DEVELOPMENT OF A MODEL OF MATHEMATICS INSTRUCTION TO FOSTER LEARNING MOTIVATION AND ACHIEVEMENT BASED ON SELF-EFFICACY AND SOCIAL COGNITIVE DEVELOPMENT THEORIES FOR LOWER PRIMARY STUDENTS IN INTERNATIONAL SCHOOLS IN BANGKOK

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Abstract: The purpose of this study was to develop and evaluate the effectiveness of an instructional model in promoting lower primary students' motivation and achievement in mathematics. The model was developed based on the theories that people's beliefs about their own ability affect their motivation and performance, and that social interaction plays a fundamental role in the development of cognition. The instructional procedures in the model emphasized the teacher's role to maintain a positive learning ambience and communicate faith in the students' ability to learn. The children were given options of mathematics tasks to choose from and were graded individually based on their selected tasks. A single-group time series design was used to investigate the effects of the instruction. A modified version of the Young Children's Academic Intrinsic Motivation Inventory (Gottfried, 1988) was used with permission to measure the children's motivation to learn mathematics. Significant improvement was found in the mathematics achievement and motivation especially of the less academically talented children.

Keywords: Motivation, Achievement, Mathematics, Self-efficacy, Primary

Introduction

Student motivation is a topic of great concern to teachers and parents around the world. Children with low motivation to learn tend to create problems in the classroom. This concern is resonant in Thailand where the Office of National Education stipulated that the teachers' roles should be 'confined to motivation and providing support in all activities' (ONEC, 2000). In fact, several motivation theories point out that learning motivation is inherent in all human beings (Bruner, 1966; Piaget, 1952; Stipek, 1993; Wlodkowski & Jaynes, 1990). Current theories further stress that motivation to learn is a natural capacity that exists in all students when they are in positive states of mind and have a supportive learning environment. The instructional environment should be one that provides genuine caring and support from teachers and other people in the system. Such social contexts which support a feeling of security and satisfying connections with others contribute to positive motivation (Stipek, 1993). Furthermore, a positive self-efficacy is found to be an essential ingredient for effective learning, without which the students will not have the motivation to learn (Bandura, 1997; Schunk, 1994).

Besides learning environment and social interaction, research findings highlighted teacher's character traits as one of the important factors influencing motivation (Cruickshank, 1990). Teachers should be enthusiastic, stimulating, warm and encouraging, inspiring students with their own enthusiasm and motivation. They should give students confidence in their ability and their future and create vibrant classroom with high expectations of students and connection to the world (Landsman, 2008). Furthermore, as children tend to invest their energy in pursuit of what they view to be achievable, Brophy (1998) suggested that the simplest way to ensure that students expect success is to make sure they achieve it consistently. This means teachers can change the negative beliefs and expectations of the students by creating routine education experiences in which hard work leads to success. Results from another study showed that teacher practice has a significant impact on students' learning in which motivational teaching strategies increased academic achievement of the students and encourage them to have a more positive attitude towards learning mathematics (Kariuki & Wilson, 2002). However, Muir (2001) identified a lack of motivational teaching models as a roadblock for motivating students' learning and suggested that educators and researchers find examples of motivating, engaging learning in the classroom.

There have been many studies pertaining to students' motivation in mathematics, but most of them were concerned with older children such as high school students. However, as more investigations

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show that children's attitude towards learning mathematics is often linked with earlier experiences, it becomes necessary that we explore ways to foster the children's motivation to learn from early primary years.

Motivation

Motivation explains why behavior occurs. Motivation can be classified as intrinsic, extrinsic, or a combination of both. Intrinsic motivation is associated with activities that are their own reward (Woolfolk, 1998). Extrinsic motivation, on the other hand, is created by external factors like rewards and punishment. One of the main approaches to motivation is the social learning approach of Albert Bandura which is a behavioral theory with cognitive elements, emphasizing observational learning and vicarious reinforcement. Out of this social learning theory and some further research, Bandura developed the theory of self-efficacy to explain people's behaviour.

Self-Efficacy

Self-efficacy refers to the beliefs in one's capabilities to organize and execute courses of action required to produce given attainments (Bandura, 1997). From his own research, Bandura found that people's self-efficacy affects the sorts of choices they make in very significant ways, particularly their levels of motivation and perseverance in the face of obstacles. Numerous other studies have confirmed this finding, showing that students with a high sense of academic efficacy display greater persistence, effort, and intrinsic interest in their academic learning and performance (Zimmerman, Bandura & Martinez-Pons, 1992). Bandura (1997) contended that "people's level of motivation, affective states, and actions are based more on what they believe than on what is objectively true". Consequently, how people behave can often be predicted by the beliefs they have about their own capabilities than by what they are actually capable of achieving.

