develop the child's self-confidence.", the standard deviation was 0.65. The level of the degree was all Disagree.

Table 4.4 The Average means ($\overline{X}$) and Standard Deviation (S.D.) of *Students' Performance* without IDI of Primary 6 Room 1

Events	Level			
	N	$\overline{X}$	S.D.	Degree
1. Understanding in content	60	2.52	0.68	Agree
2. Understanding in Concept	60	2.48	0.73	Agree
3. Have skill in Mathematics	60	2.70	0.83	Agree
4. Can use Problem Solving Mathematics more	60	2.40	0.92	Agree
5. To used multiplication table applied in Mathematics all content.	60	2.95	0.72	Agree
6. Have division skill	60	2.70	0.91	Agree
7. Have able to skillfully solve the division problems.	60	2.45	0.79	Agree
8. Able to answer the question of the Mathematics teachers	60	2.87	0.91	Agree
Total	60	2.63	0.81	Agree

The perception of respondents toward of Students' Performance without IDI of Primary 6 Room 1, table 4.4 shows that the highest average mean was 2.95 for "To use multiplication table applied in Mathematics all content." the standard deviation was 0.72, and the lowest average mean was 2.40 for "Can use Problem Solving Mathematics more.", the standard deviation was 0.92. The level of the degree was all Agree.

Table 4.5 The Average means ($\overline{X}$) and Standard Deviation (S.D.) of *Students' Performance* without IDI of Primary 6 Room 2

Table 4.5 The Average means ($\overline{X}$) and Standard Deviation (S.D.) of *Students' Performance* without IDI of Primary 6 Room 2

Events	Level			
	N	$\overline{X}$	S.D.	Degree
1. Understanding in content	57	2.51	0.80	Disagree
2. Understanding in Concept	57	2.30	0.82	Disagree
3. Have skill in Mathematics	57	2.41	0.77	Disagree
4. Can use Problem Solving Mathematics more	57	2.50	0.89	Disagree
5. To be used multiplication table applies in Mathematics all content.	57	2.33	0.87	Disagree
6. Have division skill	57	2.25	0.76	Disagree
7. Have ability to skillfully solve the division problems.	57	2.12	0.88	Disagree
8. Able to answer the question of the Mathematics teachers	57	2.42	0.70	Disagree
Total	57	2.36	0.81	Disagree

The perception of respondents toward Students' Performance without IDI of Primary 6 Room 2, table 4.5 shows that the highest average mean was 2.51 for "Understanding in content.", the standard deviation was 0.80, and the lowest average mean was 2.12 for "Have ability to skillfully solve the division problems.", the standard deviation was 0.88. So the level of the degree was all Disagree.

Table 4.6 The Average means ($\overline{X}$) and Standard Deviation (S.D.) of *Students' Attitude* without IDI of Primary 6 Room 1

Events	Level			
	N	$\overline{X}$	S.D.	Degree
1. Studying mathematics makes me feel nervous.	60	2.65	0.80	Agree
2. I am always under a terrible strain in a math class.	60	2.62	0.85	Agree
3. I am able to solve mathematics problems without too much difficulty.	60	3.57	0.59	Strongly Agree
4. Mathematics is important in everyday life.	60	3.45	0.65	Strongly Agree
5. Mathematics is one of the most important subjects for people to study.	60	3.27	0.71	Agree
6. Mathematics courses would be very helpful no matter what I decide to study, Enjoyment.	60	3.42	0.56	Strongly Agree
7. I have usually enjoyed studying mathematics in school.	60	2.70	0.77	Agree
8. Mathematics is dull and boring.	60	3.15	0.73	Agree
9. I am happier in a math class than in any other class.	60	2.33	0.88	Disagree
10. I would like to avoid using mathematics in college.	60	3.00	0.69	Agree
11. I am willing to take more than the required amount of mathematics.	60	2.57	0.83	Agree
12. I plan to take as much mathematics as I can during my education.	60	2.85	0.78	Agree
Total	60	2.97	0.74	Agree

The perception of respondents toward the Students' Attitude without IDI of Primary 6 Room 1, table 4.6 showed that the highest average mean was 3.57 for "I am able to solve mathematics problems without too much difficulty.", the standard deviation was 0.59, and the lowest average mean was 2.57 for "I am willing to take more than the required amount of mathematics.", the standard deviation was 0.83, so the level of the degree was Agree.

Table 4.7 The Average means ($\overline{X}$) and Standard Deviation (S.D.) of *Students' Attitude* without IDI of Primary 6 Room 2

Events	Level			
	N	$\overline{X}$	S.D.	Degree
1. Studying mathematics makes me feel nervous.	57	3.07	0.70	Agree
2. I am always under a terrible strain in a math class.	57	2.98	0.61	Agree
3. I am able to solve mathematics problems without too much difficulty.	57	3.47	0.73	Strongly Agree
4. Mathematics is important in everyday life.	57	3.44	0.60	Strongly Agree
5. Mathematics is one of the most important subjects for people to study.	57	3.42	0.73	Strongly Agree
6. Mathematics courses would be very helpful no matter what I decide to study, Enjoyment.	57	3.33	0.63	Strongly Agree
7. I have usually enjoyed studying mathematics in school.	57	2.81	0.77	Agree
8. Mathematics is dull and boring.	57	3.09	0.74	Agree
9. I am happier in a math class than in any other class.	57	2.49	0.83	Disagree
10. I would like to avoid using mathematics in college.	57	3.14	0.67	Agree
11. I am willing to take more than the required amount of mathematics.	57	2.65	0.81	Agree
12. I plan to take as much mathematics as I can during my education.	57	2.81	0.79	Agree
Total	57	3.06	0.72	Agree

The perception of respondents toward the Students' Attitude without IDI of Primary 6 Room 2, table 4.7 shows that the highest average mean was 3.47 for "I am able to solve mathematics problems without too much difficulty.", the standard deviation was 0.73, and the lowest average mean was 2.49 for "I am happier in a math class than in any other class.", the standard deviation was 0.83, so the level of the degree was Agree.

Table 4.8 The Maximum, Minimum, Total, Average means ($\overline{X}$) and Percentage of Pre test without IDI of Primary 6 Room 1and 2

Room	Number	Max.	Min.	Total	$\overline{X}$	S.D.	% of total point
1	60	19	2	586	9.77	3.74	48.83
2	57	20	3	649	11.39	4.35	56.93

Table 4.8, shows the comparison of Pre test between primary 6 students of room 1 and 2 by room 1 have mean ($\overline{X}$) was 9.77 so percent was 48.83% and room 2 have mean ($\overline{X}$) was 11.39 so percent was 56.93%

Table 4.9 Conclusions without IDI / ODI of Primary 6 Room 1and 2

Item	Pre IDI / ODI				
	Room	N	$\overline{X}$	S.D.	Degree
Teaching style	1	60	2.99	0.39	Agree
	2	57	2.99	0.23	Agree
Students' performance	1	60	2.63	0.81	Agree
	2	57	2.36	0.81	Agree
Students' attitude	1	60	2.97	0.74	Agree
	2	57	3.06	0.72	Agree
Pre test	1	60	9.77	3.74	48.83% of total point
	2	57	11.39	4.35	56.93% of total point

In table 4.9 Conclusions without IDI / ODI of Primary 6 room 1 and 2 by Teaching style, Students' performance, and Students' attitude have mean which is not different and have all Agree. Pre test of room 2 is higher than room 1

4.2.2 Qualitative Data Analysis

The researcher designs to implement qualitative diagnosis for collecting more information before collecting the results from diagnosis. In this step, the researcher designs to use interview techniques as below.

For this part researcher sets an information interview about Students' Performance with the Primary 6 students of room 1 and room 2. There were 60 students in room 1 and 57 students in room 2 to be interviewed and there were 4 questions in one week before using IDI / ODI. This research has interview guide as follows;

1. How to solve when you find this mathematics problem?

Room 1; There were 40 respondents who think about comparing with the example, 10 respondents think about trying to understand the mathematics problem and solve it, 7 respondents think about drawing a simple to understand, and 3 respondents think about consulting the teachers until they understand.

Room 2; There were 45 respondents who think about comparing with the example, 7 respondents think about trying to understand the mathematics problem and solve it, 3 respondents think about drawing a simple to understand, and 2 respondents think about consulting the teachers until they understand.

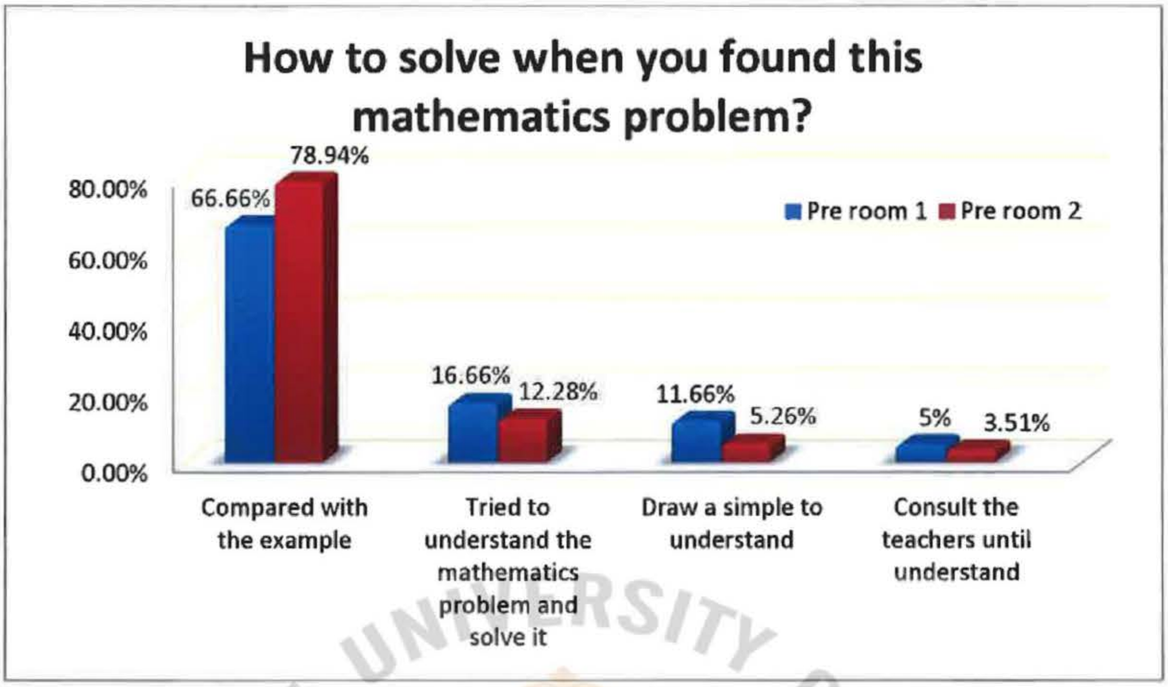


Figure 4.1: How to solve when you found this mathematics problem?

2. Who can demonstrate the solution of this mathematics problem?

Room 1; There were 25 respondents who can answers and solve correctly, 13 respondents can answers correctly but solution was incorrect, 10 respondents can explain correctly but answers were incorrect, and 12 respondents cannot answers and solve.

Room 2; There were 20 respondents who can answers and solve correctly, 4 respondents can answer correctly but solution was incorrect, 10 respondents can explain correctly but answers were incorrect, and 23 respondents cannot answer and solve.

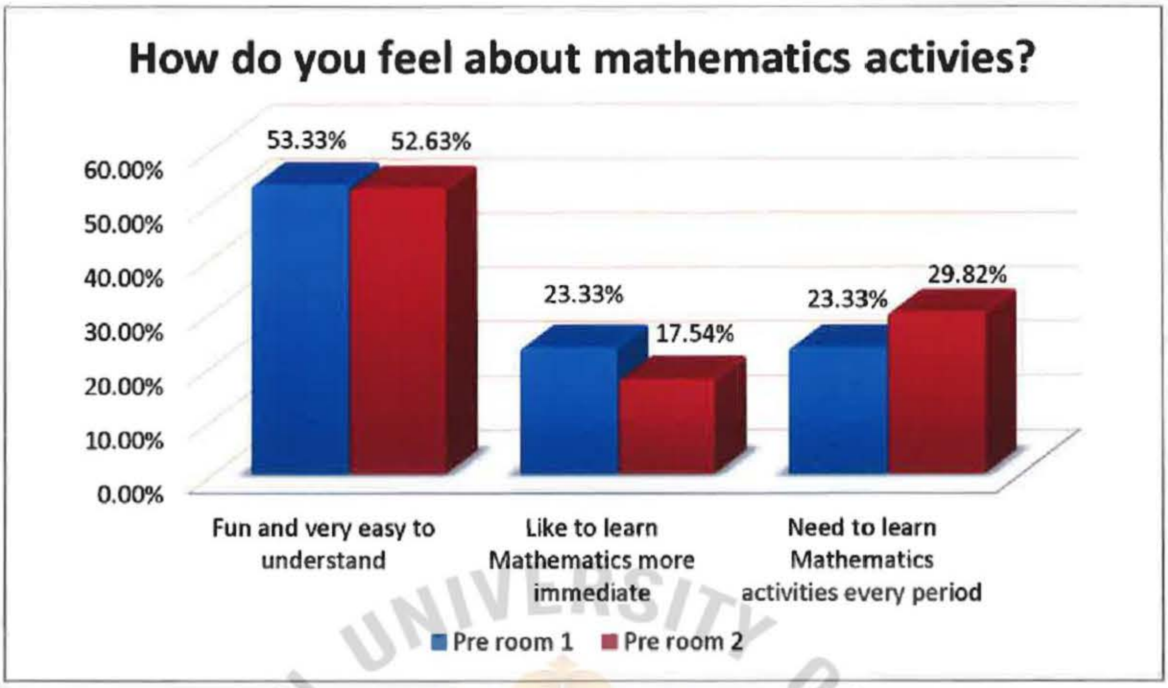


Figure 4.3: How do you feel about mathematics activities?

4. Who can explain mean of concept in Mathematics?

Room 1; There were 24 respondents who can explain and resolve correctly, 6 respondents can explain but step is missing, 12 respondents can write but cannot explain, and 18 respondents want their colleagues help.

Room 2 ; There were 18 respondents who can explain and resolve correctly, 4 respondents can explain but step is missing, 12 respondents can write but cannot explain, and 26 respondents want their colleague's help.

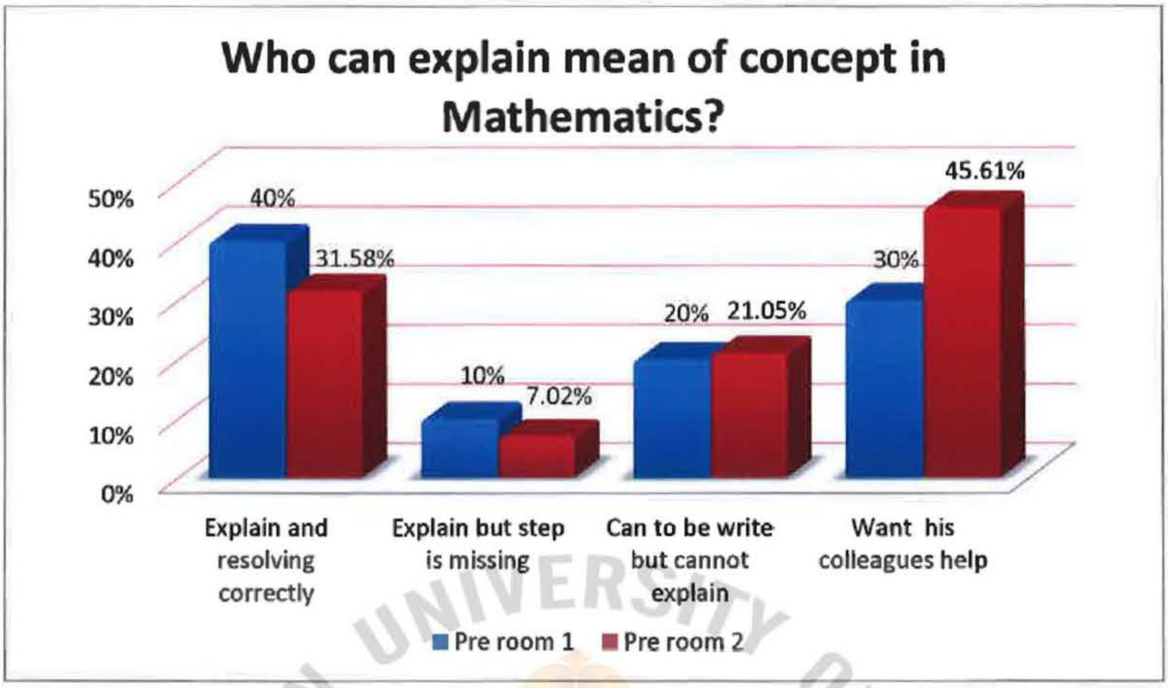


Figure 4.4: who can explain mean of concept in Mathematics?

For this part researcher sets an information interview about Students' Behavior with the Primary 6 students of room 1 and room 2. There were 60 students in room 1 and 57 students in room 2 to be observed and there were 4 observation guides in one week before using IDI. This research has observation guide as follows;

1. Attention in Mathematics.

Room 1; There were 30 respondents who that they think like to learn Mathematics activities outside class, 25 respondents think that they like to learn in class, and 5 respondents think they like both.

Room 2; There were 24 respondents who that they think like to learn Mathematics activities outside class, 17 respondents think that they like to learn in class, and 16 respondents think they like both.

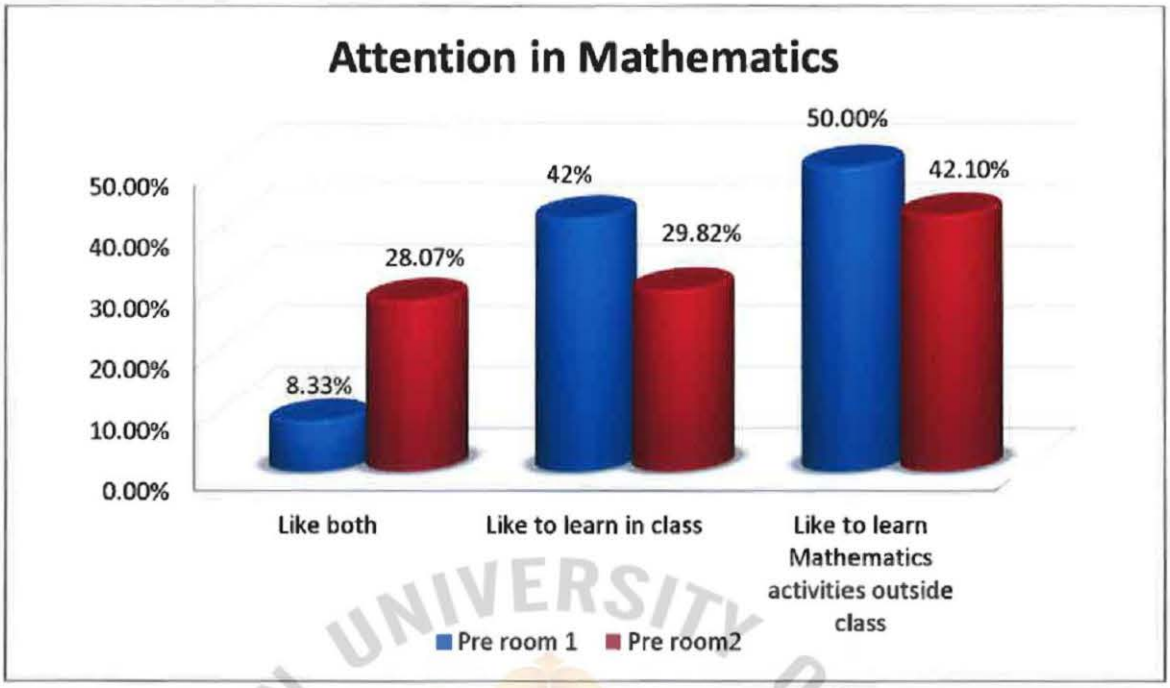


Figure 4.5: Attention in Mathematics

2. Responsible for assignment.

Pre room 1; There were 33 respondents who submit assignment on time and correct, 20 respondents submit assignment late, and 7 respondents do not submit assignment.

