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Motor Learning in Adapted Ice Skating with Children with Intellectual Disabilities – A Qualitative Study

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MOTOR LEARNING IN ADAPTED ICE SKATING WITH CHILDREN – A QUALITATIVE STUDY

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The purpose of this thesis was to analyse the motor development of the children with disabilities in a short ice skating intervention and provide the children of the Koivula School experiences in physical activity. The skating school took place in Koivula School's ice ring.

This project consisted of three skating sessions that were held in January and February 2014. Six boys and one girl participated in the project. Children were 11 to 13-years-old with diagnosis of intellectual disability. Each session had its own theme. The skills were analysed subjectively by the writers based on a motor track. Theoretical information studied in this thesis included information about adapted physical activity, motor learning and development, evaluation of skills as well as information about our intervention.

The findings showed that the intervention was too short for permanent changes in motor skills. Even though the time period was short we could see some positive changes in motor development with every child.

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CONTENTS

1 INTRODUCTION

All 7- to 18-year-olds should be physically active for at least one to two hours daily, in a variety of ways suitable for each age group. Correctly executed, physical exercise can have beneficial effects on children's health and wellbeing (Nuori Suomi 2008, 9). With children, versatile exercise is a requisite for developing motor skills (Nuori Suomi 2008, 21). Movement and exercise are central learning tools for a child and learning basic skills in physical activity is every child's basic right. Learning those skills takes a considerable amount of hours and thousands of repetitions. (Kurvinen, Neuvonen, Sivén, Vartiainen, Vihunen & Vilén, 2006, 509).

Everyone has an equal right to hobbies despite their disability or level of function. Everyone should have a right to participate in shared activities in a way best suited for oneself and with purposeful support. (Alanko et al 2004, 4-6). In teaching, it is important to consider utilizing the strong suits of special needs children and building on them. Also, due to the possible difficulties of analyzing sensory input and information in is important to convey the information through those senses that work the best (Riita 1999, 33).

Skating is a skill that demands further developed motor skills. It develops mobility, balance, reaction speed, movement control and creativity (Autio 1995, 235). People with intellectual disabilities have the same goals as other populations. Age, experience, surroundings and health effect on those goals. (Rintala 2002, 34). Children with difficulties in their motor development can be developmentally so far behind, that it causes distinct difficulties in everyday life, learning and interaction with others. According to DSM-IV (Diagnostic and Statistical Manual of Mental Disorders, 4th Edition) classifications, the main symptoms in developmental coordination disorders are slow motor development, dropping objects, clumsiness and difficulties with sports or writing. These are in relation to the age and intellectual development. (Ahonen, Viholainen, Cantell & Rintala 2005, 12).

The project was an adapted skating intervention, carried out in cooperation with Koivula School. The group consists of seven children who took part in the skating in

three sessions held over three weeks. The topic was chosen because we wanted a practical project and something in the field of adapted physical activity. Also, we wanted to offer children versatile, new experiences in sports that they might not normally have. Our focus was in researching can motor skills be developed in a short time period with specified exercises. This thesis offers valuable information about how to plan and implement adapted skating sessions and theory about adapted physical activity, motor learning and evaluating skills.

2 ADAPTED PHYSICAL ACTIVITY

Adapted physical activity is described as an exercise for individuals who due to disability, disease or decrease in functional ability or due to a social situation have difficulties in participation of the generally available exercise and whose exercise demands adaptations and special knowledge. (Mälkiä & Rintala 2002, 6.) Its aim is to take into account each individual's needs, developmental phase, capacity, fitness level and subjects of interest. Long-term illness, disability, capacity, skills, developmental phase and ethnic background can cause special needs in exercise. (Rintala, Huovinen & Niemelä 2012, 10).

Adaptations in physical activity can be technical, such as functional devices or structural/constructional applications. Adaptations can also be structural, for instance game rules modifications or educational, for example teaching methods, practising types and coaching methods. (Mälkiä & Rintala 2002, 7.)

According to the law of physical education in Finland (Act on the Sports 18.12.1998/1054, section 2) municipalities have to arrange physical activity facilities for all. The purpose of the act is to promote citizens' well-being and health, as well as to support children's and adolescent's growth and development. (Website of Finlex 2014).

Openness is the starting point of exercise. Openness in physical activity means that the action must be designed in such a way that everyone can participate in. Sometimes, adaptations in physical activity arise only during the exercise by listening and observing people. (Kauravaara, Lakkasuo & Luona-Helminen 2006, 7).

2.1 Importance of physical activity in children with disabilities

Physical activity is important for everyone, but it is considered to be particularly important for people who already have challenges related to functional capacity or health. (Rintala, Huovinen & Niemelä 2012, 38). People with special needs benefit from regular physical activity, most likely, each in a slightly different way. Exercise plays an important role in child's physical, psychological and social development. Physical activity also increases quality of life. (Mälkiä & Rintala 2002, 6.) According to Rintala, Huovinen and Niemelä (2012, 38), physically inactive lifestyle has been shown to increase, in particular person with disabilities or long-term illness, the risks of health problems as well as dependence on the help of others. (Rintala, Huovinen & Niemelä 2012, 38).

Physical activity is a great tool for improving social skills. Although the activity itself does not develop people socially, it provides the environment and the elements of social learning and behavior. Exercise environments provide opportunities for interaction where young people are more likely to express themselves and bring themselves up. In this kind of environment children and young people learn to give social feedback, as well as to encourage others. They also learn to observe and perform various movements. (Polvi 2008, 31-32).

Exercise is an essential tool for children to learn. It is a fundamental right of every child to learn the basic skills of physical activity which requires lot of time and repetitions. If the child's physical skills are not sufficient, he is often reluctant to move. With help of exercise child develops perception motor skills, as well as the relationship between themselves and environment. Exercise also provides the basis for all other forms of learning. The child must be able to manage the own body and move-

ments before it can be expected that all small muscles work together. (Kurvinen et al. 2006, 509-510).

According to Vuori (2005, 146) exercising might have direct or indirect positive effects on a child's growth, development and health. For example, exercise can improve a child's current health, as well as increase the opportunities to embrace physical activity and healthy lifestyles as a lifelong habit. In this case, exercise may therefore be health enhancing and health promoting. Exercise can also reduce child's exposure for health risks and reduce the occurrence of such factors, which can later on cause health problems, such as a body fat volume, blood cholesterol or unfavorable glucose-metabolism. Therefore, exercise can prevent diseases and protect one's health. (Vuori 2005, 146).

2.2 Adapted skating

Skating is a versatile and traditional form of exercise that can be practiced in varying environments. Skating improves especially balance. (Heikinaro-Johansson & Huovinen 2007, 424.) Most people who stand and walk independently can learn to skate successfully. In adapted skating the methods are modified according to the needs, skills and ability of the participant. (Rintala, Huovinen & Niemelä 2012, 370). The ice should be smooth and well-maintained. The skates should support the foot and the ankle. (Niemelä & Rintala 2002, 327.)

