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Critical Thinking Skills Based–Physical Activities Learning Model for Early Childhood

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Abstract

This research aimed to develop a physical activities learning model (MPAF) based on critical thinking skills (CTS) among children aged 5 to 6 years old and to evaluate its validity, practicality or commitment, and effectiveness in implementing the CTS based –MPAF among those children. The data were collected from 14 students of TK (Kindergarten) Negeri Pembina Surabaya through both qualitative and quantitative methods. The finding revealed that teachers played a vital role in learning process and could be confirmed by a successful achievement of valid, practical and effective critical thinking according to the determined standards. Conclusion: CTS based – MPAF can successfully work if the teachers precisely realize the learning principles in early childhood education and CTS based – syntax referred to available references.

Keywords: Critical thinking skills; Early childhood; Physical activities.

1. Introduction

Physical activity contributes to bodily development, social emotional, language, and child's cognition. Therefore, teacher needs to design an activity that can be done in daily activities in order to give opportunity to the child that actively involved in the game both inside and outside (Morisson, 2012). The new preface guidance from England (UK) recommends that preschoolers (3-5 years old) must participate in a physical activity at least for 180 minutes in any intensity (low, medium, and high) every day for maintaining healthy body weight, and for improving health of bone, heart, and lung (Robinson and Goodway, 2009). Meanwhile, the National Association for Physical Education in America recommends that a physical activity for preschoolers minimally should cover a 120-minutes physical activity every day consisting of 60 minutes in structural physical activities that can be done for playing freely (National Association for Sport and Physical Education, 2009). Denmark and other Scandinavian countries make children's physical activity wholly as a means for health promotion policy and children's participation in an organized sport club and is the main part of political agenda (Nielsen *et al.*, 2013).

The regulation of the Ministry of Education of Republic Indonesia, No. 22 Year 2006, which was replaced by the regulation of the Ministry of Education and Culture Number 64 Year 2013 describes that Physical Education is part of education wholly, which aims to develop all aspects encompassing physical fitness, motion skills, critical

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thinking skill, social skill, reasoning, emotional stability, moral action, and the pattern of healthy living which is planned by teacher systematically and comprehensively to achieve the purposes of the national education.

Based on the description above, it can be summarized that physical education with a physical activity is able to develop a critical thinking skill. Through a physical activity, it will assist a child in developing behavior, cognitive, and psychomotor. Additionally, in the 2013 national curriculum for early childhood education, in developing early childhood, there must be a balance between behavior, knowledge, and skill. However, there is something that needs to be paid attention that in developing a physical activity for early childhood must be adjusted on the stage of child's development. Tishman and Perkins (2013), denoted that critical thinking offers an easy way to form the relationship between physical education and other materials. Additionally, physical activities work effectively through involving reasoning, reflecting, and planning all of parts from critical thinking processes. Through an integrated learning, it is hoped that students will have a critical thinking ability to solve problems and make a decision through a physical activity, which is one of the representations of the result as a best learning. Improving a physical activity contributes significantly to motoric skills and cognitive development. Then, a healthy physical activity on the childhood cannot be neglected. Therefore, it is needed to investigate the relationship between a physical activity and health outcomes and cognition in the early childhood (Zeng *et al.*, 2017).

2. Literature Review

2.1. Critical Thinking

Critical thinking is a reasonable and reflective thinking that focus on what determination to believe or to do (Ennis, 2011). *—Critical thinking is the ongoing search for valid and reliable knowledge to guide beliefs, decisions, and actions"* (Galinsky, 2010). Therefore, critical thinking is higher order thinking between brain executive functions. Children learn by establishing their own knowledge through their experience. From their experience, children can develop their critical thinking starting from the result of observation then they do exploration and propose many kinds of questions. The questions which are proposed by children are the outcomes of their thinking (Forman and Kuschner, 1993).

2.2. Early Childhood Activity

Early childhood is an exact age where to put the basic life. This age is right to develop a physical activity as the basis in the next development especially for preschoolers (5-6 years old). Preschoolers use their body for learning processes. In this age, children will learn everything by themselves. This period is an important process of transition of movement development and motion skill which encompass body movement passing through the room by walking, running, jumping, rolling over, and climbing. This activity is used by the children to seek and get relation between themselves, room, and other objects in the room (Morisson, 2012). Physical activity is an essential part for the early stage of children and influences many aspects of children's health. The organization of health proposes that a higher level of physical activity of preschoolers related to the merit of short and long health which is important in physical domain, emotional, social, and cognitive issues in the entire life (Zeng *et al.*, 2017). Motoric skill development is a basic mechanism that supports the involvement in physical activity (Stodden *et al.*, 2012). Motion exploration is important for children in order to have a new experience through a motion activity (Hidayatullah, 2013).

The need of physical activity/motoric activity of preschoolers in an institution should be evaluated to change the environment of institution to support the importance of partially children's smooth and hard motoric development (Giagazoglou *et al.*, 2013). Physical activity for the early childhood is crucial because it is as an authorized capital in taking care of health and physical fitness that are needed throughout children's life. Physical activity is an important component for the whole life health and life quality. For some years ago, obesity has already increased quickly (Robinson and Wadsworth, 2010). Early childhood is born till five years that is an important period development and where the basic health behavior like physical activity (Birch and Fisher, 1998) is important. Sedentary behaviors like watching television is in a physical activity and sedentary behaviors of children result in biomedical health such as risk factor of body weight and bone health (Hinkley *et al.*, 2014).

Many efforts are done to overcome the problem of early childhood's physical activities. One of them is playing hip-hop for health (Lanigan, 2014). There are ninety six percent from a day care service reports that being active is important for the preschooler; however, the importance of physical activity between preschoolers like those who identified by day care services, a number of participants report that day care does not have rooms and enough infrastructure (Tucker *et al.*, 2011). This, of course, is not a problem of children who live in villages with their parents who free up their children to do physical activities such as playing. Physical activity has an important role in quality life that involves health, intellectual development in social life, and behavior. So, physical activity is developed from early childhood in order to be able to prepare quality human beings.

The level of physical activity in the preschool is very various, this shows that contextual condition and teacher's behaviors effect a lot in that level of activity (Chow *et al.*, 2015). To make it true, adult (teachers and parents) need to practice children to express their feeling verbally before, during, and after doing physical activities. Program that is developed should be able to give opportunities for children to involve in the game actively for both inside and outside. In two or three decades, physical activity has got improvements life quality for all ages (Riner and Sellhorst, 2012). Enough motion is needed especially for the children who show difficulties in particular motoric skills, so that parents must provide the recipe that can be done by the children when they are at home (Vidoni and Ignico, 2011). In addition, policy makers ought to focus their attention on standards in order to be able to give support for equal

experience for all children, early childhood teachers must have training and enough tools to give a significant experience for children (Bailey, 2002).

Basic motoric skill development has become one of the very important lessons that interests parents, educators, and specialists. Motoric skill is the basic skill development of sport (Sheikh *et al.*, 2011). Physical activity consists of body movement that is produced by skeleton by resulting substantial improvements in getting more energy when they sleep. Physical activity is crucial part of healthy life style. An active life style physically found as the factor to make sure for the merit daily health for all ages (Reunamo *et al.*, 2012). Physical activity is important for the whole development during childhood (Stork and Sanders, 2008). The development of early childhood is important to be held to help putting the basic behavior development, knowledge, skill, and creativity both in the family and playgroup (Sumantri, 2005).