There are four main sources of self-efficacy beliefs: (1) enactive mastery experience, (2) vicarious experience, (3) verbal persuasion, and (4) physiological and affective states. The ideas of self-efficacy are useful in understanding learning behaviour. Enactive mastery experience such as a man's habitual success will raise positive judgment of himself. As for vicarious experiences, people tend to observe role models and compare themselves with the models to judge their success. Verbal persuasion refers to the persuasion we received from others. As for physiological and affective states, high arousal can increase or decrease judgments of self-efficacy.

Social Cognitive Development

Russian psychologist Lev Vygotsky believes that learning occurs in a social context. His theory of social cognitive development is complementary to Bandura's social learning theory which believes that social interaction plays a fundamental role in the development of cognition. Vygotsky's theory emphasizes the role of social collaboration in learning through the child's interaction with people in their environment who are more knowledgeable than them. These More Knowledgeable Others (MKO) have a higher ability level than the learner in regards to a particular task, and include a teacher, older adult, peers, or even tools such as computers. With the help of the MKO, the learner is able to assimilate more complex ideas and concepts than could be managed alone. This potential for cognitive development is what Vygotsky describes as the zone of proximal development (ZPD). The ZPD refers to the difference between the child's current level of performance and the level of performance that the child could attain with expert guidance (Mayer, 2003). It bridges the gap between what is known and what can be known, and Vygotsky claimed that learning occurs in this zone.

Conceptual Framework

Based on the literature reviewed, the following conceptual framework is constructed. This framework depicts the levels involved in preparing the instructional model and testing its effectiveness by implementing it in the classroom, in order to foster the lower primary children's motivation and achievement in mathematics.(see figure 1 in next page)

Objectives

The objectives of this study are:

1) To develop an instructional model based on self-efficacy theory and theory of social cognitive development to foster primary students' learning motivation. The model has four stages in the development process: (i) analysis and synthesis of related theories, (ii) development of instructional principles, (iii) specifying expected learning outcome, and (iv) development of the instructional process and lesson plans.

2) To evaluate the effectiveness of the developed instructional model. In testing this objective, this study addressed the following research questions: (i) What is the effect of the instructional model on primary students' learning motivation in mathematics? (ii) Is there an improvement in student's mathematics achievement as a result of the treatment? (iii) Which component in the instructional model is effective for increasing primary students' learning motivation?