Pre room 2; There were 35 respondents who submit assignment on time and correct, 13 respondents submit assignment late, and 9 respondents do not submit assignment.

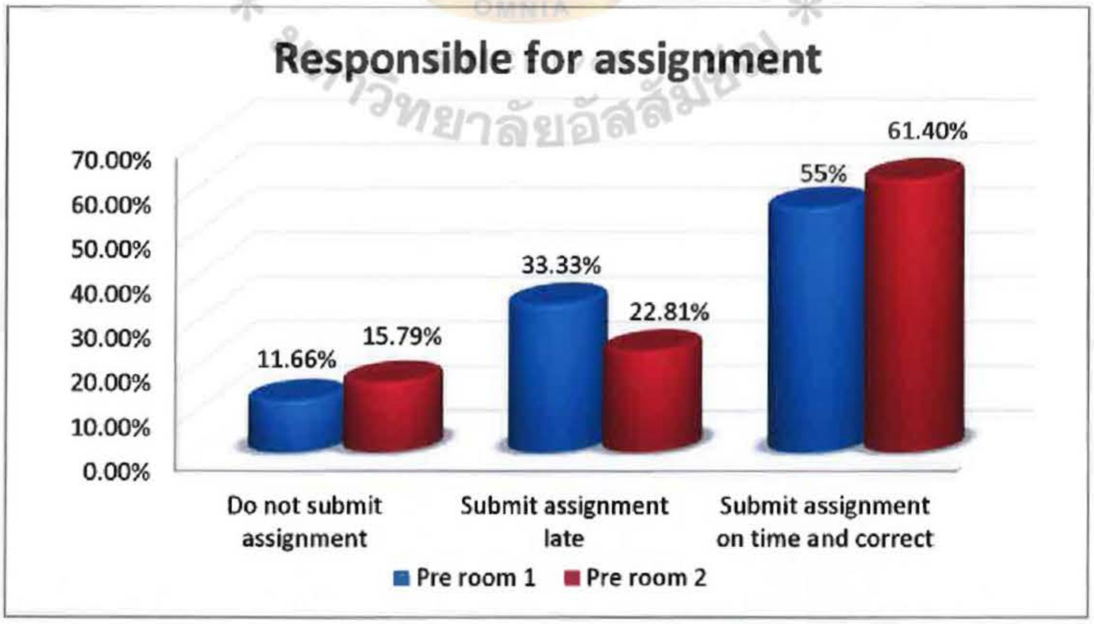


Figure 4.6: Responsible for assignment

3. Obey the teachers and have cooperation in the classroom

Pre room 1; There were 40 respondents who obey and to cooperate in class, 14 respondents do not obey but cooperate with colleagues, and 6 respondents do not obey and cooperate in class.

Pre room 2; There were 35 respondents who obey and cooperate in class, 10 respondents do not obey but cooperate with colleagues, and 12 respondents do not obey and cooperate in class.

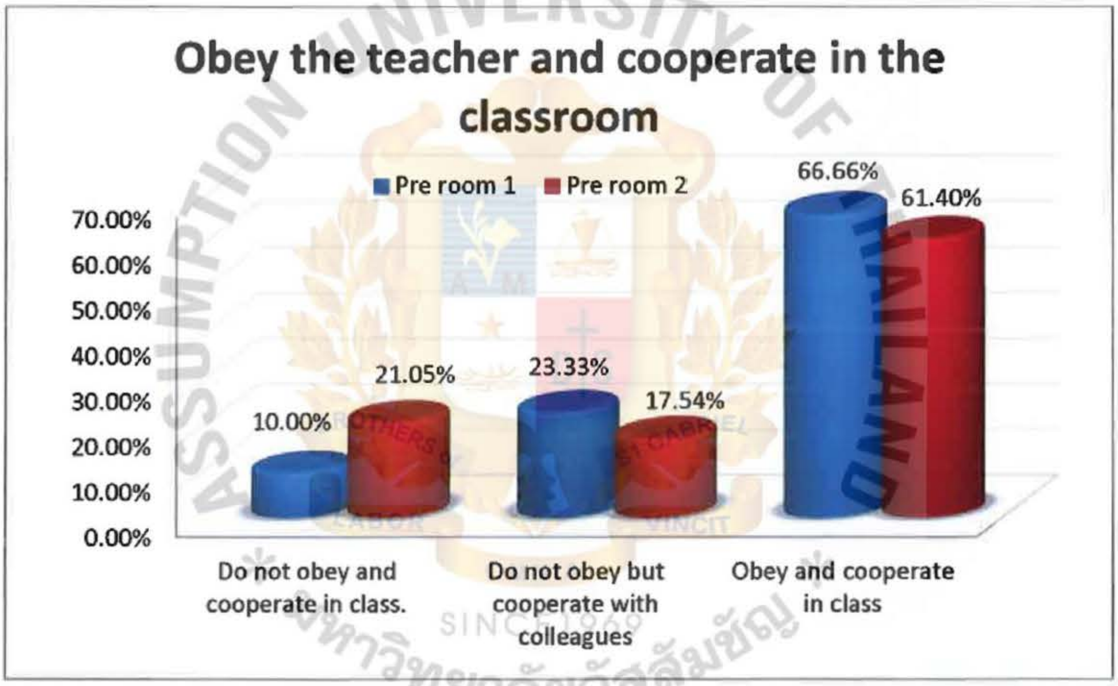


Figure 4.7: obey the teachers and cooperate in the classroom

4.3 OD / ID Interventions

This part the researcher had planned the intervention of change Teaching Style in classroom field, Students' Performance and Students' Behavior. So, This part refers to the research question in Chapter one "Question 2; What are the appropriate Instructional Development Interventions (IDI) for Teaching style, Students' performance and Students' behavior in Mathematics Primary 6 room 1 at Saint Gabriel's College, Bangkok of Thailand?" And table 4.9 shows the data of starting each intervention.

Table 4.10 Intervention time scale

STEP	2011											
	JULY				AUGUST				SEPTEMBER			
	WEEK				WEEK				WEEK			
	1	2	3	4	5	6	7	8	9	10	11	12
1. Pre-test	↔											
2. Questionnaire • **Teaching style** • **Students' attitude**	↔									↔		
3. Teaching Style (Demonstrator or Personal Model)		↔	↔	↔		↔	↔	↔				
4. Observation • **Students' behavior**		↔		↔		↔		↔				
5. Analyze		↔					↔				↔	
6. Interview • **Students' performance**			↔				↔				↔	
7. IDI		↔	↔	↔	↔	↔	↔	↔	↔			
8. Post-test												↔

Table 4.10 Shows intervention time between July to September. In July there are Pre test program, pre questionnaire about Teaching Style and Students' Attitude, use first intervention Teaching Style (Demonstrator or Personal Model), observe Students' behavior, analyze data, interview Students' Performance and use IDI in classroom. In August, use second intervention Teaching Style (Demonstrator or Personal Model), observe Students' behavior, analyze data, interview Students' Performance and use IDI in classroom. In

September post questionnaire about Teaching Style and Students' Attitude, analyze data, interview Students' Performance and post test in classroom.

4.3.1 IDI for Teaching Style; Teaching style is an important form of communication for the students to get to know and understand. So the researcher choose teaching style of "Demonstrator or Personal Model" for teaching in class. Classroom has developed over the years for modern and suitable with curriculum in Thailand. Focus is on using the student-center approach in which students are involved and play a role in learning. To learn from around itself then link to real life, therefore students can apply their knowledge in the Mathematics were actually utilized. Sometimes class has the interpolated values and ethics as well and to cultivate good things to take with students so school has a good society in the future as well.

Date: July 11 - 15, 2011 and August 15 – 19, 2011

First; Mathematics teachers find the most interesting Mathematics Media, found simple media and the Mathematics teacher cooperate with students to create new Mathematics Medias for instruction. Mathematics teachers had created and planned Mathematics activities to get students' better attention.

Figure 4.8: Students participate with Mathematics teacher

Date: July 18 – 20, 2011 and August 22 – 24, 2011

Second; Mathematics teachers change teaching style from "Formal Authority" to "Demonstrator or Personal Model". The Mathematics teachers explain content. Demonstrate concept, analyze, mathematics problem solving and apply to real life by using Mathematics Medias to help to explain. Present Mathematics activities in next period to the students; they participate in this activity by using outside classroom for excitement.

Figure 4.9: Demonstrators or Personal Model

Date: July 21 – 22, 2011 and August 25 – 26, 2011

Third; Mathematics teachers divide the students into small groups. Ask the students of each group to demonstrate in front of the class by teachers setting mathematics problem. Each student in group can analyze and explain steps of solution and practice mathematics media for demonstrator fluently.

Figure 4.10: the students can analyze and solve Mathematics Problem.

Date: July 18 – 22, 2011 and August 22 – 26, 2011

Fourth; Every Friday, mathematics teachers set mathematics activities program for the students practices analysis, synthesis, problem solving, etc.

Figure 4.11: Mathematics activities program

So the students have fun with learning Mathematics form "Demonstrator and Personal Model" inside class and outside class. Especially, in class was "Student center"

4.3.2 IDI for Students' performance;

Date: July 20 – 22, 2011 and August 24 – 26, 2011

- Researcher divided students into small group and select head of group. Each student in group had helping "Multiplication table and Mathematics division", furthermore volunteer students can help low score students very well. Mathematics teachers did worksheet about Multiplication and Mathematics division for the students to review and worksheet to improve skill.

Figure 4.12: Performance of small group

• Researcher explained each theory of Mathematics by demonstrating method and exponentially concept every theory. The class has intervention to develop mathematics skill and mathematics problem solving skill by students being able to show step in solution on the white board.

Figure 4.13: Demonstrator method

• Mathematics activities in classroom and outside are observed by Mathematics teachers who observe concept, skill, and mathematics problem solving.

Figure 4.14: Mathematics teachers observe

4.3.3 IDI for Students' Behavior;

Date: July 13 – 15, 27 - 29, 2011 and August 9 -11, 23 -25, 2011

- Researcher tries to support positive thinking with Mathematics and ask the volunteer students to take care of colleagues in class by helping with assignment to submit on time and they understood concept of mathematics content.

- Researcher gave simple homework to done for they have tenacity, like Mathematics, students wanted to do homework, a review of assignment in class, contact with the parents to help supervise, some students came to do in the teacher's room, to be completed in school, after school and before returning home (prevents the copying of their assignments as well), etc. So all the students in class can submit on time.

- Researcher gave one point when the students submit assignment on time, obedience, responsibility and one star, if done right or was all well. It was the end of the term, researcher gave extra points, low score students work hard to be encouraged and given a special award that was not number of the stars on the homework to prevent copying.

- In class; the researcher had a lot of strategies in class and at the same time observer will take care and observe the Students' behavior.

4.4 Post IDI

This phase is the result of Post IDI that includes quantitative data and qualitative data from questionnaire, interviews and observation on Teaching style, Students' performance and Students' behavior. Referring to the research question in Chapter one "Question 3; What is the Initial Impact of IDI/ODI on Teaching style, Students' performance and students' behavior in Mathematics Primary 6 room 1 at Saint Gabriel's College, Bangkok of Thailand?" as shown below.

4.4.1 Quantitative Data Analysis.

This part presents quantitative data by using average means ($\overline{X}$) and Standard Deviation (S.D.) on Teaching style, Students' performance, and Students' attitude on Primary 6 students of room 1.

Table 4.11 The Average means ($\overline{X}$) and Standard Deviation (S.D.) of *Teaching Style* with IDI of Primary 6 Room 1

Events		Level			
		N	$\overline{X}$	S.D.	Degree
Concept	1. The teacher has to build up knowledge.	60	3.58	0.50	Strongly Agree
	2. Teacher has to develop the child's deeper understanding of mathematics.	60	3.48	0.54	Strongly Agree
	3. Good teaching, easy understands and uses multimedia.	60	3.60	0.53	Strongly Agree
	4. Content in Mathematics suitable for the students.	60	3.52	0.57	Strongly Agree
Total		60	3.55	0.54	Strongly Agree
Skill	5. Have to develop the child's capacity to think and reason.	60	3.30	0.59	Strongly Agree
	6. Have mathematics activity and present in class.	60	3.47	0.54	Strongly Agree
	7. Have the steps for thinking and writing.	60	3.53	0.54	Strongly Agree
	8. Develop skill ability of the students continuously.	60	3.47	0.57	Strongly Agree
	9. Give the wide solution skill and develop basic mathematics skills.	60	3.32	0.56	Strongly Agree
	10. Use mathematics game to develop mathematics skill.	60	3.43	0.53	Strongly Agree
Total		60	3.42	0.56	Strongly Agree
Problem solving	11. Suggest the solution to Solving.	60	3.35	0.58	Strongly Agree
	12. Give opportunity to the students to present new method.	60	3.55	0.53	Strongly Agree
	13. Have the solution for problem solving Mathematics clearly.	60	3.47	0.60	Strongly Agree
	14. Develop the child's self-confidence.	60	3.50	0.54	Strongly Agree
	15. Set the real situation for the students to solve the problem.	60	3.62	0.50	Strongly Agree
Total		60	3.48	0.55	Strongly Agree

The perception of respondents toward the Teaching Style with IDI of Primary 6 Room 1, table 4.11 shows that the highest average mean of *Concept* was 3.60 for "Good teaching, easy to understand and use multimedia.", the standard deviation was 0.53 and the lowest average mean of *Concept* was 3.48 for "Teacher has to develop the child's deeper understanding of mathematics.", the standard deviation was 0.54. The level of the degree was all Strongly Agree. The highest average mean of *Skill* was 3.53 for "Have the steps for thinking and writing." the standard deviation was 0.54, and the lowest average mean of *Skill was* 3.30 for "Have to develop the child's capacity to think and reason.", the standard deviation was 0.59. The level of the degree was all Strongly Agree. The highest average mean of *Problem Solving was* 3.62 for "Set the real situation for the students to solve the problem." the standard deviation was 0.50, and the lowest average mean of *Problem Solving was* 3.35 for "Suggest the solution to Solve." the standard deviation was 0.58. The level of the degree was all Strongly Agree.

Table 4.12 The Average means ($\overline{X}$) and Standard Deviation (S.D.) of *Students' Performance* with IDI of Primary 6 Room 1

Events	Level			
	N	$\overline{X}$	S.D.	Degree
1. Understanding in content	60	3.32	0.62	Strongly Agree
2. Understanding in Concept	60	3.45	0.65	Strongly Agree
3. Have skill in Mathematics	60	3.68	0.47	Strongly Agree
4. Can use Problem Solving Mathematics more	60	3.62	0.52	Strongly Agree
5. To be used multiplication table applies in Mathematics all content.	60	3.63	0.52	Strongly Agree
6. Have division skill	60	3.70	0.53	Strongly Agree
7. Have able to skillfully solving the division problems.	60	3.52	0.57	Strongly Agree
8. Able to answer the question of the Mathematics teachers	60	3.72	0.49	Strongly Agree
Total	60	3.58	0.55	Strongly Agree

The perception of respondents toward Students' Performance with IDI of Primary 6 Room 1, table 4.12 shows that the highest average mean was 3.72 for "Able to answer the question of the Mathematics teachers." the standard deviation was 0.49, and the lowest average mean was 3.32 for "Understanding in content." the standard deviation was 0.62. The level of the degree was all Strongly Agree.

Table 4.13 The Average means ($\overline{X}$) and Standard Deviation (S.D.) of *Students' Attitude* with IDI of Primary 6 Room 1

Events	Level		
	$\overline{X}$	S.D.	Degree
1. Studying mathematics makes me feel nervous.	3.40	0.59	Strongly Agree
2. I am always under a terrible strain in a math class.	3.38	0.49	Strongly Agree
3. I am able to solve mathematics problems without too much difficulty.	3.68	0.47	Strongly Agree
4. Mathematics is important in everyday life.	3.70	0.47	Strongly Agree
5. Mathematics is one of the most important subjects for people to study.	3.43	0.53	Strongly Agree
6. Mathematics courses would be very helpful no matter what I decide to study, Enjoyment.	3.50	0.50	Strongly Agree
7. I have usually enjoyed studying mathematics in school.	3.32	0.54	Strongly Agree
8. Mathematics is dull and boring.	3.48	0.54	Strongly Agree
9. I am happier in a math class than in any other class.	3.28	0.52	Strongly Agree
10. I would like to avoid using mathematics in college.	3.38	0.59	Strongly Agree
11. I am willing to take more than the required amount of mathematics.	3.45	0.62	Strongly Agree
12. I plan to take as much mathematics as I can during my education.	3.42	0.56	Strongly Agree
Total	3.45	0.54	Strongly Agree

The perception of respondents toward the *Students' Attitude* with IDI of Primary 6 Room 1, table 4.13 shows that the highest average mean was 3.70 for "Mathematics is important in everyday life.", the standard deviation was 0.47, and the lowest average mean was 3.28 for "I am happier in a math class than in any other class.", the standard deviation was 0.52, so the level of the degree was all Strongly Agree.

4.4.2 Qualitative Data Analysis

The researcher designs to implement qualitative diagnosis for collecting more information after collecting the results from diagnosis. In this step the researcher designs to use interview techniques as below.

For this part, researcher sets an information interview about Students' Performance with the Primary 6 students of room 1. There were 60 people to be interviewed and there were 4 questions on interview guide as follows;

1. How to solve when you find this mathematics problem?

There were 10 respondents who think about comparing with the example, 35 respondents think about trying to understand the mathematics problem and solve it, 10 respondents think about drawing a simple to understand, and 5 respondents think about consulting the teachers until understand.

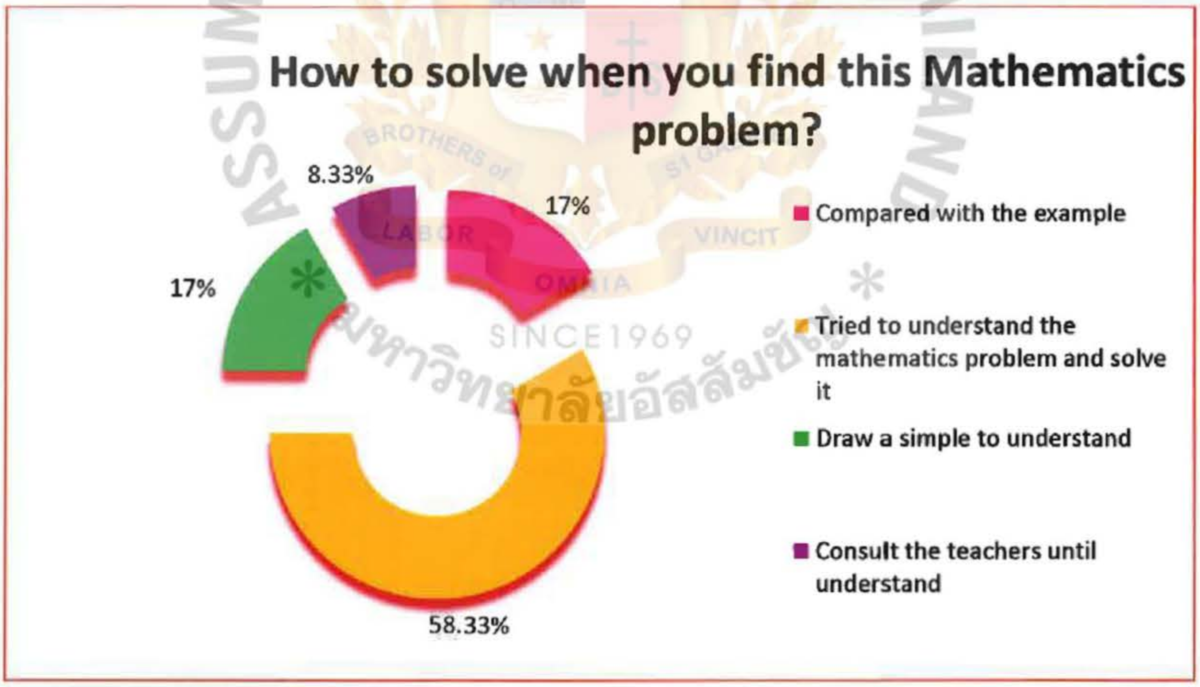


Figure 4.15: How to solve when you find this mathematics problem?