In teaching ice skating it is essential to focus on the learning of basic skills. It is crucial to teach a safe way of falling, right in the beginning. It is also important to learn how to skate forward and backward and curving, as well as, embrace a proper braking technique. (Niemelä & Rintala 2002, 327.) In the beginning the biggest barrier to learning is the fear of falling. In case of falling it is important to remember the control of the head. When falling backwards the knees should be bent and the chin kept against the chest. (Huovinen 2003, 90.) Even before going on the ice, the participants can practice standing with skates. Also use of different braces helps to prevent injuries and gives feeling of safety. Helmet should always be worn when skating. (Rintala, Huovinen & Niemelä 2012, 370).

Before going on ice it is important to find out if somebody needs supports or assistive aids (Huovinen 2003, 89). There are support devices which aim to give additional support but also independent skating. (Niemelä & Rintala 2002, 329.) Participant can also be guided manually. The child can be assisted from behind from pelvis or waist. The instructor can also assist from behind from both forearms or the assistant skates backwards and assist from the hands. The goal is to lessen assistance gradually and to not assist too much. (Rintala, Huovinen & Niemelä 2012, 370). A skater who has unilateral differences is encouraged to bring the weaker lower limb first front (Huovinen 2003, 90). According to Heikinaro-Johansson & Kolkka (1998, 161) when beginning skating, a child with an intellectual disability should be given plenty of time to get used to moving around with skates and should be taught the skills of moving around the ice. (Heikinaro-Johansson & Kolkka 1998, 161).

2.3 Instructing Adapted Physical Activity

Adapted physical education and instruction obeys same principals as normal physical education. Teaching should be modified to each individual's needs. The instructor should familiarize oneself with participants and their needs. Based on previous information, the instructor should plan goals of the activity, content, environment, needed equipment as well as teaching and evaluation methods. When the teaching is carried out clearly, goal-oriented and systematically we can talk about structural teaching. The purpose of a clear structure is that the participant perceives goals and content easily. It helps the child to direct the attention to relevant issues. (Rintala, Huovinen & Niemelä 2012, 53). It is important for children with disabilities to know what will be done first and what after that. Session's clear temporal pacing is an essential part of a successful learning experience. (Rintala, Huovinen & Niemelä 2012, 55-56).

Learning new motor skills is often slow, especially when a person has special needs which are affecting to motor skills and learning. It is important to think how to make practicing new skills fun. Training should offer enough challenges and feelings of success. In order to learn new skills teaching should be goal-oriented and it should

proceed logically from easy to more demanding. (Huovinen 2003, 13). Games should not be modified according to weakest participant. Action should be challenging enough for every child. (Alanko, Remahl & Saari 2004, 10). Most of the children with special needs learn best by methods that activates vision and sense of motion. The teacher can support the verbal guidance for the visualization of the task, for example, by showing the task or by drawing the motion path on the ice. (Huovinen 2003, 17). Individual strengths of the children should be a starting point. Weaknesses in motor skills should be left to less attention (Zimmer 2011, 175).

All teaching should aim to support positive self-perception (Huovinen 2003, 18). According to Kauranen (2011, 382) feedback is considered to be one of the most important factors in learning skills. When a child gets positive experiences it increases voluntary exercising. When a child learns a new skills it is always a great feeling and therefore it encourages practicing more. (Rintala, Huovinen & Niemelä 2012, 35).

3 MOTOR LEARNING AND DEVELOPMENT

Many aspects, together and separately, have an effect on a child's motor development. Conditions, practice order, senses and perception alongside the size of the body are the most dominant factors in learning motor skills. (Autio 1995, 56). Also, cognitive development has an important role in voluntary movement and learning motor skills. Cognitive development enables the child to utilize different sensory information in moving their body and learning new motor skills. Basic motor skills of children under school age develop through active games. Motor skills of school age children, however, are already developed further and in order to develop more targeted exercises are needed. (Nuori Suomi 2008, 62-63).

According to Kauranen (2011, 291) motor learning can be defined as a group of internal processes achieved through practice and experiences that lead to relatively lasting changes in motor capability and performances that require skill. Motor learn-

ing can be the development of a trained skill, the standardization of performances or transferring the learned skill into a new environment. (Kauranen 2011, 291).

In addition, motor development is defined as a continuing process, during which a child learns sports related skills. As the child develops, their neuromuscular system develops, their body composition and proportions of the body change and the size of the body grows. (Jaakkola 2010, 76).

Motor learning occurs through different learning experiences and exercises. They can be seen as occasions that a person attempts to better their capacity in certain motor functions and tasks through conscious effort. Motor learning is tied with the situation. A new motor skill that has been learned in one context does not automatically transfer to another context. While learning a new motor skill it should be considered in which surroundings and context the skill will be initially needed. (Kauranen 2011, 292). Because learning motor skills demands repetitions, special attention should be paid on the playfulness of the exercises. Only then can a child practice long enough to learn new and difficult skills. (Ahonen & Viholainen 2004, 231.) In learning motor skills observing is a requirement (Jaakkola 2010, 57).

There are differences in motors skills between girls and boys. Boys are better at running, long jump and throwing a ball. On the other hand, girls are better at skills that require precision and fine motor skills. The differences derive partially from heritage, neural development but also from the social influence of the surroundings that can be seen in boys and girls being encouraged to practice different exercises. (Nuori Suomi 2008, 62).

Learning motor skills differs greatly from regular cognitive learning, or classroom learning. The tool for learning is the learners own body, the many parts of which must be made to function in a coordinated way, in a manner that includes the aims of the exercise. (Jaakkola 2010, 30). Because each movements consists of sets of smaller movements or phases of movement, chopping the movements into smaller parts and practicing the more difficult parts separately aids learning in most cases. (Ahonen & Viholainen 2004, 231.)

The best age for developing and the development of general skills is one to six years. Establishing general skills and learning sport specific skills is best from seven to twelve years of age. (Sandström & Ahonen 2013, 65.) There are certain sensitive periods when learning is easier than during other times. If a skill is not learnt during that period, learning it later is much harder and troublesome. (Autio 1995, 53). Before beginning to learn a new motor skill it is worth thinking about some aspects or factors through which the effects of practicing are enhanced and practicing is made more enjoyable. One point of view into motor tasks and skills in sought through diving them into open and closed movement tasks. (Kauranen 2011, 360).

Shumway-cook & Woollacott (2007, 6) says that *"open movement tasks, such as playing soccer or tennis require the performer to adapt their behavior within constantly changing and often unpredictable environment."* (Shumway-cook & Woollacott 2007, 6.) In comparison, closed environment refers to a situation where the environment stays unchanged and predictable through the performance of the task. Closed movement tasks are, for example, typing, swimming alone in a pool, and running on a treadmill. (Kauranen 2011, 360).

Children of the same age can have a few years difference in developmental age. This sets challenges for the instructor to plan the activities so, that each child develops from their own starting points. Thanks to general coordination, balance, agility and speed development learning usually happens right away. The child should be allowed to try freely and the correct performance should be ensured right away and mistakes corrected as soon as possible. (Miettinen 1999, 16).

3.1 Motor control

Motor control is defined as an ability to regulate and instruct movement and those functions of the motor-sensory system, with which the system coordinates muscles and parts of the body during movement. (Kauranen 2011, 13; Shumway-Cook & Woollacott 2007, 4). Also, it is defined as how the muscles and nerves work together in coordinating movement (Jaakkola 2010, 32). Practicing should be begun with

movements that are big and require cross motor skills. From these the lesson should proceed to movements that are smaller and require finer motor skills. Practicing movements that require fine motor skills too early can lead to difficulties with various functions. (Autio 1995, 56) .

