

Chapter 4

STUDENTS' PHYSICAL ACTIVITY LEVEL (PAL), AND STUDENTS' FORMATIVE CLASS EVALUATION (FCE) DURING AEROBIC AND NON-AEROBIC UNITS OF ELEMENTARY SCHOOL PHYSICAL EDUCATION (ES-PE) CLASSES

4.1. Purpose

The purposes of the second phase study were:

- (1) To describe students' physical activity level (PAL) measured by using direct observation and LifeCorder, students' learning behavior (LB), and students' formative class evaluation (FCE) score during 2 fitness units for 6th graders;
- (2) To compare the students' PAL, the students' LB, and the students' FCE in both units (aerobic and non aerobic); and
- (3) To check the relationship among students' PAL, students' LB, and students' FCE score inside the 2 fitness units.

4.2. Methods

4.2.1. Subjects

Two type-units of fitness lessons for 6th graders in T and K elementary schools in Ibaraki Prefecture (Japan) were videotaped using 12 second-observe record GTS (group time sampling) recording system. The fitness unit in T school was stressed on aerobic activities. In contrast, the unit in the K school was stressed on non-aerobic activities (speed, balance, and power).

4.2.2. Observation of students' MV-PAL

In this second phase study, McKenzie's five PAL categories (lying down, sitting, standing, walking, and very active) as shown in table 3-4 on page 25 in previous chapter that originally uses for coding only a student every interval, for getting more representative data, were used for categorizing all students' PAL by using GTS format. For counting number of students who engaged in each PAL categories, we decided each student's PAL based on the observed activity of each student at a moment of observation.

4.2.3. Measurement of students' physical activity level (PAL) using pedometer

During the 7 hour continual PE lessons, students' physical activity levels (PAL) were recorded using LifeCorder (pedometer). All students used pedometer so that they could check their own number of step during the PE class, but only 23 LifeCorder were used for measuring the PAL of randomly selected students. The LifeCorder data of students who continuously present in their PE classes were included in counting the average of PAL of the class. Before measuring the students' PAL and videotaping the students-teacher behavior, the time setting of each LifeCorder and the time setting on video camera were set so that the time of both type of machine were agreed. As a result, it was easier to trace teacher or students behaviors by using the recorded real time that recorded in form of (hh:mm:ss) PM or AM in every episodes and matched with their own LifeCorder data.

4.2.4. Measurement of students' formative class evaluation (FCE) score

The students' formative class evaluation method standardized by Takahashi et al., (1994) and Hasegawa et al., (1995) as shown on page 23 was employed as a means for understanding students' perception toward their own the physical education classes. This method consists of 9 items in 4 dimensions: outcomes, volition and interest, way of learning, and cooperation. All the students were given and completed the questionnaire immediately after their physical education class was end. Response options consisted of yes, neutral, and no. Three points are given to yes, 2 points to neutral, and 1 point to no. The individual point is the average points from the 9 items, and the class points is the average from participants' points. The detail about the questionnaire could be seen in table 3-2 on page 23 in previous chapter.

4.2.5. Reliability of data

In order to gain reliable data, trainings based on S-I method (Metzler, 1983) were repeated to ensure observer-reliability of the 2 observers reached more than 80%. Reliabilities of 90% or more were obtained in all the categories of all the observation methods.

