MOVEMENT AS A TOOL TO IMPROVING LEARNING ABILITIESAMONG KINDERGARTEN CHILDREN

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Abstract: The idea of the integration of movement in learning receives support in contemporary approaches in the areas of education and teaching, based on the principles presented in the work of researchers and educators. The social cultural approach describes the learning process as a process in which the child makes cultural tools into knowledge and his property through negotiations with the environment.

Keywords: *Movement, kindergarten children, education, learning process, social cultural approach*

Hannaford (2008) discusses movement and determines that movement constitutes an important component in the daily activity, including learning. Thinking and learning are anchored by movement. Actions such as scribbling, eye movements, speaking aloud to themselves or to others, writing things – all these are known movements that occur while thinking. Without any movement, there is no conscious thought. The final product of this process is meaning.

Feldenkreiz (1972) speaks about the importance of physical listening. This ability to identify a quality and to follow it is first a physical ability. When a mathematician examines a new problem and examines a certain solution, he may feel the quality of the solution before he analyzed all the components. Something in his body speaks for him.

Lasry (2011) in his article “Physicality in Early Childhood” notes that Gideon Carmi developed a project of creative thinking around the same approach. He sought to bring physical concepts to the kindergarten children. In his opinion, abstract concepts sit always on sensory-motor experiences. Therefore, instead of attempting to explain in words it enables them to experience. Hence, what guided the learning was the sense of difference that the child identifies in his body.

The learning style generally expresses the way in which the person learns best. Most people learn through more than one style, but every person has a dominant learning channel. A learner who experiences diverse ways of learning can identify his preferences and increase the effectiveness of his learning (Kula, 1985).

Body movement is the shift of the body or part of it. Body movement is a way of thinking, expression, functioning, and nonverbal communication. Academic learning is the development of thinking, knowledge, and expression in areas learned in the kindergarten and in the school. These are primarily verbal areas. Body movement, aside from its tremendous importance to the development of children in the motor area, may contribute to the children’s academic learning (Shuval, 2003).

This perception is different from the empiricist perception that sees the environment as the source of knowledge. According to this approach, the participation of children as active partners in social activities invites reciprocal activity during which the children internalize concepts and acquire skills because of negotiations to build meaning, which occurs in the same events (Tuval, 2002).

According to this approach, the learner’s cognitive development depends on the social interaction with the environment and on the mediation of adults. The educator must create for the learner an environment in which he can experience, research, hypothesize, and predict phenomena, examine it, and confirm or refute

it. All this is during the verbalization, description, and documentation of the processes he experiences. The education must lead the learner using mediation, from his current functioning perspective, to change cognitively and to function on the potential level he could not reach without intervention.

Many research studies addressed the benefit in learning through movement. Some addressed the topic of the importance of the work on the balance. Shuval examined the influence of the body movement on the understanding of geometric movements and many others that pertained to the topic studied the influence of body movements on the understanding of different topics. The reference is the holistic constellation; the influence of movement on learning in general did not examine the relationships between movement and understanding concepts such as the understanding of the concept of number, when most research studies engage in the ages of the elementary schools and not kindergarten age.

In the kindergarten, as a part of the daily life, a situation is created in which there is an opportunity to be helped by the body movements for theoretical learning (Shuval, 2005).

“Movement is the gateway to learning.” Without movement, there is no life. Movement is an important step in human nature. We must be more aware of the body’s role in learning. Dennison (2009) coined this sentence that emphasizes the relationship between learning and movement. Like the whole person is greater than the sum of his parts, this is true for every activity, which we choose to improve, whether it is sensory-physical, emotional, or cognitive. When we improve our physical ability in activity such as soccer, we improve our area of activity in the sports field: we can kick the ball better, our spatial perception will improve, and we will see beyond the ball and the goal, we can dribble the ball better while running after we have improved our hand-foot-eye coordination, and

so on. All these aspects are expressed in all our activities in our everyday life: hand-foot-eye coordination is an important component for walking, opening a door, reading, writing, and so on. When we improve our activity only in one areas of our life each time, this will influence the quality of all our activity. We cannot rely on the fact that changes and growth will occur in general. The rapid pace of changes in our everyday lives sets before the person a demanding requirement for rapid adjustment, for new forms of functioning in new needs in a changing environment. The learning occurs when we encounter the world (Dennison, 2009).