2. Who can demonstrate the solution of this mathematics problem?

There were 48 respondents who can answer and solve correctly, 8 respondents can answer correctly but solution was incorrect, 2 respondents can explain correctly but answers were incorrect, and 2 respondents cannot answer and solve.

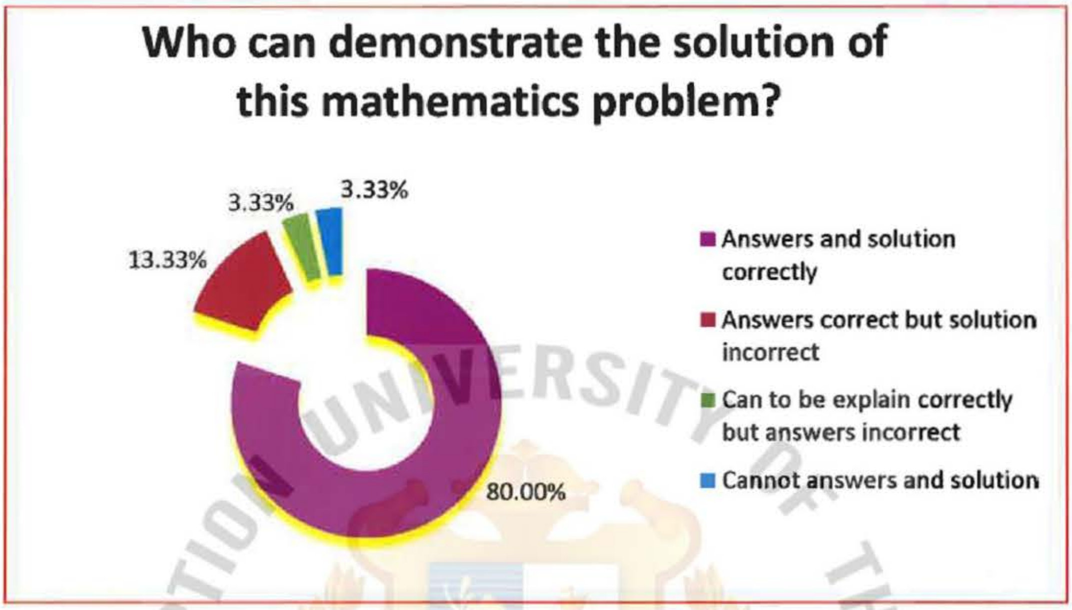


Figure 4.16: who can demonstrate the solution of this mathematics problem?

3. How do you feel about mathematics activities?

There were 45 respondents who think it is fun and very easy to understand, 6 respondents think they like to learn Mathematics more immediately, and 9 respondents think they need to learn Mathematics activities every period.

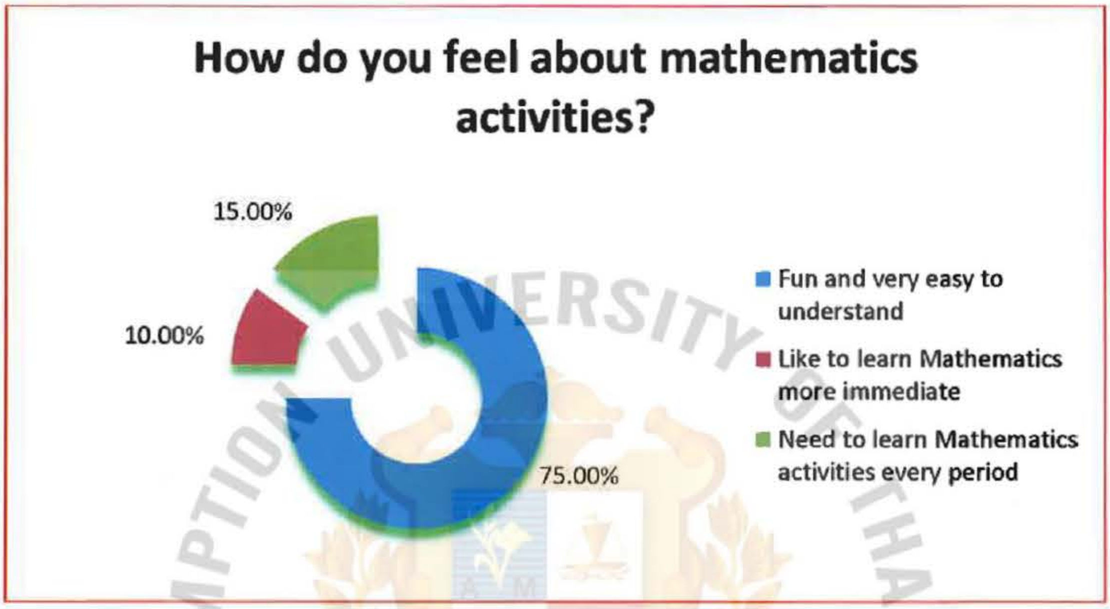


Figure 4.17: How do you feel about mathematics activities?

4. Who can explain mean of concept in Mathematics?

There were 38 respondents who can explain and resolve correctly, 4 respondents can explain but step is missing, 8 respondents can write but cannot explain, and 10 respondents want their colleague's help.

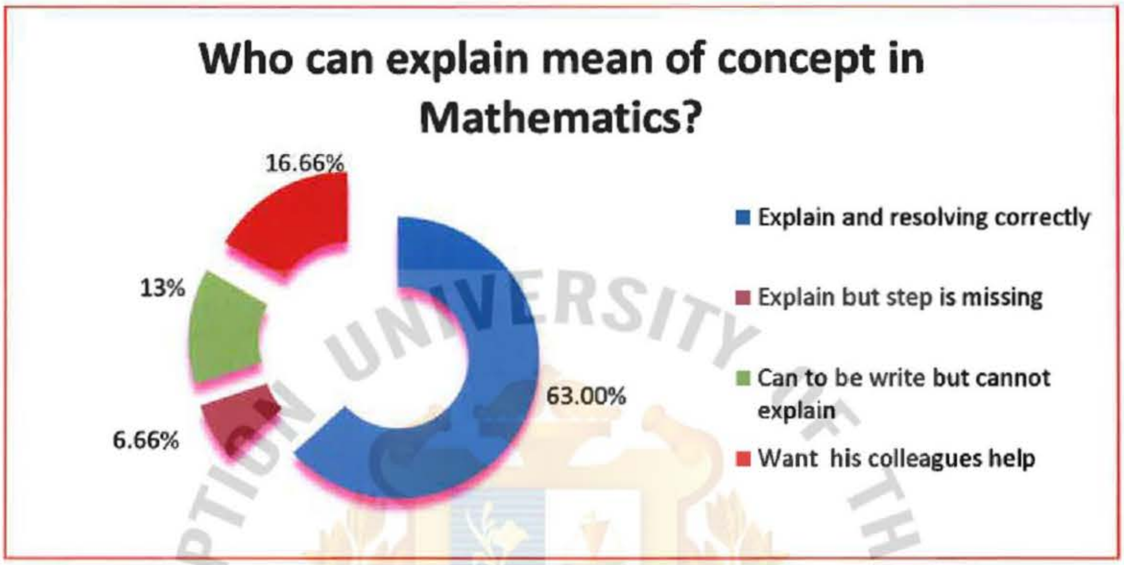


Figure 4.18: Who can explain mean of concept in Mathematics?

For this part researcher sets observation form about Students' Behavior with the Primary 6 students of room 1. There were 60 people to be observed and there were 3 questions as follows;

1. **Attention in Mathematics.**

Post IDI; There were 50 respondents who think they like to learn Mathematics activities outside class, 5 respondents think they like to learn in class, and 5 respondents think they like both.

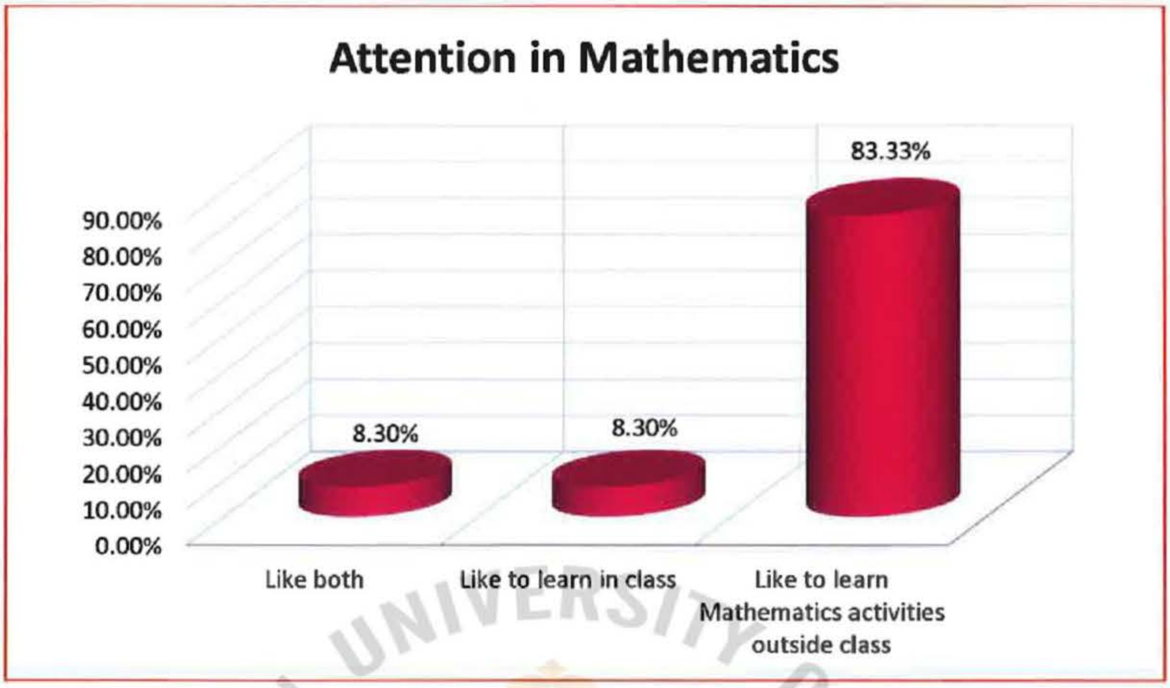


Figure 4.19: Attention in Mathematics

2. **Responsible for assignment.**

Post IDI; There were 53 respondents who submit assignment on time and correct, 5 respondents submit assignment late, and 2 respondents do not submit assignment.

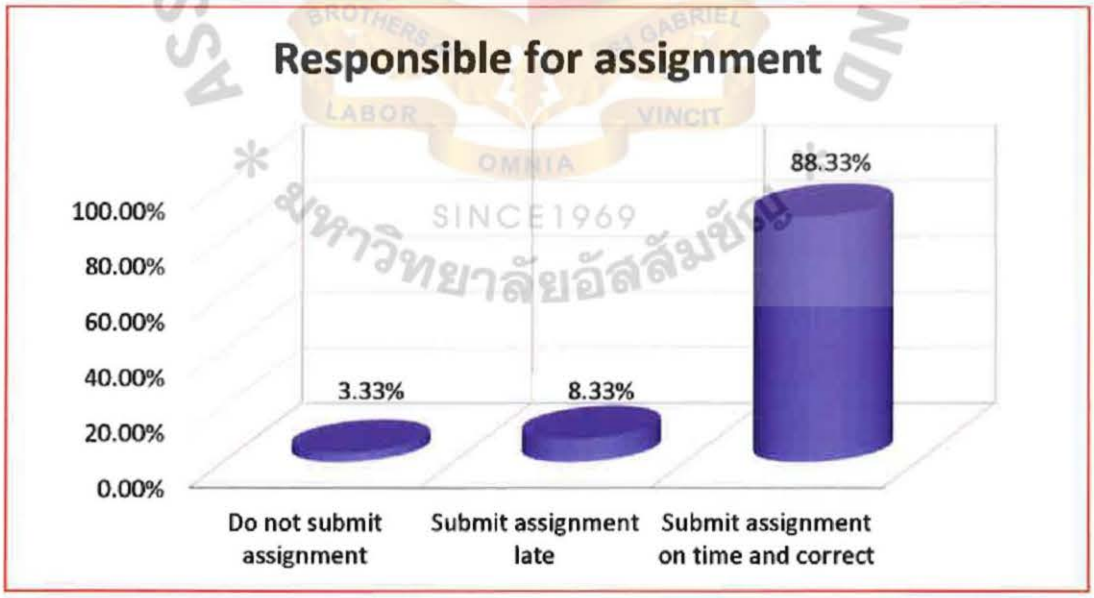


Figure 4.20: Responsible for assignment

3. Obey the teachers and cooperate in the classroom

Post IDI; There were 52 respondents who obey and cooperate in class, 6 respondents do not obey but cooperate with colleagues, and 2 respondents do not obey and cooperate in class.

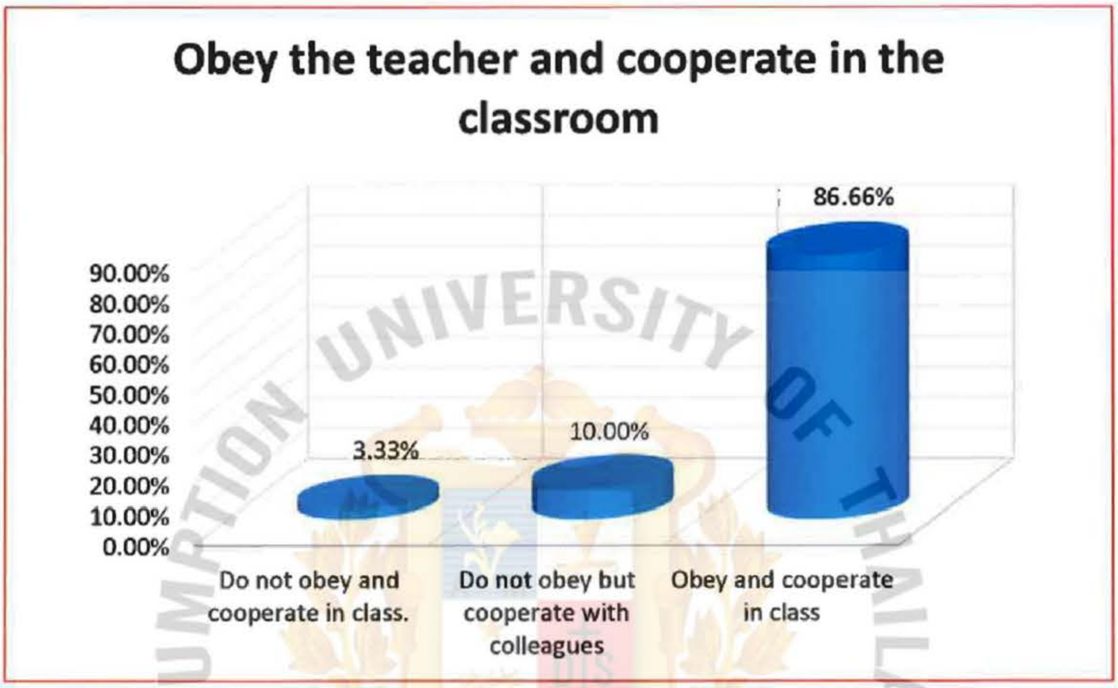


Figure 4.21: obey the teachers and cooperate in the classroom

Table 4.14 Conclusion appropriate IDI for Teaching style, Students' performance and Students' attitude in Mathematics Primary 6 room 1.

Item	Post IDI / ODI			
	Room 1			
	N	$\overline{X}$	S.D.	Degree
Teaching style	60	3.48	0.55	Strongly Agree
Students' performance	60	3.58	0.55	Strongly Agree
Students' attitude	60	3.45	0.54	Strongly Agree
Post test	60	14.42	3.78	93.08% of total point

In the table 4.14 Conclusion appropriate IDI for Teaching style, Students' performance and Students' attitude in Mathematics Primary 6 room 1. Mean, Standard deviation and Post test have scored higher than Pre IDI and have all Strongly Agree. Post test has score different form Pre test about 44.25%.

4.5 Comparison of the Pre and the Post; Hypothesis Testing

4.5.1 This phase is the result comparison of the Pre and the Post IDI with students of primary 6 room 1 and 2 on Teaching style, Students' performance and Students' behavior. Referring to the research question in Chapter one; "Question 4. What is the difference between the pre IDI/ODI and post IDI/ODI of Primary 6 Room 1 and Room 2 in terms of teaching style, Students' performance and students' behavior?"

Table 4.15 The Paired Sample T-test, the Average Mean ($\overline{X}$) and Standard Deviation (S.D.) on Teaching Style with IDI of Primary 6 room 1 (60 students)

	Events	Test	$\overline{X}$	S.D.	t-test	Sig.
Concept	1. The teacher has to build up knowledge.	Pre	3.25	0.60	-5.06	0.00
		Post	3.58	0.49		
	2. Teacher has to develop the child's deeper understanding of mathematics.	Pre	3.13	0.74	-4.69	0.00
		Post	3.48	0.53		
	3. Good teaching, easy understands and use multimedia.	Pre	3.20	0.77	-5.07	0.00
		Post	3.58	0.53		
	4. Content in Mathematics suitable For the students.	Pre	3.15	0.68	-5.46	0.00
		Post	3.52	0.56		
Total		Pre	3.18	0.70	-9.05	0.00
		Post	3.54	0.53		
Skill	5. Have to develop the child's capacity to think and reason.	Pre	2.93	0.68	-5.15	0.00
		Post	3.30	0.59		
	6. Have mathematics activity and present in class.	Pre	2.93	0.73	-6.35	0.00
		Post	3.47	0.53		
	7. Have the step for thinking and writing.	Pre	3.40	0.61	-2.65	0.00
		Post	3.53	0.53		
	8. Develop skill ability of the students continuously.	Pre	3.00	0.73	-5.56	0.00
		Post	3.47	0.56		
	9. Give the wide solution skill and develop basic mathematics skills.	Pre	2.80	0.81	-5.52	0.00
		Post	3.30	0.56		
	10. Use mathematics game to develop mathematics skill.	Pre	3.05	0.74	-4.15	0.00
		Post	3.43	0.53		
Total		Pre	3.01	0.72	-10.33	0.00
		Post	3.42	0.55		
Problem solving	11. Suggest the solution for Solving.	Pre	2.93	0.75	-4.80	0.00
		Post	3.35	0.57		
	12. Give opportunity to the students to present new method.	Pre	3.23	0.83	-4.11	0.00
		Post	3.55	0.53		
	13. Have the solution for problem solving Mathematics clearly.	Pre	2.78	0.80	-7.30	0.00
		Post	3.47	0.59		
	14. Develop the child's self-confidence.	Pre	2.80	1.00	-6.53	0.00
		Post	3.50	0.53		
	15. Set the real situation for the students to solve the problem.	Pre	2.20	0.65	-14.33	0.00
		Post	3.62	0.49		
Total		Pre	2.78	0.81	-15.05	0.00
		Post	3.41	0.55		
All total		Pre	2.99	0.39	-15.465	0.00
		Post	3.47	0.22		

* Significant Number < 0.05

From the table 4.15; The paired sample t-test on Teaching style after IDI in room 1 this table shows that the total average mean in room 1 before and after, by pre implementation IDI activities was 2.99 and the standard deviation was 0.39 and post implementation IDI activities was 3.47 and the standard deviation was 0.22. Moreover, sig was 0.00 which was less than the significance level of 0.05. Therefore, the null hypothesis (Ho1, Ho2) was rejected and the alternative was accepted. This could imply that there was a significant difference in "Teaching style" before and after IDI in room 1.

