

# The Development of Muay Thai Learning Management Plan According to Cognitive Behavior Modification Concept for Reducing Aggressive Behavior of Lower Secondary School Students

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## ABSTRACT

The objective of this study was to develop Muay Thai learning management plan according to cognitive behavior modification concept for reducing aggressive behavior of lower secondary school students. In this study, 60 lower secondary school students aged 13-15 were selected by stratified random sampling and were randomly divided into experimental and control groups. Each included 30 students. The research instruments consisted of (1) the interview form, (2) the assessment form on students' aggressive behavior, (3) observation and note-taking form, and (4) the Muay Thai learning management plan. The learning management plan was applied to the experimental group for 16 weeks, one session per week, and 50 minutes per each. Both groups were assessed before the experiment as a pre-test, during the 8-week trial, and lastly in the 16th week of the experiment. Findings were statistically analyzed with Two-way ANOVA repeated measures and One-way ANOVA repeated measures.

The research results were as follows:

1. The Muay Thai learning management plan consists of 16 learning management plans, five teaching steps: preparation and physical fitness development, explanation and demonstration, practice, implementation, and summary. The physical education learning management and practiced cognitive behavior techniques consisting of thought-stopping, mental arithmetic counting, self-taught, muscle relaxation, and positive reinforcement indicated that an index of item objective congruence was 0.90 (IOC=0.90).
2. The Muay Thai learning management plan according to cognitive behavior modification concept was effective in decreasing aggressive behavior of the experimental group students during the 8-week trial and the post-trial when comparing with the results of the pre-trial. The results were statistically significantly different at .05. However, in terms of the control group, they were not different

## Keywords

Muay Thai learning management plan, cognitive behavior modification, aggressive behavior, lower secondary school students

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## Introduction

In today's society, aggressive behavior in children and adolescents is becoming more and more violent day by day, leading to misuse, especially bullying behavior, harming others, destroying other people's property, being rude, brawling, burglary, and physical abuse. In some cases, it can even be fatal. In 2002, a report of World Health Organization revealed that violent and aggressive behavior among students was a major problem, bullying, also known as Bully. It was found that one-seventh of school children had bullied one another and had been bullied before as in [1]. In Thailand, the Department of Mental Health conducted a survey in 2016 among more than four million children and adolescents aged 13-17 years. The survey revealed that aggressive behavior represented 3.8% which was estimated that there were about 150,000 people nationwide. At the same time, Thailand had the second highest rate in the world accounting for 40% of the time, which was mostly abuse on social media. The main causes of aggressive behavior were parenting and family. These behavioral problems will affect families and society in the future, leading to a major cause of harming each other, a thug, or a criminal as in [2]. For the reasons above, it has been become aware of the necessity to reduce the aggressive behavior of junior high school students. Therefore, Thai society should focus on solving problems and preventing the aggressive behavior of children and youth, which is an

important resource of the nation to help them grow into potential adults and be a main powerful force for further national development.

Physical education is another academic learning by using physical education activities or sports as a medium of instruction. It focuses on students to use movement activities, games, sports, and exercise as a tool and medium to encourage children and youth to develop in all aspects of their own, leading to people who have physical, mental, emotional, social, intellectual, moral, ethical, attitudes, and desirable behaviors. The Ministry of Education has designated physical education as one of the learning subjects in the Basic Education Core Curriculum 2008, in the fifth learning area, Health and Physical Education, in the third learning standard consisting of movement, physical exercise, games, Thai and international sports. The quality of learners at the secondary school level is defined as being able to participate in physical, sports, recreational activities to enhance physical fitness for health by applying the principles of mechanical skills, favor for physical exercise, playing games and sports with regular practices according to their skills and interests. The quality of learners also includes self-discipline, observance of rights, rules and regulations, having sporting spirit, having true competitive spirit, working as a team in a systematic manner with commitment and sportsmanship until achieving the goals with appreciation of the aesthetics of sports as in [3].