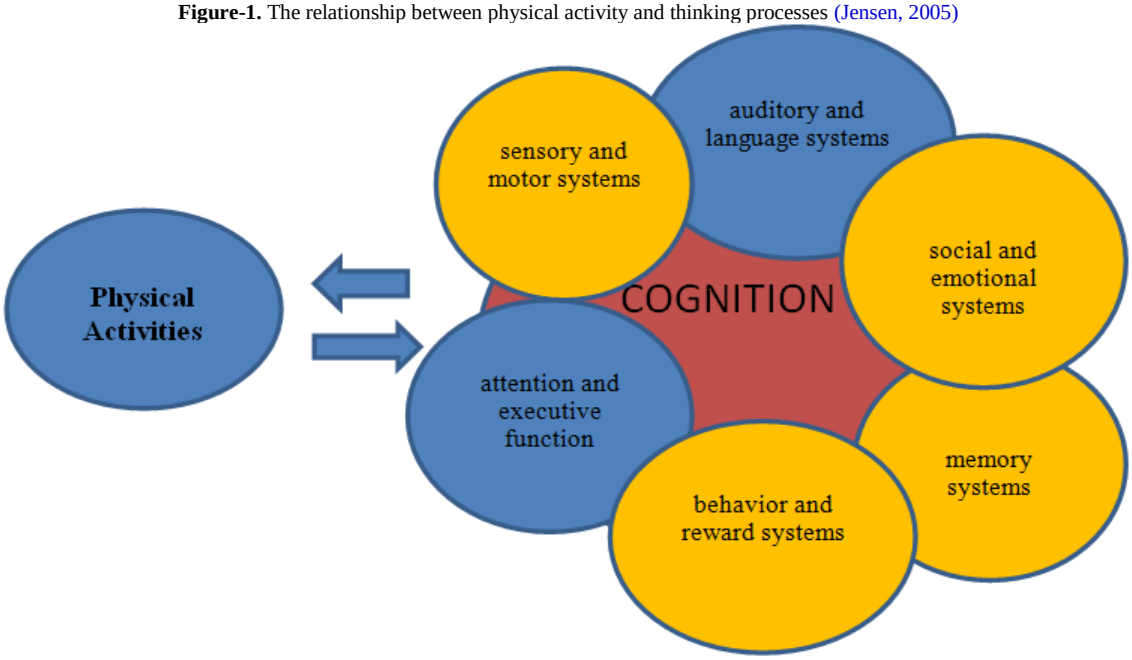
2.3. Physical Activity and Thinking Process

The brain increases from 70 percent of its adult weight to 90 percent between ages 2 and 6. At the same time, preschoolers improve in a wide variety of skills—physical coordination, perception, attention, memory, language, logical thinking, and imagination (Berk, 2008). There is a convergent proof in the level of molecular, cellular, behavior, and system that the participation of physical activity is useful for cognition (Hillman *et al.*, 2008). Physical activity has a positive effect on cognition followed by the structure and brain function (Donnelly *et al.*, 2016). Physical activity has a positive effect on cognitive function, which is partly caused by physiological changes in the body. For example, the improvement of the degree of neutropics factor which is decreased from the brain, it can facilitate learning and care the cognitive function by fixing synaptic plasticity and by functioning as neuroprotective agent, which causes the improvement of the neuroelectric activity and increases the brain circulation (Zeng *et al.*, 2017).

In doing physical activity, there is an input accepted by the brain and then there is a command to do action (Deborah *et al.*, 2009). There are three stages in motion learning through the stages of development such as cognition, fixation, and autonomy (Anson *et al.*, 2005). Adaptive and flexible modifications from motoric behaviors are rudimentary to various skilled actions that characterize human behaviors (Seidler, 2010). Motoric learning is a series of processes related to the practice or experience which direct to the change of permanent relative in the ability to skilled movement. Motoric activity, and especially training coordinative capacity, can become one of the factors, which gives a contribution to increase potency to cognitive development on the children (Galdi *et al.*, 2015). All cognition is built from lower-order brain systems, including (1) sensory and motor systems, (2) auditory and language systems, (3) attention and executive function, (4) social and emotional systems, (5) memory systems, and (6) behavior and reward systems (Jensen, 2005).

Physical activity which is done from early childhood will build the ability in thinking which is needed on the next age. Critical thinking is part of cognitive ability, which is built by parts of brain that has a relationship between brain system and other brain system. See Figure 1.

Figure-1. The relationship between physical activity and thinking processes (Jensen, 2005)



2.3. The Development of Physic Activity Oriented *Critical Thinking Skills* (CTS) to the Early Childhood

The structured physical and unstructured activities must be provided in indoor environment and comfortable outdoor and the emphasis must be on more happiness and participation than competition (Jones and Okely, 2011). Physical activity affects the spatial perception and attention on the early childhood (Zach *et al.*, 2015). Physical activity that is appropriate to the early childhood is playing activities by paying attention to the stages of playing

development. The stages of playing development have a relationship with physical activity, those are: exploration stage, mastery stage, and achievement stage (Gallahue, 1989). In playing time, the children always move, at the moment motion skills of the children develop through the other stages based on the children characteristics that are different from adult.

Playing is the activity which has a different format during the childhood and the adult (Ramazan *et al*., 2012). In exploring the relationship between critical thinking and physical education, it offers some special opportunities. The teaching of physical education and health can be done through the activity of playing by considering the structural things which can teach the children to improve their critical thinking (Bayu *et al*., 2013). The thing that should be done is firstly; students can follow physical activity especially in supporting contexts to learn critical thinking. Secondly, developing critical thinking in physical education contexts to increase our understanding about critical thinking itself is concerned on learning critical thinking side.

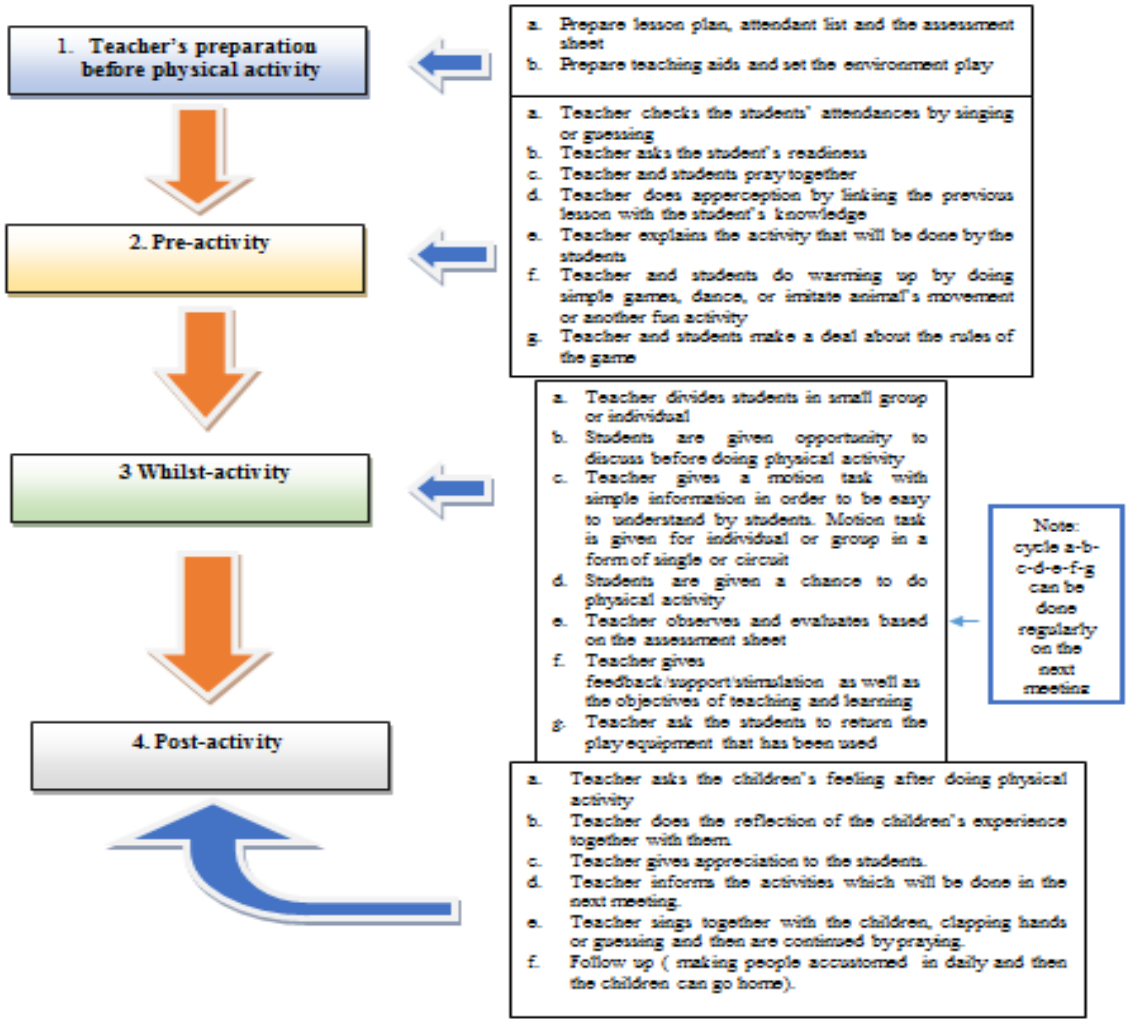
However, the relationship between physical education and critical thinking also cause some interesting theoretical problems and to show the new way in academic research. Thirdly, critical thinking offers the obstacle to physical education and the other subjects. Many settings of the education at this moment, teachers try to fulfill integrated curriculum to find out the new network and interests. For example, history and literature or mathematics, critical thinking offers an easy way to form a relationship between physical education and the other materials. Critical thinking cannot be separated from physical activity and is the highest order of cognition. This circumstance can be directed at the moment and effective physical working in long term must involve enough reasons which encompasses how the way of arranging the strategy and planning all aspects which have a relation with critical thinking.