Table 4.16 The Paired Sample T-test, the Average Mean ($\overline{X}$) and Standard Deviation (S.D.) on Teaching Style without IDI of Primary 6 room 2 (57 students)

	Events	Test	$\overline{X}$	S.D.	t-test	Sig.
Concept	1. The teacher has to build up knowledge.	Pre	2.17	0.65	-7.68	0.00
		Post	3.21	0.70		
	2. Teacher has to develop the child's deeper understanding of mathematics.	Pre	2.19	0.61	-5.51	0.00
		Post	2.93	0.65		
	3. Good teaching, easy understands and use multimedia.	Pre	2.47	0.82	-2.48	0.01
		Post	2.77	0.62		
	4. Content in Mathematics suitable For the students.	Pre	2.47	0.90	-3.25	0.00
		Post	2.91	0.68		
Total		Pre	2.32	0.33	-10.92	0.00
		Post	2.95	0.39		
Skill	5. Have to develop the child's capacity to think and reason.	Pre	2.26	0.87	-4.55	0.00
		Post	2.89	0.64		
	6. Have mathematics activity and present in class.	Pre	3.17	0.65	1.99	0.04
		Post	2.96	0.73		
	7. Have the step for thinking and writing.	Pre	2.03	0.73	-6.44	0.00
		Post	2.89	0.69		
	8. Develop skill ability of the students continuously.	Pre	2.17	0.68	-8.58	0.00
		Post	3.12	0.62		
	9. Give the wide solution skill and develop basic mathematics skills.	Pre	2.26	0.74	-4.48	0.00
		Post	2.82	0.65		
	10. Use mathematics game to develop mathematics skill.	Pre	2.17	0.92	-6.22	0.00
		Post	3.04	0.68		
Total		Pre	2.34	0.31	-9.79	0.00
		Post	2.95	0.42		
Problem solving	11. Suggest the solution for Solving.	Pre	2.33	0.85	-4.98	0.00
		Post	2.96	0.65		
	12. Give opportunity to the students to present new method.	Pre	2.26	0.91	-5.45	0.00
		Post	3.04	0.68		
	13. Have the solution for problem solving Mathematics clearly.	Pre	2.24	0.68	-7.76	0.00
		Post	3.18	0.60		
	14. Develop the child's self-confidence.	Pre	2.15	0.64	-7.93	0.00
		Post	3.14	0.61		
	15. Set the real situation for the students to solve the problem.	Pre	2.49	0.71	-5.51	0.00
		Post	3.16	0.62		
Total		Pre	2.29	0.40	-11.77	0.00
		Post	3.09	0.37		
All total		Pre	2.99	0.23	-14.44	0.00
		Post	3.00	0.32		

* Significant Number < 0.05

From the table 4.16; The paired sample t-test no IDI on Students' performance in room 2 this table shows that the total average mean in room 2; result of survey have pre was 2.99 and the standard deviation was 0.23 and post was 3.00 and the standard deviation was 0.32. And difference of the total average means is less than room 1. Moreover, sig was 0.00 which was less than the significance level of 0.05.

Table 4.17 The Paired Sample T-test, the Average Mean ($\overline{X}$) and Standard Deviation (S.D.) on Students' performance with IDI of Primary 6 room 1 (60 students)

Events	Test	$\overline{X}$	S.D.	t-test	Sig.
1. Understanding in content	Pre	2.52	0.67	-7.66	0.00
	Post	3.32	0.62		
2. Understanding in Concept	Pre	2.48	0.72	-8.65	0.01
	Post	3.45	0.64		
3. Have skill in Mathematics	Pre	2.70	0.83	-4.28	0.00
	Post	3.68	0.46		
4. Can use Problem Solving Mathematics more	Pre	2.40	0.92	-5.09	0.00
	Post	3.62	0.52		
5. To be used multiplication table applies in Mathematics all content.	Pre	2.95	0.72	-8.34	0.00
	Post	3.63	0.52		
6. Have division skill	Pre	2.70	0.90	-9.65	0.00
	Post	3.70	0.53		
7. Have able to skillfully solving the division problems.	Pre	2.45	0.79	-5.88	0.00
	Post	3.52	0.56		
8. Able to answer the question of the Mathematics teachers	Pre	2.87	0.91	-6.89	0.00
	Post	3.72	0.49		
Total	Pre	2.63	0.31	-21.59	0.00
	Post	3.58	0.17		

* Significant Number < 0.05

From the table 4.17; The paired sample t-test on Students' performance after IDI in room 1, this table shows that the total average mean in room 1 before and after, by pre implementation of IDI activities was 2.63 and the standard deviation was 0.31 and post implementation of IDI activities was 3.58 and the standard deviation was 0.17. Moreover, sig was 0.00 which was less than the significance level of 0.05. Therefore, the null hypothesis

(Ho1, Ho2) was rejected and the alternative was accepted. This could imply that there was a significant difference in Students' performance before and after IDI in room 1.

Table 4.18 The Paired Sample T-test, the Average Mean ($\overline{X}$) and Standard Deviation (S.D.) on Students' performance without IDI of Primary 6 room 2 (57 students)

Events	Test	$\overline{X}$	S.D.	t-test	Sig.
1. Understanding in content	Pre	2.70	0.80	-4.62	0.00
	Post	2.82	0.57		
2. Understanding in Concept	Pre	2.30	0.82	-6.61	0.00
	Post	3.00	0.46		
3. Have skill in Mathematics	Pre	2.63	0.77	-5.53	0.01
	Post	3.04	0.53		
4. Can use Problem Solving Mathematics more	Pre	2.56	0.88	-6.19	0.00
	Post	2.98	0.71		
5. To be used multiplication table applies in Mathematics all content.	Pre	2.33	0.87	-5.34	0.01
	Post	2.98	0.61		
6. Have division skill	Pre	2.65	0.87	-8.54	0.00
	Post	2.98	0.66		
7. Have ability to skillfully solve the division problems.	Pre	2.25	0.76	-5.23	0.00
	Post	3.04	0.56		
8. Able to answer the question of the Mathematics teachers	Pre	2.93	0.70	-7.89	0.00
	Post	3.19	0.61		
Total	Pre	2.54	0.81	-15.32	0.00
	Post	3.00	0.59		

* Significant Number < 0.05

From the table 4.18; The paired sample t-test no IDI on Students' performance in room 2, this table shows that the total average mean in room 2; result of survey of pre was 2.54 and the standard deviation was 0.81 and post was 3.00 and the standard deviation was 0.59. And difference of the total average means less than room 1. Moreover, sig was 0.00 which was less than the significance level of 0.05.

Table 4.19 The Paired Sample T-test, the Average Mean ($\overline{X}$) and Standard Deviation (S.D.) on Students' attitude with IDI of Primary 6 room 1 (60 students)

Events	Test	$\overline{X}$	S.D.	t-test	Sig.
1. Studying mathematics makes me feel nervous.	Pre	2.65	0.80	-8.48	0.00
	Post	3.40	0.58		
2. I am always under a terrible strain in a math class.	Pre	2.62	0.85	-5.66	0.00
	Post	3.38	0.49		
3. I am able to solve mathematics problems without too much difficulty.	Pre	3.57	0.59	-9.53	0.00
	Post	3.68	0.46		
4. Mathematics is important in everyday life.	Pre	3.45	0.64	-8.82	0.01
	Post	3.68	0.46		
5. Mathematics is one of the most important subjects for people to study.	Pre	3.27	0.71	-10.56	0.00
	Post	3.43	0.53		
6. Mathematics courses would be very helpful no matter what I decide to study, Enjoyment.	Pre	3.42	0.56	-5.77	0.00
	Post	3.50	0.50		
7. I have usually enjoyed studying mathematics in school.	Pre	2.70	0.77	-8.85	0.00
	Post	3.32	0.53		
8. Mathematics is dull and boring.	Pre	3.15	0.73	-7.52	0.01
	Post	3.48	0.53		
9. I am happier in a math class than in any other class.	Pre	2.33	0.88	-6.88	0.00
	Post	3.22	0.52		
10. I would like to avoid using mathematics in college.	Pre	3.00	0.69	-9.14	0.00
	Post	3.38	0.58		
11. I am willing to take more than the required amount of mathematics.	Pre	2.57	0.83	-8.87	0.00
	Post	3.45	0.62		
12. I plan to take as much mathematics as I can during my education.	Pre	2.85	0.77	-10.32	0.00
	Post	3.42	0.56		
Total	Pre	2.96	0.36	-16.04	0.00
	Post	3.44	0.22		

* Significant Number < 0.05

From the table 4.19; The paired sample t-test on Students' attitude after IDI in room 1, this table shows that the total average mean in room 1 before and after, by pre implementation of IDI activities was 2.96 and the standard deviation was 0.36 and post implementation of IDI activities was 3.44 and the standard deviation was 0.22. Moreover, sig was 0.00 which was less than the significance level of 0.05. Therefore, the null hypothesis

(Ho1, Ho2) was rejected and the alternative was accepted. This could imply that there was a significant difference in Students' performance before and after IDI in room 1.

Table 4.20 The Paired Sample T-test, the Average Mean ($\overline{X}$) and Standard Deviation (S.D.) on Students' attitude with IDI of Primary 6 room 2 (57 students)

Events	Test	$\overline{X}$	S.D.	t-test	Sig.
1. Studying mathematics makes me feel nervous.	Pre	3.07	0.70	-4.08	0.01
	Post	3.16	0.62		
2. I am always under a terrible strain in a math class.	Pre	2.98	0.61	-3.45	0.00
	Post	3.09	0.57		
3. I am able to solve mathematics problems without too much difficulty.	Pre	3.47	0.73	-4.88	0.00
	Post	3.39	0.59		
4. Mathematics is important in everyday life.	Pre	3.44	0.59	-4.61	0.00
	Post	3.39	0.52		
5. Mathematics is one of the most important subjects for people to study.	Pre	3.42	0.73	-3.16	0.01
	Post	3.30	0.68		
6. Mathematics courses would be very helpful no matter what I decide to study, Enjoyment.	Pre	3.33	0.63	-4.57	0.00
	Post	3.28	0.67		
7. I have usually enjoyed studying mathematics in school.	Pre	2.81	0.76	-3.94	0.00
	Post	2.98	0.64		
8. Mathematics is dull and boring.	Pre	3.09	0.73	-3.12	0.0
	Post	3.02	0.58		
9. I am happier in a math class than in any other class.	Pre	2.49	0.82	-5.28	0.00
	Post	2.70	0.70		
10. I would like to avoid using mathematics in college.	Pre	3.14	0.66	-4.04	0.00
	Post	3.11	0.61		
11. I am willing to take more than the required amount of mathematics.	Pre	2.65	0.81	-9.21	0.00
	Post	3.04	0.65		
12. I plan to take as much mathematics as I can during my education.	Pre	2.81	0.78	-8.12	0.00
	Post	2.98	0.74		
Total	Pre	3.05	0.72	-10.04	0.00
	Post	3.12	0.63		

* Significant Number < 0.05

From the table 4.20; The paired sample t-test no IDI on Students' performance in room 2, this table shows that the total average mean in room 2; result of survey of pre was 3.05 and the standard deviation was 0.72 and post was 3.12 and the standard deviation was

0.63. And difference of the total average means less than room 1. Moreover, sig. was 0.00 which was less than the significance level of 0.05.

Table 4.21 The difference between the pre IDI/ODI and post IDI/ODI of Primary 6 Room 1 and Room 2

Item	Pre IDI / ODI				Post IDI / ODI		T-test	Sig.	Result toHo1	Result toHo2
	Room	N	$\overline{X}$	S.D.	$\overline{X}$	S.D.				
Teaching style	1	60	2.99	0.39	3.47	0.22	-15.46	0.00	Reject	Reject
	2	57	2.99	0.23	3.00	0.32	-14.44		-	-
Students' performance	1	60	2.63	0.31	3.58	0.17	-21.59	0.00	Reject	Reject
	2	57	2.54	0.81	3.00	0.59	-15.32		-	-
Students' attitude	1	60	2.96	0.36	3.44	0.22	-16.04	0.00	-	-
	2	57	3.05	0.72	3.12	0.63	-10.04		-	-
Achievement test	1	60	9.77	3.74	14.42	3.78	-	-	-	-
	2	57	11.39	4.36	11.26	3.40	-		-	-

In table 4.21 Conclusion of the difference between the pre IDI / ODI and post IDI / ODI of Primary 6 Room 1 and Room 2 by mean, standard deviation of post IDI / ODI room 1 have more than post IDI / ODI room 2 all item. And sig. was 0.00 which was less than the significance level of 0.05.

This part is qualitative data about *Students' performance* by interviewing the students of primary 6 room 1(60 students) and room 2(57 students).

Figure 4.22 shows the paired Percentage on Students' Performance after room 1 with IDI, by pre implementation IDI interviews about "How to solve when you find this Mathematics problem?" After the researcher implemented IDI interviews most students "Tried to understand the Mathematics problem and solve it."

Pre room 1: There were 40 respondents who think about comparing with the example, 10 respondents think about trying to understand the mathematics problem and solve it, 7 respondents think about drawing a simple to understand, and 3 respondents think about consulting the teachers until they understand.

Post room 1: There were 10 respondents think about compared with the example, 35 respondents think about tried understand with the mathematics problem and solve it, 10 respondents think about draw a simple to understand, and 5 respondents think about consult the teachers until understand.

Therefore the null hypothesis (Ho1, Ho2) was rejected and the alternative was accepted. This could imply that there were a number of differences in Students' performance before and after IDI in room 1. *Found the students tried to understand the mathematics problem and solve it is higher compared with the example.*

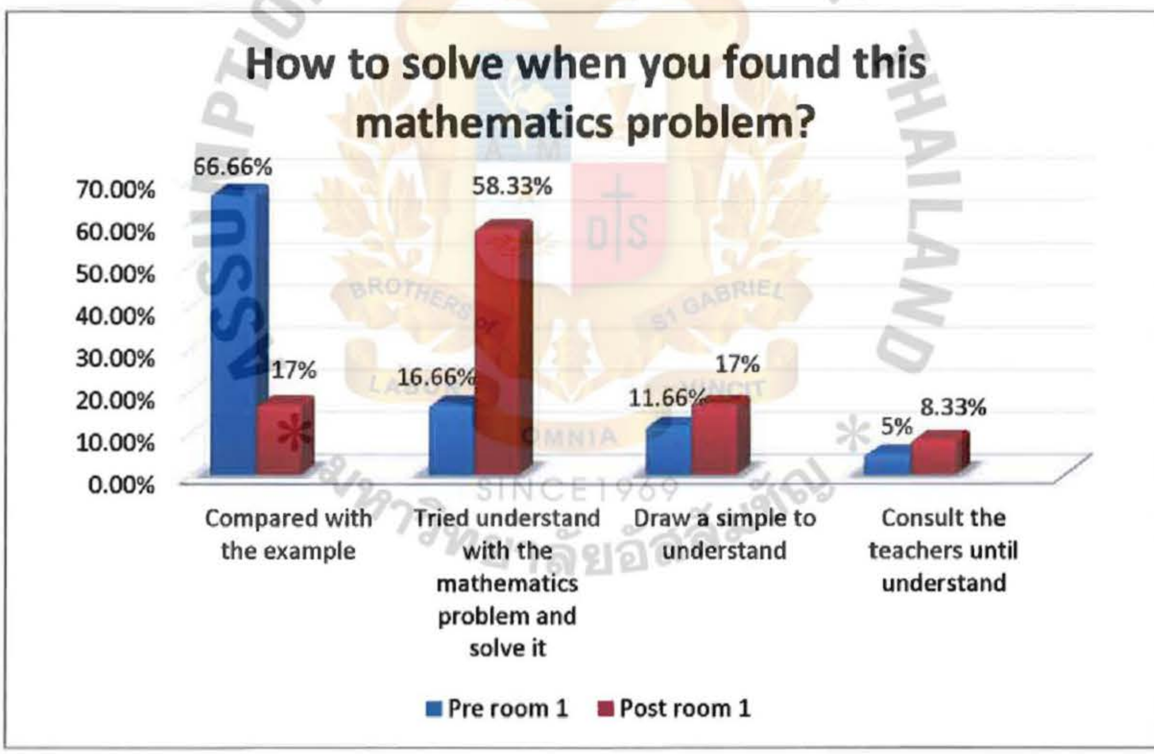


Figure 4.22: Comparison of the Pre and the post IDI; Students' performance room 1

Figure 4.23 shows the paired Percentage on Students' Performance after room 2 with IDI, by pre implementation IDI interviews about "How to solve when you find this

Mathematics problem?" After the researcher implemented IDI interviews most students "Compared with the example."

Pre room 2: There were 45 respondents who think about comparing with the example, 7 respondents think about tried to understand the mathematics problem and solve it, 3 respondents think about draw a simple to understand, and 2 respondents think about consult the teachers until they understand.

Post room 2; There were 47 respondents who think about comparing with the example, 8 respondents think about trying to understand the mathematics problem and solve it, 1 respondents think about draw a simple to understand, and 1 respondent think about consult the teachers until they understands.

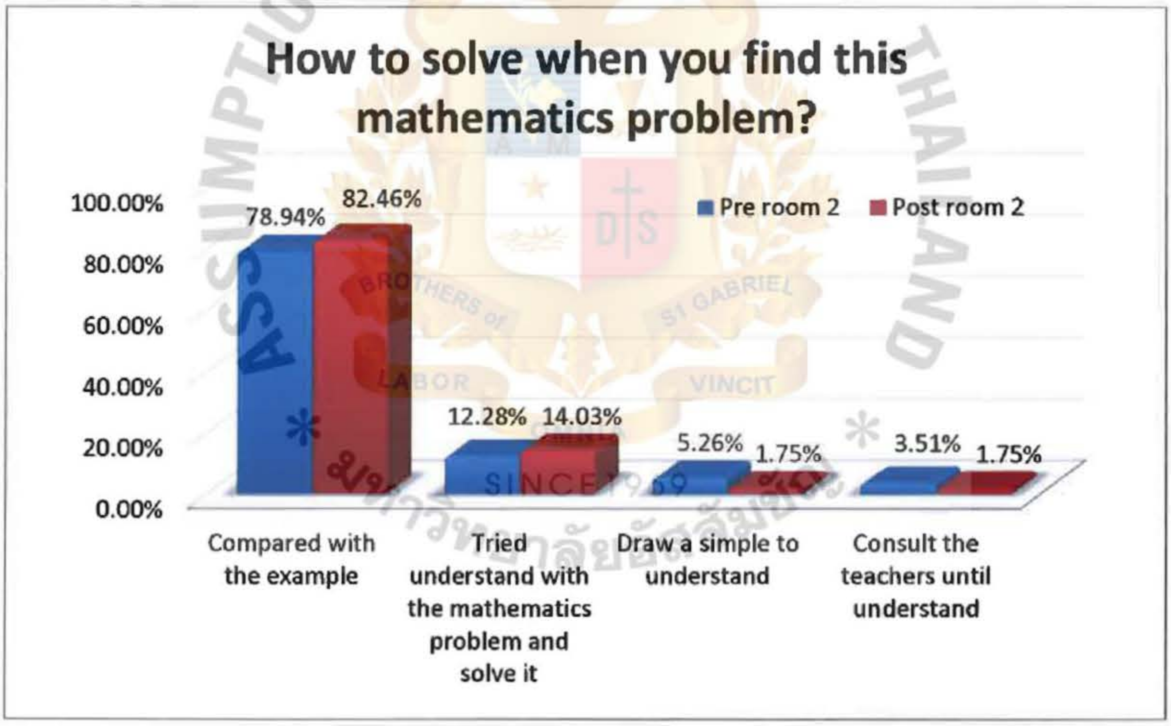


Figure 4.23: Comparison of the Pre and the post IDI; Students' performance room 2

Figure 4.24 shows the paired Percentage on Students' Performance after room 1 with IDI, by pre implementation IDI interviews about "Who can demonstrate the solution of this Mathematics problem?" After the researcher implemented IDI interviews most students

"Answers and solution correctly." However, "the students cannot answers and solution" had percent decreased explicitly.

