Locomotor basic movement skill instruments through games for elementary school

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Abstract. The instrument of locomotor basic movement skills for elementary school students based game is a measurement tool to determine the eight learning outcomes of locomotor basic movement in early level students an age where fun activities are essential to them. This study aims to develop the instrument by identifying the characteristics of children generally at their age besides to analyse the current methods that have been used by teachers in elementary school. Literature review method was used in this research through pre-survey activities. The survey was carried out in 17 public elementary schools in Ciracas sub-district, East Jakarta. Early research results in, the indicator of locomotor basic movement’s scoring add up to 8, making test scoring form with scoring range 1 until 4 with observation test of locomotor basic movement skill which is conducted through playing puzzle activity. The results of this preliminary study recommended that puzzle games can be applied as an assessment tool for the locomotor basic movement of low-grade students in the elementary school, but with revisions to improve the final blueprint/prototype.

1. Introduction
Basic movement is the behavior pattern of students that physically possess certain characteristics through the movement activities. In children age, the basic movement should be in line with their growth process. The mastery of fundamental movement skills (FMS) Commonly developed in childhood and subsequently refined into context-and sport-specific skills, they include locomotor (e.g. running and hopping), manipulative or object control (e.g. catching and throwing) and stability (e.g. balancing and twisting) skills [1]. Clark et al. suggested that fundamental movement skills are considered the basic building blocks for movement and provide the foundation for specialized and sport-specific movement skills required for participation in a variety of physical activities [2]. Thus, it can be said that basic movement is the basis of the movement of children to perform various movements in playing activities, sports, and dance around their social environment. It is divided into locomotor, no locomotor and manipulative movements. Locomotor movement is the movement – i.e. walking, running, jumping, etc. one location to others. At the level of the elementary school, it is divided into two levels: low and high level. Based on the characteristics exist in this age range. By dividing it into two classes, certain treatments in teaching activities will be necessary to adapt with existing conditions. According to Desminta important aspect of psychosocial development that occurs during childhood includes games [3]. At this age, children will spend more time in outdoors activities to play with friends.
Research conducted Ricky Wibowo et al. the results indicated that all correlation between FMS toward GI and GP in both games were statistically significant. Student who have better FMS will perform better [4]. According to E. Jean Buckler et al., these results suggest a low-organized games-based focus may support a moderate improvement in FMS proficiency in young children [5]. At primary school age, especially low-grade students, the achievement of movement skills is carried out through physical education activities based on the curriculum in elementary school. For those students, the curriculum of physical education learning, is about how to develop children's basic movements through a series of movement activities. This process must be evaluated properly therefore the effectiveness of the activities carried out can be clearly measured and assessed. Related to assessment instruments, locomotor basic in low-grade children were found only in one of the assessments, namely the assessment of processes and standard instruments commonly used, The Test of Gross Motor Skill developed by Gallahu et al. [6], which had different characteristics than in Indonesia. The assessment was carried out in the form of process evaluation with a rating scale of one and Zero which did not include the effort that had been carried out by students. If it was not suitable with the observation indicator, the score obtained was zero. The procedure of conducting the test also looks boring and there were lots of pressures when it was implemented. Research conducted by Rachman outcomes that simple play is able to influence basic movement skill of student’s class II SDN Duren Jaya 7 Kota Bekasi, test instrument applies in the research is using TGMD David Gallahu et. al., with six indicators of locomotor basic movement with scoring range 1 and 0 [7]. TGMD-2 Ulrich describes subtest of locomotor basic movement becoming 6, run, gallop, hop, leap, horizontal jump, and slide with scoring 1 and 0 [8].

According to this, the researcher emphasizes the need of the development of locomotor basic instruments that are adapted to the characteristics of elementary school students in Indonesia besides develops instruments which in carrying out the tests considers the condition of the students who like playing activities.

2. Methodology
This study aims to develop the instrument of locomotor basic motion skills of low-grade students in game-based elementary schools by paying attention to the characteristics of children in general at their age. The methodology to conduct this research was by literature study that carried out in 17 public elementary schools in the Ciracas sub-district, East Jakarta.

The data collection used in this study is an observation technique by testing the instrument for locomotor-based basic motion skills assessment for several predetermined elementary schools. Previous research carried out a literature study by comparing the instruments of basic motion skills assessment according to Gallahue et al. with instruments of basic motion skills assessment to be developed [6]. Before being given to several schools, the assessment instruments were validated in advance by experts. Having validated, a trial was conducted to find out accurate results.