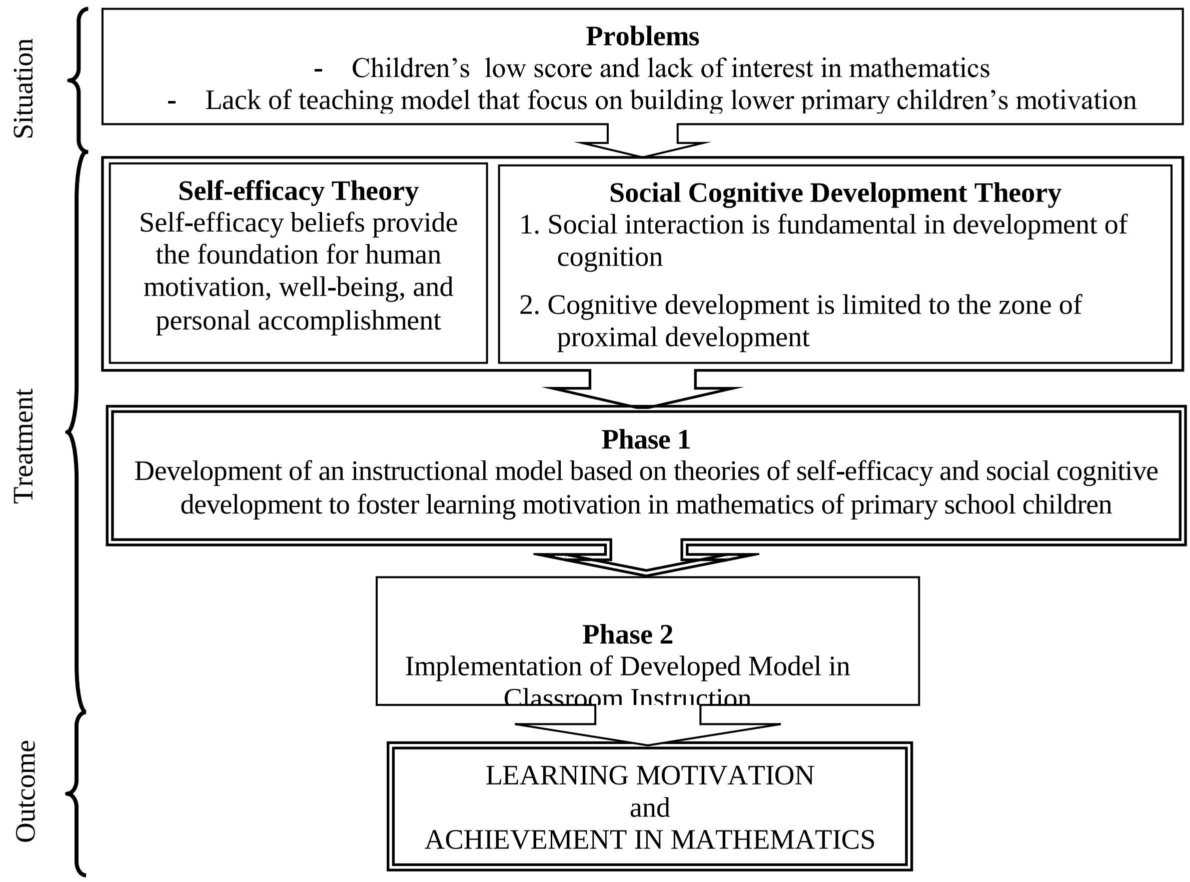

Figure 1: Conceptual Framework of the Research

Phase 1 of the research is summarized below:

Table 1: Summary of Phase 1

1). Synthesis of main principles of Self-Efficacy and Social Cognitive Development Theories

Self-Efficacy Theory

1. Teacher structures tasks in masterable steps to ensure that the students achieve a high level of initial success. Once this is achieved, tasks that are at appropriate challenging level can be assigned, to raise their feelings of competence upon successful completion of it.
2. Teacher models the requisite skills for successful completion of task, and provide students the opportunity to model teaching.
3. Teacher persuades students that they have the ability to acquire the skills and gives them explicit feedback on their progress.
4. Teacher creates a classroom atmosphere that is conducive for learning, where students feel safe and encouraged to perform.

Social Cognitive Development Theory

1. A positive teacher-student relationship makes learning a positive experience. Teacher models positive attitudes such as respect and hopeful determination. Teacher models by demonstrating to the children the skill to be learned. The children model the same skill while teacher facilitates their learning. More able children can be assigned to teach the less able.
2. Teacher assigns work that is at the appropriate challenging level for the child and assists only as and when is necessary.
3. Teacher uses a variety of teaching materials and presentation methods to engage students' interest. Teacher relates learning to students' real-life experiences so they find learning meaningful.

2). Development of Instructional Principles for Current Study

1. Promotion of good teacher-student relationship creates a positive learning ambience.

2. Collection of variety of teaching materials and provision of choice of tasks make learning appropriate and meaningful to students.
3. Modeling of tasks in masterable steps makes the tasks more easily achievable.
4. Arranging tasks that allows students to experience consistent success gives them a feeling of competence.
5. Providing challenging activities to students at appropriate level which they can accomplish with minimal guidance increases their sense of competence.
6. Evaluation based on individual progress makes learning non-threatening.
7. Encouragement and praise, and expression of faith in the student's ability increase their self-efficacy.

3). Specifying Instructional Objectives for Current Study

1. To develop students' positive attitudes towards learning mathematics.
2. To provide variety and choice of tasks to sustain students' engagement on task.
3. To demonstrate or model a worked example by breaking up task into smaller manageable steps.
4. To structure activities in ways that brings success to the students.
5. To challenge students with tasks that is at their appropriate level.
6. To provide the students with information about their progress based on individual results in math.
7. To enhance the student's confidence in learning mathematics.