Pre Room 1; There were 25 respondents who can answer and solve correctly, 13 respondents can answers correctly but solution was incorrect , 10 respondents can explain correctly but answers were incorrect, and 12 respondents cannot answer and solve.

Post room 1; There were 48 respondents who can answer and solve correctly, 8 respondents can answer correctly but solution incorrect, 2 respondents can to be explain correctly but answers incorrect, and 2 respondents cannot answers and solution.

Therefore the null hypothesis (Ho1, Ho2) was rejected and the alternative was accepted. This could imply that there were a number of differences in Students' performance before and after IDI in room 1. *It was found that about 80% of the students' room 1 can answers and solution correctly higher answers correct but solution incorrect.*

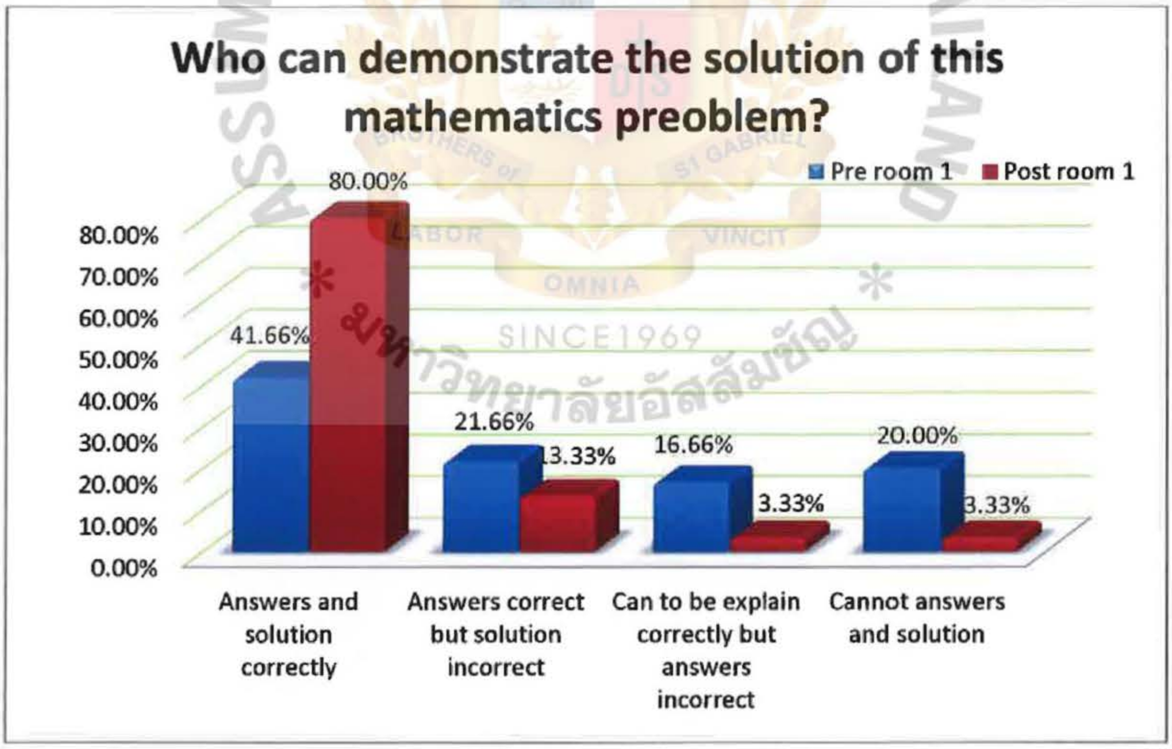


Figure 4.24: Comparison of the Pre and the post IDI; Students' performance room 1

Figure 4.25 shows the paired Percentage on Students' Performance after room 2 with IDI, by pre implementation IDI interviews about "Who can demonstrate the solution of this Mathematics problem?" After the researcher implemented IDI interviews most students "Answers and give solution correctly." And "the students cannot answers and give solution" decreased explicitly. But "the students' can explain correctly but answers are incorrect" and "Answers correct but solution incorrect" had percent give up.

Pre room 2; There were 20 respondents who can answers and give solution correctly, 4 respondents can answers correctly but solution was incorrect , 10 respondents can explain correctly but answers were incorrect, and 23 respondents cannot answer and give solution.

Post room 2; There were 33 respondents who can answer and give solution correctly, 8 respondents can answer correctly but solution was incorrect, 14 respondents can explain correctly but answers were incorrect, and 2 respondents cannot answer and give solution.

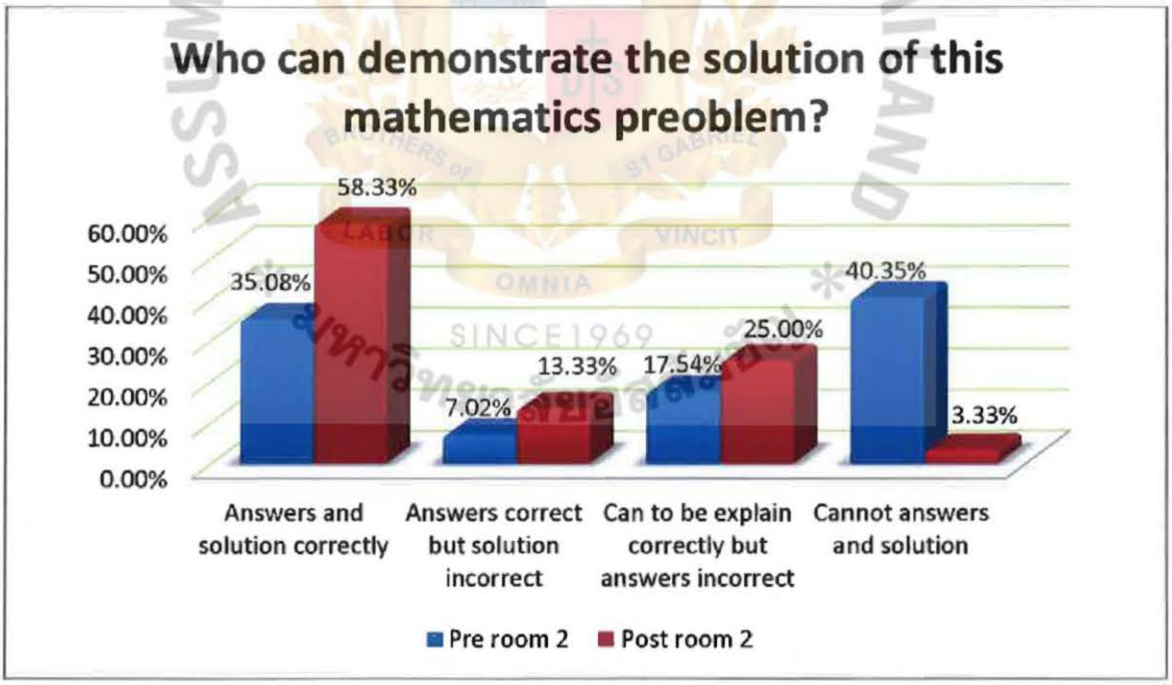


Figure 4.25: Comparison of the Pre and the post IDI; Students' performance room 2

Figure 4.26 shows the paired Percentage on Students' Performance after room 1 with IDI, by pre implementation IDI interviews about "How do you feel about Mathematics activities?" After the researcher implemented IDI interviews most students think it was "Fun and very easy to understand."

Pre room 1; There were 32 respondents who think that it was fun and very easy to understand, 14 respondents think they like to learn Mathematics more immediately, and 14 respondents think they need to learn Mathematics activities every period.

Post room 1; There were 45 respondents who think that it was fun and very easy to understand, 6 respondents think they like to learn Mathematics more immediately, and 9 respondents think they need to learn Mathematics activities every period.

Therefore the null hypothesis (Ho1, Ho2) was rejected and the alternative was accepted. This could imply that there were a number of differences in Students' performance before and after IDI in room 1. *It was found about 75% of the students' room 1 feel fun and very easy to understand which is higher than pre about 22%.*

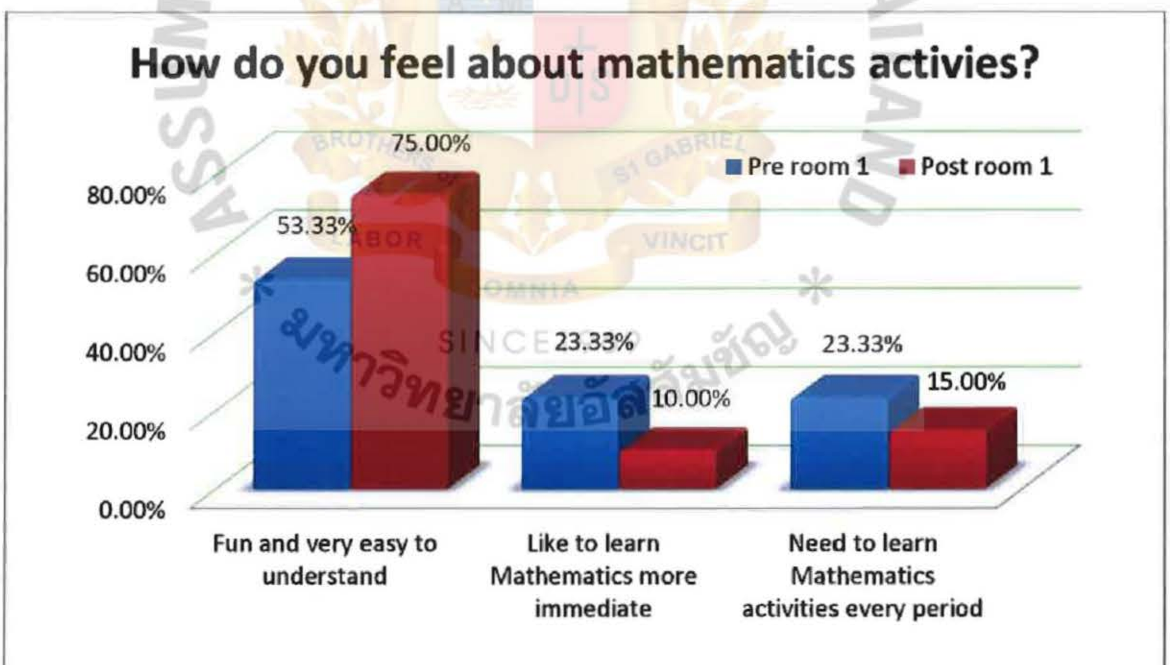


Figure 4.26: Comparison of the Pre and the post IDI; Students' performance room 1

Figure 4.27 shows the paired Percentage on Students' Performance after room 2 with IDI, by pre implementation IDI interviews about "How do you feel about Mathematics activities?" After the researcher implemented IDI interviews most students think it was "Fun and very easy to understand." But it had 29.82% in "Need to learn Mathematics activities every period" because the student don't link Mathematics theory

Pre room 2; There were 30 respondents who think that it was fun and very easy to understand, 10 respondents think they like to learn Mathematics more immediately, and 17 respondents think they need to learn Mathematics activities every period.

Post room 2; There were 35 respondents who think that it was fun and very easy to understand, 5 respondents think they like to learn Mathematics more immediately, and 17 respondents think they need to learn Mathematics activities every period.

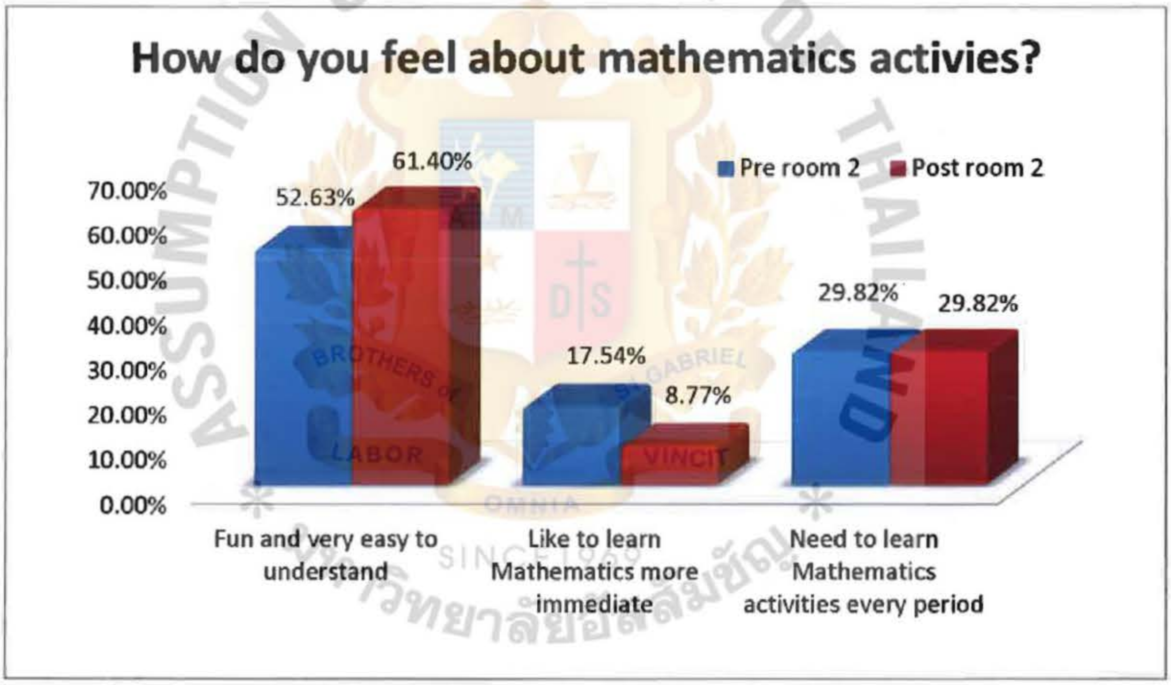


Figure 4.27: Comparison of the Pre and the post IDI; Students' performance room 2

Figure 4.28 shows the paired Percentage on Students' Performance after room 1 with IDI, by pre implementation IDI interviews about "Who can explain mean of concept in Mathematics?" After the researcher implemented IDI interviews most students "Explain and resolve correctly." Increase and the students had percent of "Explain but step is missing" and "Can write but cannot explain" decrease.

Pre room 1; There were 24 respondents who can explain and resolve correctly, 6 respondents can explain but step is missing, 12 respondents can write but cannot explain, and 18 respondents want their colleague's help.

Post room 1; There were 38 respondents who can explain and resolve correctly, 4 respondents can explain but step is missing, 8 respondents can write but cannot explain, and 10 respondents want their colleagues help.

Therefore the null hypothesis (Ho1, Ho2) was rejected and the alternative was accepted. This could imply that there were a number of differences in Students' performance before and after IDI in room 1. *It was found about 63% of the students' room 1 can explain and resolve correctly which is higher than pre about 23%. So, In class the students can be "Student-centered".*

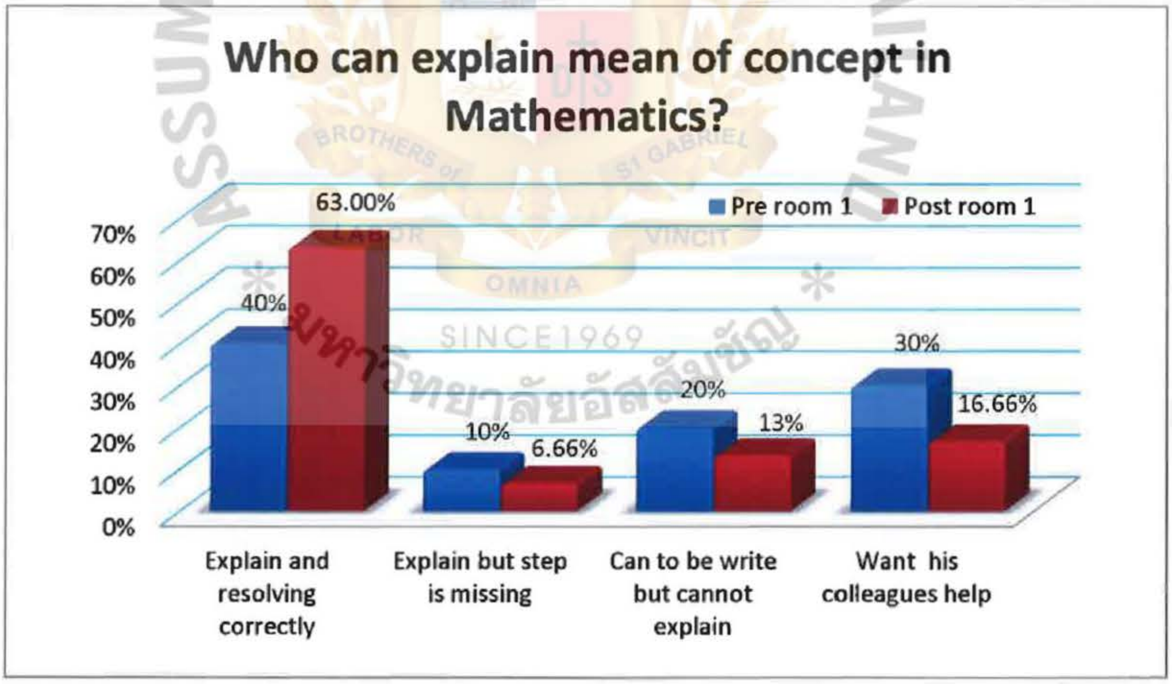


Figure 4.28: Comparison of the pre and the post IDI; Students' performance room 1

Figure 4.29 shows the paired Percentage on Students' Performance after room 2 with IDI, by pre implementation IDI interviews about "Who can explain mean of concept in

Mathematics?" After the researcher implemented IDI interviews most students had "Want his colleagues help" decrease, but at the same time the students had percent of "Explain but step is missing" and "Can write but cannot explain" increase.

Pre room 2; There were 18 respondents who can explain and resolve correctly, 4 respondents can explain but step is missing, 12 respondents can write but cannot explain, and 26 respondents want their colleague's help.

Post room 2; There were 20 respondents who can explain and resolve correctly, 8 respondents can explain but step is missing, 16 respondents can write but cannot explain, and 13 respondents want their colleagues help.

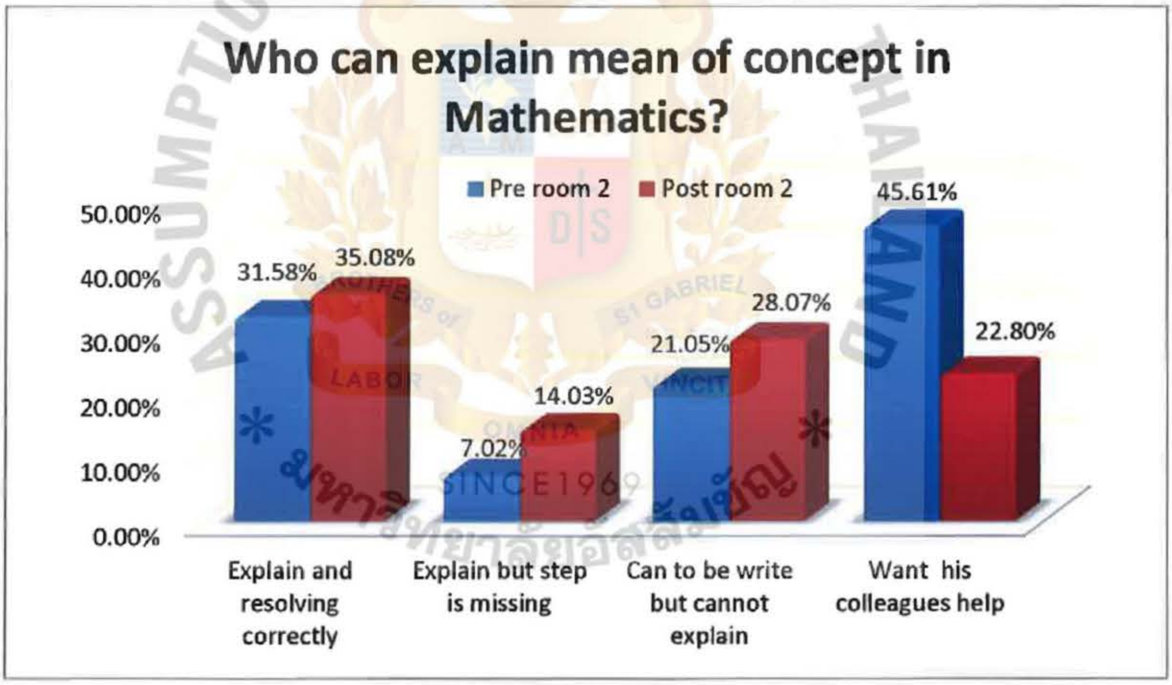


Figure 4.29: Comparison of the Pre and the post IDI; Students' performance room 2

This part is qualitative data about ***Students' Behavior*** by observing the students in primary 6 room 1(60 students) and room 2(57 students) by;

Figure 4.30 shows the paired Percentage on Students' behavior after room 1 with ODI, by pre implementation ODI activities about "Attention in Mathematics" and after the researcher implemented ODI activities. In second week, most students had *"Like to learn Mathematics activities outside class."* increase.