Muay Thai, or Thai boxing, has been one of the most unique sports in Thailand for a long time until now. It has been applied as a means of teaching and learning exercise to encourage children and young people to practice for their physical, mental, emotional, moral, and ethical health, to protect themselves from any harm, to have desirable behavior, as well as to help preserve good art and culture to be able to carry on with Thai society. Muay Thai is one of the Thai sports that is charming and a form of Thai national martial arts. It has been regarded as valuable culture, tradition, and identity of the nation for a long time since Sukhothai period to the present. In the past, learning and practicing Muay Thai was used as a fighting method to defense from various dangers and to defense the government and people from neighboring tribes. Nowadays, the world has changed in different eras. Instead of being a method for protecting the country as in the past, Muay Thai has been brought to classes and trained for exercise, leading to promoting physical health, mental health, attitudes, beliefs, and values of Thai people passed down from their ancestors. It also represents the perfection and integrity of Thai culture since Muay Thai is a kind of sports and Thai games that has beautiful rules and traditions harmonized through the distillation of good aspects, and reflects Thai-ness with beautiful culture. Moreover, cultural and psychological elements are added to Muay Thai, as a boxer has to perform a traditional "paying respect to the teachers" ritual or Wai Khru ceremony, which is good culture and tradition, and be a blessing to the students from the past to the present. This represents virtue, prosperity, value, way of life, as well as good self-practice as in [4]. Muay Thai is a martial art and combat sport that is the combined use of fists, feet, knees, and elbows. Wai Khru, a ritualistic dance carried out before a fighter engages in the ring, and Ram Muay, a dance unique to each master instructor and taught to his student, are regarded as invaluable Thai national identity that should be preserved and promoted. According to the National Education Act and the Basic Education Core Curriculum 2008 in promoting Thai arts and culture, children and youth should be encouraged to learn about Thai boxing, resulting in the development of physical, mental, emotional, social, moral, ethical, desirable behaviors, and consciousness of being Thai citizen.

According to a study conducted by Thanomsingha and Sarayutpitak [5] on the development of activity model using Muay Thai arts to promote the quality of life of high school students, it was found that an activity model using Muay Thai arts resulted in a better quality of life of the students. In addition, with respect to a study on the development of an exercise program using Muay Thai arts to improve upon life skills regarding emotional coping of upper elementary students conducted by Sukdee [6], it was found that after participating in the exercise program, the experimental group improved life skills regarding emotional coping based on comparison of test results before and after the experiment, and between the experimental and the control groups with statistical significant difference at the 0.5 level. Moreover, Singthit and Thamsaowapak [7] studied effect of keata mouy thai exercising program to physical fitness of pratomsuksa the fifth and sixth grade students. It was found that the students' physical fitness was better after training, and the physical fitness between before and after training

had a statistically significant different at the 0.5 level. Muay Thai can be seen to be beneficial on various aspects, which should be encouraged to have Muay Thai learning and training for children and youth in Thailand today. However, there has not been any study on applying related concepts and theories to Muay Thai learning and training in order to achieve the learning goals.

Cognitive behavior modification is an important concept to help change unwanted behaviors of children and youth in order to reduce or stop the negative behaviors. By adjusting the cognitive behavior, this helps to modify the internal behavior in order to cause changes in the behaviors expressed externally in the positive way and suitable for various different situations. This is important to help adjust behaviors in children and young people in self-control in stressful situations, self-discipline, including how to deal with anxiety. These will encourage students to have better internal and external behaviors as mentioned by Iamsupasit [8] and Maneesri [8].