4). Developing Instructional Procedures for Current Study

CORDIALITY: Teacher models warmth, respect, and caring attitude. Before lesson starts, teacher greets students by name as they enter the classroom.
COLLECTION: Teacher uses a variety of material/tool or opening presentation method to start the lesson.
CLARITY: Teacher demonstrates to students the steps and procedure involved in solving the mathematics task by doing worked examples.
COORDINATION: Teacher provides students with initial tasks that are certain to bring success to the students, including asking students to paraphrase the modeled steps/procedure and providing them practice in applying the procedure.
CHALLENGE: Provide options of tasks for children to choose – from course book, independent work card, or problem-posing – that gives them optimal challenge.
CONFIRMATION: Record students' results in individual file for evaluation of progress. The result should not be compared with other students' results.
COMMUNICATION: Communicate faith in the children's ability. Praise them for their effort. Challenge them to do their best.

5). Teaching Procedure

Teacher maintains a positive ambience where children feel encouraged, accepted and unafraid to try.

<u>*Classroom Activities*</u>:
Step 1: Interest Stimulation
- use material or opening presentation technique that links topic to real life

Step 2: Clear Coordination
- demonstrate by breaking task into manageable steps
- provide practice

Step 3: Individualized Challenge
- provide choices/options of tasks

<u>*Progress Check*</u>:
- assign grades based on selected tasks recorded individually

Teacher communicates faith in the students' ability and praises their effort and correct response.

Phase 2 of the research illuminates the result of the implementation of the instructional model to foster learning motivation and achievement in mathematics of the lower primary students. This phase sought to answer the research questions. The researcher hypothesized that by following the teaching procedure of the above model based on Bandura's self-efficacy theory and Vygotsky's social cognitive development theory, the teacher would be able to foster the lower primary students' motivation to learn mathematics, and improve their mathematics achievement.

Methods

Participants

Eleven Grade Two children aged between 7 and 8 years participated in this study after their parents were informed of the experiment. In selecting that class, a purposive sampling was done to select the lower primary class with subject characteristics most closely resembling that of the target population. The students' behavior in mathematics class was observed and their mathematics results from five previous tests were recorded to establish a baseline. An interview with individual students was made to gain an insight of the children's personal beliefs about their mathematics competence. A pretest to quantitatively measure the children's motivation to learn mathematics was individually administered to the participants.

Instrumentation

The children's mathematics achievement was measured by their scores in unit tests. Their motivation to learn mathematics was measured using Young Children's Academic Intrinsic Motivation Inventory (Gottfried, 1988) which had been modified by the researcher with permission from the publisher for use in this study. A reliability test was done on modified Y-CAIMI by administering it to 43 primary children who were not included in the experiment class. Internal consistency of the scale yielded a reliability coefficient of .907 on Cronbach's Alpha.

Procedure

The process of developing the instructional model came in four stages: 1) analysis and synthesis of theories related to motivation, 2) development of the instructional principles, 3) specifying the instructional objectives and expected outcome of instruction, and 4) development of the instructional process. This was then followed by the implementation of the instructional process in the mathematics classroom. Furthermore, two types of investigation were performed in order to obtain a comprehensive result. The first investigation involved a quantitative method to measure the changes in learning motivation and in achievement results. The second type involved a qualitative approach to observe the children during lessons and interview them at school.

In this study, a One-Sample Kolmogorov-Smirnov Test was first carried out to determine that the test distribution is normal, before parametric test was performed. Paired-samples t-test and the mean and standard deviation were performed on the motivation pretest and posttest scores. A time-series sequence chart was further derived from the observed unit test results to show the trend of the participants' mathematics achievement.

Findings

In order to determine the effectiveness of the developed instructional model on the participants' motivation to learn mathematics, the means on the participants' pre- and post-treatment motivation were compared and t-test performed. From the tables below, a *t* of 4.60 and p-value of .001showed that there was a statistically significant difference between the means of pre- and post-test, indicating that the participants' motivation to learn mathematics was significantly higher after the implementation of the treatment.

Table 1: Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 Posttest - Pretest	.42091	.30323	.09143	.21720	.62462	4.604	10	.001

Table 2. Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Posttest	2.8818	11	.12750	.03844
	Pretest	2.4609	11	.36198	.10914

Looking at the graph in Figure 2, in all the 16 items on the motivation instrument, there was an improvement in the participants' responses about their motivation towards mathematics learning, except for item #3 "I feel good inside when I learn something new in math" in which both the pretest and posttest yielded the same results. There was a substantial improvement in the children's response to item #10 "I like to do hard maths work" which scored the lowest at Pretest. Other items which showed marked improvement included responses to "I like to do as much work as I can in math" (item #4), "I think doing math is fun" (#8), and "I thinking working with numbers is fun" (#16).