Moreover, physical and intellectual activities are united that cannot be separated. During playing time, children always move and do the activity which involves their body directly. Developing thinking skill programs is a challenge and a good opportunity. Its obstacle lies on the reality that there are some comprehensive model programs that are always there and they are renewal to be adopted in thought constructing. Thinking, as the purpose of study and is part of good curriculum in the school. Expanding the thinking skill program is also as the opportunity because if it is done very well, the program which has been designed to teach in the school is beneficial to utilize students' thinking skills as the final result from learning processes. This opportunity is a very valuable challenge. This thing is very possible that education is the effort development program which is more significant, where school can be involved and to develop comprehensive thinking skill programs for their students practically (Ennis, 1988).

To make children ideal critical thinkers, the children need to be released to try ―doing correctly, to present a position honestly and clearly, and to aware with other people (Ennis, 2011). The school can develop thinking skills by considering the children's development stage. Therefore, a teacher needs to think the exact activities to assist the children's development. One of them is physical activity. In constructing CTS for the early childhood, there should be some strategies such as (1) speak up with the children about why something can take place and encourage them to be interesting with the knowledge and reasoning skills who come by the description, and the reason for the children in making conclusion, (2) encourage the children to offer the opinion about their preference and relative merit from the different objects, the events and the experiences, (3) make an opinion and propose questions which can encourage the children to make prediction logically about what will take place in the next, (4) encourage children to place themselves into the other thoughts with the questions like, ―What do you think about her or his thoughts? (5) utilize the opportunity every day to encourage children to solve problems, to assist the children to draw the problem and to utilize their knowledge and experience when they think about the alternative solution and decide the best choice.

To construct critical thinking skills, it needs to be integrated and related to the communication, both being tightly linked in the children's ability in understanding the information that they accept and the ability in expressive language, social, and physical activity. In order to get meaning experience, children from physical activity which they have done to be needed various strategies as already mentioned above. Critical thinking has a place indeed in the psychomotor area. Physical education and sports environment can provide supportive environments for individual to learn critical thinking (Walkuski, 1997). Moreover, a teacher has to provide a lesson plan systematically. Therefore, it needs to be arranged for learning syntax that can be drawn clearly about anything which is needed in physical activity processes by teachers and students during learning processes. Physical activity syntax model for increasing critical thinking skills and body fitness are shown on the Figure 2 below.

Figure-2. Physical Activity Sintaxs Model CTS Oriented



3. Method

This research used both qualitative and quantitative methods (Mukminin *et al.*, 2017; Syaiful *et al.*, 2018). Data were collected from 14 students aged between 5 and 6 years old of State *Pembina* Kindergarten Surabaya. Data collection was done through observation in the processes of teaching and learning by using an instrument consisting of 12 achievement indicators of critical thinking skills. Additionally, observation was done during the whilst activity for 20 minutes by using time technique sampling record by taking notes used tally which were divided into 1-5 minutes, 6-10 minutes, 11-15 minutes, and 16-20 minutes. Data were collected from 8 physical activities such as past the bridge beam, words match with sentences, rope jumping, survival of the island, circuit, patterned rope, playing parachute, reflecting the ball. To analyze the quantitative data, the researchers used the SPSS Program while for the observation data, after the data were categorized based on 8 physical activities. The analysis was done by following what Mıles and Huberman (1994) called "within case analysis" and "cross-case analysis" (Maimunah *et al.*, 2018; Mukminin *et al.*, 2017; Mukminin *et al.*, 2018; Syaiful *et al.*, 2018). The researchers analyzed all data of observations one by one (within case analysis) and then compared all the data (cross-case analysis).

4. Finding and Discussion

The achievement of goals in this research was affected by the teacher's understanding towards CTS which was proceeded from their comprehension about definition, purpose, kinds of physical activities, and the stages of constructing CTS for the early childhood. Teacher has an important role in planning, and doing physical activities based on the critical thinking skills (CTS). Teacher must also have a precise strategy to give stimulation in kinds of physical activities permanently without neglecting learning syntax which has been arranged in every step of kinds of physical activities. Moreover, supporting facilities and infrastructure and the environment should be packed attractively and done in a fun situation for playing. Another important thing is the readiness of the teacher and the children's mental.

Furthermore, mental situation has a great impact on learning processes to achieve indicators of CTS which have been set. In this research, researchers used the observation as the instrument which contains twelve CTS indicators. To achieve the goals which are hoped to give different ways in physical forms based on those indicators. According to the observation, there were two indicators needed additional time for teachers in giving stimulation to achieve the indicators. They were physical activities through observation by asking and doing scientific activities. This then could be done by making comparison (similarities and differences). The data collected were analyzed below:

Table-1. Achievement of critical thinking skills based on students' initial abilities

No.	Students' names	Achievement (%)	Category of achievement
1	Alona	63%	Moderate critical thinking skills
2	Ogie	63%	Moderate critical thinking skills
3	Jedi	63%	Moderate critical thinking skills
4	Kinanthi	63%	Moderate critical thinking skills
5	Azkiya	63%	Moderate critical thinking skills
6	Nayla	63%	Moderate critical thinking skills
7	Morgan	63%	Moderate critical thinking skills
8	Raja	63%	Moderate critical thinking skills
9	Cantika	58%	Moderate critical thinking skills
10	Rafa	58%	Moderate critical thinking skills
11	Bima	63%	Moderate critical thinking skills
12	Syifa	63%	Moderate critical thinking skills
13	Arka	63%	Moderate critical thinking skills
14	Kayla	63%	Moderate critical thinking skills

Based on the table above, it shows that 14 students had achievement more than 50% where all students were included in the category of moderate critical thinking skills. It can be said that all students have not achieved the category of higher critical thinking skills.