3. Results and discussion
Based on the study of instruments, the assessment of locomotor basic movement skills, according to Gallahue et al., the researcher found that there were shortcomings in the preparation of locomotor baseline assessment instruments which had an impact on the results of the assessment [6]. The shortcomings namely; 1) there is no comprehensive certain assessment format, thus causing difficulties, 2) the range of the assessment score is limited to 0 and 1, 3) the basic movements that being observed are only 6, 4) and there is no element of play in undertaking locomotor basic movement tests.

Based on the shortcomings mentioned above, the researcher made improvements in the preparation of locomotor basic movement assessment instruments by adding points as follows; 1) comprehensive movement indicator information in the assessment document, 2) addition of the assessment score range from 1 to 4, 3) there will be 8 locomotor basic movements for being observed, and 4) the use of game elements during the test. Having improved four points above, the researchers tried to make a
locomotor basic movement assessment instrument based on a puzzle game. The following table is a locomotor basic movement research instrument which was developed with eight locomotor basics and the rules for tests application in the form of puzzle games.

**Table 1. Research on development of locomotor basic movement instruments.**

| Dimension of Movement | Skills | Indicators                                                                 | Score |
|-----------------------|--------|-----------------------------------------------------------------------------|-------|
|                       | Walk   | The eyes view are straight forward, the hands are swinging back and forth, the body position is upright, and the feet move forward alternately. | 4     |
|                       |        | Straight forward view, relaxed body position and leaning forward, hands swing back and forth alternately, knee position raised with both feet moved quickly and flying towards to the front. | 3     |
|                       | Run    | The body moves sideways, the eyes look horizontally, the arms move following the movement of the body, and the legs are not crossed. | 2     |
|                       |        | Both legs are raised, moving forward alternately for several steps and then jumping and preceded landing on one leg, swinging hands following body movements, straight eyesight. | 1     |
|                       | Slide  | A straight forward view, the position of the foot is lifted alternately and moves forward, relaxing body, the position of the hand follows body movements. | 4     |
|                       |        | The feet jump alternately (up and down), the position of the body upright moves to float, a straight forward view, the hand swings following the body movements. | 3     |
|                       | Leap   | The position of the body is lifted and moves from one place to another place, hands are swinging forward following body movements, feet are raised forward (down and up) quickly, knees are bent when landing. | 2     |
|                       |        | One of the legs is lifted up alternately and moves forward, one hand straight up opposite the leg raised up, body position is upright, and when landing begins with one leg as a pedestal. | 1     |
|                       | Gallop | A straight forward view, the position of the foot is lifted alternately and moves forward, relaxing body, the position of the hand follows body movements. | 4     |
|                       | Skip   | The feet jump alternately (up and down), the position of the body upright moves to float, a straight forward view, the hand swings following the body movements. | 3     |
|                       | Jump   | The position of the body is lifted and moves from one place to another place, hands are swinging forward following body movements, feet are raised forward (down and up) quickly, knees are bent when landing. | 2     |
|                       |        | One of the legs is lifted up alternately and moves forward, one hand straight up opposite the leg raised up, body position is upright, and when landing begins with one leg as a pedestal. | 1     |
|                       | Hop    | One of the legs is lifted up alternately and moves forward, one hand straight up opposite the leg raised up, body position is upright, and when landing begins with one leg as a pedestal. | 4     |

**Norms of play-based locomotor basic movement assessment skills, as follows:**

- Score 4: Students can move locomotor with all aspects of skills
- Score 3: Students can move locomotor with three aspects of skills
- Score 2: Students can move locomotor with two aspects of skills
- Score 1: Students can move locomotor with one aspect of skill

**3.1. Implementation of locomotor basic movement skills assessment with puzzle games**

![Figure 1. Implementation of locomotor basic movement skills assessment with puzzle games.](image-url)
3.1.1. **The purpose of playing.** To measure the level of attainment of mastery of the locomotor movements that have been learned in each lesson, including basic movements of walking, running, sliding, jumping, leaping, galloping, skipping and hopping.

3.1.2. **Facilities and infrastructure.** Playing area, Puzzle, Cones, Ladder.