3.2 Problems with motor development.

Children with intellectual disabilities have trouble processing information. This can be seen in observation skills, concentrating, memory, problem solving or planning and conducting their own activities. (Ahonen, Viholainen, Cantell & Rintala 2005, 17-18). Concentration means having the ability to differentiate meaningless information and focusing on one source of information (Zimmer 2002, 53).

A child's knowledge base and ability to use already learned knowledge in new context has been impaired. It is typical that motor skills develop later than normal and it is typical that motor functioning is slow. This can be seen in planning, starting and executing movements. (Ahonen, Viholainen, Cantel &, Rintala 2005, 17-18).

Children with intellectual disabilities learn best by doing. Therefore directions should be given in a short and positive way, demonstrating with speech and manual guidance. Also they have the same basic need as anyone else, to they should be approached as normally as possible. (Rintala 2002, 35). Children with trouble completing tasks can be given more time to complete the task, the difficulty level of the task can be changed or the child can be given help or support in completing the task (Zimmer 2011, 94). For an individual with an intellectual disability, learning motor skills is often difficult. Therefore it is important that the subject at hand is divided into smaller part in relation with the goals so that the tasks progress from easier to more difficult. (Heikinaro-Johansson & Kolkka, 1998, 45).

3.3 Theory of motor learning

There are several theories of motor learning and Schmidt's schema theory was chosen as the most suitable for our purpose. A schema is defined as a formula, chart or plan. It is a half-finished blank that does not include all the details about the exercise, only the most relevant factors of the movements. (For example, after we've learned once what a car looks like, we can recognize other types of cars as cars.) It can be used in different movements and surroundings. By acquiring basic information about a schema a motor program can be built on it. Information about starting position and required force must be known before the exercise. Varying one schema enables learning new movements and functions. Schemas are developed and formed by the surroundings. (Kauranen 2011, 37-38).

3.4 Stages of learning

The stages of learning are from Fitts and Posner Three-Stage Model. The first stage is described as the cognitive stage where the practitioner thinks of strategies to achieve a goal. This phase can last from a few days to a few weeks. The second phase is called the associative phase where the practitioner has solved most of the strategic and cognitive problems of the task at hand, and is aware of how the task should be completed. The third and finals stage is the autonomous stage where movements and sensory feedback work independently and automatically. Therefore, the power of observation is freed to other needs. (Kauranen 2011, 307-308).

3.5 Learning styles

Learning styles are defined as ways of acquiring and processing information and can be thought of as a sum of many aspects (Jaakkola 2010, 18). A visual learner learns optimally through the sense of seeing and visually received information. An aural learner learns optimally through hearing and sound. A kinesthetic learner learns best through the sense of feeling. (Kauranen 2011, 305). An analytical learner likes problem solving and aspires to analyze both the instructor's performance and their own (Jaakkola 2010, 19).

Learning styles mean ways of acquiring and processing information, and those can be thought of as sum of many factors. Widely inspected, the main factors of learning styles are environmental, social, physiological and psychological. Senses are also important channels for learning, and in most cases one sense is dominant in learning. A visually oriented person learns by watching and seeing. To them important aids in learning are examples, displays and the entirety. With an aurally oriented learner the sense of hearing and the meaning of hearing are emphasized. The learner focuses on surrounding sounds and conversations and likes dialogue and explanations. A kinesthetic learner learns best through experiences or trying, moving together or through testing the matter at hand. (Jaakkola 2010, 18-19). According to Jaakkola (2010, 20) the table below shows clue words and strategies that can be used in teaching and councelling.

Instructing	Learning styles			
	Visual	Kinesthetic	Aural	Analytical
Clue words for instructing	Look	Feel	Hear	Analyze
	Follow	Touch	Listen	Think
	Watch	Sense	Observe	Study
	Imagine	Move	Monitor rhythm	Compare
Example strategies for instructing	Showing	Mimicking	Clapping	Explaining
	Pictures	Guidance	Music	Trying
	Videos	Try and slip up	Producing sound	Problem solving

Table 1. Clue words and strategies for different learners. (Jaakkola 2010, 20).

3.6 Balance

Balance is a skill that the nervous system learns to execute by using various systems: different areas of the central nervous system, senses, muscles and biomechanical factors that enable the execution. (Talvitie, Karppi & Mansikkamäki 2006, 229). Balance is usually defined as a general state where the weight of the object is spread

through the points of balance so that the state of the object stays set without external forces. But human balance is defined as the ability to control the position, mass or center of balance in relation to the base of support, with sensory information and muscle strength. Also, balance is a controlled action and remains under control throughout the whole execution. The requirements for maintaining balance change vary from one situation to another. The demands depend on the task at hand, the surroundings and the physical and mental attributes of a person. (Kauranen 2011, 180-181).

Balance is an essential part of exercising. Balance indicates the cooperation of muscles, sight and balance organs. It can be divided into stationary and dynamic balance and it develops the most before school age. (Autio 1995, 49). According to developmental physiologists the position of the head and body is learned only through experiences that a child goes through when learning to move about. Therefore, if a child cannot walk normally, the balance organs do not produce enough stimuli for the cerebellum to combine with the proprioceptive information from the muscles of the neck into models that regulate the position and balance of the whole body. (Sandström & Ahonen 2013, 29.) Balance develops evenly throughout the childhood (Jaakkola 2010, 75).

Balance can be improved by lowering the body's center of balance, for example, by bending the knees or changing the bearing to be larger by using assistive aids or changing the position of the feet. An exercise can be made easier or more demanding by changing the size of the bearing. Balance can also be maintained by muscle strength in some positions. For example if a person sways on a slippery surface, they can most often quickly fix the balance by enlarging the bearing. (Kauranen & Nurkka 2010, 247.) In maintaining balance, it is essential to maintain the stability of the center of gravity in relation to the bearing when moving or an outside force is disturbing the balance. (Sandström & Ahonen 2013, 51.)

3.7 Posture control

The position of the body is controlled by several sensory systems: the visual system, the somatic sensory system and the vestibular system. There are three external factors that effect on posture control: the position of the head in relation to the body, the visual location of an external target (or the relationship between the body and the surroundings), and vestibular orientation; the body's position in relation to gravity. (Talvitie, Karppi & Mansikkamäki 2006, 230-231). Controlling the position of the body is done by fours strategies; the ankle strategy, the hip strategy, the compensatory stepping and movements of the arm. Finding a suitable strategy depends on the challenges set by the task and the surroundings. (Talvitie, Karppi & Mansikkamäki 2006, 234-235). A child should be offered versatile exercise possibilities so that different senses can be nourished diversely (Autio 1995, 80).

3.8 Evaluation of motor skills

Testing or evaluating motor skills must always have a purpose or reason, why is it done and what is done with the received information (Laasonen 2005, 199). The extent and specificity level of the assessment should be decided primarily on the intended use of the collected information (Laasonen 2005, 204). Observation should be carried out the same way during each session and similar evaluation criteria should be used with each person being measured. (Talvitie, Karppi & Mansikkamäki 2006, 119).