4.3. Results

4.3.1. Comparison on purpose of aerobic and non-aerobic fitness units

Table 4-1: The unit plan of the aerobic unit

Aims	Aim 1: to identify basic movements and then to do the basic movements that fit with own target.				Aim 2: to construct movements based on basic movements that fit with own target.				
Lesson	1	2	3	4	5	6	7	8	
Min									
10	Orientation: <ul style="list-style-type: none"> Explaining unit. Exercise time, intensity of activity, and physical condition. How to use pedometer. Group formation. Learning Card. Explanation on stretching, reinforcement exercise, and relaxation: individual, with peer, group. 	A. To identify warm-up/ stretching, and own target (focused on individual).				A. To identify warm-up/ stretching, and own target (focused on peer relation).			
20		B. Enjoying movements: <ul style="list-style-type: none"> Identify movements in VTR Identify movements in movement sheet. Choose movements. 				B. To construct exercise movements: <ul style="list-style-type: none"> Construct basic routine. Construct exercise as main strategy of power-up. 		Survival Aerobic: <ul style="list-style-type: none"> Checking time, intensity of movement, number of steps, and energy expenditure before exercise. To endure the appropriate movements. Checking time, intensity of movement, number of steps, and energy expenditure after exercise. Power-up performance: <ul style="list-style-type: none"> To present training have been thought. 	
30		C. To do combination of movements and rhythm as long as possible: <ul style="list-style-type: none"> Checking time, intensity of movement, number of steps, and energy expenditure before exercise. Arrange the order of movements. Do movements appropriate with own condition. Checking time, intensity of movement, number of steps, and energy expenditure after exercise. 				C. To do as long as possible basic routine that constructed by team together with rhythm: <ul style="list-style-type: none"> Checking time, intensity of movement, number of steps, and energy expenditure before exercise. Arrange the order of movements. Try to think and put into practice what movements that appropriate with own goal. Checking time, intensity of movement, number of steps, and energy expenditure after exercise. 			
40		D. Strategy for power-up: To endure training on each of part that want to be powered-up.				D. Strategy for power-up: To endure training on each of part that want to be powered-up.			
45	E. Stretching and relaxation F. Learning conclusion and reflexion								
Evaluation plan	Concern, Desire, Attitude.	Able to have concern on own fitness and own movements. Have desire to try the pleasure of doing physical activity with rhythm.			Interested in own and peer of fitness and physical activity. Want to continue to enjoy rhythmic activities. <u>Could do exercise with peer cooperatively.</u>			Observation, individual card	
	Thought, and Decision	Able to aware toward the own physical condition. With peer, able to choose kind of exercise, and make sure they aware about safety of area.			Able to decide target that appropriate with fitness level and physical condition, and also aware about the situation of own and peer's physic and mental. Able to choose kind of exercise and then compose exercise with peer while aware about the safety of area.			Observation, individual card	
	Skill	Able to do stretching and reinforcement exercise. Able to do exercise and to feel rhythm continuously.			Able to do proper stretching and reinforcement exercise. Able to improve fitness by using combination with rhythm.			Observation, individual card	

The fitness unit plan as shown in table 4-1 indicated that the 8 lessons (1 in classroom and 7 in gym) in T school were designed to enable students to exercise continuously with musical rhythm (aerobic exercises). The first half of the lesson focused on stretching and relaxation exercises for increasing flexibility and manipulative ability. In the second half, aerobic exercises were introduced (to improve general endurance). Strength work such as power training was also incorporated. In contrast, the fitness unit in K elementary school, as planed in table 4-2 on page 42, was designed for students to be interested in various movements of their bodies (non-aerobic activities). The aim was to improve students' physical

fitness, to construct original movements and to check for PF improvement. This kind of learning process designated to enable students to enthusiastically cope with exercises for improving their physical fitness.

Table 4-2: The unit plan of non-aerobic unit

Aims		Aim 1: practicing many kind of movement skill to increase fitness			Aim 2: practicing selected movement skills that fit with own fitness for increasing fitness.			
Lesson	1	2	3	4	5	6	7	8
Min								
		Line up, greeting, and health observation						
10	To take intention on own body by checking the change of heart rate cause of sport and peer stretching	Explain about how to do each course and how to check the movements			Trying self creative movement skill under peer observation	Trying to do movement skill chosen by peer and report own feeling	To practice own choice movement skill	To check the improvement of fitness To think about improving fitness in daily life.
20		Course for mastering balance	Course for mastering speed	Course for mastering power				
30		To challenge time with peer						
40		Learning conclusion						