Table-2. Achievement of critical thinking skill based on indicators

No.	Indicator	Achievement (%)	Category of achievement
1	Carry out orders	100%	High critical thinking skills
2	Follow the rules	100%	High critical thinking skills
3	Do appropriate physical activity	100%	High critical thinking skills
4	Do correct physical activity	100%	High critical thinking skills
5	Find various ways	50%	Moderate critical thinking skills
6	Find new ways	50%	Moderate critical thinking skills
7	Do physical activity base on the steps that already stated by teacher	93%	High critical thinking skills
8	Do physical activity through observation by asking	0%	Very low critical thinking skills
9	Collect data through physical activity by doing exploration and counting	50%	Moderate critical thinking skills
10	Do scientific activity by making comparison (similarities and differences)	0%	Very low critical thinking skills
11	Do physical activity though its own way	50%	Moderate critical thinking skills
12	Give solution or problem solving (give idea in doing physical activity)	50%	Moderate critical thinking skills

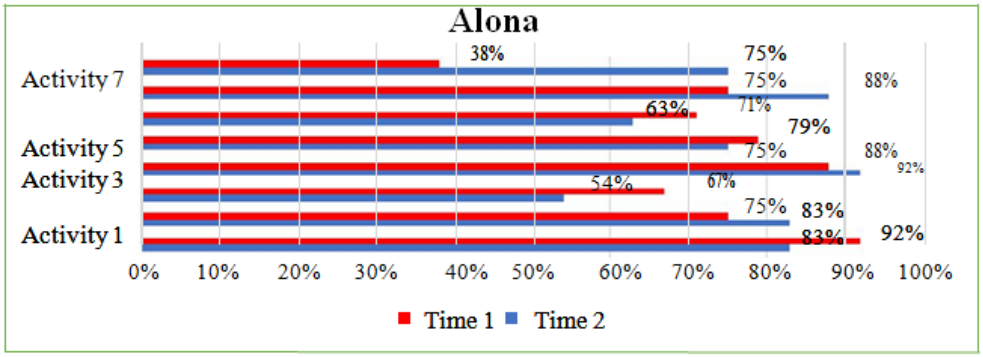
Based on the table above, it shows that of 12 indicators of achievement critical thinking skills, it can be seen that only 5 indicators are included in high critical thinking skills. The first indicator (carrying out orders) achieved 100% critical thinking skills. The second indicator (following the rules) achieved 100% critical thinking skills. The third indicator (doing appropriate physical activities) achieved 100% critical thinking skills. The fourth indicator (doing correct physical activities) achieved 100% critical thinking skills. The seventh indicator (doing activity based on the steps that has been stated by teachers) achieved 93% critical thinking skills. Furthermore, there were 5 indicators of moderate critical thinking skills. The fifth indicator (finding various ways) achieved 50% critical thinking skills. The sixth indicator (finding new ways) achieved 50% critical thinking skills. The ninth indicator (collecting data through

physical activities by doing exploration and counting) achieved 50% critical thinking skills. The eleventh indicator (doing physical activity through its own way) achieved 50% critical thinking skills. The twelfth indicator (giving solution and problem solving (give idea) achieved 50% critical thinking skills.

Moreover, two indicators were included in low critical thinking skills such as the eighth indicator (doing physical activities through observation by asking) achieved 0% critical thinking skills and the tenth indicator (doing scientific activities by making comparison (similarities and differences) achieved 0% critical thinking skills.

Table-3. The Result of The Data Based on The Children Per Activities: Alona

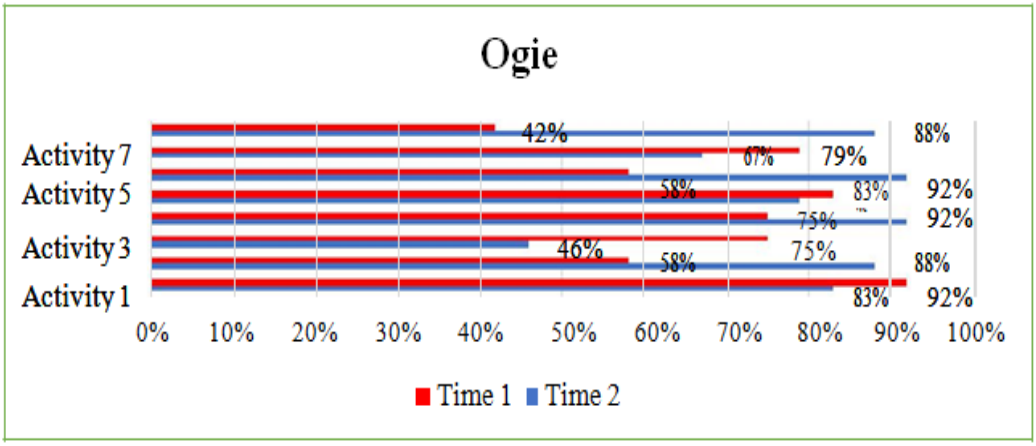
Kinds of activities	Period	Achievement (%)	Category of achievement
Activity 1	*1*	92%	High critical thinking skills
	2	83%	High critical thinking skills
Activity 2	*1*	75%	High critical thinking skills
	2	83%	High critical thinking skills
Activity 3	*1*	67%	Moderate critical thinking skills
	2	54%	Moderate critical thinking skills
Activity 4	*1*	88%	High critical thinking skills
	2	92%	High critical thinking skills
Activity 5	*1*	79%	High critical thinking skills
	2	75%	High critical thinking skills
Activity 6	*1*	71%	High critical thinking skills
	2	63%	Moderate critical thiking skills
Activity 7	*1*	75%	High critical thinking skills
	2	88%	High critical thinking skills
Activity 8	*1*	38%	Low critical thinking skills
	2	75%	High critical thinking skills



Based on the table and graphic above, it shows that the student, Alona achieved the highest critical thinking skill (92%) for the first activities (Catwalk) on the first time and the fourth activities (survival in the island) on the second time whereas, the degree of the lowest critical thinking skills was 38% which was categorized as the low critical thinking skills for the eighth Activities (reflecting the ball) on the first time.

Table-4. The Result of The Data Based on The Children Per Activities: Ogie

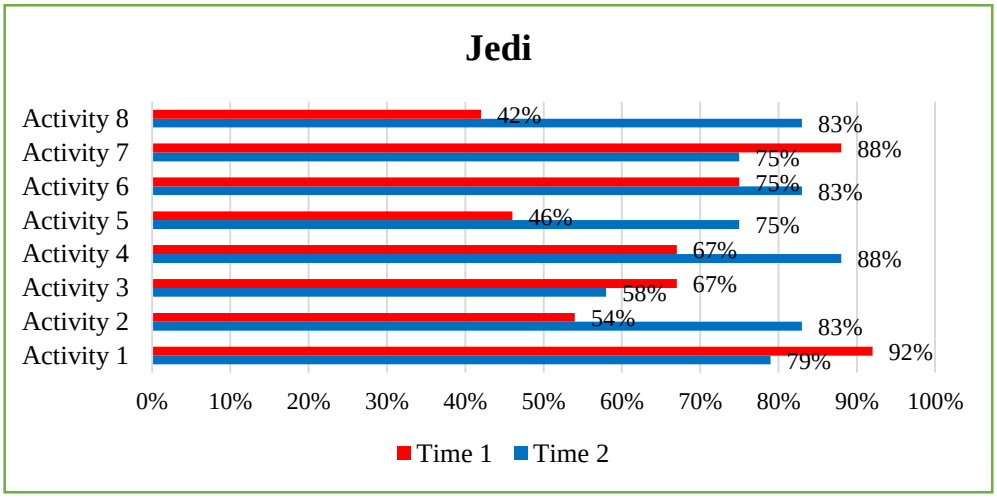
Kinds of activities	Period	Achievements (%)	Category of achievement
Activity 1	*1*	92%	High critical thinking skills
	2	83%	High critical thinking skills
Activity 2	*1*	58%	Moderate critical thinking skills
	2	88%	High critical thinking skills
Activity 3	*1*	75%	Moderate critical thinking skills
	2	46%	Moderate critical thinking skills
Activity 4	*1*	75%	High critical thinking skills
	2	92%	High critical thinking skills
Activity 5	*1*	83%	High critical thinking skills
	2	79%	High critical thinking skills
Activity 6	*1*	58%	Moderate critical thinking skills
	2	92%	High critical thinking skills
Activity 7	*1*	79%	High critical thinking skills
	2	67%	Moderate critical thinking skills
Activity 8	*1*	42%	Low critical thinking skills
	2	88%	High critical thinking skills



Based on the table and graphic above, it shows that the student, Ogie achieved the highest critical thinking skill that was 92% which was categorized as the high critical thinking skill. Those were on the first activities (Catwalk) on the first time and the fourth activities (survival in the island) on the second time and the sixth activities (patterned rope) on the second time. Whereas, the lowest critical thinking skills was 42% which was categorized as the low critical thinking skill, that was on the eighth activities (reflecting the ball) on the first time.