Kindergarten teachers and teachers who teach academic subjects choose tasks that entail body movements, when they want to promote the academic learning of the children in their classrooms (Ben-Ari, 2002). In the kindergarten, for example, the children hop while counting (Alkemeyer, 2002; Light, 2002). The meaning of these researchers' statements is reinforced further by the researchers Jensen (2003), Hannaford (2008), Lidor (1994), Yazdi Ogev, (1993) who maintain that movement is an inseparable part of our everyday life: it occurs in every place and at every time. A person moves spontaneously while being aware of his movements and sometimes when he is not aware. Movement enables the person to exist, to function, to protect himself, to adjust himself to the environment, and to enlist the environment for his needs, to acquire knowledge, to act effectively, to create relationships, and to maintain his health and wellbeing. In modern society and in contemporary culture, considerable emphasis is placed on technological aspects and functional convenience. Simultaneously the place of movement activity, in its different types, in everyday life both among adults and among children lessens. The children's leisure time hours are characterized by the minimization of outdoor games, movement games, and free play, and this reduction in movement has influences on the children's physical state and quality

of life. Opposing these phenomena, the educational research emphasizes the role of physical activity in the child's normal development (Hannaford, 2008; Jensen, 2003; Lidor, 1994, Yazdi-Ogev, 1993), in the child's functioning in and adjustment to the framework in which he is found, and its influence on the learning ability and his personal ability expression.

In an era of accelerated technological development, the children in our era have become 'couch potatoes'. Consequently, they infrequently move their body. However, activity, play, and movement not only are liked by children but also constitute basic elements in every process of motor development and learning of movement skills, primarily during early childhood. In essence, they constitute an inseparable part of the child's process of development in the physical, emotional, social, and cognitive aspect. Progress has made our lives easier but has also stolen from this life an important part of the health and development of the child and the adult. For children during early childhood, movement is a basic need found at the center of their lives. Naturally the children evince interest in movement and tend to examine the boundaries of the movement of their body. The children use movement also to express emotions and through it they learn about the world around them and themselves (Clements, 2003; Lorenzo-Lasa, Ideishi, & Ideishi, 2007; Shohat, 2003; Walter, 2011).

In light of the reduction of movement games and out of the desire to add physical activity to the study day, ideas and programs were proposed for the integration of guided movement in the teaching of the learning contents in the kindergarten and in the initial classes of the elementary school (Segev-Tal Galili, 2010).

Maria Montessori, Gideon Levin, and Danny Lasry best expressed in short, the idea of the use of movement. They maintain that over the years there have been many thinkers on the theory of the kindergarten who repeatedly

emphasized the importance of the body in movement (Montessori & Levin, 1995). Lasry (2011) emphasizes the advantages and importance of activity in general and spontaneous activity in particular.

Children must look at the movement and be attentive. After the children have internalized the movement, they must process the sight into movements and implement it into movement. The movement contributes also to the ability to follow the instructions and understand them. The children must master their body and their movements and adjust them to the request of the environment. Using the movement, the children can also release their emotions. They learn to control themselves and their body and thus their desires and emotions (Lasry, 2011; Lorenzo-Lasa et al., 2007; Walter, 2011). As the child succeeds in mastering his body better and performing complicated motor skills, his self-confidence increases, he succeeds in postponing satisfactions, coping with frustrations and mastering his drives, thoughts, and emotions in the best possible way (Lorenzo-Lasa et al., 2007; Walter, 2011).

The child who is asked to create a comparison in movement performs an outside process – and simultaneously will attempt in a process of internal thinking to identify the difference. This experience is actions of trial and error; it enables the perseverance in action all the time that the movement shifts to another movement.

The movement is arousing, enjoyable, and encourages the children to continue in the task. Arousal is the willingness to act; enjoyment is a product of the sense of satisfaction with activity. It is difficult to separate between arousal and enjoyment since they nurture one another. Enjoyment preserves arousal, and arousal enables enjoyment (Shuval, 2003). The researcher adds that movement develops and encourages the ability of spatial orientation, the individual's ability to know the environment, with its complexity, and to act in it.

Walter (2011) and Lorenzo-Lasa et al. (2007) summarize the main perception that movement constitutes an important component in everyday activity, including learning. The movements are necessary for functions such as concentration, understanding instructions, the perception of space, size, and quantity, and the development of self-confidence and independence.

The movement of the body enables feedback to be obtained since it is an activity that appears to all those who are present and invites a response from them. Feedback encourages continuation and experience. The kindergarten teacher's feedback will allow the continuation of the experience and perhaps even will awaken new directions of development. The kindergarten children and their response to one another in giving the feedback create a new situation to which the child responds and thus enables longer focus on the task.