4.3.2. Comparison on pattern of teacher's activities

Table 4-3: Pattern of teacher's activity in the 2 fitness units

Aerobic Unit (in T School)		Non-Aerobic (in K School)	
●	Explaining to students the important of fitness for daily life and children's growth and how to assess it.	●	Explaining to students: What fitness is? How to assess it?, and How to improve it?
●	Asking individual student: (1) to assess his own fitness (power), to set his own power up target, and to create exercises for achieving the target. Exp: arm power-up by push-up; (2) to find out at least 3 favorite aerobic exercise movements (PA). Students may choose from samples on VIDEO TAPE or create by own idea; and (3) to practice his/her own favorite movements and adjust to the tempo of music*1	●	a. Introducing to students how to improve balance by doing: C-ball, Balance Board, and Stick Balance. b. Asking individual student to try the 3 activities and choose one from those for increasing his/her balance. c. Introducing to students how to improve speed by doing: Ladder, Gathering Ball, and Box Jump. d. Asking individual student to try the 3 activities and choose one from those for increasing his/her speed. e. Introducing to students how to improve power by doing: Push-up, Human Curling, and Crossing Vaulting Horse with hand steps. f. Asking individual student to try the 3 activities and choose one from those for increasing his/her power.
●	Across the unit, teacher provided students: a. About 12 minutes per lesson for practicing favorite movements with the tempo of music*1 and teaching his/her group or other groups how to do those movements. b. About 4 minutes per lesson for presenting a set of aerobic exercise with normal tempo of music*1 c. About 4 minutes per lesson for presenting a set of aerobic exercise with high tempo of music*2 d. About 4 minutes per lesson for presenting a set of aerobic exercise with normal tempo of music*1 e. About 4 minutes per lesson for free power-up exercise for achieving individual target.	●	During each lesson, students were given time: - around 7-10 minutes to practice balance exercise - around 7-10 minutes to practice speed exercise - around 7-10 minutes to practice power exercise
●	In the end of each presentation, students were asked to assess their own heart rate or number of steps.	●	Asking individual student to find tips for doing and improving fitness (balance, speed, and power), record it, and teach the tips to others for the next exercises.

Note: *1 = movement force factor as normal tempo of music; *2 = movement force factor as fast tempo of music

In table 4-3, we compare the list of teacher activities pattern during the 2 units. In the aerobic unit, there were 4 patterns of teacher's activities. Those were: (1) explaining the important of fitness activities, (2) asking students to access and to find favorite movements, (3) to

practice aerobic exercise, and to present the aerobic exercise in two different tempo of music, and (4) to evaluate their PAL after conducting aerobic exercise. In contrast, in the non-aerobic unit, the 4 patterns of teacher's activities were: (1) explaining about what fitness is and how to measure and improve, (2) introducing fitness activities, and asking students to try the fitness activities, (3) giving students' time for practicing fitness activities, and (4) finding tips for their next exercises. In addition, from the list of activities in the table, we found that in aerobic unit, teacher allocating more than half of PE time for aerobic practice and presentation. But, in non-aerobic unit, teacher allocated about half of PE time for practicing balance, speed, or power exercises. In addition, teacher in the aerobic unit (table 4-3, left side on page 42) used two kinds of musical rhythm to create tempo for students' movement. However, in the non-aerobic unit (table 4-3, right side on page 42), students moved according to their own movement speed. Therefore, the difference was on tempo of PA (free speed vs. designated speed), and learning material (aerobic exercise vs. power/speed/balance).

4.3.3. Comparison on proportion of learning context categories

As shown in appendix 4-1 on page 54, average proportion of motor learning (A2) episodes in the aerobic unit was significantly longer than those in the non-aerobic unit, (*Mean* = 62.41% vs. 50.26%; *t* = 3.536; *sig.* = .004). In reverse, average proportion of instruction (I) episodes in the non-aerobic unit was significantly longer than those in the aerobic unit, (*Mean* = 13.83% vs. 27.01%; *t* = -3.678; *sig.* = .003). In addition,

proportion of cognitive learning (A1) and management (M) episodes in both units were statistically similar, (*Mean A1 = 10.90% vs. 12.09%; t = -.586; sig. = .569*), and (*Mean M = 12.87% vs. 10.64%; t = 1.391; sig. = .190*). As could be seen in figure 4-1 and figure 4-2, the proportion of motor learning (A2) episode was not gradually increase. In addition, the proportion of instruction (I) episode was also not gradually decrease as one characteristic of a good PE unit.

Fig. 4-1: Proportion of lesson contexts in aerobic unit (N=8)

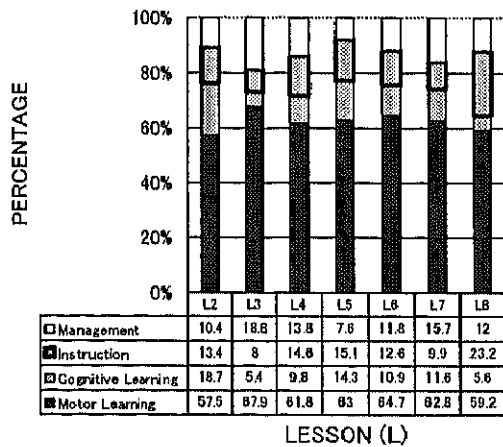
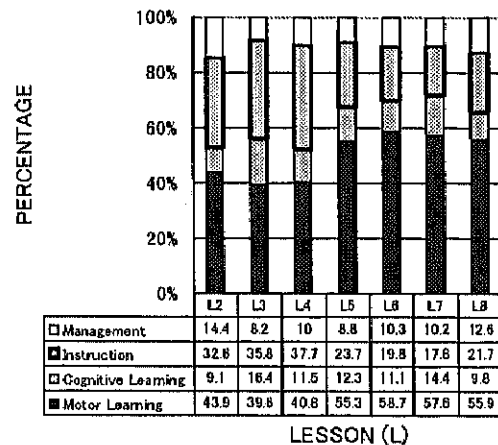