Several studies on applying cognitive behavior modification concept for reducing unwanted behaviors have been conducted in various fields. Chailert [9] studied the effects of cognitive behavior modification on achievement motivation of tennis players. The research results showed that (1) the cognitive behavior modification had an effect on the achievement motivation of tennis players. The experimental group athletes exhibited achievement motivation behavior at the end of the 12-week trial significantly different from the pre-trial period at the .05 level, but in the control group, no efficacy was found, and (2) at the end of the 12-week trial, the experimental and the control groups had as statistically significant difference at the .05 level. Besides, Chen et al [10] studied cognitive behavioral therapy to reduce overt aggression behavior in Chinese young male violent offenders. It was found that there were between-group differences in change of Modification Overt Aggressive Scale (MOAS) total score ( $p < .001$ ) and all sub-scores ( $P < .01$ ) except aggression against property. In addition, Lochman [11] studied effects of different treatment lengths in cognitive behavioral intervention with aggressive boys. This study revealed that length of treatment had a significant effect on the outcome of cognitive behavioral treatment of aggressive boys. In accordance with using a quasi-experimental design, a longer eighteen session intervention produced more significant changes in classroom behavior than did a twelve session intervention. Additionally, Smith et al [12] studied effects of cognitive-behavioral training on angry behavior and aggression of three elementary-aged students. The results indicated that the students were able to learn the strategy and that the intervention produced a decreased level of undesired behavior. Maintenance data demonstrated that all three students were able to maintain decreased levels of anger and aggression over time.

Based on the information of the problem and its significance mentioned above, this demonstrates the need for Muay Thai learning management, which is one of the Thai sports that should be conserved and applied in teaching and learning to help reduce negative behavior. In particular, the aggressive behavior of junior high school students is becoming increasingly common in today's society, which should be improved in order to encourage children and youth to be

physically, mentally and socially ready. This is important to help them succeed in living in the future. At the same time, the cognitive behavior modification concept has principles consistent with reducing undesired behavior of children and young people. Muay Thai learning management and the cognitive behavior modification concept can be applied together in the development of physical education learning management to be suitable in each class of teaching. Regarding the importance and background mentioned above, the researcher therefore has found that a Muay Thai sports learning management plan should be studied and developed according to the cognitive behavior modification concept in order that this group of children have a chance to learn the correct and appropriate physical education, including learning Muay Thai, a sport that is a unique and valuable sport of Thailand. In addition, for those related to junior high school students, they are able to adapt a Muay Thai learning management plan based on the cognitive behavior modification concept in teaching physical education for this group of children to learn and exercise at school. This will lead to the readiness of the body in every dimension for the children who will grow into adults and the main force for developing the country in the future. It also helps preserve the national culture and values to remain priceless in the future.

### Research Objectives

To develop the Muay Thai learning management plan according to cognitive behavior modification concept for reducing aggressive behavior of lower secondary school students.

#### Scope of the study

1. The study is based on the data drawn from schools providing physical education teaching at the secondary level under the Office of the Basic Education, Muang district, Udon Thani province.
2. The study is conducted to study two groups of related variables consisting of one independent variable, namely the Muay Thai learning management plan based on cognitive behavior modification concept, and one dependent variable which is aggressive behavior of lower secondary school students.

### Research Methodology

#### A. Population and sample

The population is lower secondary school students aged 13-15 studying at schools under the Office of the Basic Education, Muang district, Udon Thani province. The sample is a group of 60 lower secondary school students aged 13-15 studying at schools under the Office of the Basic Education, Muang district, Udon Thani province, selected by stratified random sampling and simple random sampling was used to select sample of 60 students, divided into experimental and control groups by random assignment. Each includes 30 students.