In order to determine the starting point of the practice program it is essential to first determine the level and ways on completion the child already masters rather than just difficulties they face. When testing cross motor skills, attention must be paid to timing, direction of movement and purposeful use of strength in throwing, catching, dribbling, kicking, jumping and skipping. The symmetry, continuity, rhythm, balance and purposefulness of strength are essential signs of a successful performance. (Laasonen 2005, 197-210). In some tests the criteria can even be such that only a third of the children can execute the performance correctly. However, this does not mean that two out of three children have actual difficulties. (Laasonen 2005, 205).

According to Zimmer (2011, 90-92) observing can be divided into two different categories. Observing can be done in free game and play situations and in standardized play and physical exercise situations. Also, it can be done by writing down notes or through criteria defined beforehand. Spontaneous occasions have an advantage: children can play and act without outside interference. In standardized occasions, the situation is planned beforehand. In testing, qualitative assessment is possible when clear criteria have been defined according to which the task should be carried out. (Zimmer 2011, 90-92).

The initial purpose of analysing movement is to measure and model certain movements completed during a motor task. Central factors in human movement are the degrees of freedom that are dependent on the anatomical structures of the joints. (Kauranen & Nurkka 2010, 370.) It is essential to concentrate on the key factors of movement. Some movements should be shown so that the child understands what is expected. The evaluation can be completed during several sessions and it can be carried out by one adult instructing and one taking notes. Also, the evaluation can be included in a motor track that the children complete a few times. (Karvonen 2000,42-43). However, it is important to focus on the quality of movement instead of seconds or centimeters. Results are not to be compared to other children but to rather their own, previous performances. (Karvonen 2000, 10).

4 INTELLECTUAL DISABILITY

The term intellectual disability is used when a child has difficulties in learning, communication and coping with independent activities of daily living or so called adaptive behavior. (Rintala et al 2005, 17). In the Finnish law, a person with intellectual disabilities is defines as a person whose development or intellectual function is delayed or disturbed due to an illness, disability or injury during fetal development or birth and who cannot receive the services they need in accordance with another law. (Kaski 2004, 179).

Intellectual disability is caused by factors of birth or surroundings or a sum of many factors. Before birth it can be caused, for example, by chromosomal changes or diseases the mother has suffered, premature birth, low birth weight or different complications during labor. Illness and trauma can lead to intellectual disability later in life. (Heikinaro-Johansson & Kolkka, 89.) Often, children with an intellectual disability have associated conditions such as speech impairment, problems with motor function, sensory deficit, epilepsy and psychic conditions. The incidence of intellectual disability is about 30 000 people in Finland. (Kaski 2004, 179).

Disabilities are classified by the severity of the condition: mild intellectual disability causes problems in learning whereas moderate causes considerable delays in development. A person with a severe intellectual disability causes that person to need continuous support, assistance and guidance and if the disability is profound it causes the person to be completely dependent on other people for care. (Kaski 2004, 181).

5 PURPOSE AND AIMS

The purpose of this thesis was to analyse the motor development of the children in a short ice skating intervention and provide the children of the Koivula School experiences in physical activity. Our intention was to research whether motor skills can be improved in a short period of time with exact exercises. The teaching of skating was divided into three parts, each with their own theme. The skills were measured subjectively by the writers in the form of a motor track. This thesis evaluated the motor learning in a short time period and provided a look at the challenges we faced during the process.

6 THE INTERVENTION

6.1 Qualitative analysis

"Qualitative analysis is the primary method used to improve human movement of clients in many kinesiology professions" (Knudson and Morrison 1997, 1).

Knudson and Morrison (1997, 21-22) suggest Hay and Reid's model as *"one of the most complete discussions of qualitative analysis in biomechanics."* It involves four steps: Developing a model of the skill in question, Observing performance and identifying faults, ranking priority of the faults and instructing the performer. The model includes research to know what is evaluated, defining how a skills faults and successes are evaluated and how the performance should be corrected and the information used. (Knudson, Morrison 1997, 21-22). Qualitative analysis can be written down in any way, as long as it is legible and can be understood by another assessor later (Karvonen 2000, 42).

6.2 The Sampling

We were provided information about the children by their teacher. All of them had a diagnosis of intellectual disability. In addition, one of the children had been diagnosed with cerebral palsy; he participated in the lessons without skates, and, therefore, he will not be assessed in the motor development. The children had different amounts of experience with skating. The following table shows the preliminary information about the children.

Child	Age	Gender	Diagnosis	Assistive aid
Child 1	12	Male	Intellectual Disability	Support from instructor if needed
Child 2	12	Male	Intellectual Disability	No
Child 3	12	Male	Intellectual Disability	Support from instructor if needed
Child 4	13	Male	Intellectual Disability	Support sledge, for the first two sessions

Child 5	11	Male	Intellectual Disability	No
Child 6	11	Female	Intellectual Disability	No

Table 2. Preliminary information.

6.3 Sessions

The basic structure of each session was a name game, basic motor skill (each lesson had a different theme), motor track and game. Each session was approximately 45 minutes long. The first session included basic skating skills, the theme of the second session was balance and the last session combined the skills we have learned into the games we played. To the last two sessions we added a gathering at the end, in order to receive feedback and calm down the situation.

The detailed structure of each session can be seen in appendices 1-3 and the structure of the motor track in appendix 4. One child had Cerebral Palsy and did not participate in the skating, he will, therefore, be left out of the assessment. Table 3 describes the skills of each student during each lesson.

According to Huovinen and Rintala (2007, 204), children with learning disabilities benefit from repeating similar exercises, and slowly switching from easy to harder. Also, children with intellectual disability benefit from practicing familiar skill, rather than changing the exercises continuously. Because of this we had some of the same exercises in each session. (Huovinen & Rintala 2007, 204.)

Sausage skating is mentioned in the following text often, it is described in more detail in appendix 1.

The Skills of Each Child in Each Session

First session	Second Session	Third Session
CHILD 1		
• Cannot complete sausage skating • Skating is stepping, not pushing and gliding • Balance is poor and he falls easily when crouching. • Slaloming is done by stopping to turn. • He is a quiet boy.	• Sausage skating was better, definite attempt! • Mainly stepping instead of pushing and gliding, but he has grasped the idea of pushing and gliding. Better in the beginning of the lesson than at the end. • In some instances he is in too much of a hurry to concentrate. • Balance was better and movement was more relaxed.	• Does not concentrate on movement, but rather just does as quickly as possible. • Sausage skating was better. • Still stepping instead of pushing and gliding, has grasped the basic skills. • Balance was better, and movements more relaxed • Main issue is gathering speed.
CHILD 2		
• He had a bad day because of ill-fitting skates • He has troubles concentrating properly, but his skating skills are good. • He can do the slaloming well, without stopping to turn. • He could get up from the ice well, tried everything, with some hesitance	• Skates were not good this time either. • He is good at skating. • He should develop his skating posture and balance. • Poor concentration.	• Was not present
CHILD 3		
• Skating is more stepping than pushing and gliding. • Crouching down and coming up was done well, but demanding and took a lot of concentration. • He received some support by holding the instructors hands. • Slaloming was decent; he did not glide much and stopped to turn. • An analytical learner.	• Very analytical, can skate quite well when supporting by holding hands. • Still some stepping, does not like falling. • Balance in crouching had improved. • Push and glide better but still stops to turn.	• Can skate quite well when given support by holding hands. Wants support. • Better sausage skating without support. Proper with some support. • Balance in general and in crouching had improved. • Push and glide better. • His skating is still more stepping, but he has improved. Main issue is gathering speed.