Fig. 4-2: Proportion of lesson contexts in non-aerobic unit (N=17)



4.3.4. Comparison on the average of students' MV-PAL engagement

As shown in appendix 4-1 on page 54, in general, the average of students' MV-PAL engagement in the aerobic unit was significantly higher than those in the non-aerobic unit, (*Mean = 54.17% vs. 31.06%; t = 5.699; sig. = .000*). In motor learning (A2) episodes level, the average of students' MV-PAL engagement in the aerobic unit was also significantly higher than the non-aerobic unit, (*Mean = 76.26% vs. 48.49%; t = 4.870; sig. = .000*). As could be seen in figure 4-3 on page 45, the proportion of

MV-PAL during aerobic unit was gradually increased, but the increasing tendency was not found in non-aerobic unit (figure 4-4).

Fig. 4-3: Proportion of students' MV-PAL engagement in aerobic unit (N=8)

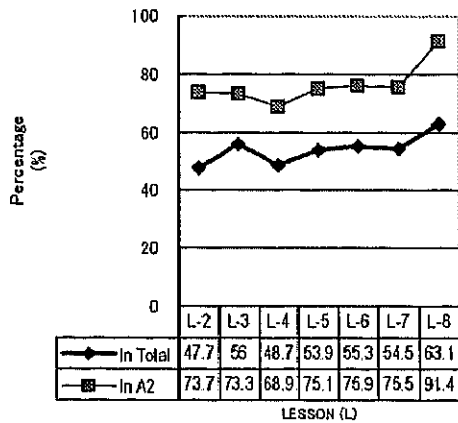
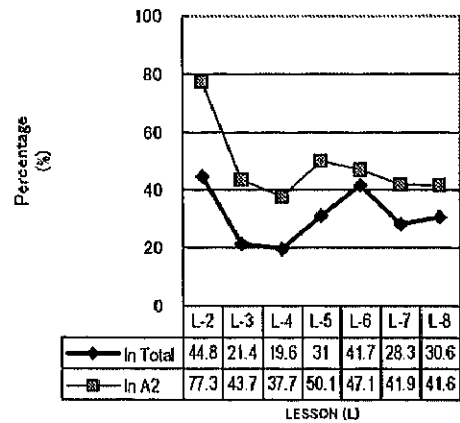


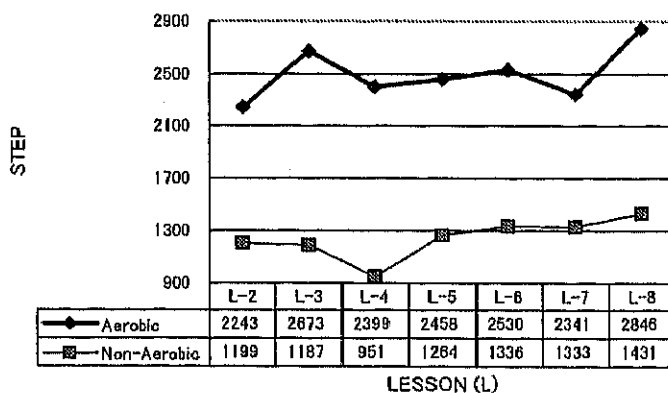
Fig. 4-4: Proportion of students' MV-PAL engagement in non-aerobic unit (N=17)



4.3.5. Comparison on number of students' steps

As clearly shown in appendix 4-1 on page 54, the aerobic unit (*Aerobic*) provided students significantly more number of step than the non-aerobic unit (*Non-Aerobic*) (*Mean = 2498.6 steps vs. 1243.0 steps; t = 12.919; sig. = .000*). As could be seen in figure 4-5, the number of students' step was tend to gradually increase in both units.