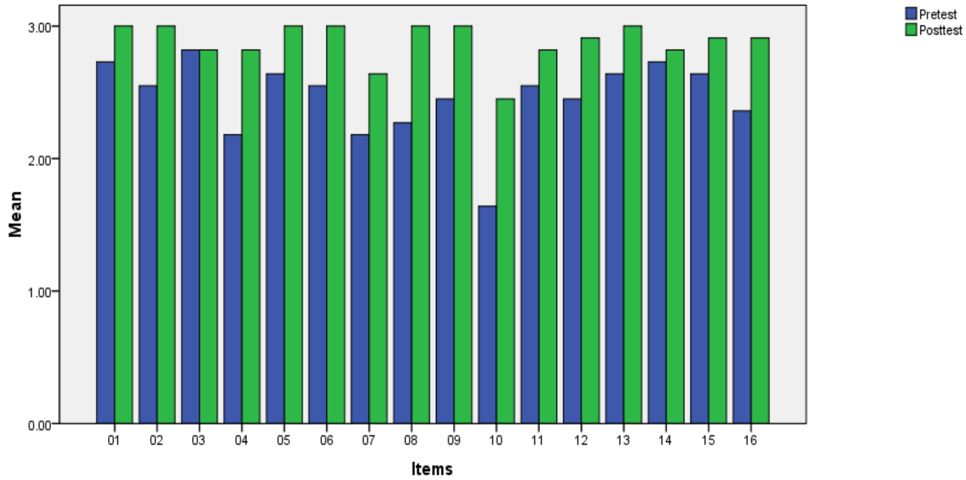

Figure 2: Motivation Instrument: Item Means of Pretest and Posttest

A score of 80 percent was set as the minimum criteria for the children to achieve. Results following treatment as seen in Figure 3, showed an increase in the mean score of each test (O6, O7, O8, O9) measuring above 80 percent. The slight drop in the last test (O9) on the topic 'Graph' was investigated. After analyzing that the children's prior knowledge in multiplication was a pre-requisite for 'Graph', and the participants' past test on 'Multiplication' (O5) was lowly scored, the drop in score from O8 to O9 was explained as being linked to the weak foundation in multiplication.

In determining which component of the instructional model was effective for fostering learning motivation, classroom observation and answers to structured interview were used to answer this research question. Results seemed to indicate that the effective components are Cordiality, Collection, Challenge, and Communication. The children liked the freedom to share their ideas in class. They also liked the teacher to use stories and other stimulating manipulative to teach them. Furthermore, they liked to be given the choices of tasks to do. Finally, they found it motivating to have an encouraging teacher who always expects them to do their best. As for Clear Coordination and Confirmation, there was a smaller difference in the change of the participants' pre- and post-treatment responses. Nevertheless, the