CHILD 4		
• He used a support sledge to skate. • Afraid of falling. • He did not want to try, for example crouching down and practicing because he relies on the sledge so much.	• According to the teacher he is lazy. • He can skate quite well with support by holding hands, with the sledge he mainly leans on it and does not want to try everything.	• Skating without the support sledge (teachers request). • Got tired easily and took a lot of breaks. Can skate rather well when supported from hands, but not necessarily assisting. • He is able to complete sausage skating moderately if instructor pulls him. • Balance is not very good. Cannot get up without support.
CHILD 5		
• He can skate properly, fall down and get up safely following proper technique. • He did not require any special attention in teaching. • Had some trouble concentrating.	• He still skates well, his concentrating was better. • However, his ankles are in a really bad valgus position which makes, sausage skating and stopping much harder.	• Skates well, but his ankles are a problem • Good skills. • Sausage skating has developed from last time.
CHILD 6		
• She skates well, probably best of the group. • Concentrating is poor if there are any other stimuli. • She could already break with one foot. • She is very enthusiastic and did not want to stop skating.	• Poor concentration, but good skills.	• Poor concentration, but good skills. • Lost interest quickly. Complained the tasks were too easy, but when presented with something more challenging, she did not want to try completing the task.

Table 3. Children's skills during different lessons.

The table above shows the children's skills during different lessons. They were evaluated by the instructors subjectively.

7 RESULTS

7.1 Criteria for Evaluation

	Balance	**Slide**	**Kick**
1	Whole body stiff- fear	0 m	V-stance
2	LL stiff - small movements	<0,5m	weight shift
3	UL stiff	0,5 m < 1m	push
4	relaxed reciprocal movement	>1m	bilateral

Table 4. Criteria for evaluation. UL= Upper Limbs, LL=Lower Limbs

The criteria we had for the evaluation can be seen in the table above. We decided to evaluate the quality of skating by three factors; balance, length of slide and pushing.

Balance was evaluated during movement. The lowest criterion was a stiff body, as if the skater was a plank of wood from head to toe. In the next one the skaters movements was more relaxed but the limbs were still stiff. The third criteria the upper limbs were stiff to ease the balance, but lower libs more relaxed. In the fourth criterion the movements were reciprocal and relaxed.

The slide was chosen to measure two aspects. First if the skater was able to remain balanced while moving on the skates, but also whether the skater was able to reach a necessary speed to be able to glide. The shorter the glide, the less speed they were able to accomplish.

The third element was the pushing. This was broken into four steps: the V-stance (heels together), shifting weight in this position, being able to push from this position and push bilaterally and repeatedly. This also indicates their ability to pick up speed.

All the afore mentioned three elements together show what kind of a skater each child is. In order to ease the interpretation of the results each child was given a number from 1-4 in each segment for the first session and the last session. 1 is the lowest score in the evaluation criteria in part 6, 4 is the highest. Some children required assistance more than the others but their performance is evaluated on their completion of the motor track, during which they did not receive support from the instructors.

These charts below represent the results of this thesis. Bar graphs were chosen to show the development of each child individually.

7.2 Balance

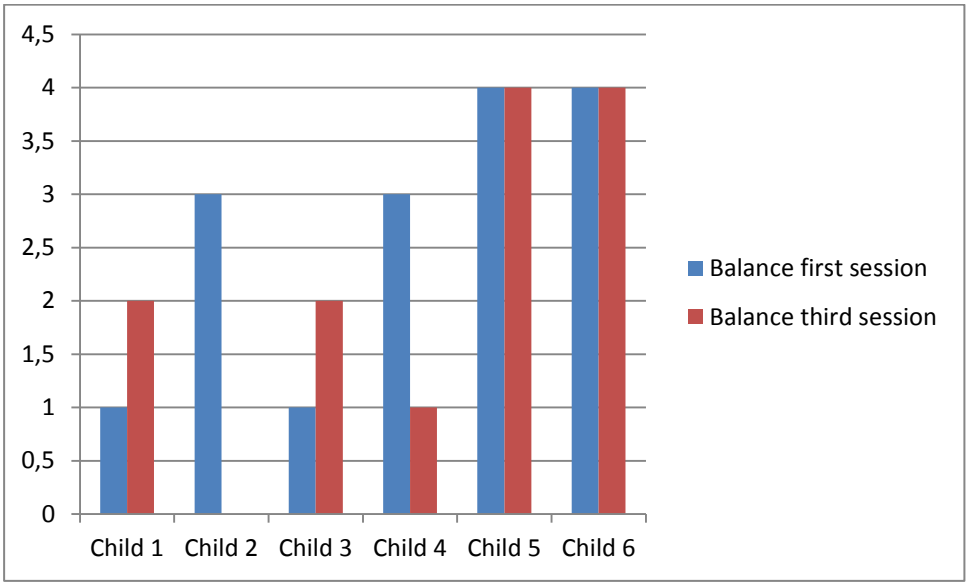

Chart 1. Improvement of balance

Balance is something everyone can improve. The improvement of balance can be seen in the chart above. With these children we focused on their ability to stay upright and move gracefully about the ice. Child 1 and child 3 were the least skilled in the beginning (scoring a 1). They fell down the easiest and needed the most support in skating. However, since they were the least skilled their development could also be seen to have the biggest improvement. Child 3 and child 1 received some assistance during the sessions by one of the instructors holding their hands; this gave them courage to try more. Child 4 had great balance with the assistive sledge, but without it he was very prone to falling and his whole body was very stiff.