Fig. 4-5: Average number of student's step in aerobic (N=8) and non-aerobic (N=17) units



4.3.6. Comparison on average intensity of student's PA

As shown in appendix 4-1 on page 54, in the total episodes, average intensity of student's PA in the aerobic unit was significantly higher than those in the non-aerobic unit, (*Mean* = 2.47 vs. 1.17; *t* = 12.514; *sig.* = .000). This difference was supported by the different intensity of student's PA inside motor learning (A2) episodes in the two units, (*Mean* = 3.30 vs. 1.53; *t* = 11.430; *sig.* = .000). As could be seen in figure 4-6, the intensity of student's PA during the aerobic unit was gradually increase, but the increasing tendency was not found in the non-aerobic unit (figure 4-7).

Fig. 4-6: Average intensity of student's PA in aerobic unit (N=8)

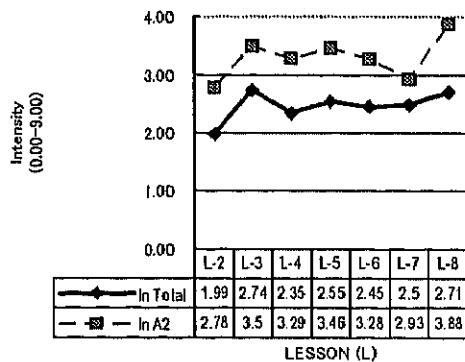
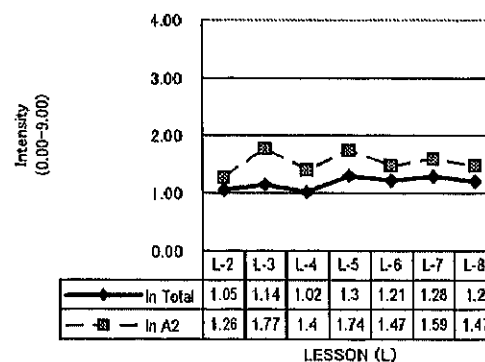


Fig.4-7: Average intensity of student's PA in non-aerobic unit (N=17)



4.3.7. Comparison on proportion of students' LB

As seen in appendix 4-1 on page 54, proportion of students' engagement in learning during motor learning (A2) episodes of the aerobic unit were significantly more than in the non-aerobic unit (*Mean* = 86.4% vs. 50.3%; *t* = 8.322; *sig.* = .000). As could be seen in figure 4-8 and figure 4-9 on page 47, in both units the proportion of learning engagement was not gradually increase.

Fig. 4-8: Proportion of learning and non-learning engagements during motor learning (A2) episodes in aerobic unit (N=8)

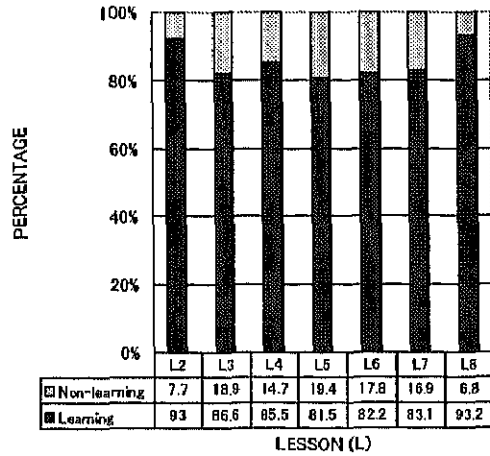
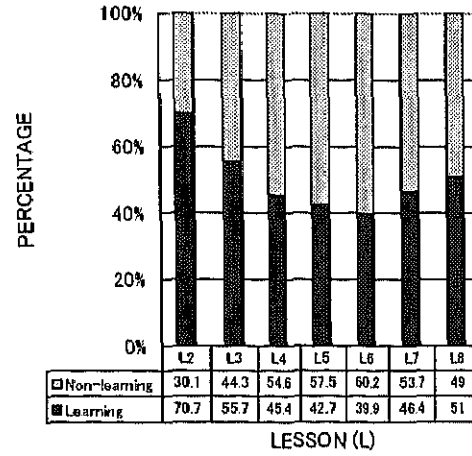


Fig. 4-9: Proportion of learning and non-learning engagements during motor learning (A2) episodes in non-aerobic unit (N=17)



4.3.8. Comparison on the average score of students' FCE

As shown in appendix 4-1 on page 54, in general, average total score of students' FCE in the non-aerobic unit was significantly higher than those in the aerobic unit, (*Mean* = 2.88 vs. 2.72; *t* = -3.920; *sig.* = .002). In dimension level, score "products" of both units were sharply different (*Mean* = 2.47 vs. 2.82; *t* = -6.030; *sig.* = .000). Average dimension scores of "interest" in the non-aerobic unit were also significantly higher than those in the aerobic unit, (*Mean* = 2.87 vs. 2.96; *t* = -2.551; *sig.* = .025). But, average dimension scores of "way of learning" and "cooperation" were statistically similar in both units, (*Mean* = 2.87 vs. 2.89; *t* = -.309; *sig.* = .763), and (*Mean* = 2.82 vs. 2.87; *t* = -.975; *sig.* = .349). As clearly seen in comparison between figure 4-10 and figure 4-11 on page 48, it was clear that score dimension product in aerobic unit was very low and still low until the end of the unit.