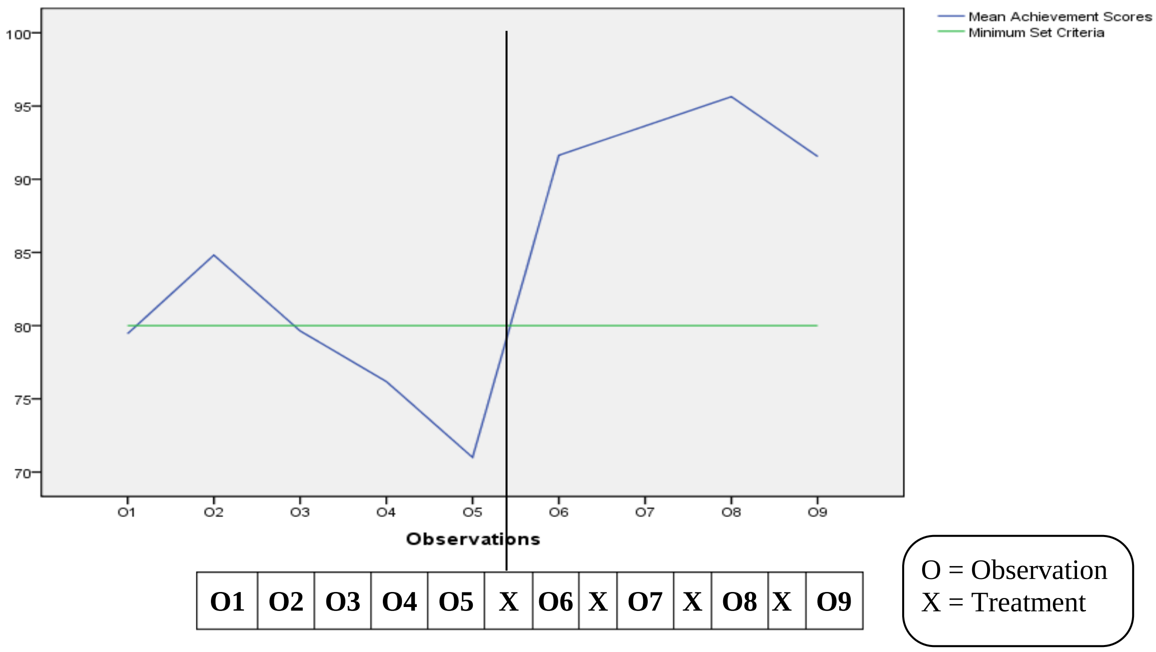

Figure 3: Mathematics Achievement Before and After Treatment

participants said they liked to be given the opportunity to teach others, and the method of recording the students' grades in individual folders seemed to foster the children's motivation, especially of the less talented students.

Discussion

The Developed Instructional Model and the Students' Motivation to Learn Mathematics

Results from this research study show that the lower primary children (N=11) who were participants in the experimental treatment portrayed higher motivation level after the treatment as measured by the modified Y-CAIMI instrument. The children's responses to the items on Y-CAIMI showed a positive change, and there was a statistically significant difference between the means of pretest and posttest scores at 99% confidence level. Observations of the children's learning behavior during mathematics class were done to provide stronger evidence about the change in the participants' motivation towards learning the subject. Furthermore, responses made to structured interview questions were used to reveal more insightful thoughts into the actual change in learning motivation. The following discussion will now relate learning motivation to each of the components in the instructional model.

1. Challenge and Learning Motivation

For the students to have control over their own learning, they need to be able to make personal decisions that will affect the outcome of their choices. As per interview report, the researcher's introduction of choices of tasks and challenging activities for the students has increased the number of children who liked mathematics. These findings are consistent with the results of several studies in which some autonomy, where the students had control over the work they did based on a modest amount of choices, was shown to be an essential ingredient of intrinsic motivation (Lewin, Lippitt, and White, 1939; Swann and Pittman, 1977; Wilson, 2011; Zuckerman, Porac, Lathin, Smith, and Deci, 1978).

2. Cordiality and Learning Motivation

Bruner (1966) emphasized that in the process of teaching, the teacher imparts attitudes toward a subject and toward learning itself. Teachers have universal codes of ethics that govern their practice. When a teacher shows a sense of trust, security, and support, the children will echo those feelings and behaviors. The Teachers' Council of Thailand (2010) stipulated that teachers "must have love, faith, honesty and responsibility for the profession and ….treat students with love, compassion, concern, help, and support. [They] must not act with antagonism regarding the physical, mental, psychological, emotional and social growth of students". Results from this study show that the number of children who felt fearful in maths class declined after the treatment was introduced. In his Self-Efficacy theory, Bandura (1997) specified that the physiological state of the child is one of the factors that influenced the child's learning. This is confirmed in the current study where it was found that once the participants' anxiety diminished, and they felt a positive relationship with the people in their environment, they were able to focus their attention more on making personal progress than being concerned about appearing smart or dumb.

3. Communication and Learning Motivation

From the start of the experiment, the researcher had clearly communicated to the children of her faith in their ability to do well in mathematics and that they were expected to do their best. Expressions like "I do my best!", "I love math", and "Math is fun" were posted on the classroom wall where everyone can see every day. The teacher's words had apparently shown power and influence to effectively improve the children's perception in their ability. As mentioned, the children were aware of the researcher's high expectation for them and have apparently retained it in their mind, as shown by their responses to the interview question "What advice would you give to the Year 1 students who are going to Year 2?" Many of them said they should practice, and several mentioned trying their best. "Practice" and "Try your best" were words that have been often used by the researcher to indicate the importance of effort. All these results verify that when children observe a behavior modeled repeatedly or they hear something said frequently, they retain this information and later produce similar kind of behavior. There was strong evidence from this study to indicate that children learn quickly by observation, and their perceptions of own ability can be changed by the persuasion of significant others.