Table-5. The Result of The Data Based on The Children Per Activities: Jedi

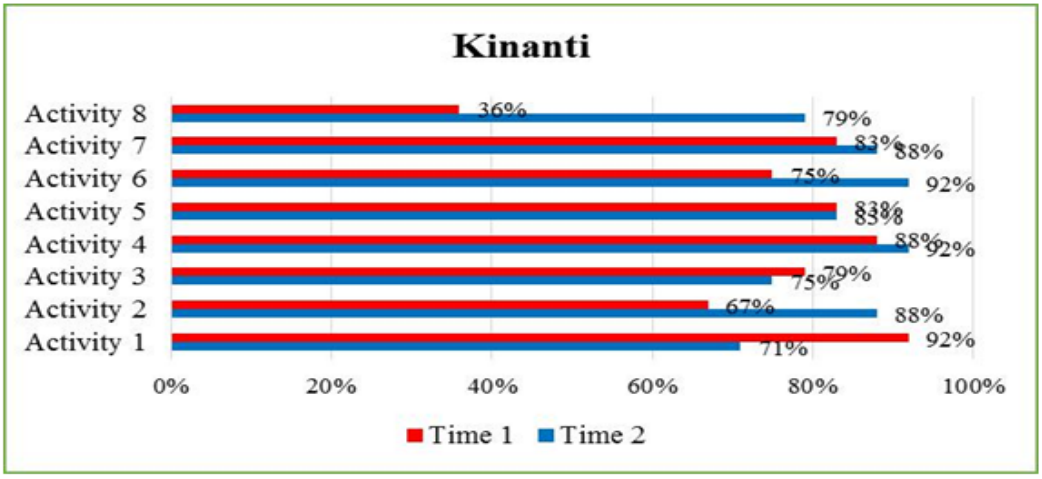
Kinds of activities	Period	Achievement (%)	Category of achievement
Activity 1	*1*	92%	High critical thinking skills
	2	79%	High critical thinking skills
Activity 2	*1*	54%	Moderate critical thinking skills
	2	83%	High critical thinking skills
Activity 3	*1*	67%	Moderate critical thinking skills
	2	58%	Moderate critical thinking skills
Activity 4	*1*	67%	Moderate critical thinking skills
	2	88%	High critical thinking skills
Activity 5	*1*	46%	Low critical thinking skills
	2	75%	High critical thinking skills
Activity 6	*1*	75%	Moderate critical thinking skills
	2	83%	High critical thinking skills
Activity 7	*1*	88%	High critical thinking skills
	2	75%	Moderate critical thinking skills
Activity 8	*1*	42%	Low critical thinking skills
	2	83%	High critical thinking skills



Based on the table and graphic above, it showed that the student, Jedi achieved the highest critical thinking skills. It was 92% which was categorized as the high critical thinking skill that was on the first activities (Catwalk) on the first time whereas; the degree of the lowest critical thinking skill was 42% for the eighth activities (reflecting the ball) on the first time.

Table-6. The Result of The Data Based on The Children Per Activities: Kinanti

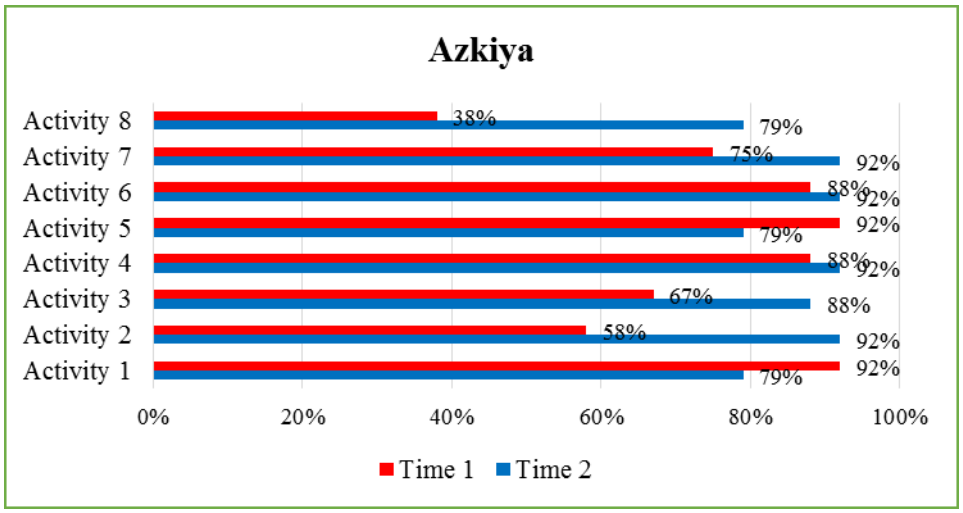
Kinds of acitivities	Period	Achievement (%)	Category of achievements
Activity 1	*1*	92%	High critical thinking skills
	2	71%	High critical thinking skills
Activity 2	*1*	67%	Moderate critical thinking skills
	2	88%	High critical thinking skills
Activity 3	*1*	79%	High critical thinking skills
	2	75%	High critical thinking skills
Activity 4	*1*	88%	High critical thinking skills
	2	92%	High critical thinking skills
Activity 5	*1*	83%	High critical thinking skills
	2	83%	High critical thinking skills
Activity 6	*1*	75%	High critical thinking skills
	2	92%	High critical thinking skills
Activity 7	*1*	83%	High critical thinking skills
	2	88%	High critical thinking skills
Activity 8	*1*	36%	Low critical thinking skills
	2	79%	High critical thinking skills



Based on the table and the graphic above show that the student on behalf of Kinanti achieves the highest critical thinking skills is as big as 92% can be categorized The High Critical Thinking Skills (KBKT) those are on the first Activities (Catwalk) on the first time and the fourth Activities (Survival In The Island) on the second time and the sixth Activities (Patterned Rope) on the second time. Whereas, the degree of the lowest critical thinking skills is as big as 36% can be categorized The Low Critical Thinking Skill (KBKR) that is on the eighth Activities (Reflect The Ball) on the first time.

Table-7. The Result of The Data Based on The Children Per Activities: Azkiya

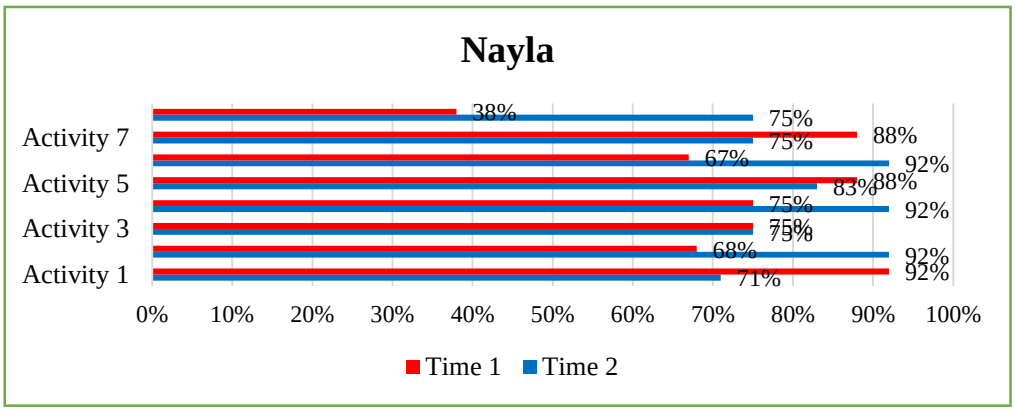
Kinds of activities	Period	Achievements (%)	Category of achievements
Activity 1	*1*	92%	High critical thinking skills
	2	79%	High critical thinking skills
Activity 2	*1*	58%	Moderate critical thinking skills
	2	92%	High critical thinking skills
Activity 3	*1*	67%	Moderate critical thinking skills
	2	88%	High critical thinking skills
Activity 4	*1*	88%	High critical thinking skills
	2	92%	High critical thinking skills
Activity 5	*1*	92%	High critical thinking skills
	2	79%	High critical thinking skills
Activity 6	*1*	88%	High critical thinking skills
	2	92%	High critical thinking skills
Activity 7	*1*	75%	High critical thinking skills
	2	92%	High critical thinking skills
Activity 8	*1*	38%	Low critical thinking skills
	2	79%	High critical thinking skills



Based on the table and graphic above, it shows that the student, Azkiya achieved the highest critical thinking skill (92%) for the first activity (Catwalk) on the first time and for the second activity (Rope Jumping) on the second time, for the fourth activity (survival in the island) on the second time, for the fifth activity (Circuit) on the first time, for the sixth activity (Patterned Rope) on the second time and for the seventh activity (Parachute) on the second time whereas, Azkiya achieved the low critical thinking skill (38%) for the eight activity (reflecting the ball) on the first time.