Fig.4-10: Average students' FCE scores in aerobic unit (N=8)

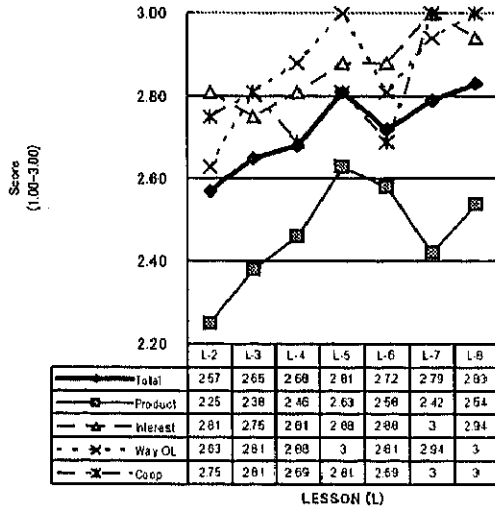
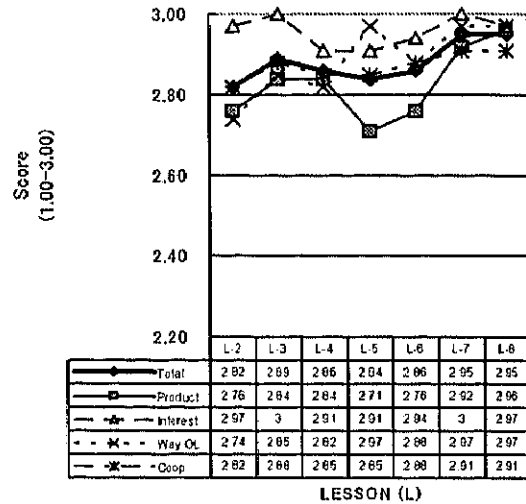


Fig. 4-11: Average students' FCE scores in non-aerobic unit (N=17)



4.3.9. Relationships among variable PAL, LB, and FCE

Based on Pearson correlation analysis among 3 variables (PAL, LB, and FCE) that was only conducted toward 7 data in each unit, the results were as follows: (1) as could be seen in appendix 4-2 on page 54, although it was not significant, the coefficient correlation between students' PAL measured using LifeCorder and total score of students' FCE in both units was positive and relatively high. In addition, as shown in appendix 4-3 on page 54, the relationship between students' PAL measured by using McKenzie's 5 PAL observation categories and students' FCE score was clear in the aerobic unit, but not clear in the non-aerobic unit; (2) the relationship between students' FCE and students' LB in both units, as shown in appendix 4-4 on page 54, was not clear; and (3) as shown in appendix 4-5 on page 54, the clear relationship between students' PAL and students' LB was only found inside motor learning (A2) episodes with the

PAL was measured by using the McKenzie's 5 PAL observation categories. Thus, we could summarize the relationship among students' PAL, LB and FCE as follows: (1) although it was not significant because of small number of data (only 7 score in each unit), the clear relationships were found in between students' PAL and students' FCE in both units, and also in between students' MV-PAL engagement during motor learning (A2) episodes and students' LB in both units; (2) the not clear relationship was found in between students' LB and students' FCE score in both units; and (3) in general, the relationships was more clearly found inside the aerobic unit than inside the non-aerobic unit.

4.4. Discussion

During the 2 fitness units, the range of average students' PAL was relatively wide. The highest average number of student's steps per lesson was 2846 steps in the 8th lesson of the aerobic unit and the lowest one was 951 steps in the 4th lesson of the non-aerobic unit. The highest number of steps was produced through aerobic survival presentation with normal and high tempo of music. The lowest number of steps was produced through power up exercises (human curling, push-up on vaulting horse [box], and hand walk across 2 boxes). As shown in appendix 4-1 on page 54, both units were significantly different in the average number of student's step (Mean= 2498.6 vs. 1243.0; $t = 12.919$; sig. = .000) as well as in student's MV-PAL engagement (Mean= 54.17% vs. 31.1%; $t = 5.699$; sig. = .000), and also significantly different in intensity of student's PA (Mean= 2.47 vs. 1.17; $t = 12.514$; sig. = .000). Thus, in term of students' PAL, students