Breaking up the school day with physical activity for the kindergarten children makes them better students. It becomes clear that physical activity prepares the children for intellective activity and more effective learning in both physical and intellective terms (Vogovitz, 2008). According to Vogovitz, when the educator 'breaks up' the school day with activity in movement, active children become better students. Activities in movement enable children to be aware and curious (Vogovitz, 2008). A routine of activity in movement constitutes a good tool of coping for children with a short attention span (Hall, 2007). The child who attempts over time activity enabled by movement presents better attention (Leont'ev, 1994).

In contrast to Vogovitz, (2008) maintain that transitions during activity in movement help children focus and offer possibilities to connect between thought and body. This activity enables the teachers to build an atmosphere of trust and encourage the children to think, learn inside and outside of the school walls. The movement experience enables children to better digest what they learned.

Therefore, children with a short attention span need more frequent time periods. Activity in movement during the day enables children to internalize what is learned. The activity needs to be a part of the routine of the school system and be aimed at the hours when the children have low energy (Vogovitz, 2008).

Vogovitz (2008) believes that successful activity in movement in the class with peers can constitute a source of happiness and a sense of belonging for the child. Children learn movement and song quickly, and they enjoy group activity. The implementation of activity in movement in the class in the agenda is important, primarily during the hours when the children tend to be restless and lack alertness (Vogovitz, 2008).

Movement during learning makes initiative easier, since the child can determine the initial level and content according to his nature and skills. After the child attempts movement, new possibilities of learning are opened that encourage the child to continue to initiate. Every child can perform the task in ways of his own, in an order that is significant to him, with a complexity of actions meaning to him, and to decide on the level of involvement of his body (one hand, two hands, use of feet). After the experience, every child has some conclusions about parameters for comparison, which are met in movement (Shuval, 2003). The researcher adds that it is important to begin with small activity and to build it gradually. Children learn best new material based on previous knowledge. However, the movement provides an opportunity for independent learning in that it reduces the dependence on previous information.

The improvements that occurred in the quality of the movement cause great satisfaction and thus encourage the continuation of activity. When the learning is independent, the child performs learning activities at his initiative, regardless of the necessary dependence on the direct interaction with the educator – the kindergarten teacher, teacher, or any other known adult. The reduction of the

dependence on previous information is made possible because of the information that the movement provides for the person who is coping with the task. The attempt to cope with the question verbally depends on the previous knowledge. In contrast, the experience with movement serves for the learner as a scaffolding for independent experience that causes the meeting with the experience of difference (Shuval, 2003).

If we compare the group learning using body movement to group learning through discussion alone, we can emphasize the contribution of the movement: in discussion, only those with the ability to express their ideas verbally, ability that depends on the social background and complex skills, can initiate participation in the group discussion. In contrast, in the raising of ideas in movement there is no limitation of social background since different abilities from different levels bring diverse and significant ideas for experience and learning (Shuval, 2003).

Shank (2011) conducted a meta-analysis that summarizes twenty years of research on the topic. In his review, Shank discusses at length the concept of motivation and its impact on the learning process. From his research studies it is possible to clearly conclude that learning motivation is significant and more important for the promotion of achievements and the cultivation of an independent learner with high order thinking, who learns from enjoyment and motivation. The scholastic motivation and its contribution are important, since motivation leads to the development of the learner's self-efficacy and constitutes a basis for the learner's change of behavior in relation to his scholastic achievements. The learner who perceives himself as having high efficacy will evince willingness to take part in a task and will invest effort in perseverance over time.

Movement as an instrument enables occurrences such as perseverance in the task and independence during the coping with the task. It is possible to say

that there is a reason that children use movement for learning (Shuval, 2003). Our role is to enable them freedom of movement: not to disturb, to let them discover their body, to participate in the children's physical experience, and to teach them to listen to their body. The sitting over time in sessions and the recurrent demand made of the child to restrain his spontaneous movement sabotage his development. The child needs to move, and when a child feels that his freedom of movement is respected it is easier for him to focus (Lasry, 2011).

Walter (2011) and Lorenzo-Lasa et al. (2007) opine that the development of movement has great value as an instrument that helps the child behave better in his environment. Using games of moving and stopping the child develops emotional regulation and self-control. For the performance of these actions, the child must succeed in skills of motor organization. The child must adjust himself and his movements to the field conditions, implement consideration, to decide when to stop and listen to outside directives, to begin and to stop the movement at the time required of him. These activities help the child adjust and cope with the social reality (Lorenzo-Lasa et al., 2007; Walter, 2011).