Table-8. The Result of The Data Based on The Children Per Activities: Nayla

Kinds of acitivities	Period	Achievements (%)	Category of achievements
Activity 1	*1*	92%	High critical thinking skills
	2	71%	High critical thinking skills
Activity 2	*1*	68%	Moderate critical thinking skills
	2	92%	High critical thinking skills
Activity 3	*1*	75%	High critical thinking skills
	2	75%	High critical thinking skills
Activity 4	*1*	75%	High critical thinking skills
	2	92%	High critical thinking skills
Activity 5	*1*	88%	High critical thinking skills
	2	83%	High critical thinking skills
Activity 6	*1*	67%	Moderate critical thinking skills
	2	92%	High critical thinking skills
Activity 7	*1*	88%	High critical thinking skills
	2	75%	High critical thinking skills
Activity 8	*1*	38%	Low critical thinking skills
	2	75%	High critical thinking skills



Based on the table and graphic above, the student, Nayla achieved the highest critical thinking skills (92%) for the first activity (Catwalk) on the first time, the second activity (Rope Jumping) on the second time, the fourth activity (survival in the island) on the second time, and for the sixth activity (Patterned Rope) on the second time whereas, the degree of the lowest critical thinking skills (38%) for the activity 8 (reflecting the ball) on the first time.

Table-9. The Result of The Data Based on The Children Per Activities: Cantika

Kinds of activities	Period	Achievements (%)	Category of achievements
Activity 1	*1*	92%	High critical thinking skills
	2	88%	High critical thinking skills
Activity 2	*1*	68%	Moderate critical thinking skills
	2	92%	High critical thinking skills
Activity 3	*1*	63%	Moderate critical thinking skills
	2	42%	Low critical thinking skills
Activity 4	*1*	79%	High critical thinking skills
	2	92%	High critical thinking skills
Activity 5	*1*	88%	High critical thinking skills
	2	88%	High critical thinking skills
Activity 6	*1*	67%	Moderate critical thinking skills
	2	75%	High critical thinking skills
Activity 7	*1*	83%	High critical thinking skills
	2	88%	High critical thinking skills
Activity 8	*1*	38%	Low critical thinking skills
	2	88%	High critical thinking skills

Based on the table and graphic above, the student, Cantika achieved the highest critical thinking skills (92%) for the first activity (Catwalk) at the first time, the second activity (Rope Jumping) at the second time and for the fourth activity (survival on the island) at the second time whereas, the degree of the lowest critical thinking skills was 38% for the eighth activity (reflecting the ball) on the first time.

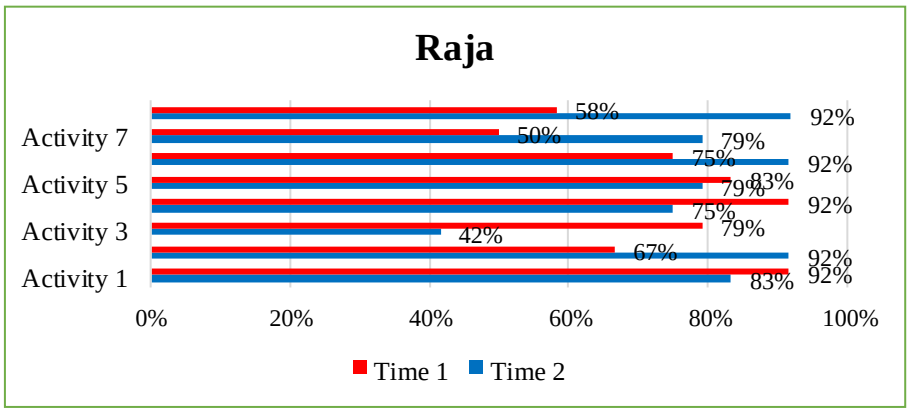
Table-10. The Result of The Data Based on The Children Per Activities: Morgan

Kinds of activities	Period	Achievements (%)	Category of achievements
Activity 1	*1*	92%	High critical thinking skills
	2	88%	High critical thinking skills
Activity 2	*1*	67%	Moderate critical thinking skills
	2	92%	High critical thinking skills
Activity 3	*1*	88%	High critical thinking skills
	2	67%	Moderate critical thinking skills
Activity 4	*1*	79%	High critical thinking skills
	2	92%	High critical thinking skills
Activity 5	*1*	92%	High critical thinking skills
	2	92%	High critical thinking skills
Activity 6	*1*	92%	High critical thinking skills
	2	92%	High critical thinking skills
Activity 7	*1*	83%	High critical thinking skills
	2	92%	High critical thinking skills
Activity 8	*1*	67%	Moderate critical thinking skills
	2	88%	High critical thinking skills

Based on the table and graphic, it could be known that the student, Morgan achieved the highest critical thinking (92%) for the first activity (Catwalk) at the first time, the second activity (Rope Jumping) at the second time, the fourth activity (Survival in the Island) at the second time, the fifth activity (Circuit) at the first time, the sixth activity (Patterned Rope) at the first time and second, and the seventh activity (Parachute) at the second time. Meanwhile, the degree of the lowest critical thinking skills was 67% which is categorized as moderate critical thinking skills for the second activity (Rope Jumping) at the first time, the third activity (matching word with the sentence) at the second time and the eighth activity (reflecting the ball) at the first time.

Table-11. The Result of The Data Based on The Children Per Activities: Raja

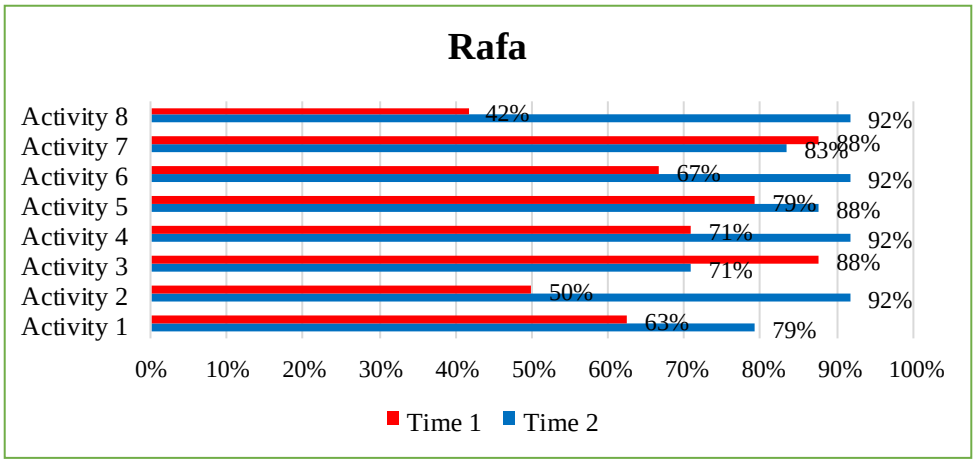
Kinds of activities	Period	Achievements (%)	Category of Achievements
Activity 1	*1*	92%	High critical thinking skills
	2	83%	High critical thinking skills
Activity 2	*1*	67%	Moderate critical thinking skills
	2	92%	High critical thinking skills
Activity 3	*1*	79%	High critical thinking skills
	2	42%	Low critical thinking skills
Activity 4	*1*	92%	High critical thinking skills
	2	75%	High critical thinking skills
Activity 5	*1*	83%	High critical thinking skills
	2	79%	High critical thinking skills
Activity 6	*1*	75%	High critical thinking skills
	2	92%	High critical thinking skills
Activity 7	*1*	50%	Moderate critical thinking skills
	2	79%	High critical thinking skills
Activity 8	*1*	58%	Moderate critical thinking skills
	2	92%	High critical thinking skills



According to the table and graphic above, the student, Raja got the highest critical thinking skills (92%) for the first activity (Catwalk) at the first time, the second activity (Rope Jumping) at the second time, the fourth activity (Survival in the Island) at the first time, the sixth activity (Patterned Rope) at the first time and the eighth activity (Reflecting the Ball) at the second time. Then, the degree of the lowest critical thinking skills was 42% which was categorized as the low critical thinking skills for the third activity (matching word with the sentence) at the second time.