7.3 Slide

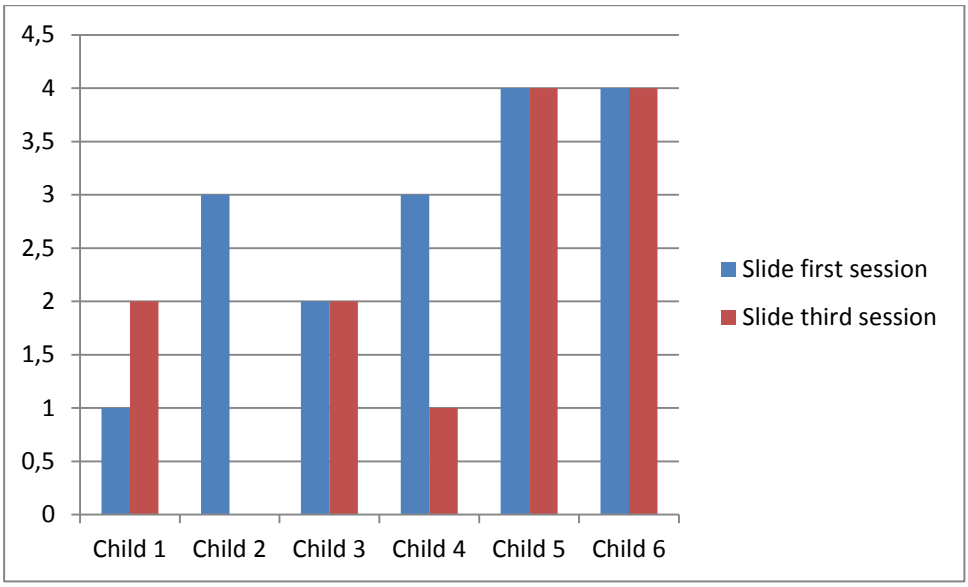

Chart 2. Improvement of slide

The evaluation of the sliding was the hardest to measure. The improvement of sliding can be seen in the chart above. In order to accomplish the sliding the child has to be able to pick up speed. This means they have to be able to push themselves forward properly. Child 1 had the most problems with this in the beginning. He was in such a hurry that he didn't push; his movements were better described as stepping. Even with support he couldn't slide for long distances. Child 3 had a similar style and similar issues, but with some support and assistance he could slide for a short distance. However, his performance did not improve greatly when he skated without the support of an instructor. It should be noted that for a child to improve in our evaluation they have to be able to complete the skill more than once. Child 4's performance was good with the help of the assistive sledge, but without it he was not able to slide at all.

7.4 Push

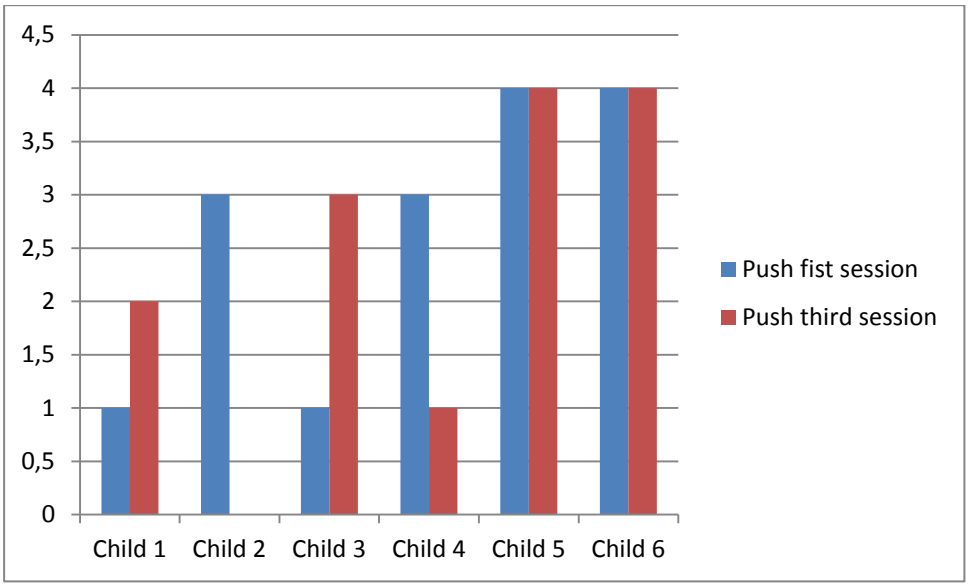

Chart 3. Improvement of push

The evaluation of pushing gave us an idea about the children's ability to pick up speed. The improvement of pushing can be seen in the chart above. Child 1 and Child 3 had the most trouble with pushing in the beginning. With guiding and support Child 3 was able to improve pushing. Child 1 was again so quick with his movements, that his improvement was small and could only be seen in short occasions. Child 4 was very good with the help of the assistive sledge, but without assistance he was not able to push at all.

7.5 Conclusion

Since we used the same criteria for each child, some children "didn't develop" at all. This means they were as good as our highest criteria states. These three criteria give an idea of each child's ability to skate as a whole. Even if one aspect of the skating is excellent, but one part is lagging, their skating needs improvement. For example, child 3 improved in pushing and balance, but his sliding did not improve. This means even though improvement can be seen in some areas of motor learning, combining these new skills will need more time and practice.

In all criteria child 4's level of performance declined due to him using a support sledge during the first two sessions, but not during the third. He mainly leaned on the sledge and made his way by pushing forward, but without the sledge he grew anxious, did not want to try some exercises and tired fast, resulting in him sitting on the bench by the ice for a great part of the last session.

Even though child 5's skating was good, his ankles were in a very poor position; they were laterally deviated the whole time. When we attempted to correct this he stated that the skates hurt his feet. We could not improve this during our intervention, but new skates might be of help. Child 2 was not present for the last session, so his scores are only from the first session. Child 5 and child 6 were the best skaters of the group. Their skills were already optimal for the skill level we aimed to in the beginning.

During the last session the motor track started to go more smoothly and the quality of performances improved due to development. Also, the familiar exercises became routine for the children. Children with disabilities often have changes in the mood so it was difficult to know whether they tried their best and therefore, the reliability of the results suffered.

8 THESIS PROCESS

The thesis process can be seen in figure 1. The process began in May 2013 with choosing a topic, winter skating day for children with disabilities. A partner was found and a contract was written. From June to August research was done on the topic and writing was started. In the beginning of the fall semester we were in contact with the client and the school in the area. However, due to lack of participants, the event was cancelled.

A new topic was chosen in December 2013, in the same field as the first one. Koivula School was contacted in December and the intervention was agreed to be carried

out in January. In the beginning of January, we had no snow and therefore no ice, which caused issues in planning. However snow arrived in time and the skating commenced in January. The thesis was finalized and presented in February 2014.