Using the engagement in movement, it is possible to promote many developmental, motor, cognitive, social, and emotional areas. In addition, the development of movement helps the children be attentive to their environment and move according to the conditions of the environment, without endangering themselves or those around them (Lorenzo-Lasa et al., 2007; Walter, 2011).

The goals of movement education in early childhood are to provide the child with the opportunity to learn to organize himself in a changing environment, to learn to identify and define problems, to learn to choose and develop orientation, to learn to solve problems, to learn to identify himself, to learn to use different options, to learn to collect data, and so on (Shimoni, 2006). Shuval (2006) writes about movement in which children create with their bodies

geometric shapes to learn about the shape, draw relationships, and understand the relationship between the cause and the effect. In addition, during the activities the children see their peers moving, touching them and objects, and cooperating to create needed movements – all to use the possibilities of the movement of the body for the purpose of learning. The movement is composed of 'movement for its own sake' and 'movement by the way'. Movement for its own sake is planned ahead of time for a defined goal of the improvement of the physical competencies and motor skills. This movement does not occur during the time of academic learning, its relationships to scholastic achievements are not direct, they occur through mediated processes, such as the acquisition of the skills needed for learning: strong work morality, respect of authority, and perseverance in the movement in time and physical space. It is necessary to invest in its strength, and when it occurs in a group it causes the individual to encounter different social situations (Shuval, 2006).

In play, the child coaches and practices his physical skills. He repeats a certain action several times and develops good motor control of his body limbs and coordination between them. During play in the corners of the kindergarten the child imitates the movements and actions of adults and acquires similar physical agility (Pellegrini & Galda, 1991).

Verbal interaction enables feedback to movement in that it confirms movement experience, proposes changes to it or explains it, and thus enables transition from practical experience to its setting verbally as an inclusive idea or as another possibility for solution. The movement interaction provides visual, kinesthetic, and tactile feedback and enables the examination of verbal hypotheses and their illustration through the initiative to attempt them in movement (Ben-Ari, 2002).

Segev-Tal and Galili (2010) propose to integrate guided movement in teaching curricula in the first classes of the elementary school and in the kindergarten. The ideas and rationale behind them are based on contemporary approaches in education and are aimed at teaching that acts on all the student's personality dimensions. The integration of active learning contributes to the flexible organization of the scholastic agenda. Movement activity in Israel is often found at the margins. The use of movement is primarily utilized in special events, such as ceremonies and shows presented by the school. The belief in the importance of the guided movement activity led to the search for the integration of the movement activity in the school agenda in the work of the teachers who are not teachers of movement primarily as a tool, means, of additional method of teaching to the accepted methods. It is important that the teacher sees movement to be a relevant topic for her and not something 'strange' that 'does not belong'. A teacher who likes movement, who enjoys moving herself, will be open to the possibility of the presentation of the movement contents for the children, with whom she works. She will not rely on the thought about ideas and theoretical explanations from the professional literature but will search for ways of realizing them. The movement will pave for the teacher another path to draw close to the child and to 'speak' to him in a language close to his existence and she will add a dimension of depth and uniqueness to the dialogue with him.

The holistic framework includes also aesthetic qualities that extend the student's ability of choice and help him decide the way in which he will experience the world. In the teaching of the learning of movement, there is expression of the holistic approach, since in this way the students have physical activity in which there is spontaneity, thinking, search and experiment, improvisation and connection and aesthetic aspects that are not necessarily related to the engagement in art. The integration of the studies of movement in

conventional learning will constitute a change in the nature of the learning activity to which the students are accustomed, will emphasize the movement-physical dimension, and will increase the relationships between it and additional components involved in learning. Learning that integrates movement will influence the learners' sense of enjoyment, whether this is enjoyment for its own sake or as a byproduct of the activity. The main place of the individual in the learning is expressed in the emphasis of the learners' needs and in the attribution of meaning to their personal viewpoint in the learning process (Brooks & Brooks, 1999)

According to the approaches prevalent today in education, it is necessary to allow the learner to express his processes of thinking and the contexts he makes and, in this way, to promote his learning. The integration of movement in the teaching and learning processes presents an opening also for other learning styles, different from those that exist in the class. It expresses the recognition of the existence of difference among students and encourages unique personal expression. The flexible organization of the learning class is a necessary component in the considerations of the teaching, primarily since the educational system in Israel is characterized by a very crowded learning environment. In the school classes and the kindergarten classes, there are physical conditions that limit the personal space, the movement, and the mobility of the students and the teacher/kindergarten teacher.