Table-12. The Result of The Data Based on The Children Per Activities: Rafa

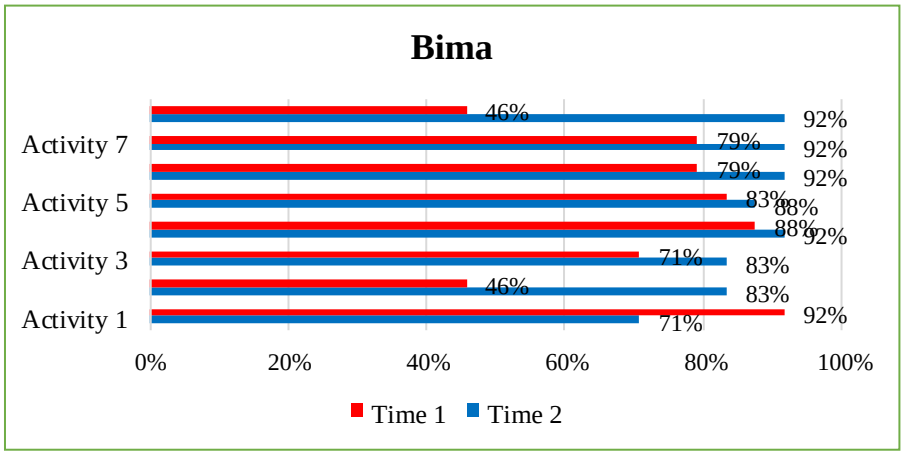
Kinds of activities	Period	Achievements (%)	Category of achievements
Activity 1	*1*	63%	Moderate critical thinking skills
	2	79%	High critical thinking skills
Activity 2	*1*	50%	Moderate critical thinking skills
	2	92%	High critical thinking skills
Activity 3	*1*	88%	High critical thinking skills
	2	71%	High critical thinking skills
Activity 4	*1*	71%	High critical thinking skills
	2	92%	High critical thinking skills
Activity 5	*1*	79%	High critical thinking skills
	2	88%	High critical thinking skills
Activity 6	*1*	67%	Moderate critical thinking skills
	2	92%	High critical thinking skills
Activity 7	*1*	88%	High critical thinking skills
	2	83%	High critical thinking skills
Activity 8	*1*	42%	Low critical thinking skills
	2	92%	High critical thinking skills



It can be shown on the table and graphic above, the student, Rafa had the highest critical thinking skills (92%) for the second activity (Rope Jumping) at the second time, the fourth activity (Survival in the Island) at the second time, the sixth activity (Patterned Rope) at the second time and the eighth (Reflecting the Ball) at the second time. Then, the degree of the lowest critical thinking skills was 42% which is categorized as the low critical thinking skills for the eighth activity (Reflecting the Ball) at the first time.

Table-13. The Result of The Data Based on The Children Per Activities: Bima

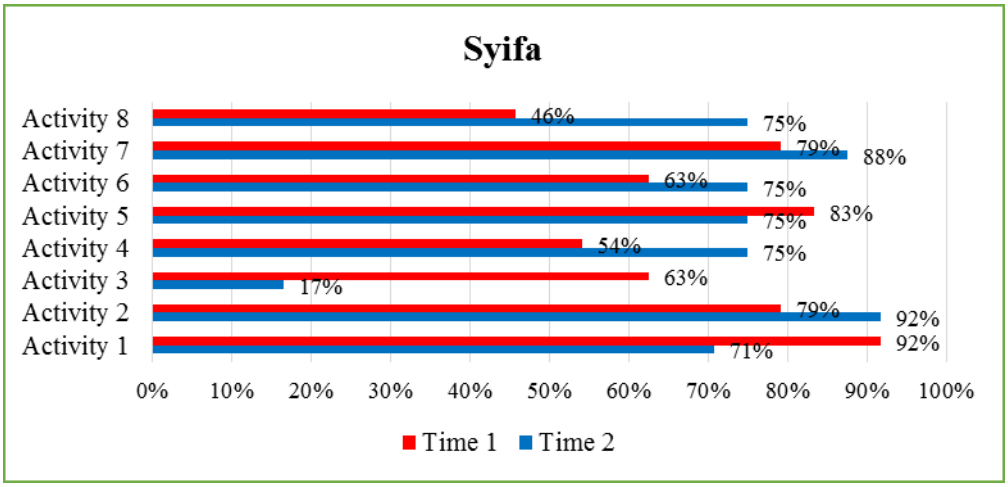
Kinds of activities	Period	Achievements (%)	Category of achievements
Activity 1	*1*	92%	High critical thinking skills
	2	71%	High critical thinking skills
Activity 2	*1*	46%	Low critical thinking skills
	2	83%	High critical thinking skills
Activity 3	*1*	71%	High critical thinking skills
	2	83%	High critical thinking skills
Activity 4	*1*	88%	High critical thinking skills
	2	92%	High critical thinking skills
Activity 5	*1*	83%	High critical thinking skills
	2	88%	High critical thinking skills
Activity 6	*1*	79%	High critical thinking skills
	2	92%	High critical thinking skills
Activity 7	*1*	79%	High critical thinking skills
	2	92%	High critical thinking skills
Activity 8	*1*	46%	Low critical thinking skills
	2	92%	High critical thinking skills



Based on the table and graphic above, the student, Bima achieved the highest critical thinking skills (92%) for the first activity (Catwalk) at the first time, the fourth activity (Survival in the Island) at the second time, the seventh (Parachute) at the second time and the eighth (Reflecting the Ball). Whereas, the degree of the lowest critical thinking skills was 46% which is categorized as the low critical thinking skills for the second activity (Rope Jumping) at the first time and the eighth activity (Reflecting the Ball) at the second time.

Table-14. The Result of The Data Based on The Children Per Activities: Syifa

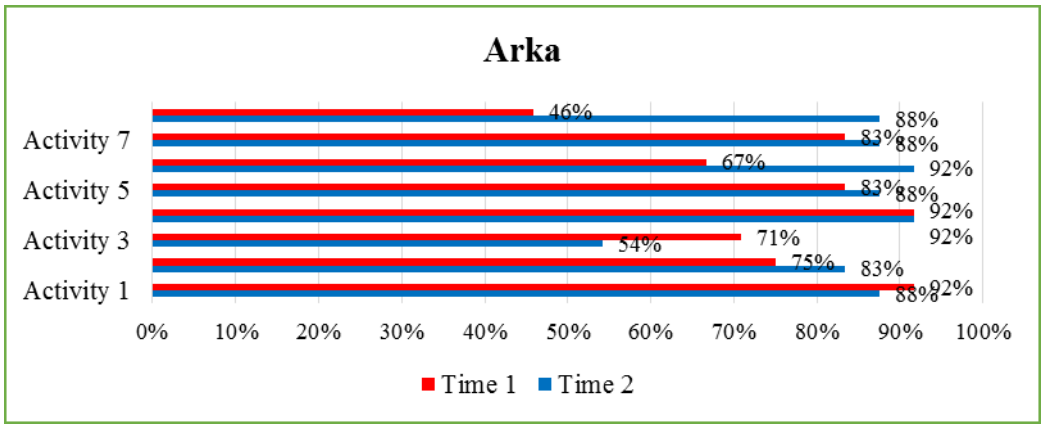
Kinds of activities	Period	Achievements (%)	Category of achievements
Activity 1	*1*	92%	High critical thinking skills
	2	71%	High critical thinking skills
Activity 2	*1*	79%	High critical thiking skills
	2	92%	High critical thinking skills
Activity 3	*1*	63%	Moderate critical thinking skills
	2	17%	Very low critical thinking skills
Activity 4	*1*	54%	Moderate critical thinking skills
	2	75%	High critical thinking skills
Activity 5	*1*	83%	High critical thinking skills
	2	75%	High critical thinking skills
Activity 6	*1*	63%	Moderate critical thinking skills
	2	75%	High critical thinking skills
Activity 7	*1*	79%	High critical thinking skills
	2	88%	High critical thinking skills
Activity 8	*1*	46%	Low critical thinking skills
	2	75%	High critical thinking skills



Based on the table and graphic above, the student, Syifa achieved the highest critical thinking skills (92%) for the first activity (Catwalk) at the first time and the second activity (Rope Jumping) at the second time. Next, the degree of the lowest critical thinking skills was 17% which is categorized as the low critical thinking skills for the third activity (matching word with sentence) at the second time.