Pre room 1; There were 30 respondents who think they like to learn Mathematics activities outside class, 25 respondents think they like to learn in class, and 5 respondents think they like both.

Post room 1; There were 50 respondents who think they like to learn Mathematics activities outside class, 5 respondents think they like to learn in class, and 5 respondents think they like both.

Therefore the null hypothesis (Ho1, Ho2) was rejected and the alternative was accepted. This could imply that there were a number of differences in Students' behavior before and after IDI in room 1. *It was found the students' in room 1 like to learn Mathematics activities outside class higher than like to learn inside class.*

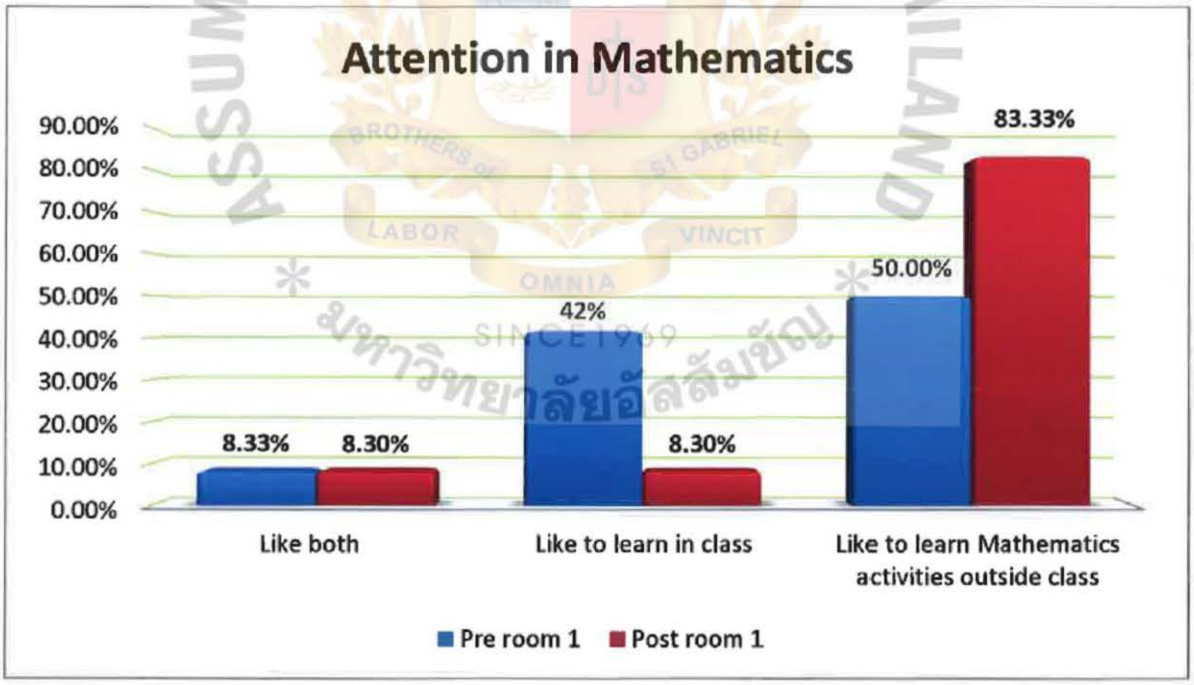


Figure 4.30: Comparison of the Pre and the post ODI; Students' Behavior room 1

Figure 4.31 shows the paired Percentage on Students' behavior in room 2 without ODI about "Attention in Mathematics". The researcher and observer have observed without

Mathematics activities both inside class and outside class. Pre and post room 2 had *"Like to learn in class"* increase.

Pre room 2; There were 24 respondents who think they like to learn Mathematics activities outside class, 17 respondents think they like to learn in class, and 16 respondents think they like both.

Post room 2; There were 17 respondents who think they like to learn Mathematics activities outside class, 30 respondents think they like to learn in class, and 10 respondents think they like both.

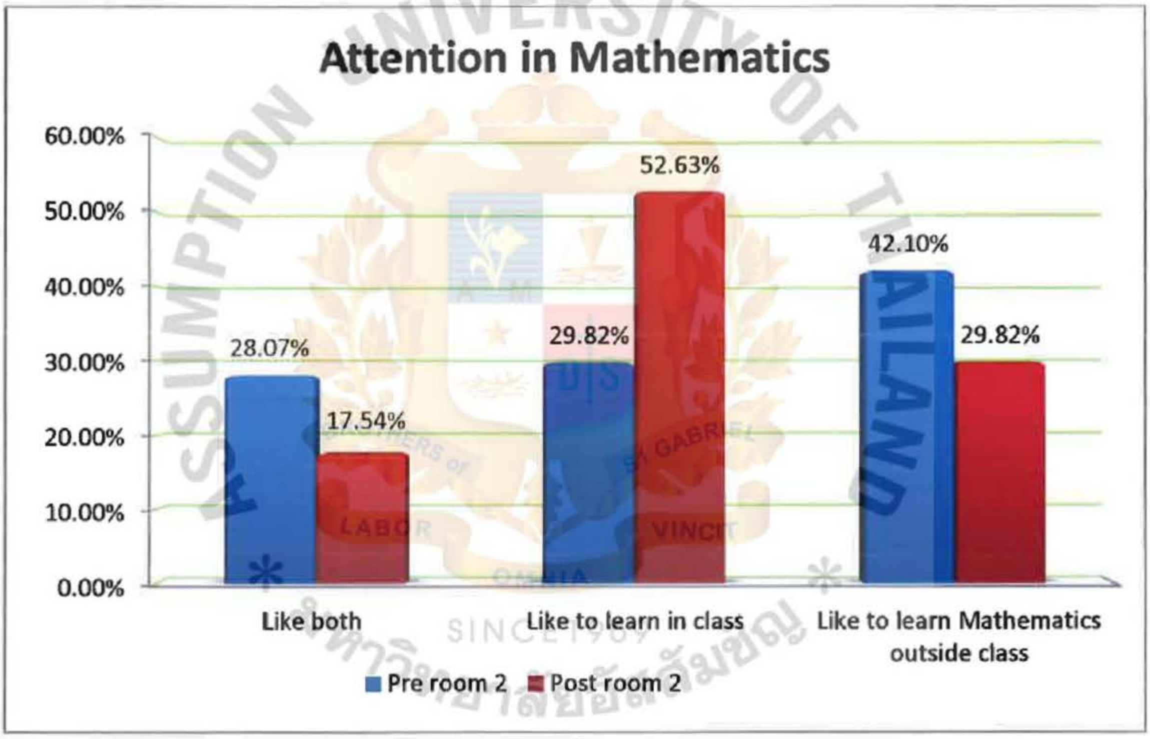


Figure 4.31: Comparison of the Pre and the post ODI; Students' Behavior room 2

Figure 4.32 shows the paired Percentage on Students' behavior after ODI in room 1, by pre implementation ODI activities about "Responsible for assignment". After the researcher implementation ODI activities most students had percent of *"submit assignment on time and correct."* increase.

Pre room 1; There were 33 respondents who submit assignment on time and correct, 20 respondents submit assignment late, and 7 respondents do not submit assignment.

Post room 1; There were 53 respondents who submit assignment on time and correct, 5 respondents submit assignment late, and 2 respondents do not submit assignment.

Therefore the null hypothesis (Ho1, Ho2) was rejected and the alternative was accepted. This could imply that there were a number of differences in Students' behavior before and after IDI in room 1. *It was found the students' room 1 submits assignment on time and correct higher than submit assignment late.*

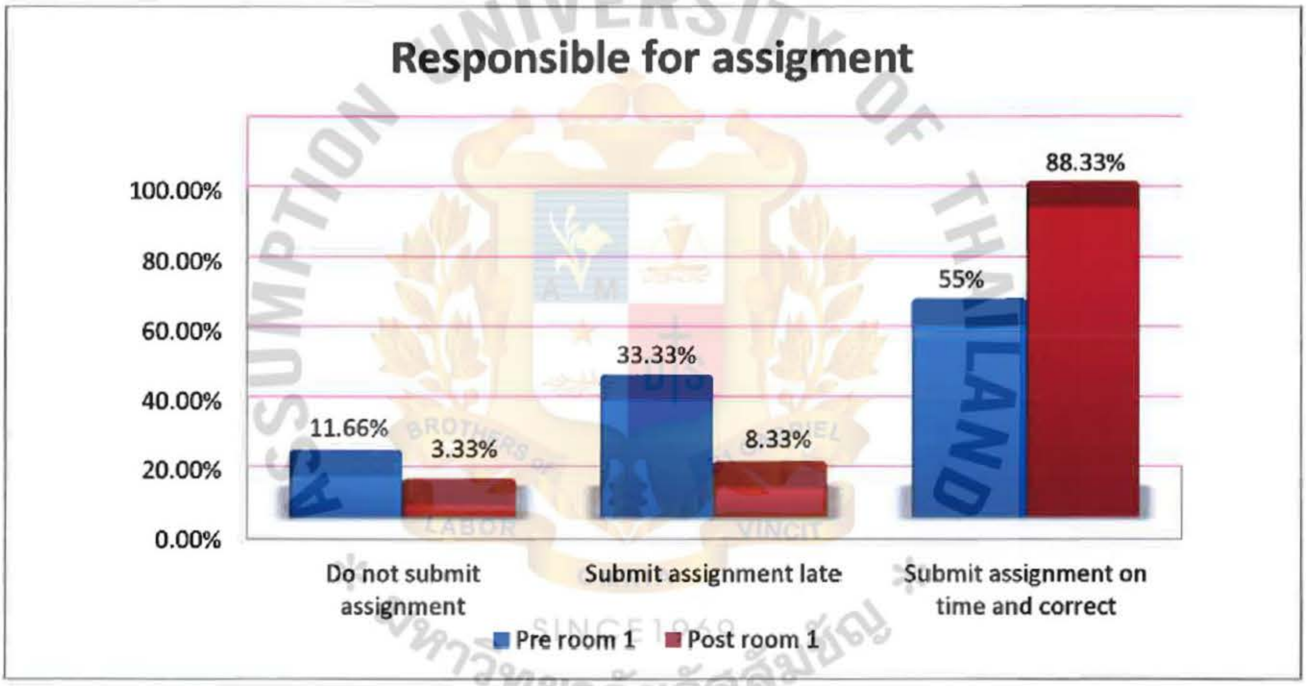


Figure 4.32: Comparison of the Pre and the post ODI; Students' Behavior room 1

Figure 4.33 shows the paired Percentage on Students' behavior room 2 without ODI about "Responsible in assignment". The researcher and observer have observed without implementation ODI activities in classroom. The Pre and the post had percent of "*Submit assignment on time and correct*" not different and *"Submit assignment late"* percentage increase.

Pre room 2; There were 35 respondents who submit assignment on time and correct, 13 respondents submit assignment late, and 9 respondents dents do not submit assignment.

Post room 2; There were 34 respondents who submit assignment on time and correct, 17 respondents submit assignment late, and 6 respondents do not submit assignment.

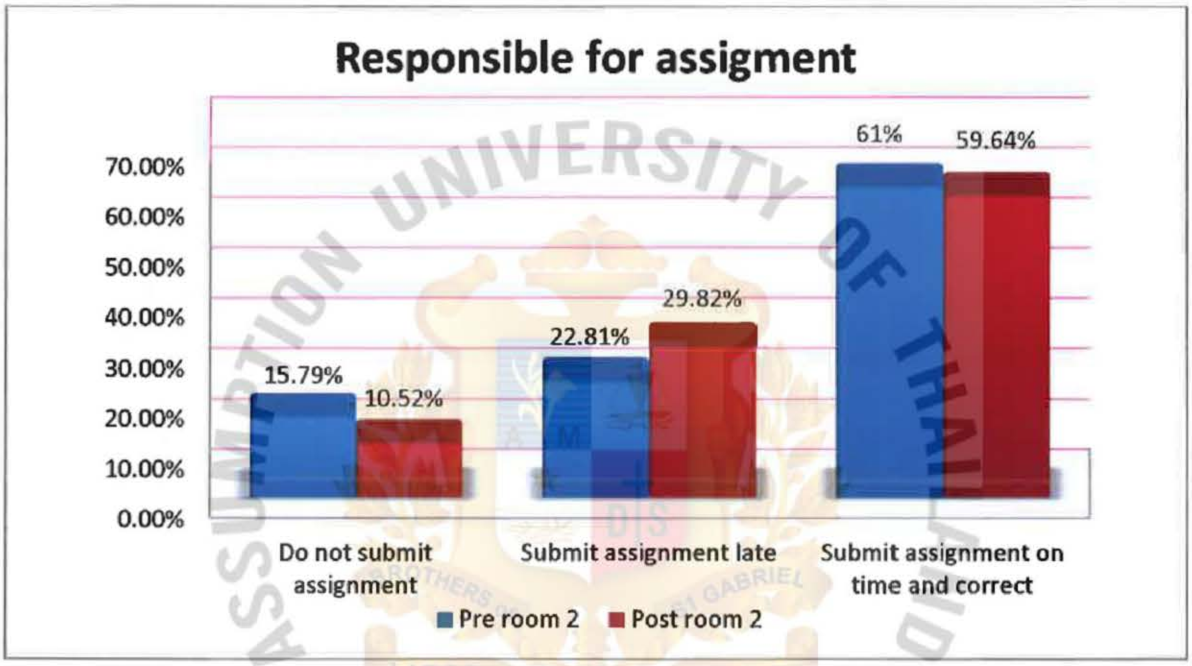


Figure 4.33: Comparison of the Pre and the post ODI; Students' Behavior room 2

Figure 4.34 shows the paired Percentage on Students' behavior after ODI in room 1, by pre implementation ODI activities about "Obey the teacher and cooperate in classroom". After the researcher implemented ODI activities, most students have percent of *"Obedience and to cooperate in class"* increase.

Pre room 1; There were 40 respondents who obey and cooperate in class, 14 respondents do not obey but cooperate with colleagues, and 6 respondents do not obey and cooperate in class.

Post room 1; There were 52 respondents who obey and cooperate in class, 6 respondents do not obey but cooperate with colleagues, and 2 respondents do not obey and cooperate in class.

Therefore the null hypothesis (Ho1, Ho2) was rejected and the alternative was accepted. This could imply that there were a number of differences in Students' behavior before and after IDI in room 1. *It was found the students' room 1 obey and cooperate in class is higher than do not obey but cooperate with colleagues.*

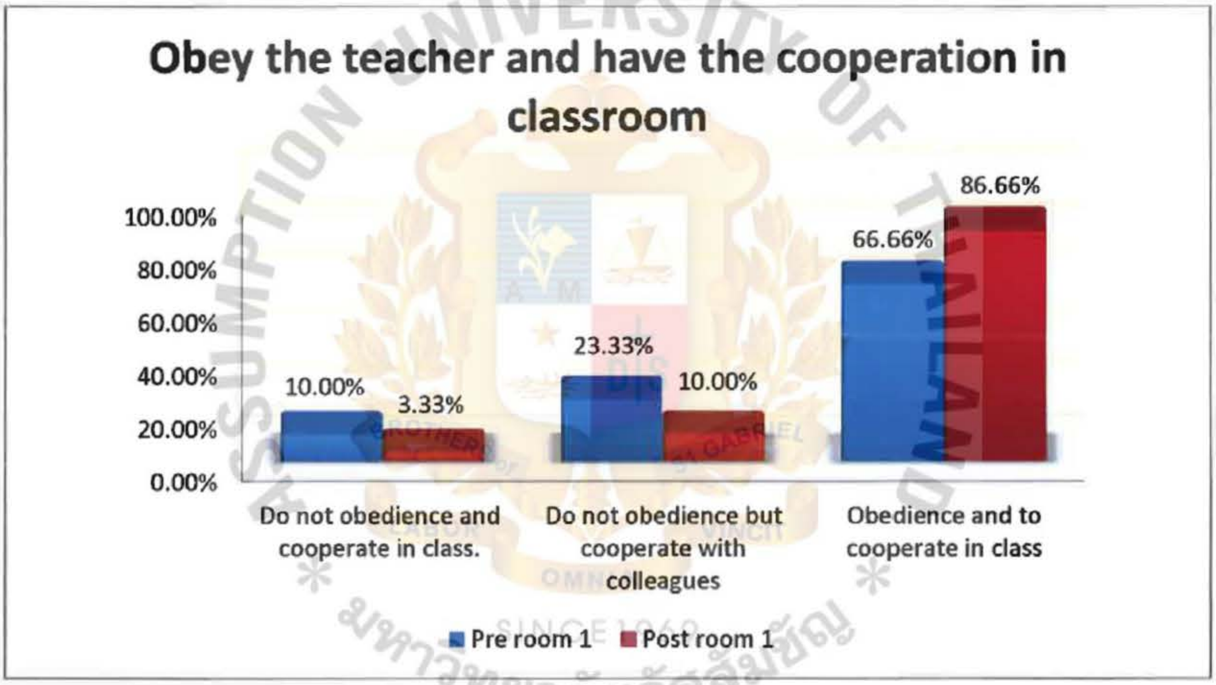


Figure 4.34: Comparison of the Pre and the post ODI; Students' Behavior room 1

Figure 4.35 shows the paired Percentage on Students' behavior room 2 without ODI about "Obey the teacher and cooperate in classroom. The researcher and observer have observed without implementation ODI activities in classroom. The Pre and the post, the students had *"Obey and cooperate in class"* not different.

Pre room 2; There were 35 respondents who obey and cooperate in class, 10 respondents do not obey but cooperate with colleagues, and 12 respondents do not obey and cooperate in class.

Post room 2; There were 36 respondents who obey and cooperate in class, 11 respondents do not obey but cooperate with colleagues, and 10 respondents do not obey and cooperate in class.