in the aerobic unit were more active than those in the non-aerobic unit. Students in the aerobic unit were also more active than students in Kaga et al. (1997) study (Mean= 2498.6 steps vs. 1936 steps). In term of MV-PAL engagement, students in the aerobic unit were as active as students during fitness unit in McKenzie et al. (1991) study (Mean= 54.17% vs. 57.6%). The aerobic unit had two following merits dealing with providing students' MV-PAL engagement during PE class: (1) students did motor task together at the same time; and (2) the number of movement per minute was designated by musical tempo. Thus, in the beginning lessons of this unit, some students did exercise with late in tempo and mistake in action because of many new or difficult movements. But, in the end of unit, students managed to successfully follow the musical tempo, resulting in a high number of steps per minute. This study also indicated that both units provided students with different opportunities to be physically active during motor learning (A2) episodes. In general, the two units provided the different length of motor learning (A2) episodes, different chances to make trial at the same time (maximum involvement rate=MIR), and also different trial per minute for the individual (movement force factor=MFF).

The students' learning engagement (LB) in the aerobic unit was also significantly higher than those in the non-aerobic units (Mean= 86.4% vs. 50.3%; $t= 8.322$; sig. = .000). The average of the students' LB in the both units was higher than the average the students' LB in 60 PE classes (42.3%) in our previous study.

The students' FCE score was different in both units. Appendix 4-1 on page 54 indicated that students' FCE score in the non-aerobic unit was

significantly higher than those in the aerobic unit (Mean = 2.72 vs. 2.88; $t = -3.920$; sig. = .002). The difference was mainly because of the dimension scores of "product" in the aerobic unit (as shown in figure 4-10 on page 48) averagely always lower than the other dimensions until the end of the unit. This is may be students did not know exactly the product of their learning from each lesson and did not know how to evaluate or measure them exactly so that they did not aware about the progress of their learning product. As a result, they evaluate consistently significant lower score of dimension product of FCE that causing significantly lower average total score of FCE compared to the total score. In contrast, non-aerobic unit had many movement tasks to achieve the skills, so that students could have pleasure to challenge and also could fulfill their achievement targets.

In the former study on the relationships among students' PAL, students' LB, and students' FCE score, in general, it was recognized positive correlation among the three variables (PAL, LB, and FCE). Inside motor learning (A2) episodes, not clear relationship was found between PAL and FCE. In this study, more clear relationship was found especially in aerobic unit. But, in appendix 4-2 on page 54, correlation between PAL and dimension score "interest" was so low in aerobic unit. This may be an indication of the low interest of students in aerobic unit toward their level of PA. The high level of PAL during the aerobic unit may be disliked by many students (too high level for them) so that causing significantly their lower score of dimension interest in aerobic unit. McKenzie indicated that

upper elementary students more interested in moderate level of PA than the more strenuous ones.

Unclear relationship between variable LB and FCE was found in this study. It may be caused by: (1) fitness units in this study did not have characteristics as good unit evaluated by student. In good unit, the length of motor learning unit is getting longer and the teacher's instruction is getting shorter; and (2) during both fitness units, there were other than variable LB that more strongly affecting students' FCE score, such as the content or the quality of learning may be more important factors for affecting students' FCE score.

4.5. Conclusion and recommendation

After discussing the findings, it is concluded that: (1) the aerobic unit provided students with significantly higher PAL (averagely 2498.6 steps, 2.47 levels of intensity, and 54.17% of MV-PAL engagement) than the non-aerobic unit (averagely 1243.0 steps, 1.17 levels of intensity, and 31.1% of MV-PAL engagement); (2) the aerobic unit provided students with significantly more learning engagement (averagely 86.4%) than the non-aerobic unit (averagely 50.3%); but (3) students in the aerobic unit give FCE score to their PE classes significantly lower (averagely 2.72) than those in the non-aerobic unit (averagely 2.88); (4) there were clear relationships in between students' PAL and students' FCE and in between students' MV-PAL engagement and students' LB inside both units, but the relationship between students' LB and students' FCE score was not clear; (5) the relationships tendency among 3 variables inside the aerobic unit

was more clear than those in the non-aerobic unit; and (6) thus, related the results from previous study, it was reconfirm the close relationships in between variable PAL and both LB and FCE, but fail to confirm the close relationship in between variable LB and FCE.