4. Collection and Learning Motivation

What the researcher discovered from this study was that stories are effective in engaging and sustaining the children's attention during mathematics class, especially where the stories are easily linked to the children's life experiences. Such stories have the power to move the children out of the confines of their classroom walls and bring them to a world more familiar to them. It also helped the children to see the usefulness of mathematics in daily life and not view it as just a mandated subject. Bruner (1966) explained that while young children are notoriously wandering in their attention, they can be kept in a state of rapt and prolonged attentiveness by being told compelling stories. This premise certainly held true in the present study.

For children of 7 to 8 years old like the research participants, the use of manipulative in games and quizzes still proved effective in capturing their attention and interest. Bruner (1966) suggested that a learning environment in the mathematics classroom should encourage exploration using manipulative, present mathematical ideas in a concrete manner, and does not equate failure with punishment. The current study had provided such a learning environment for the children, and the result is apparent in the participants' higher motivation. However, there should be a variety of ideas or items prepared for each unit, such that each lesson would arouse the children's curiosity and challenge them to think. Overall, the participants seemed to enjoy the classes for the collection of ideas and items that the researcher had prepared.

5. Clear Coordination and Learning Motivation

In the Clarity and Coordination components that formed the Clear Coordination step of the teaching procedure, the evidence of a change to the children's learning motivation as a result of this step was based on the participants' interview responses. The growth in the children's confidence in doing math tasks, and their gaining mastery in the particular mathematics units learned seemed to support that Clarity and Coordination have been useful in helping achieve the expected outcome. Moreover, as research findings on teacher effectiveness reported the importance of clarity and coordination as having a strong, positive relationship to pupil learning (Cruickshank, 1990), the researcher proposed that the importance of Clarity and Coordination components of the developed model in this study should not be overlooked.

6. Confirmation and Learning Motivation

Although there was only weak indication from observations to verify that the method used in this study to grade the children and keep their scores had helped foster their learning motivation, the students' improvement in their test scores relative to their past achievement provided sufficient evidence that the Confirmation component has helped instill a less-threatening learning environment, especially for those who were usually anxious about announcement of their results or those who believed they were incapable of higher achievement in mathematics. The researcher suggests that if children can be rewarded in a fair and consistent way for performing better than their own past performance level, perhaps this might be able to raise their personal beliefs that success is attainable, and subsequently increase their motivation to learn.

The Developed Instructional Model and the Students' Achievement in Mathematics

1. Challenge and Mathematics Achievement

In the present study, the researcher's provision of choices of tasks and challenging activities such as quizzes had increased the number of children who liked mathematics. Although the students' higher mathematics achievement after the treatment cannot be directly attributed to the Challenge component, the children's initiative to seek assistance from teachers, peers or parents in doing their tasks, had apparently helped enable the children to attain higher achievement.

2. Communication and Mathematics Achievement

Results from this study suggested that verbal persuasions expressing teacher's high expectation for success for all students, as well as conveying faith in the students' capability and praising them for effort exerted, seemed to contribute to the children's higher achievement in mathematics. Furthermore, the researcher's explicit, compelling feedback to the less talented students that forcefully disputed their pre-existing disbelief in their capabilities had seemingly enhanced those students' beliefs in their mathematics competence and achievement in mathematics by the way.

3. Clear Coordination and Mathematics Achievement

Jere Brophy (1998) stated that "the simplest way to ensure that students expect success is to make sure that they achieve it consistently." This was attested in the present study where after consistently witnessing their own success in math tasks during the treatment period, 10 out of 11 children revealed their expectation to get more than 80% in their mathematics exam, as compared with only 3 out of 11 prior to the treatment. Two children specifically mentioned that they expected to get 100% in their exam, and both of them did obtain high scores. It can therefore be concluded that the Clarity and Coordination components have helped the children gain mastery and confidence in the mathematics unit learnt, and seemingly helped further enhance the children's achievement in mathematics.

4. Collection and Mathematics Achievement

The researcher's effort to apply mathematics to real situations through the many different math-related group activities had sparked enthusiasm in the children. They were noticed to display attentiveness during lesson and often show eagerness to participate in the activities. Although the children's higher achievement results cannot be directly attributed to the Collection component, there seemed sufficient evidence to indicate that by the children paying attention, they gained better understanding of the topic through the use of different teaching methods and materials, thereby enabling them to retain their learning. The result was then shown in their higher achievement.