#### B. Instrument

1. The interview form on students' aggressive behavior for teachers and advisory teachers.
2. The assessment form on students' aggressive behavior towards other people
3. The aggressive behavior observation and note-taking form
4. The Muay Thai learning management plan according to cognitive behavior modification concept for reducing aggressive behavior of lower secondary school students consisting of 16 learning management plans has been developed by the researcher based on analysis and synthesis of the contents and theories in relation to physical education learning management, Muay Thai sports, cognitive behavior modification concept, aggressive behavior, and review of related literature. The plans comprises five teaching steps: preparation and physical fitness development, explanation and demonstration, practice, implementation, and summary. The learning management plans are applied to the experimental group for 16 weeks, one session per week, 50 minutes per each.
5. The Muay Thai learning management plan according to cognitive behavior modification concept for reducing aggressive behavior of lower secondary school students is calculated to obtain content validity with Index of Item Objective Congruence: IOC by relevant qualified experts. The consistency index is from 0.5-1.0. It has been found that the consistency is .90. In terms of the content validity of the interview form, behavior observation form, assessment form on students' aggressive behavior towards other people, the index of item objective congruence is 0.65 or higher for all items.
6. The assessment form on students' aggressive behavior towards other people is applied to students who are not the sample to find the quality of each question by testing the significance of the correlation coefficient at the .05 level.
7. In this study, Cronbach's Coefficient Alpha is used to calculate the consistency coefficient of the items in the assessment form on students' aggressive behavior towards other people at the acceptable 0.85 level.

#### C. Data collection

In order to obtain information, the researcher takes the following steps:

1. The researcher collects data from stakeholders and people related to the high school students by in-depth interviews and group interviews.
2. The researcher analyzed and synthesized of the contents and theories in relation to physical education learning management, Muay Thai sports, cognitive behavior modification concept, aggressive behavior, and review of related literature.
3. The Muay Thai learning management plan according to cognitive behavior modification concept for reducing aggressive behavior of lower secondary school students is applied to a 30-person experimental group for 16 weeks, one session per week, 50 minutes per each.
4. According to aggressive behavior assessment, both experimental and control groups are assessed before the

experiment as a pre-test, during the 8-week trial, and post-trial.

5. The data obtained from the experiment are analyzed, summarized, and discussed.

#### D. Data analysis

The process of data analysis in this study is as follows:

1. Descriptive statistic is used to analyze the data on the students' aggressive behavior assessment to find mean scores and standard deviation.

2. Shapiro-Wilk Test is used to compare the variables in the study including before, during and after the experiment.

2.1 Two-way ANOVA repeated measures are used to analyze the difference in mean scores on aggressive behavior of both experimental and control groups obtained from pre-trial, during the 8-week trial, and post-trial.

2.2 One-way ANOVA repeated measures are used to analyze the difference in mean scores on aggressive behavior of both experimental and control groups obtained from pre-trial during the 8-week trial, and post-trial. Each group is analyzed individually.

2.3 Bonferroni's method is used to analyze a pairwise comparison of the mean scores on aggressive behavior from pre-trial, during the 8-week trial, and after post-trial.

2.4 The statistical significance is determined at the .05 level.

### Research Results

The research findings are as follows:

1. In terms of development of the Muay Thai learning management plan according to cognitive behavior modification concept for reducing aggressive behavior of lower secondary school students, the researcher has studied and developed the 16 Muay Thai learning management plans based on analysis and synthesis of the contents and theories in relation to physical education learning management, Muay Thai sports, cognitive behavior modification concept, aggressive behavior, and review of related literature. The plans comprises five teaching steps: preparation and physical fitness development, explanation and demonstration, practice, implementation, and summary. The physical education learning management and practiced cognitive behavior techniques consists of thought-stopping, mental arithmetic counting, self-taught, muscle relaxation, and positive reinforcement. The 16 Muay Thai learning management plans are applied to the experimental group for 16 weeks, one session per week, 50 minutes per each. The learning management plans are calculated to obtain content validity with Index of Item Objective Congruence: IOC by relevant qualified experts. The consistency index is from 0.5-1.0. It has been found that the consistency is .90. In addition, the qualified experts' recommendations on the learning management plans are taken into account. Besides, the consistency coefficient of the Muay Thai learning management plans have been tried out with students who are not the sample, but close to the sample. It has been found that the consistency coefficient is 0.85, which indicates that the 16 Muay Thai learning management plans according to cognitive behavior modification concept is effective in reducing aggressive behavior of lower secondary school

students, and teachers can apply this learning management plans for teaching in physical education class.