For developing effective fitness unit as a part of fitness education for children, this study found consistently close relationship between variable LB and PAL, and consistently weak relationship between variable PAL and FCE. But, it was not clear yet whether all of students' MV-PAL engagement during motor learning (A2) episodes of their PE classes directly related to motor learning or not. In addition, to ensure students satisfaction toward the activities inside the PE classes, the limit of PAL and LB that appropriate for students need to be clarified in future research.

Appendix 4-1: T-test of lesson context, FCE, PAL, and LB between aerobics and non-aerobics units (N=14 classes)

Variable		Aerobic unit (7 classes)		Non-aerobic unit (7 classes)		t-test		
		Average	SD	Average	SD	t	Sig.	
Lesson context (%)	Motor learning (A2)	62.4	3.4	50.3	8.4	3.536	.004 *	
	Cognitive learning (A1)	10.9	4.7	12.1	2.6	-.586	.569	
	Instruction (I)	13.8	4.8	27.0	8.2	-3.678	.003 *	
	Management (M)	12.9	3.6	10.6	2.2	1.391	.190	
FCE	Total Score	2.72	0.09	2.88	0.05	-3.920	.002 *	
	Product	2.47	0.13	2.83	0.09	-6.030	.000 **	
	Interest	2.87	0.09	2.96	0.04	-2.551	.025 *	
	Way of Learning	2.87	0.13	2.89	0.09	-.309	.763	
	Cooperation	2.82	0.13	2.87	0.03	-.975	.349	
PAL	MV-PAL (%)	Total (inside A2, A1, I and M)	54.17	5.1	31.1	9.4	5.699	.000 **
		A2 (inside A2 episode only)	76.26	7.1	48.5	13.3	4.870	.000 **
	Steps	Total (inside A2, A1, I and M)	2498.6	205.7	1243.0	154.3	12.919	.000 **
		Intensity PA	Total (inside A2, A1, I and M)	2.47	0.25	1.17	0.11	12.514
		A2 (inside A2 episode only)	3.30	0.37	1.53	0.18	11.430	.000 **
LB (%)	Learning	A2 (inside A2 episode only)	86.4	4.9	50.3	10.4	8.322	.000 **
	Non-learning	A2 (inside A2 episode only)	14.6	5.2	49.9	10.2	-8.142	.000 **

Appendix 4-2: Pearson correlation between FCE and PAL

FCE	Aerobic unit (7 classes)			Non-aerobic unit (7 classes)		
	Number of steps	Intensity of physical activity		Number of steps	Intensity of physical activity	
		Total	In A2		Total	Total
Total	.458	.650	.558	.518	.413	.247
Product	.440	.550	.624	.375	.035	-.031
Interest	.039	.193	.009	.110	.103	.140
Way of Learning	.474	.717	.636	.630	.882**	.581
Cooperation	.367	.486	.257	.618	.562	.373

Appendix 4-3: Pearson correlation between FCE and MV-PAL

FCE	Aerobic unit (7 classes)		Non-aerobic unit (7 classes)	
	Proportion of MV-PAL engagement		Proportion of MV-PAL engagement	
	In Total	In A2	In Total	In A2
Total	.702	.593	-.387	-.618
Product	.503	.321	-.432	-.518
Interest	.450	.524	.000	.082
Way of Learning	.614	.449	-.245	-.602
Cooperation	.663	.683	-.304	-.696

Appendix 4-4: Pearson correlation between FCE and LB

FCE	Aerobic unit (7 classes)		Non-aerobic unit (7 classes)	
	Learning	Non-Learning	Learning	Non-Learning
	Total	-.321	.155	-.244
Product	-.541	.388	-.008	-.006
Interest	-.164	-.102	.462	-.471
Way of Learning	-.347	.236	-.660	.657
Cooperation	.228	-.248	-.454	.444

Appendix 4-5: Pearson correlation between PAL and LB

PAL		Aerobic unit (7 classes)		Non-aerobic unit (7 classes)	
		Learning	Non-Learning	Learning	Non-Learning
Number of steps:	In Total	.230	-.102	-.116	.117
Intensity of PA:	Total (A2+A1+I+M episodes)	-.241	.374	-.549	.552
	Motor Learning (A2)	.100	-.019	-.420	.414
MV-PAL:	Total (A2+A1+I+M episodes)	.126	-.091	.313	-.299
	Motor Learning (A2)	.491	-.548	.766*	-.754