5. Cordiality and Mathematics Achievement

The Cordiality component of the current instructional model was designed to play an important role in developing the children's positive attitude towards learning mathematics. Although there is no conclusive evidence that this component would necessarily lead to the children's higher achievement, the researcher is confident that with a positive attitude towards learning, the students will be able to achieve higher results. Various reviews of research have identified that teacher's cordiality is associated with teaching effectiveness (Cruickshank, 1990). Just as described in the developed instructional model the qualities teachers should have, research also indicate that effective teachers are warm, enthusiastic, stimulating, encouraging, trusting, are able to express feelings, and have good listening skills.

6. Confirmation and Mathematics Achievement

The method used to record the children's results in this study differed from the traditional mass marking and subsequent public announcement of the results for comparison. While the latter benefits the high performers, it has an adverse effect on the less talented students. Based on observations in this study, the Confirmation component of the developed model was found to bring a positive feeling to the children, whereby the less talented students were more willing to take up challenges, knowing that they would not be compared with their peers. Such an improvement in their learning attitude would undoubtedly bring about higher achievement, suggesting that Confirmation component did contribute to the children's improvement in their test results.

Conclusion

The instructional model developed in the present study appeared to work effectively in fostering lower primary children's motivation to learn mathematics, especially among the low-achievers. At least, the model developed for this research has proved to help foster in the children greater motivation, higher perception of ability, and improved achievement in mathematics.

References

Bandura, A. (1997). *Self-efficacy: The exercises of control*. New York: W. H. freeman.

Brophy, J. (1998). *Motivating Students to Learn*. McGraw Hill, Boston, MA. In Dornyei, 2001.

Bruner, J. (1966). *Toward a Theory of Instruction.* Harvard University Press.

Cruickshank, D. R. (1990). *Research that informs teachers and teacher educators*. Phi Delta Kappa, Indiana.

Gottfried, A.E. (1988). *Young Children's Academic Intrinsic Motivation Inventory*. Reproduced by special permission of the Publisher, Psychological Assessment Resources, Inc., Florida.

Kariuki, P. & Wilson, P. (2002). *The effects of motivation on at risk high school students in math performance*. Paper presented at the annual meeting of the mid-south educational research association, Chattanooga, TN, November 6-8.

Landsman, J., Moore, T., Simmons, R. (2008). Reluctant teachers, reluctant learners. *Educational Leadership*, 65 (6), 62-66.

Lewin, K., Lippitt, R., and White, R. (1939). Pattern of aggressive behavior in experimentally created "social climates". *Journal of Social Psychology*, 10, 271-299.

Mayer, R. (2003). *Learning and Instruction*. Pearson Education, New Jersey.

Muir, M. (2001). What gets in the way for underachievers? *Journal of the Maine Association for Middle Level Education*, Vol. 11, No.1.

Office of the National Education Commission (ONEC), 2000. *Learning Reform: A Learner-Centered Approach*.

Piaget, J. (1952). *The origins of intelligence in children*. New York: W.W. Norton.

Schunk, D. H. & Zimmerman, B. J. (1994). *Self-regulation of learning and performance: issues and educational applications*. Lawrence Erlbaum Associates, UK.

Stipek, D. (1993). *Motivation to learn: from theory to practice*. (2nd ed.) Allyn and Bacon, U.S.A.

Swann, W. and Pittman, T. (1977). Initiating play activity of children: The moderating influence of verbal cues on intrinsic motivation. *Child Development*, 48, 1128-1132.

The Teachers' Council of Thailand, www.ksp.or.th /khurusapha/en, retrieved on 29 Nov 2010.

Wilson, J.T. (2011). Students' Perspective on Intrinsic Motivation to Learn: A Model to Guide Educators. *A Journal of the International Christian Community for Teacher Education*, Vol.6, Issue 1.

Wlodkowski, R. & Jaynes, J. (1990). *Eager to learn: helping children become motivated and love learning*. San Francisco: Jossey-Bass.

Woolfolk, A. (1998). *Educational Psychology*. (7th Ed.) Allyn and Bacon.

Zimmerman, B., Bandura, A., & Martinez-Pons, M. (1992). Self-motivation for Academic Attainment: The Role of Self-efficacy Beliefs and Personal Goal Setting. *American Educational Research Journal*, 29, 663-676, in LeFrancois, G. (2000). *Psychology for teaching*. Wadsworth, p.423.

Zuckerman, M. , Porac, J., Lathin, D. Smith, R., and Deci, E. (1978). On the importance of self-determination for intrinsically motivated behavior. *Personality and Social Psychology Bulletin*, 4, 443-466.