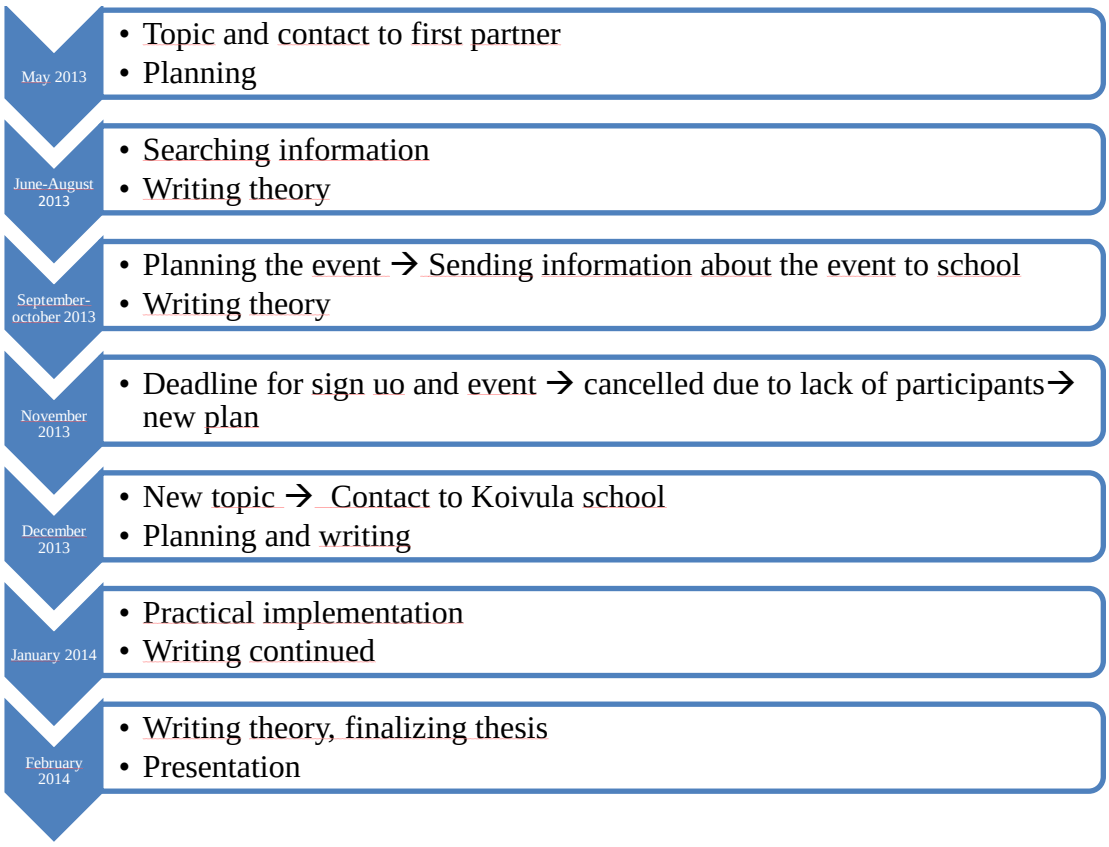

Figure 1. Thesis process

9 DISCUSSION

The thesis process started with an idea to make a practical thesis. We wanted it to be related to adapted physical activity. Our original idea was to implement winter activity day for children with disability but we had to cancel the event due to no enrollments. Therefore, we had to change the topic. We chose to plan and implement a skating school for children with disabilities. We chose skating because we wanted to complete our thesis before spring and skating is a great winter activity. Also, skating is challenging to teach and challenging to learn. We wanted to challenge ourselves,

therefore the skating was selected. We got inspired about a skating school and we wanted to offer experiences.

All skating sessions were implemented outdoors. Activities arranged outdoors requires good planning and organization. The fact that the weather conditions cannot be predicted caused some challenges. We also had to have an alternative program in case of rain or cold temperatures if we could not go outside. Various external stimuli caused some problems in concentration for the children. For instance, passersby, other skaters, ill-fitting skates and the cold temperature made concentrating more difficult.

We saw the children for the first time when we had the first skating session. We did not know much about their skills and, therefore, planning the session was very challenging. The planning would have been easier if we would have seen the kids before beginning. We could have planned one session held inside to have a basic idea about their skills. If we had known the children previously we could have planned more individual exercises. On the other hand, the results may be more reliable because we did not know the base level and what we were seeking for.

Deciding the evaluation criteria was hard. We did not have an exact test battery for the evaluation, because there wasn't one available. Since the children were at different skill levels, we had to decide a base level of the skills. Two of the children were already at the highest level that we determined and with them increase in skills and motor development could not be seen in this short of a time and little practice. Also, each child should have been evaluated the exact same way each time. One of the children did not have the support sledge with him during the last session and due to this his results are not reliable. During the last session he did not use the assistive aid due to the request of the teacher.

Skating sessions were planned to develop different areas in motor skills. We also tried to plan the sessions so that we took into account each children's special needs and so that everybody could participate at their own level. Differences in skill levels caused some challenges when planning and implementing sessions. Some of the children were more brave and talented whereas some of them were shyer and had

weaker skating skills. We planned exercises so that they were challenging enough but still easy to adopt. Sometimes the exercises turned to be too easy for some and vice versa. Due to differences in skills it was a challenge to plan a session which would have been perfectly suitable for every child.

We noticed that motor track goes smoother when the kids with better skills go first and the slower ones follow. It is also important that we finish each session by gathering together and calming down for a moment. In the end of the first session the kids left suddenly to take off the skates.

One of the challenges was the difficulty to instruct, assist and analyze at the same time. Even though we were two instructors it turned out to be difficult. Analyzing the results could have been easier if we would have videotaped each session or had assistants. The evaluation of the results was subjective from our point of view.

Due to changes in the schedule we were able to carry out only three skating session. Learning motor skills takes time and repetitions; therefore, the time period for our intervention was not ideal for the purpose. Due to the fact that the sample group was too small and the time period too short we cannot generalize these findings. Even though the time period was short we could see some positive changes in motor development with every child. There was one child with cerebral palsy participating without skates and he was, therefore, left out of the evaluation.

We learned from this process how to plan and implement a skating school for children with disabilities. In addition, we learned what to take into consideration when instructing special groups and therefore our instructing skills improved. During the writing process we improved our skills in using references.

9.1 Considerations for future topics

One future thesis could be a skating school with more sessions and more children than we had and some sessions could be held indoors. Also, the time period could be longer in order to study long term learning. It would interesting to see what the skills

of this group would be like if they were evaluated again a few weeks or months later. Also, different motor skills could be studied from the same sampling, not just skating.

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APPENDIX 1

Aims (Aims of each activity: cognit./psychomotor/affect./soc.)	Activities (Introduction, activity, modification etc.)	Teaching method	Org. issues and material (grouping of clients, material needed etc.)	Evaluation (Evaluation according to the aims
To learn the children's names and to get to know them.	Name and favorite animal	Each child introduces themselves and tells their favorite animal	Standing in a circle on the ice, skates on.	Each child understood the task and was able to complete it.
To determine what skills they have previously and to determine what should be trained next time	Duck walk (feet in v shape, heels together), marching, sausage glide (starting with heels together pushing toes out, then toes towards each other pushing inwards. Repeat), push & glide	One of the instructors explained and other one showed. Children then performed the movement. The children started at one line (determined by cones) and traveled to the next in	Children in a line, cones defined the area. two children support sledge	Children were at different levels (motor) developmentally, some had trouble concentrating due to other stimuli (skaters)

	(Practicing pushing and then gliding), stopping (practicing braking with one foot sideways, crouching down and standing up while glid-ing, picking glove off ice, falling down safely and getting up.	different ways.		
Getting warm and playing to see the action, using playfulness to learn.	Who is afraid of iceman? The children gathered in the line and one was se-lected as an iceman. Ice-man shouts “Who is afraid of the iceman?” The iceman’s purpose is to catch kids when they are skating from line to another line. When one is	The children knew the game, rules were ex-plained quickly.	Cones and the iceman.	The children were warm and had fun.

	cached he/she will help the iceman to catch others.			
The aim of the motor track is to evaluate the skills of each child separately, and this is the main too to be used in the subjective analysis in motor development.	Motor track (see appendix x).	Jenni explained and Anni showed how to complete the track.	3 ice hockey sticks, 11 cones.	Each child completed the track in the way they could and we could see the base level of their motor skills.