Table-15. The Result of The Data Based on The Children Per Activities: Arka

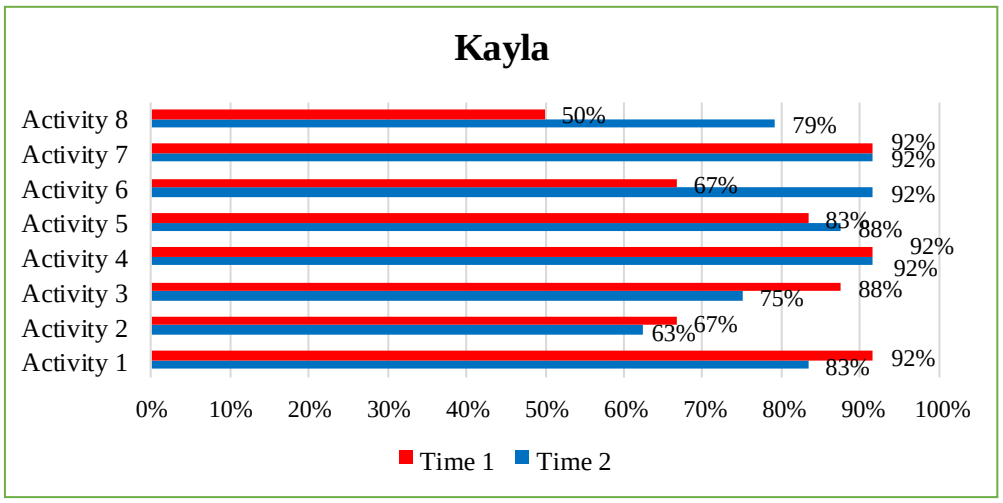
Kinds of activities	Period	Achievements (%)	Category of achievements
Activity 1	*1*	92%	High critical thinking skills
	2	88%	High critical thinking skills
Activity 2	*1*	75%	High critical thinking skills
	2	83%	High critical thinking skills
Activity 3	*1*	71%	High critical thinking skills
	2	54%	Moderate critical thinking skills
Activity 4	*1*	92%	High critical thinking skills
	2	92%	High critical thinking skills
Activity 5	*1*	83%	High critical thinking skills
	2	88%	High critical thinking skills
Activity 6	*1*	67%	Moderate critical thinking skills
	2	92%	High critical thinking skills
Activity 7	*1*	83%	High critical thinking skills
	2	88%	High critical thinking skills
Activity 8	*1*	46%	Low critical thinking skills
	2	88%	High critical thinking skills



Based on the table and graphic above, the student, Arka got the highest critical thinking skills (92%) for the first activity (Catwalk) at the first time, the fourth activity (Survival in the Island) at the first time, the second and the sixth activity (Patterned Rope) at the second time. Meanwhile, the degree of the lowest critical thinking skills was 46% that is categorized as the low critical thinking skills for the eighth activity (Reflecting the Ball) at the first time.

Table-16. The Result of The Data Based on The Children Per Activities: Kayla

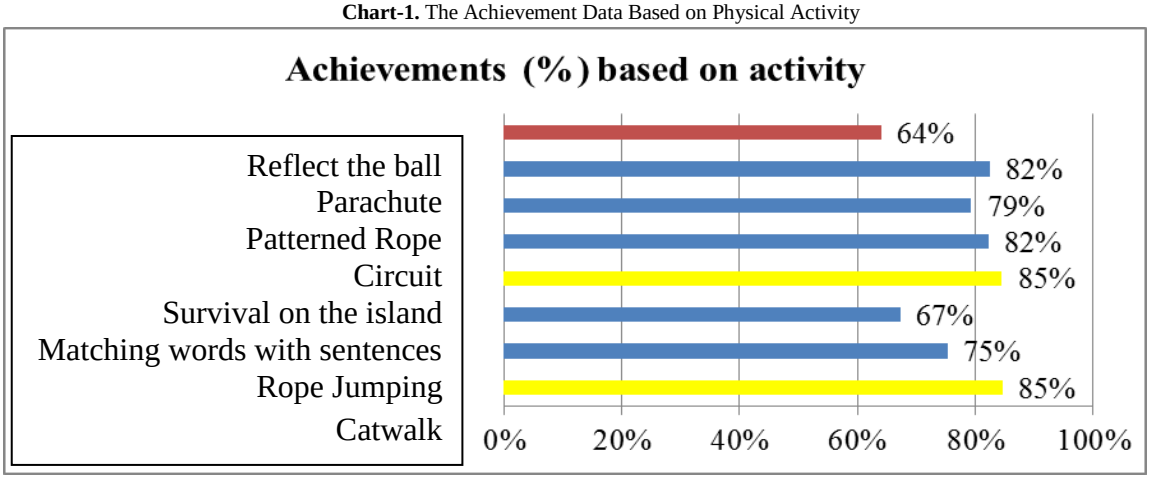
Kinds of activities	Period	Achievements (%)	Category of achievements
Activity 1	*1*	92%	High critical thinking skills
	2	83%	High critical thinking skills
Activity 2	*1*	67%	Moderate critical thinking skills
	2	63%	Moderate critical thinking skills
Activity 3	*1*	88%	High critical thinking skills
	2	75%	High critical thinking skills
Activity 4	*1*	92%	High critical thinking skills
	2	92%	High critical thinking skills
Activity 5	*1*	83%	High critical thinking skills
	2	88%	High critical thinking skills
Activity 6	*1*	67%	Moderate critical thinking skills
	2	92%	High critical thinking skills
Activity 7	*1*	92%	High critical thinking skills
	2	92%	High critical thinking skills
Activity 8	*1*	50%	Moderate critical thinking skills
	2	79%	High critical thinking skills



According to the table and graphic above, the student, Kayla achieved the highest critical thinking skills (92%) for the first activity (Catwalk) at the first time, the fourth activity (survival in the island) at the first and second time, the sixth (Patterned Rope) at the second time and the seventh activity (Parachute) at the first and second time. Then,

the degree of the lowest critical thinking skills was 50% that was categorized as the low critical thinking for the eighth activity (Reflecting the Ball) at the first time.

Chart-1. The Achievement Data Based on Physical Activity



The graphic above shows the eighth activities that have the highest achievement percentage of critical thinking skill. Survivals in the island and catwalk activities have similar percentages (85%) and they are categorized as the high critical thinking skills whereas the lowest percentage was "reflecting the ball activities (64%).

5. Conclusion

This result denoted that if the teacher understood and was able to apply the constructing stage of CTS (critical thinking skills) consistently, it could give encouragement and the opportunity for their students in their class of physical activities for their daily life so the students could practice to develop CTS in accordance with their development stage. The activities could be done by giving the opportunity to the children to do such as observation, discussion, investigation, proposing questions, solving problems, and making a decision on what will be done through the investigation in the certain time.

One thing that becomes a concern in constructing CTS for the early childhood is the needs of the children's mental condition in a secure and comfortable situation without having under pressure, especially during the learning processes. Physical activities for the early childhood could construct CTS if it is done by paying attention to the physical activity stages oriented to CTS which is packed in the learning through playing because it purposes to achieve the indicators that have been set.

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