2. According to efficiency of the Muay Thai learning management plan according to cognitive behavior modification concept for reducing aggressive behavior of lower secondary school students, the results are as follows:

**Table 1** The analysis of difference in mean scores on aggressive behavior of experimental and control groups before the trial, during the 8-week trial and after the trial

Group	Duration	n	Pre-trial		During the 8-week trial		Post-trial	
			$\bar{x}$	S.D.	$\bar{x}$	S.D.	$\bar{x}$	S.D.
Experimental group	30		106.67	1.82	77.70	1.90	45.57	1.72
Control group	30		97.20	2.58	96.83	2.61	96.50	2.46

According to Table 1, it was found that:

1) Before the experiment, a mean score of the experimental group was 106.67 and a standard deviation was 1.82. For the control group, a mean score was 97.20 and a standard deviation was 2.58.

2) During the 8-week trial, a mean score of the experimental group was 77.70 and a standard deviation was 1.90. For the control group, a mean score was 96.83 and a standard deviation was 2.61.

3) After the experiment, a mean score of the experimental group was 45.57 and a standard deviation was 1.72. For the control group, a mean score was 96.50 and a standard deviation was 2.46.

**Table 2** The results of Two-way ANOVA repeated measures in mean scores on aggressive behavior of experimental and control groups before the trial, during the 8-week trial and after the trial

Source of variance	df	SS	MS	F	p
Subjects between groups					
Groups	1	18727.20	18727.20	1780.48	.000
Error	58	610.04	10.52		
Subjects within groups					
Tests	2	28125.64	14062.82	6742.09	.000
Error	116	396.89	3.42		
Mauchly's W = .97, Chi-square(2,30) = 1.55, p = .46					

\*p < .05

According to Table 2, it was found that:

1. Regarding each test, a mean score on aggressive behavior between the experimental and control groups was statistically significant different at the .05 level.

2. There was statistically significant difference in mean scores on aggressive behavior within the experimental and control groups before the trial, during the 8-week trial and after the trial at the .05 level.

In addition, it was found that the experimental group variables and the number of times tested had an interaction effect with statistically significant difference at the .05 level. Therefore, they had to be analyzed individually by One-way ANOVA repeated measures.



**Table 3** The results of One-way ANOVA repeated measures of the experimental group before the trial, during the 8-week trial and after the trial

Source of variance	df	SS	MS	F	p
Tests	2	54974.68	27487.34	9528.75	.000
Error	58	167.31	58		
Mauchly's W = .886, Chi-square (2,30) = 3.396, $p = .183$					
The results of pairwise comparisons were analyzed using Bonferroni's method.					
Post-trial < pre-trial ( $p = .000$ , $d = -.60.50$ )					
Post-trial < during the 8-week trial ( $p = .000$ , $d = -.32.13$ )					
During the 8-week trial < pre-trial ( $p = .000$ , $d = -.28.37$ )					

\* $p < .05$ 

Regarding Table 3, in terms of the experimental group, the results showed that the post-trial mean score on aggressive behavior was statistically significantly lower than the pre-trial mean score at the .05 level. Besides, the post-trial mean score on aggressive behavior was statistically significantly lower than during the 8-week trial mean score at the .05 level. During the 8-week trial mean score on aggressive behavior was statistically significantly lower than pre-trial mean score at the .05 level.