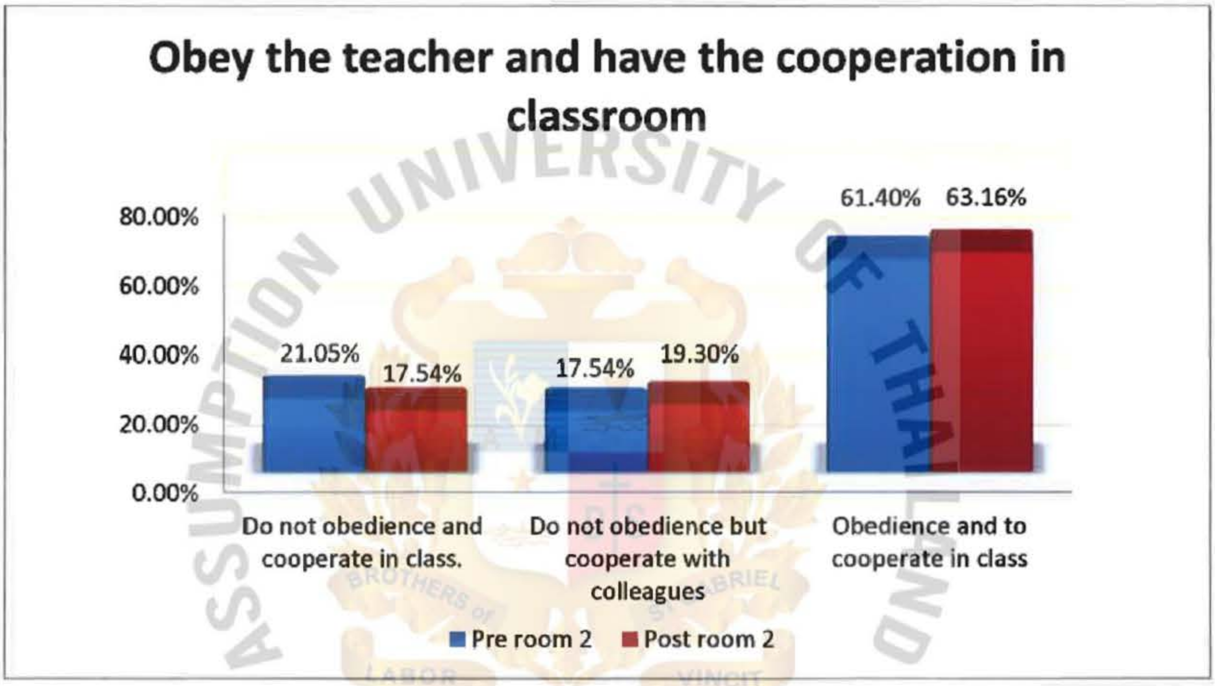


Figure 4.35: Comparison of the Pre and the post ODI; Students' Behavior room 2

This phase is the result comparison of the Post IDI students primary 6 room 1 and 2 on Teaching style, Students' performance and Students' behavior. Referring to the research question in Chapter one; **"Question 5. What are the differences between the post IDI/ODI of Primary 6 room 1 with intervention and room 2 without intervention in term of teaching style, Students' performance and students' behavior?"**

Table 4.22 The Paired Sample T-test, the Average Mean (X) and Standard Deviation (S.D.) on "*Teaching style*" after IDI of Primary 6 room 1 and 2

Events		Room	N	$\overline{X}$	S.D.	t-test	Sig.
Concept	1. The teacher has to build up the knowledge.	1	60	3.60	0.46	3.46	0.00
		2	57	3.21	0.70		
	2. Teacher has to develop the child's deeper understanding of mathematics.	1	60	3.49	0.54	4.89	0.00
		2	57	2.93	0.65		
	3. Good teaching, easy understands and use multimedia.	1	60	3.56	0.54	7.28	0.00
		2	57	2.77	0.63		
	4. Content in Mathematics suitable for the students.	1	60	3.53	0.57	4.74	0.00
		2	57	2.91	0.69		
Skill	5. Have to develop the child's capacity to think and reason.	1	60	3.28	0.59	3.30	0.00
		2	57	2.89	0.65		
	6. Have mathematics activity and present in class.	1	60	3.46	0.54	4.48	0.00
		2	57	2.96	0.73		
	7. Have the step for thinking and writing.	1	60	3.54	0.54	5.59	0.00
		2	57	2.89	0.70		
	8. Develop skill ability of the students continuously.	1	60	3.46	0.57	3.02	0.00
		2	57	3.12	0.63		
	9. Give the wide solution skill and develop basic mathematics skills.	1	60	3.32	0.54	4.17	0.00
		2	57	2.82	0.66		
	10. Use mathematics game to develop mathematics skill.	1	60	3.46	0.54	3.97	0.00
		2	57	3.04	0.68		
Problem solving	11. Suggest the solution for Solving.	1	60	3.35	0.58	3.38	0.00
		2	57	2.96	0.65		
	12. Give opportunity to the students to present new method.	1	60	3.56	0.54	4.94	0.01
		2	57	3.04	0.68		
	13. Have the solution for problem solving Mathematics clearly.	1	60	3.46	0.60	2.58	0.00
		2	57	3.18	0.60		
	14. Develop the child's self-confidence.	1	60	3.53	0.54	3.56	0.00
		2	57	3.14	0.61		
	15. Set the real situation for the students to solve the problem.	1	60	3.61	0.49	4.06	0.00
		2	57	3.16	0.62		
Total		1	60	3.48	0.23	14.47	0.00
		2	57	2.80	0.30		

* Significant Number < 0.05

From the table 4.22; The paired sample t-test on Teaching style after IDI in room 1 and 2, it shows that the total average mean in room 1 after implementation IDI activities was 3.48 and the standard deviation was 0.23 but average mean in room 2 without implementation of IDI activities was 2.80 and the standard deviation was 0.30. Moreover, sig was 0.00 which was less than the significance level of 0.05. Therefore, the null hypothesis (Ho3) was rejected and the alternative was accepted. This could imply that there was a significant difference in the teaching style before and after IDI in room 1 and 2 before and after the IDI.

Table 4.23 The Paired Sample T-test, the Average Mean (X) and Standard Deviation (S.D.) on "*Students' Performance*" after IDI of Primary 6 room 1 and 2

Events	Room	N	$\overline{X}$	S.D.	t-test	Sig.
1. Understanding in content	1	60	3.33	0.61	4.531	0.000
	2	57	2.82	0.57		
2. Understanding in Concept	1	60	3.46	0.66	4.173	0.000
	2	57	3.00	0.46		
3. Have skill in Mathematics	1	60	3.68	0.47	7.337	0.000
	2	57	3.04	0.53		
4. Can use Problem Solving Mathematics more	1	60	3.61	0.53	5.190	0.000
	2	57	2.98	0.72		
5. To be used multiplication table applies to Mathematics all content.	1	60	3.61	0.53	7.099	0.000
	2	57	2.98	0.61		
6. Have division skill	1	60	3.68	0.54	5.850	0.000
	2	57	2.98	0.67		
7. Have able to skillfully solving the division problems.	1	60	3.49	0.57	4.173	0.000
	2	57	3.04	0.57		
8. Able to answer the question of the Mathematics teachers	1	60	3.72	0.49	4.689	0.000
	2	57	3.19	0.61		
Total	1	60	3.57	0.17	12.285	0.000
	2	57	3.00	0.27		

* Significant Number < 0.05

From the table 4.23; The paired sample t-test on Students' performance after IDI in room 1 and 2, this table shows that the total average mean in room 1 after implementation IDI activities was 3.57 and the standard deviation was 0.17 but average mean in room 2 without implementation IDI activities was 3.00 and the standard deviation was 0.27. Moreover, sig was 0.00 which was less than the significance level of 0.05. Therefore, the null hypothesis (Ho3) was rejected and the alternative was accepted. This could imply that there was a significant difference in Students' performance before and after IDI in room 1 and 2 before and after the IDI.

This part is qualitative data about *Students' Behavior* by observing the students of primary 6 room 1(60 students) and room 2(57 students).

Figure 4.36 shows the paired Percentage on "Students' behavior" after with ODI in room 1 but room 2 without ODI. The results of percentage *"like to learn Mathematics activities outside class"* of the post implementation ODI activities about "Attention in Mathematics" *room 1 is higher than room 2.* Therefore the null hypothesis (Ho3) was rejected and the alternative was accepted. This could imply that there were a number of differences in Students' behavior before and after IDI in room 1. *It was found the students' likes to learn Mathematics activities outside class room 1is higher than room 2.*

Post room 1; There were 50 respondents who think they like to learn Mathematics activities outside class, 5 respondents think they like to learn in class, and 5 respondents think they like both.

Post room 2; There were 17 respondents who think they like to learn Mathematics activities outside class, 30 respondents think they like to learn in class, and 10 respondents think they like both.

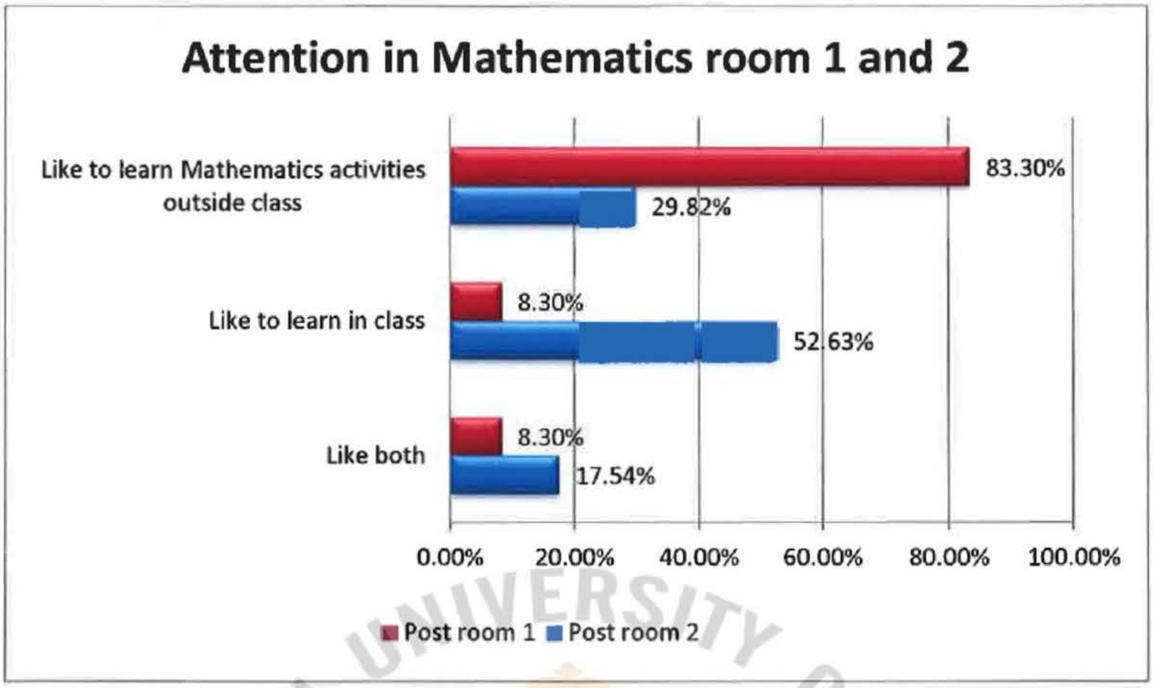


Figure 4.36: The Paired Percentage of the difference "Attention in Mathematics" on Students' behavior primary 6 room 1 with ODI, and room 2 without ODI.

Figure 4.37 shows the paired Percentage on "Students' behavior" after with ODI in room 1 but room 2 without ODI. The results of percentage *"Submit assignment on time and correct"* of the post implementation ODI activities about "Responsible for assignment" *room 1 is higher than room 2.* Therefore, the null hypothesis (Ho3) was rejected and the alternative was accepted. This could imply that there were a number of differences in Students' behavior before and after IDI in room 1. *It was found the students' submit assignment on time and correct room 1 is higher than room 2.*

Post room 1; There were 53 respondents who submit assignment on time and correct, 5 respondents submit assignment late, and 2 respondents do not submit assignment.

Post room 2; There were 34 respondents who submit assignment on time and correct, 17 respondents submit assignment late, and 6 respondents do not submit assignment.

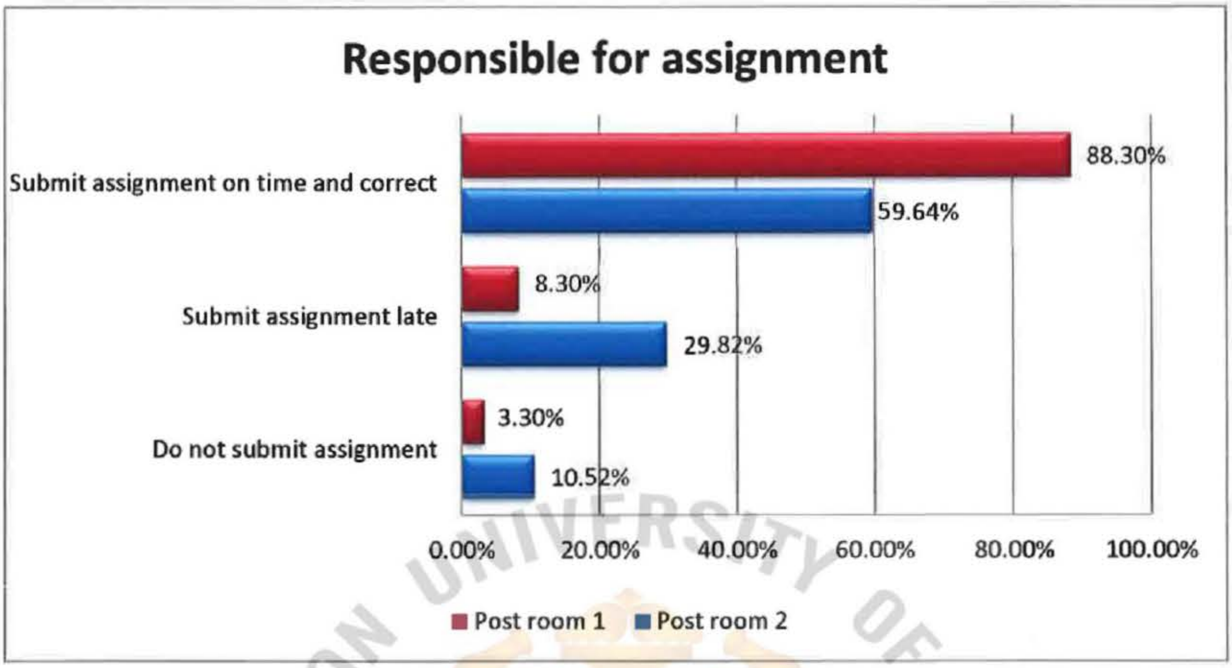


Figure 4.37: The Paired Percentage of the difference "Responsible in assignment" on Students' behavior primary 6 room 1 with ODI. and room 2 without ODI.

Figure 4.38 shows the paired Percentage on "Students' behavior" after with ODI in room 1 but room 2 without ODI. The results of percentage *"Obey and cooperate in class"* of the post implementation ODI activities about "Obey the teacher and cooperate in classroom" *room 1 is higher than room 2.* Therefore the null hypothesis (Ho3) was rejected and the alternative was accepted. This could imply that there were a number of differences in Students' behavior before and after IDI in room 1. *It was found the students' obedience and to cooperate in class room 1 is higher than room 2.*

Post room 1; There were 52 respondents who obey and cooperate in class, 6 respondents do not obey but cooperate with colleagues, and 2 respondents do not obey and cooperate in class.

Post room 2; There were 36 respondents who obey and cooperate in class, 11 respondents do not obey but cooperate with colleagues, and 10 respondents do not obey and cooperate in class.

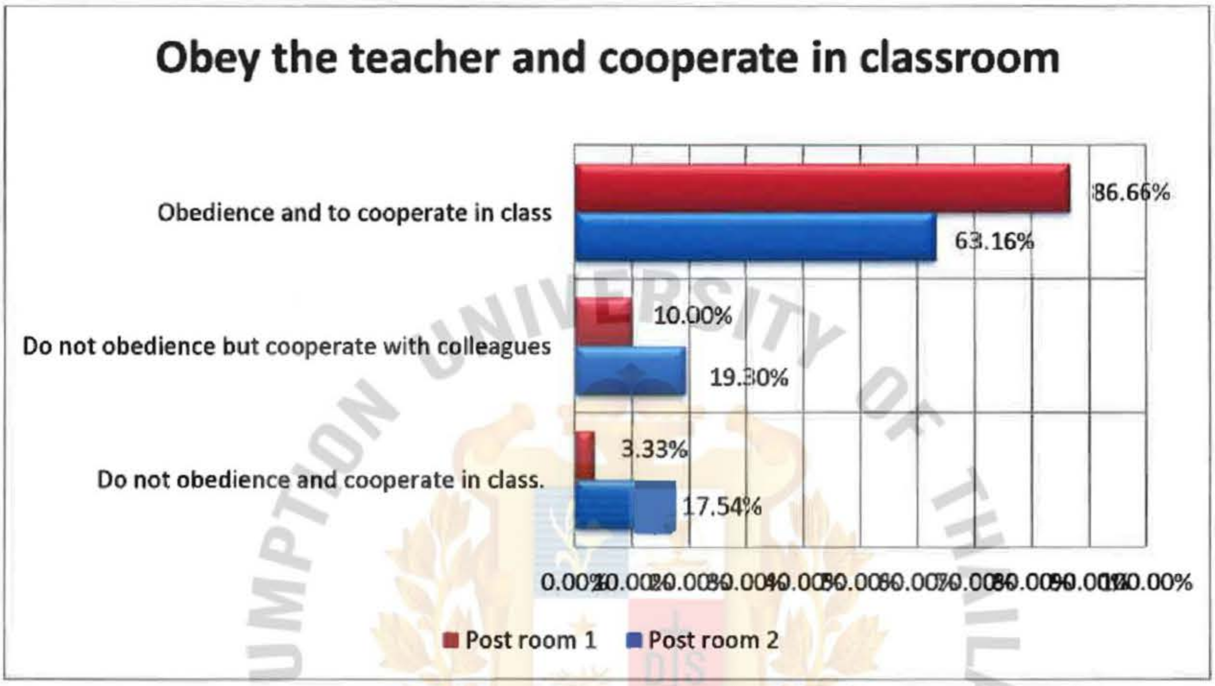


Figure 4.38: The Paired Percentage of the difference "Obey the teacher and have the cooperation in classroom" on Students' behavior primary 6 room 1 with ODI and room 2 without ODI.

Table 4.24 The Paired Sample T-test, the Average Mean (X) and Standard Deviation (S.D.) on "*Students' Attitude*" after IDI of Primary 6 room 1 and 2

Events	Room	N	$\overline{X}$	S.D.	t-test	Sig.
1. Studying mathematics makes me feel nervous.	1	60	3.42	0.57	2.443	0.018
	2	57	3.16	0.62		
2. I am always under a terrible strain in a math class.	1	60	3.40	0.50	3.618	0.001
	2	57	3.09	0.58		
3. I am able to solve mathematics problems without too much difficulty.	1	60	3.68	0.47	2.982	0.004
	2	57	3.39	0.59		
4. Mathematics is important in everyday life.	1	60	3.70	0.46	3.478	0.001
	2	57	3.39	0.53		
5. Mathematics is one of the most important subjects for people to study.	1	60	2.91	0.54	-3.099	0.003
	2	57	3.30	0.68		
6. Mathematics courses would be very helpful no matter what I decide to study, Enjoyment.	1	60	3.60	0.50	2.810	0.007
	2	57	3.28	0.68		
7. I have usually enjoyed studying mathematics in school.	1	60	3.33	0.55	3.352	0.001
	2	57	2.98	0.64		
8. Mathematics is dull and boring.	1	60	3.51	0.54	4.610	0.000
	2	57	3.02	0.58		
9. I am happier in a math class than in any other class.	1	60	3.23	0.54	3.966	0.000
	2	57	2.70	0.71		
10. I would like to avoid using mathematics in college.	1	60	3.39	0.56	2.661	0.010
	2	57	3.11	0.62		
11. I am willing to take more than the required amount of mathematics.	1	60	3.46	0.63	3.511	0.001
	2	57	3.04	0.65		
12. I plan to take as much mathematics as I can during my education.	1	60	3.42	0.57	3.310	0.002
	2	57	2.98	0.74		
Total	1	60	3.42	0.23	5.46	0.000
	2	57	3.12	0.34		

From the table 4.24; The paired sample t-test on Students' attitude after IDI in room 1 and 2, this table showed that the total average mean in room 1 after implementation IDI activities was 3.42 and the standard deviation was 0.23, but average mean in room 2 without implementation IDI activities was 3.12 and the standard deviation was 0.34. Moreover, sig was 0.00 which was less than the significance level of 0.05. This could imply that there was a significant difference in the Students' attitude before and after IDI in room 1 and 2 before and after the IDI.