APPENDIX 2

Aims	Activities	Teaching method	Org. issues and material	Evaluation
Warm up and start concentrating on tasks.	Earth-sea-ship- game. First the game area needs to be defined. Three different areas were marked with cones. Then it is agreed which of them is Earth, sea and ship. The instructor then shouted one of the places and kids skated as fast as possible to the right area.	The children gathered in the earth and the instructor yelled to which placement they should skate.	Six cones of three different colors.	The children enjoyed the game and we could see how their concentration was good.
To determine their level of advance and to remind them of what we did last time, also to concentrate on training balance.	Duck walk, marching, sausage glide, push & glide, stopping, up & down while gliding, kangaroo & rabbit (jump and	Children were asked what they remember and they could show and the others followed, if they did not remember the	Children in a line, cones defined the area. Two children had a support sledge.	Some children had advanced and could remember quite well. Each child had something that was difficult.

	croutch), alphabet	instructors showed.		
Getting warm and playing to see the action, using playfulness to learn.	Who is afraid of iceman? The children gathered in the line and one was selected as an iceman. Iceman shouts "Who is afraid of the iceman?" The iceman's purpose is to catch kids when they are skating from line to another line. When one is cached he/she will help the iceman to catch others.	The children knew the game, rules were explained quickly.	Cones and the ice man.	The children were warm and had fun.
The aim of the motor track is to evaluate the skills of each child separately, and this is the main too to be used in the subjective analysis in motor development.	Motor track (see appendix x)	The track was reviewed	Three ice hockey sticks, eleven cones.	Each child completed the track in the way they could and we could see the development level of their motor skills. Some

				children were given support (holding hands)

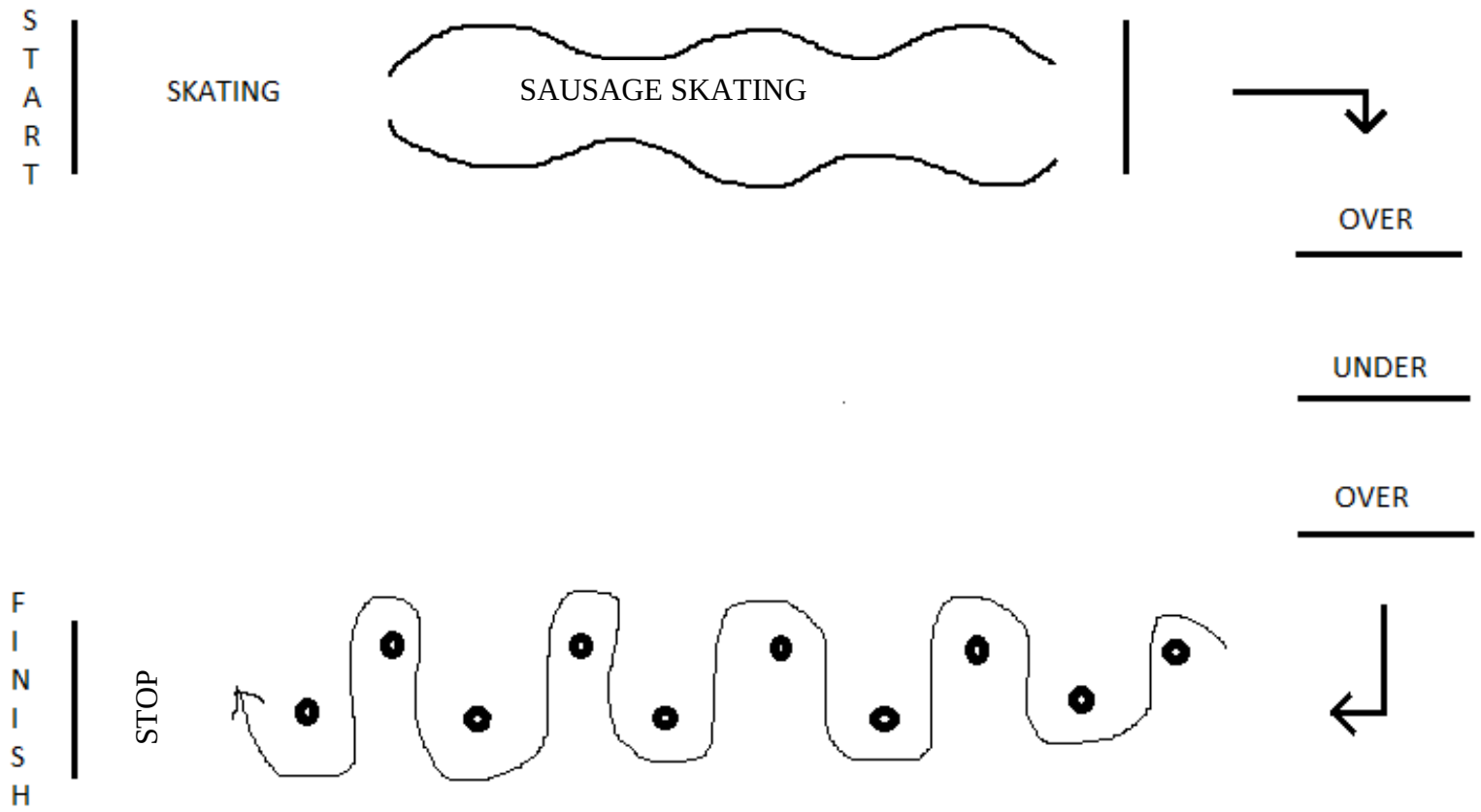
APPENDIX 3

Aims	Activities	Teaching method	Org. issues and material	Evaluation
Warm up and start concentrating on tasks. Practicing balance and push.	Hammer, saw and screw-driver. Kids were skating freely and then the instructor said e.g. hammer. Then, kids stopped and they moved like a hammer=jumping. Saw= skates goes back and forward in one place. Screwdriver= one foot still and other goes around.	The children skated in the marked area and the instructor yelled e.g. saw. If they did not remember how to perform the movement the instructor showed.	Area was defined with cones.	Game was unknown for kids. The children enjoyed the game and they were concentrating.
To determine their level of advance and to remind them of what we did last time, also to concentrate on training balance	Duck walk and push, sausage glide through cones, push & glide, kangaroo & rabbit (jump and croutch),	Children were asked to perform various styles.	Children in a line, cones defined the area.	Some children had advanced. Each child had something that was difficult.

and push.	slalom between the cones			
Warm up and have fun.	Banana tag. When a child was cached he or she stayed still and lifted both arms up. Saving happened so that you pull both hand down like you would peel a banana.	Instructions were given and then the game started. Reminding kids how to safe a person.	Area was defined with cones.	Children had fun and they got warm.
The aim of the motor track is to evaluate the skills of each child separately, and this is the main too to be used in the subjective analysis in motor development.	Motor track (see appendix x)	The track was reviewed.	Three ice hockey sticks, eleven cones.	Each child completed the track in the way they could and we could see the development level of their motor skills. Some chidren were given support (holding hands).
Exercise balance when squatting down to collect an item.	Treasure hunt. Ice was full of different treasures (e.g. balls, bean bags). Every child had their own	Instructions were given and after that they could play.	7 buckets and various treasures (different balls, bean bags).	Children really enjoyed this game. This was very fun way to practice balance and skating.

	bucket where they could collect as many treasures they could. They collected one item at a time to their bucket. At the end each child's treasures were counted.			

APPENDIX 4


START
SKATING
SAUSAGE SKATING
OVER
UNDER
OVER
FINISH
STOP