**Table 4** The results of One-way ANOVA repeated measures of the control group before the trial, during the 8-week trial and after the trial

Source of variance	df	SS	MS	F	p
Tests	2	7.356	3.678	2.858	.000
Error	58	74.644	1.287		
Mauchly's W = .912, Chi-square (2,30) = 2.587, $p = .274$					
The results of pairwise comparisons were analyzed using the Bonferroni's method.					
Post-trial < pre-trial ( $p = .251$ , $d = -.700$ )					
Post-trial < during the 8-week trial ( $p = .582$ , $d = -.333$ )					
During the 8-week trial > pre-trial ( $p = .327$ , $d = -.367$ )					

\* $p < .05$ 

Table 4 indicated that according to the control group, there was no statistically significant difference in mean scores on aggressive behavior among pre-trial, during the 8-week trial and post-trial.

**Table 5** The analysis of difference in mean scores on aggressive behavior of experimental and control groups

Test	Groups	n	M	SD	t
Post-trial	Experimental group	30	45.47	1.72	-93.02
	Control group	30	96.50	2.46	

\* $p < .05$ 

Table 5 revealed that post-trial mean score on aggressive behavior of the experimental group was statistically significantly lower than the control group's at the .05 level.

## Discussion And Conclusion

According to the research results, the important results of the study can be summarized and discusses as follows:

1. The Muay Thai learning management plan according to cognitive behavior modification concept for reducing aggressive behavior of lower secondary school students

consisting of 16 learning management plans has been developed by applying theories and principles of physical education learning management, Muay Thai sports, cognitive behavior modification concept, aggressive behavior from books, textbooks, documents, and related studies. The plans comprises five teaching steps: preparation and physical fitness development, explanation and demonstration, practice, implementation, and summary. The physical education learning management and practiced cognitive behavior techniques consisting of thought-stopping, mental arithmetic counting, self-taught, muscle relaxation, and positive reinforcement are applied in the study for 16 weeks, one session per week, 50 minutes per each. It was found that the Muay Thai learning management plan according to cognitive behavior modification concept was developed to reduce aggressive behavior of lower secondary school students. In accordance with the use of the unique Thai boxing arts, an identity of Thailand, in physical education teaching, this encouraged students to develop physical, mental, emotional, social and intellectual areas, life skills, and reduced undesired behaviors.

The study results support the findings of a previous study conducted by Sukdee [13] who studied the development of an exercise program using Muay Thai arts to improve upon life skills regarding emotional coping of upper elementary students. It was found that after participating in the exercise program, the experimental group improved life skills regarding emotional coping based on comparison of test results before and after the experiment, and between the experimental and the control groups with statistical significance at the 0.5 level. The results of the present study also support a study on the development of exercise activities using Muay Thai arts to promote the quality of life of high school students by Thanomsingha and Sarayutpitak [14]. The results revealed that an exercise activity model using Muay Thai arts resulted in a better quality of life of the students. With respect to Wright [15] who studied using boxing in social group work with high-risk and offender youth to reduce violence. His article explored the concept of using boxing in social group work with juvenile offenders and high-risk youth as a means to decrease violence in their lives and their communities. It examined how learning the art of boxing could be woven into the group process to address violence. It presented ten attributes of boxing in a social group work setting that contributed to violence prevention. With regard to Azizi [16], effects of doing physical exercises on stress-coping strategies and the intensity of the stress experienced by university students in Zabol, Southeastern Iran was studied. The results showed that non-athlete students dealt with stress using more sentimental oriented coping strategies and yet they reported more intensity of stress. On the other hand, athlete students used higher levels of problem oriented coping strategies and reported less intensity of stress. Thus, it seemed that exercise had effect in selecting efficient and appropriate coping strategies and reduced the intensity of stress. Dealing with a study on effects of a health promotion program by using Thai folk games to reduce aggressive behaviors of elementary school students conducted by Yasiasat [17], it was found that 1) the mean score on aggressive behavior among experimental group students after applying a health promotion program was lower than

pre-trial with a statistically significance at the 0.5 level, and 2) the mean score on aggressive behavior among experimental group students after applying a health promotion program was significantly lower than that of the control group at the 0.5 level. The results indicated that a health promotion program using Thai folk games could reduce the aggressive behavior of primary school students.