Table 4.25 The Paired Sample T-test, the Average Mean (X) and Standard Deviation (S.D.) on "*Post test*" after IDI of Primary 6 room 1 and 2

Item	Room	N	$\overline{X}$	S.D.	T-test	Sig.
Post test	1	60	14.42	3.78	4.321	0.00
	2	57	11.26	3.40		

* Significant Number < 0.05

From the table 4.25; The paired sample t-test on Post test after IDI in room 1 and 2, this table shows that the total average mean in room 1 after implementation of IDI activities was 14.42 and the standard deviation was 3.78 but average mean in room 2 without implementation of IDI activities was 11.26 and the standard deviation was 3.40. Moreover, sig was 0.00 which was less than the significance level of 0.05. Therefore, the null hypothesis (Ho3) was rejected and the alternative was accepted. This could imply that there was a significant difference in the Post test before and after IDI in room 1 and 2 before and after the IDI.

Table 4.26; The summary Table of the Comparison of the Average after IDI of Teaching style, Students' performance, Students' attitude and Post test of primary 6 room 1 and 2

Item	Post (room 1)			Post (room 2)			T-test	Sig.	Result toHo1	Result toHo2	Result toHo3
	N	$\overline{X}$	S.D.	N	$\overline{X}$	S.D.					
Teaching style	60	3.48	0.55	57	2.79	0.30	14.47	0.00	Reject	Reject	Reject
Students' performance	60	3.58	0.55	57	3.00	0.27	12.29	0.00	Reject	Reject	Reject
Students' attitude	60	3.45	0.54	57	3.01	0.23	5.45	0.00	Reject	Reject	Reject
Post test	60	14.42	3.78	57	11.26	3.40	4.321	0.00	Reject	Reject	Reject

* Significant Number < 0.05

Table 4.26; Indicates the summary of the comparison of the average, standard deviation, T-test and significant number to illustrate the differences between the post IDI data room 1 and 2. It could be concluded for students' assessment summary. That there were significant differences between the pre and post IDI on Teaching style, Students' performance, and Students' attitude. All area the null hypothesis (Ho3) was rejected and the alternative was accepted.

Chapter 5

Summary, Conclusion and Recommendation

This chapter summarizes and concludes the results and the findings. It consists of three sections. The first section is the interpretation of the results or summary of finding. The section is the conclusion and the last section contains recommendations and suggestion for future research.

5.1 Summary

The respondents for this study were the students in primary 6 room 1 and 2. The research sets questionnaire 3 type about Teaching style, Students' performance and Students' attitude. Sets observation 1 type to respondents and observer participate in this survey. And set interviews guide to quality data of "Students' behavior"

For students' respondent there were 2 rooms or 117 students by room 1 have 60 students and room 2 has 57 students. The researcher found primary 6 room 1 have the problem in class so this research used primary 6 room 1 was case study and used primary 6 room 2 was comparison. Base on the research question "*What are the differences between the post IDI/ODI of Primary 6 room 1 with intervention and room 2 without intervention in term of teaching style, Students' performance and students' behavior?*" the researcher found after doing intervention, refer to the SPSS program Independent Pair Sample T-test, the information indicated that there was a significant difference between the mean of the Pre IDI/ODI and Post IDI/ODI in Teaching style, Students' performance, Students' attitude with 2 tailed significant of 0.00 which was lower than 0.05, so Ho; the null hypothesis was rejected and Ha; IDI/ODI has initial impact on Teaching style, Students' performance, and Students' behavior of primary 6 students at Saint Gabriel College of Thailand.

5.2 Conclusions

In conclusions, the results of data analysis show IDI and ODI have an impact on Teaching style, Students' performance, and Students' behavior. The researcher made comparison of Students' attitude to support the research.

For the current situation and Students' performance of Saint Gabriel College in terms of "Students' center" and "Professional teacher", by the time the researcher collected Post IDI/ODI data and the overall results of respondents showed an obvious impact in the research.

For the Teaching style, the researcher found *"Set the real situation for the students solve the Mathematics problem", "The teacher has to build up the knowledge"* it had high average mean in classroom implementation IDI. Moreover, for the variable, the p-value was 0.00 and it less than the significance level of 0.05, so the null hypotheses (Ho1,Ho2,Ho3) was rejected and the alternative was accepted. This could imply that there was a significant difference in the Teaching style before and after the IDI.

For the Students' performance, the researcher found that most students like *"Fun and very easy to understand"*. So the students can present solution and explain more about Mathematics problem with colleagues. The whole of results show after implementation IDI, it had obvious direct effect on Students' performance. Moreover, for the variable, the p-value was 0.00 and it was less than the significance level of 0.05, so the null hypotheses (Ho1,Ho2,Ho3) was rejected and the alternative was accepted. This could imply that there was a significant difference in the Students' performance before and after the IDI.

For the Students' behavior, the researcher found the students need *"learning Mathematics activities outside class"*. So; "Mathematics activities" has stimulated students to study with more interest. The whole of results show after implementation ODI, it had obvious direct effect on Students' behavior. Moreover, for the variable, the p-value was 0.00

and it was less than the significance level of 0.05, so the null hypotheses (Ho1,Ho2,Ho3) was rejected and the alternative was accepted. This could imply that there was a significant difference in the Students' behavior before and after the ODI.

Specially, for this research, the researcher made the survey about Students' attitude. The researcher performed IDI in class by using questionnaire. The researcher found the students had attitude about *"Mathematics is important in everyday life", "Mathematics courses would be very helpful no matter what I decide to study, Enjoyment"*. So, Teaching style, Students' performance, Students' behavior and Students' attitude had great relationship. Moreover, for the variable, the p-value was 0.00 and it was less than the significance level of 0.05, so this could imply that there was a significant difference in the Students' attitude before and after the IDI.

5.3 Recommendations

Table 5.1 Conceptual Framework instruction field

Findings after IDI	**Proposed IDI/ODI**	**Desired Result in the Future**
Teaching Style		
• Some students can't present or demonstrate in front of the class but can explain with colleague by oneself.	• Ask the students to present solution on Mathematics problem with self confidence.	• New education in SG. is **"Main students center"** by the Mathematics having teacher as consultant.
• Some Mathematics media lack interesting and modern.	• Mathematics teachers ask the student to participate and create new Mathematics media.	• Mathematic media is something to help imagine for easy understanding. And SG. is **"Mathematics media center"**
Students' Performance		
• Time to practice Mathematics skill less.	• Enough time in Teaching style will help students understand (concept) each content, help the student practice work sheet (skill) and set real situation about Mathematics problem to solve(problem solving).	• Most students have the concept, skill, and problem solving in Mathematics content and apply to next grade. So, the concept, skill, and problem solving is based on Students' Performance.
• Some students don't review Mathematics content.	• Form the small groups to help friend to review Mathematics content and explain, practices Mathematics skill with Mathematics teacher as the consultant.	• Most students have high score.

Findings after IDI	Proposed IDI/ODI	Desired Result in the Future
Students' Behavior • Some students lack teamwork skill.	• Change behavior some students known work as a team.	• The students have humanity and love of learning.

After intervention, the desired results in the future were the teachers have more understanding toward different Teaching style, Students' performance and Students' behavior. Mathematics class should have the following:

5.3.1 Improving Organization

1. Teaching style by using Mathematics activities based on the concept of Constructivism to help low score student to love Mathematics more. When they don't understand the friends in each group can help.

2. Divide into small groups (5-6 students per group) for all members to have opportunities to comment thoroughly. And the members in group help solve the problem in Mathematics activities, there is harmony, accept comment, allow the student to be reasonable, and democratic practices as well

3. From the research; Teaching style *"demonstrator or personal model"*, Mathematics activities can help the students to have academic achievement higher than the regular instruction. So, the teachers and others concerned can use this teaching style of the researcher for instruction in primary 6.

4. Sometimes the students can create Mathematics media and building Mathematics media by themselves to help the students understand as well.

5. Learning environment should be a friendly atmosphere. In class should have comment between teachers and students, students and students by commenting freely.

5.3.2 Recommendations for further Research

1. Students' Climate
2. Consult Management
3. Students' Leadership

EPILOGUE

In MMOD program, the researcher started to learn with ODT Integration Process that made me know how to integrate the 4 parts of our brain to work together, how to let the other work with us well, how to work with the people with different style and then, the researcher learnt Organization Development & Management Fundamental course, this course let me know about how we can develop, improve management of organization to be better in the future. After that, the researcher learnt the overall perspective of organization development and management course, it helps me to see my organization picture in the parts and look forward to the future then, the researcher learnt the theory of change management in communication, climate, and culture, fundamentals of management, OD&T Management of Creativity and Entrepreneurship etc. The entire course that the researcher learned provided me with valuable knowledge that helped me when the researcher did this study. For the course of micro system diagnosis, Change and Transformation this course we have to implement diagnosis in the micro systems in the organization so, the researcher can think and decide the problems solving on my own also. The important thing is the fundamental research course and action research course. It taught me how to collect data and how to analyze both quantitative and qualitative data etc. which motivates me to do the study in many different ways.

Earlier in my life, the researcher thought about "Future" and considered "Change" a little. The researcher never thought that, it is an important thing in human life. The researcher never planned to do and the researcher did not know what the researcher should do for my future. As the time passed by, the researcher learnt a lot of knowledge about these, especially organization development and management from MMOD Program. This program has made me to change my world to think positively, helped me to think better, work very well than the past and provided me valuable knowledge when the researcher did this study. This research paper is one great result to impart the knowledge from instructors and the books to apply in the real situation in my work and my life.

In this research; the researcher gained many ideas that are very useful for me. Not only knowledge, skill, and good experience but self-fulfillment, especially after implementation, all the results let me know; how to teach Mathematics and classroom management, how to make Mathematics activities interesting for the students to participate, how to change students' performance to deep knowledge and be happy to learn by using new activities, what the need of students in learning Mathematics, and also the researcher can get the way to improve and integrate teaching style to be better in teaching by using Mathematics media, technologies, Mathematics game, small group and individual presentations.

However, this research does not seen to end here, as the intervention and the change is still going on in my organization in the coming future, the researcher still will provide recommendations and keep a record of the following results and also the researcher would like to contribute the knowledge and experience for my future work, to help my organization to always strive to be the best.

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Appendix A

Mathematics Teaching Style Survey Form

Saint Gabriel's College

Mathematics Teaching Style Survey Form

Student's name: ……………………………………………………………

Instructor: ……………………………………………………………

Please respond to the following question for each of the items below, using a scale of 1 to 4. By checking ✓ in the when you need to be choose it.

Instruction: Strongly agree = 4, Agree = 3, Disagree = 2 and Strongly disagree = 1.

	Events	**Degree**			
		1	**2**	**3**	**4**
CONCEPT	1. The teacher has new knowledge for instruction.				
	2. Teacher has to develop the child's deeper understanding of mathematics.				
	3. Good teaching, easy understand and use multimedia.				
	4. The content in Mathematics suitable for the students.				
Skill	5. Have to develop the child's capacity to think and reason.				
	6. Have mathematics activity and present in class.				
	7. Have the steps for thinking and writing.				
	8. Develop skill ability of the students continuously.				
	9. Give the wide solution skill and develop basic mathematics skills.				
	10. Use mathematics game to develop mathematics skill.				
Problem Solving	11. Suggest the solution to Solve.				
	12. Give opportunity to the students to present new method.				
	13. Have the solution for problem solving Mathematics clearly.				
	14. Develop the child's self-confidence.				
	15. Set the real situation for the students to solve the problem.				

โรงเรียนเซนต์คาเบรียล

แบบสำรวจรูปแบบการสอนกับการเรียนวิชาคณิตศาสตร์

ชื่อนักเรียน ....

ผู้สอน ....

กรุณาตอบคำถามต่อไปนี้ แต่ละรายการด้านล่างมีคะแนนในระดับถึงที่ 1 ระดับ 4 โดยการใส่เครื่องหมาย ✓ ลงในช่องตามความต้องการ

คำแนะนำ :เห็นด้วยอย่างยิ่ง4 = , เห็นด้วย3 = , ไม่เห็นด้วย = 2 และ ไม่เห็นด้วยมาก1 =

	เหตุการณ์	ระดับ			
		1	**2**	**3**	**4**
ความเข้าใจ	1.ครูมีการเพิ่มความรู้ใหม่ๆให้นักเรียนอยู่เสมอ				
	2.ครูให้พัฒนาความเข้าใจของเด็กอย่างลึกซึ้ง				
	3.ครูมีการสอนที่ดีและเข้าใจง่าย				
	4.เนื้อหาที่นำมาสอนตรงตามหลักสูตรและสอนเข้าใจง่าย				
ทักษะทางคณิตศาสตร์	5.มีการพัฒนาความสามารถทางความคิดและเหตุผลของนักเรียน				
	6.ให้นักเรียนทำงานอย่างมีระบบและประณีตเรียบร้อย				
	7.สอนให้คิดและเขียนแสดงวิธีทำอย่างขั้นตอน				
	8.พัฒนาทักษะทางคณิตศาสตร์ให้นักเรียนอย่างต่อเนื่อง				
	9.ให้ทักษะและความรู้ทางคณิตศาสตร์อย่างกว้างขวาง				
	10. มีเกมคณิตศาสตร์พัฒนาทักษะทางคณิตศาสตร์				
กระบวนการแก้ปัญหา	11.แนะนำวิธีการแก้ปัญหาคณิตศาสตร์ที่ดี				
	12.ให้โอกาสนักเรียนแสดงวิธีคิดใหม่ๆ				
	13.มีขั้นตอนแสดงวิธีทำที่อธิบายชัดเจน				
	14.พัฒนาความมั่นใจในการคิดของนักเรียน				
	15.ให้นักเรียนปฏิบัติงานด้วยตัวเองก่อนเสมอ				

Appendix B

Interview guide for action research about Students' Performance

Saint Gabriel's College

Interview guide for action research about Students' Performance

Name .... Primary 6 Room ....

Date .... Time ....

1. How to solve when you find this mathematics problem?

....

....

....

2. Who can demonstrate the solution of this mathematics problem?

....

....

....

3. How do you feel about mathematics activities?

....

....

....

4. Who can explain mean of concept in Mathematics?

....

....

....

Appendix C

Students' Behavior and Students' Performance Observation Form

Saint Gabriel's College

Students' Behavior and Students' Performance Observation Form

Student name…………………………………………………………………………………
Instructor…………………………………………   ……………………………………
Observer……………………Length of Observation………
Lesson…………………………

Students' Behavior

1. Attention in class……………………………………………………………………………………
2. Responsible for assignment……………………………………………………………………………
………
3. Obey the teacher and cooperate in the classroom…………………………………………………
………
4. Other
………

Students' Performance

Using a scale of 1 to 4. By checking ✓ in the when you need to be choose it.

Instruction: Strongly agree = 4, Agree = 3, Disagree = 2 and Strongly disagree = 1.

1. Understanding in content	①	②	③	④
2. Understanding in Concept	①	②	③	④
3. Have skill in Mathematics	①	②	③	④
4. Can use Problem Solving Mathematics more	①	②	③	④
5. To be used multiplication table applies in Mathematics all content.	①	②	③	④
6. Have division skill	①	②	③	④
7. Have able to skillfully solving the division problems.	①	②	③	④
8. Able to answer the question of the Mathematics teachers	①	②	③	④

Appendix D

Mathematics Students' Attitude Survey Form

Saint Gabriel's College

Mathematics Students' Attitude Survey Form

Student's name: ....

Instructor: ....

Please respond to the following question for each of the items below, using a scale of 1 to 4. By checking ✓ in the when you need to be choose it.

Instruction: Strongly agree = 4, Agree = 3, Disagree = 2 and Strongly disagree = 1.

	Events	**Degree**			
		1	**2**	**3**	**4**
Self-confidence	1. Studying mathematics makes me feel nervous.				
	2. I am always under a terrible strain in a math class.				
	3. I am able to solve mathematics problems without too much difficulty.				
Value	4. Mathematics is important in everyday life.				
	5. Mathematics is one of the most important subjects for people to study.				
	6. Mathematics courses would be very helpful no matter what I decide to study, and enjoy them.				
	7. I usually enjoy studying mathematics in school.				
	8. Mathematics is dull and boring.				
	9. I am happier in a math class than in any other class.				
Motivation	10. I would like to avoid using mathematics in college.				
	11. I am willing to take more than the required amount of mathematics.				
	12. I plan to take as much mathematics as I can during my education.				

โรงเรียนเซนต์คาเบรียล

แบบสำรวจทัศนคติของนักเรียนกับการเรียนวิชาคณิตศาสตร์

ชื่อนักเรียน ....

ผู้สอน ....

กรุณาตอบคำถามต่อไปนี้ แต่ละรายการด้านล่างมีคะแนนในระดับถึงที่ 1 ระดับ 4 โดยการใส่เครื่องหมาย ✓ ลงในช่องตามความต้องการ

คำแนะนำ :เห็นด้วยอย่างยิ่ง4 = , เห็นด้วย3 = , ไม่เห็นด้วย = 2 และ ไม่เห็นด้วยมาก1 =

รายการ		ระดับ			
		1	**2**	**3**	**4**
ความเชื่อมั่นในตนเอง	1.การเรียนคณิตศาสตร์ทำให้รู้สึกหงุดหงิด				
	2.ฉันรู้สึกเครียดเวลาเรียนวิชาคณิตศาสตร์				
	3.ฉันสามารถคิดคณิตศาสตร์ที่ไม่ยากเกินไปได้				
คุณค่า	4.คณิตศาสตร์เป็นสิ่งสำคัญในชีวิตประจำวัน				
	5.คณิตศาสตร์เป็นหนึ่งในวิชาที่สำคัญที่สุดสำหรับคนที่จะศึกษา				
	6.คณิตศาสตร์เป็นหนึ่งในวิชาที่มีประโยชน์มาก				
	7.ฉันมีความสุขมากที่จะเรียนคณิตศาสตร์ในโรงเรียน				
	8.คณิตศาสตร์เป็นวิชาที่น่าเบื่อ				
	9.ฉันเรียนคณิตศาสตร์มีความสุขมากกว่าวิชาอื่น				
แรงจูงใจ	10.ฉันต้องการจะหลีกเลี่ยงการใช้คณิตศาสตร์ในโรงเรียน				
	11.ฉันยินดีที่เรียนคณิตศาสตร์มากกว่าการได้เงิน				
	12.ฉันวางแผนที่จะใช้คณิตศาสตร์มากที่สุดเท่าที่ฉันสามารถในระหว่างการศึกษาของฉัน				

Appendix E

Researcher's Profile

Researcher's Profile

Name: Mr.Kittirat Sirithanapipat

Date of Birth: 6 May 1978

Place of Birth: Bangkok

Address on Census Registration: 20 Samsen 26, Samsen Rd., Dusit, Bangkok, 10300

Address Present time: 20 Samsen 26, Samsen Rd., Dusit, Bangkok, 10300

Work Place: Saint Gabriel's College

Education;

1996: High School from WATRAJADHIVAT High School Bangkok.

2000: Bachelor's Degree from KASETSART UNIVERSITY Bangkok, Thailand.

2010: Graduate Diploma in Teacher Profession SUKHOTHAT THAMMATHIRAT OPEN UNIVERSITY Bangkok, Thailand

2011: Master's Degree from ASSUMPTION UNIVERSITY Bangkok, Thailand.

ประวัติโดยย่อผู้วิจัย

ชื่อ – ชื่อสกุล	นายกิตติรัตน์ ศิริธนาพิพัฒน์
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ที่อยู่ตามทะเบียนบ้าน	20 ซ.สามเสน 26 ถ.สามเสน แขวงถนนนครไชยศรี เขตดุสิต กทม.
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สถานที่ทำงาน	565 ถ.สามเสน แขวงวชิรพยาบาล เขตดุสิต กทม. 10300
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พ.ศ. 2555	จบการศึกษาระดับปริญญาโท (บธ.ม.) มหาวิทยาลัยอัสสัมชัญ หัวหมาก กทม.