3.1.3. **How to play**

- Students are divided into two groups and line up with a distance between one group and another group.
- The teacher prepares two large puzzle packages in the form of cardboard pieces, two ladders, four cones as boundaries between each groups.
- Puzzle pieces are placed randomly in a circle.
- Puzzle pieces contain commands to carry out locomotor movements to be observed.
- The other side of the puzzle piece is a combination of an image of one locomotor skill.
- At the time of the command the students in each group will run to the circle where the puzzle was and took one piece into the group.
- The group will read the order, and alternately each group member will make a move according to the instructions on the ladder track that has been prepared.
- After all students make the first move, next students will take the second puzzle and subsequently bring it into a group and will take a move alternately following the order in the puzzle pieces.
- And so on until all group members make the ordered movements in each puzzle piece.
- After all the movements have been done, the group will arrange the puzzle pieces into a picture of locomotor skills.
- The group that succeeded in compiling quickly is declared the winner.

After conducting a series of trials on a number of low-grade students in public elementary schools in the Ciracas sub-district, East Jakarta, the researcher adjusted some of the things found in the trial. Some considerations and adjustments have been made as follows:

- The purpose of the assessment which is in accordance with the 8 types of locomotor basic movements including the basic movements of running, walking, jumping, leaping, sliding, hopping, galloping and skipping.
- When the test was being carried out, it was found that the difficulty of making an assessment. It was when the teacher did not have a certain observation format that could accommodate the number of observed students and 8 basic locomotor movements performed, thus a blank or systematic assessment form was made to facilitate teacher assessment.
- There were changes to the rules or ways to play when the assessment of the test was being carried out, namely two groups competing together in one assessment, which was changed to each group and carried out alternately. This is undertaken to make it easier for the student's movement assessment. The winning group was determined by the acquisition of the fastest time and the accuracy of the movements of each group member.
- Looking at the characteristics of low-grade elementary school children and the general ability to master, the use of ladders as a path to do locomotor basic movements was replaced only by using line boundaries or cones as the sign (start and finish) which are placed between 5-10 meters. This was done as many students have difficulty placing their feet on the ladder box hence the basic locomotor movements that were expected to emerge based on the abilities of each child becoming not appropriate with their actual abilities.
3.2. Enhanced puzzle game
Furthermore, this is the development of locomotor basic movement assessment instruments based on puzzle games that have been made completely and practically.

![Figure 2. Figure of enhanced puzzle game.](image)

3.2.1. The purpose of playing. To measure the level of attainment of mastery of the locomotor movements that have been learned in each lesson, including basic movements of walking, running, sliding, jumping, leaping, galloping, skipping and hopping.

3.2.2. Facilities and infrastructure. Play area, Puzzle, Cones.

3.2.3. How to play

- Students were divided into several groups with the same number of members. Stopwatch on when the first group member moved from a predetermined boundary and stops when all group members have arranged all the puzzle pieces that exist.
- The teacher prepared a large puzzle package in the form of pieces of wood, placing a sign as the boundary of the standing group, the area / track with a distance of 5-10 meters, where the puzzle pieces and puzzle boards were placed at the end of the track boundary.
- Puzzle pieces consisted of two sides, on one side containing the command to do locomotor movements and the other side was image which will be arranged into a picture of basic movement skills.
- At the time of the command the students in each group ran to the circle where the puzzle was and took one piece into the group.
- The group will read the order, and alternately each group member will make a move according to the order on the straight track that has been prepared.
- After all students did the first move the second student will take the second puzzle and then bring it into the group and will take turns in the order of the puzzle pieces alternately.
- And so on until all group members did the movements that are ordered on each puzzle piece.
- After all the movements have been carried out by group members, they arranged the puzzle pieces into a picture of locomotor skills.
- The group of winners is if they have the fastest time and precisely arrange the puzzle pieces from the other groups.
3.3. Evaluation of locomotor skills based on puzzle games

Miang divided locomotor base movement into eight basic movements consisting of running, walking, jumping, leaping, sliding, galloping, hopping, and skipping [9]. According to Hyvonen, playing activity is an important and valuable action, which is considered as a pleasant and beneficial thing in personal development [10]. In the self-learning process, playing activities can improve motor skills and motivation to learn physical education and sports [11]. Based on this, playing activities are fun activities that will have an influence on the success of student learning in school. Hartinah suggested that there were three major impulses experienced by children during this period, namely the urge to leave the house and enter into peer groups, physical encouragement to perform various forms of games and activities that lead to physical skills/movement, and mental impulses to enter the world of adult concepts, thoughts, interactions and symbols [12].