2. The results of the evaluation on the efficacy of the Muay Thai learning management plan according to cognitive behavior modification concept revealed that the experimental group students' mean score on aggressive behavior, after being applied with the 16 Muay Thai learning management plans, was lower with a statistically significant difference at the .05 level for pre-trial, during the 8-week trial, and post-trial. When comparing with the control group, the experimental group's post-trial mean score on aggressive behavior was statistically significantly different at the .05 level. This indicated that the Muay Thai learning management plan according to cognitive behavior modification concept could reduce aggressive behavior of the lower secondary school students. This may be due to the fact that the students in the experimental group are oriented and trained based on cognitive behavior techniques consisting of thought-stopping, mental arithmetic counting, self-taught, muscle relaxation, and positive reinforcement, which is a mediator in connecting the thinking process. As a result, the students have better control over their own aggressive and unwanted behaviors, know their self-restraint in taking action and how to stop thinking if what is going to be right or not. They are able to deal with their anger when there is a bully or harassment, know how to teach oneself right or wrong, and how to reduce muscle relaxation from situations that provoke anger and more violent emotions. This is based on cognitive processes and behaviors which are related to each other. Also, in accordance with the theory of social intelligence stated by Bandura [18], learning takes place in social context, person, and environment. Additionally, a comparative investigation of the effects of cognitive-behavioral group practices and psychodrama on adolescent aggression conducted by Karatas et al [19] showed that cognitive-behavioral approach was effective in decreasing aggressive scores, except verbal aggression, and psychodrama approach was effective in decreasing all aggression scores, except verbal physical aggression. ANOVA analysis indicated that cognitive-behavioral approach was more effective in decreasing total aggression, physical aggression, and anger than psychodrama. The follow-up test results showed that the effects of group practices on both experimental groups lasted for up to 16 weeks. Chen et al [20] later studies cognitive behavioral therapy to reduce overt aggression behavior in Chinese young male violent offenders. It was found that there were significant between-group differences in change of modified overt aggression scale (MOAS) total score ( $P < .001$ ) and all sub-scores ( $P_s < .01$ ), except aggression against property. These findings suggest William Life Skills Training (WLST) has the potential to be an effective intervention to reduce overt aggressive behavior in young male violent offenders. Besides, Vorasaksene [21] studied the development of model for organization physical education activities based on the cognitive-behavior modification approach to decrease aggressive behavior of lower

secondary school students. The results revealed that 1) post-trial and follow-up mean scores of the experimental group students applied with the physical education activity models based on the cognitive behavior modification were less than the pre-trial mean scores, and 2) post-trial and follow-up mean scores of the experimental group students applied with the physical education activity models based on the cognitive behavior modification concept were less than the students not applied with the physical education activity models. Moreover, Pomprasit et al [22] studies the results of the use of physical education activities based on self-regulation approach to reduce aggressive behavior of lower secondary school students. It was found that a mean score on offensive behavior of the experimental group students after being applied with the physical education activities was significantly lower than the pre-trial at the 0.5 level.

In addition, the experimental group students were also instilled in the conceptual values and knowledge of Muay Thai in terms of compliance, gratitude, respect for teachers, self-respect, respect for others, duties and responsibilities, sportsmanship, good health, including physical, mental, emotional, moral, ethical, and desirable behaviors.

### Applications

1. The Muay Thai learning management plan according to cognitive behavior modification concept for reducing aggressive behavior of lower secondary school students can be applied by taking readiness of the personnel, location, and safety into account in order to prevent accidents that may occur during the course.
2. In terms of the management of Muay Thai learning and teaching according to cognitive behavior modification concept, the instructor has to monitor in the practice stage closely in order to check for the correctness of the practice.

### Suggestions for further studies

The development of Muay Thai learning management plan promoting other skills such as critical thinking, decision making, creative problem solving, and building good relationship with others could be studied since these are the skills necessary for sustaining life and leading to be successful in the future.

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