Griffiths et. al., they wrote Physical Education is often viewed as the place where Fundamental Motor Skills (FMS) are developed. These skills underpin the development of motor competence and perceived competence, therefore impacting on participations and physical literacy [13]. Bryant et. al., suggested children at different ages will have a lower score in different skills, the effect of BMI and gender on certain FMS is important knowledge for the target of intervention in primary school children [14]. Delas et. al., suggested the factors of explosive strength and coordination could be defined as the most integrated motor abilities in learning fundamental motor skill (especially jumping and running) for girl and boy [15]. Based on the condition above, the researcher conducts and adaptation of using the tool, equipment and test conducting procedure by considering factors in locomotor basic movement skill when the test is going on.

4. Conclusion
Based on the results of the pilot testing of locomotor-based basic movement puzzle games on low-grade students in 17 public elementary schools in Ciracas sub-district, East Jakarta, it was concluded that the development of locomotor-based basic movement instruments in puzzle games was applicable. But in its implementation there were several things that must be considered, as follows: 1).
Test items for locomotor basics are 8 basic movements, 2). the assessment form should be in one sheet form to be used during the assessment process effectively, 3). ladder is no longer used as a student moving track, only lines to be used for (cones) start / finish with a distance of 5-10 meters, 4). Adjustments to the implementation of the race are no longer carried out by two groups together but per group which is carried out alternately by using the benchmark of the fastest time obtained by each group.

References
[1] Lubans D R, Morgan P J, Cliff D P, Barnett L M, and Okely A D 2010 Fundamental movement skills in children and adolescents Sports medicine 40(12) 1019-1035
[2] Clark C C, Barnes C M, Holton M, Summers H D, and Stratton G 2016 A kinematic analysis of fundamental movement skills Sport Science Review 25(3-4) 261-275
[3] Desmita 2009 Psikologi Perkembangan (Bandung: Rosda Karya) 141
[4] Wibowo R, Sultoni K, Soeratin E N 2017 Fundamental Movements Skill and Game Performance In Vasion Game Activities. Proceeding of the 2nd International Conference on Sport Science, Health and Physical Education (ICSSHPE) 390-395.
[5] Burrows E J, Keats M R and Kolen A M 2014 Contributions of after school programs to the development of fundamental movement skills in children International journal of exercise science 7(3) 236.
[6] Gallahue D L, Ozmun J C, and Goodway J D 2012 Understanding Motor Development (Singapore: The McGraw-Hill Companies) 243-244
[7] Rachman R A 2017 The Effect of Small Games on Basic Motion Skills in Class II A Students of Duren Jaya 7 Bekasi Elementary School. Faculty of Sport Science (Thesis, Jakarta State University) 65-70
[8] Ulrich D A and Sanford C B 1985 Test of gross motor development (Austin, TX: Pro-ed)
[9] Miang T K S 2010 Fundamental Movement Skills For Growing Active Learners Singapore The Singapore Sports Council
[10] Hyvonen P T 2011 Play in the school context? The perspectives of Finnish teachers Australian journal of teacher education 36(8) 5
[11] Zuhrotiilanwar A, Hartoto S, Kartika D C 2017 The Influence of the Aplication of the Games on Improving Motor Skills and Student Learning Motivation in Learning Physical Sport and Health Education (PSHE) Journal of Physical Education Health and Sport 4(2) 59
[12] Hartinah S 2008 Perkembangan Peserta Didik (Bandung: Refika Adi) 55
[13] Griffiths G and Billard R, 2013 The Fundamental Movement Skills of a Year 9 Group and a Gifted and Talented Cohort Journal of Physical Education Health and Sport 3(4) 215
[14] Bryant E S, Duncan M J, and Birch S L 2014 Fundamental movement skills and weight status in British primary school children European journal of sport science 14(7) 730-736
[15] Delaš S, Miletić A, and Miletić D 2008 The influence of motor factors on performing fundamental movement skills: The differences between boys and girls Facta universitatis-series: Physical Education and Sport 6(1) 31-39