In such learning, the children are involved in the initiative and planning of the learning tasks and act independently to reach the understanding of the learning content. They express their attitudes and their objections and link what is learned to previous personal knowledge, while they are implementing the information they obtained or making some use of it. The movement is an active action, and the integration of movement in learning creates immediate conditions for the

existence of active learning. There is reference to the learner's personal pace and style of learning and a large degree of independence and freedom of choice of the students in the planning and performance of the tasks. Learning that incorporates movement awakens physical enjoyment. When active learning of this type is supported by a positive atmosphere and the setting of a cognitive and movement challenge, the student's internal motivation is strengthened and creates in him a sense of inner reward. The level of internal motivation influences the brain activity and is expressed in the excretion of chemical substances and the change of the pace of the transmission of the nervous messages (Jensen, 2003). The freedom of movement and opportunities for the personal choice in the active learning inculcate in the student a feeling of autonomy and strengthen the self-confidence (Sharen & Hertz-Lazarovitz, 1981).

The researchers differentiate between two types of transference: higher and lower (Salomon & Perkins, 2000). In higher transference, there is an entity of principles and pieces of knowledge acquired through direct teaching. This is transference with a conceptual nature. For instance, in activity on the topic of the 'number' concepts of large, small, before, and after are mentioned. The performances of movement and advancement forward and backward with the accompaniment of focused guidance will clarify to the participants the nature of the concepts. The lower transference is achieved, according to the researchers, through the performance and recurrent practice and through illustration and reinforcements. For instance, the recurrent experience in the performance of movement at a different pace from what he is used to will teach him to shift with flexibility between the activities that require different speed and pace and to adjust himself to them. The activities serve as a factor that supports learning and the creation of attention and as a break or transition between activities and lessons. The learning contents that the movement activity directs at are tailored to the

kindergarten child and students of the lower classes of the state elementary school. The teachers and kindergarten teachers of the program offer ideas for the integration of movement in the teaching of the different topics through linkages to personal, social, and cultural aspects. The kindergarten teacher can use the guidelines as they are or process the proposals and adjust them to the topics learned in the kindergarten and the children's cognitive and motor abilities.

Hannaford (2008) conveys the main message in a few words: learning requires moving. Movement contributes to academic learning in five intertwined ways: activates the kinesthetic perception, which constitutes a channel of information significant to learning, creates conditions for learning through the delay of the movement of body, encourages perseverance in learning, helps in the transfer of intuitive information to knowledge to formal knowledge, and provides opportunities for independent learning (Shuval, 2005).

Kinesthesia (*kincin* meaning to move, and *aesthesis,* feeling) is the feeling of movements and postures of the parts of the body. Through kinesthesia, without the sense of vision, we absorb the place of the limbs. The kinesthetic information is absorbed and conveyed through four types of receptors: the muscles, the tendons, the joints, and the skin above the joints. Kinesthesia provides continuous information on all the parts of the body, on the facilitators, on the tension in the muscles, and on the movements being performed. Kinesthesia is vital to all sensory-motor behavior. It is essential for the preservation and posture of facilitators and for the identification and correction of mistakes in the skilled movements towards a goal, and it is the main source of information for the memorization of the movements.

Shuval (2005) uses the idea of kinesthesia to explain the contribution of the movement to the learning. The main meaning of the physical encounter with

the environment that is learned about is the opportunity to use the kinesthetic perception.

The kinesthetic perception provides information about the position of the body in the environment, the place of each one of the limbs, the changes in the position of the entire body or some of the limbs, the size of the objects, the learning about its traits, the weight of the object, the speed of its movement, and primarily the forces that act on it. It is possible to observe that in all learning in which the kinesthetic perception can provide information that does not come from the regular perceptions of academic learning, this information will allow the learning about the physical world of objects, about space, and about time – the dimensions of the movement (Scherer, 1987). The kinesthetic perception provides the learners also with information that complements the information from the other senses. The range of information that the perception complements is broadest.

If we follow up after the curricula in the kindergarten and the elementary school, we see that most of the topics of learning depend on the perceptual information, and the information from the kinesthetic perception may help. The mental image of the movement is expressed in the recall of the movement. The uniqueness of the mental image of the movement is that it links image information to the way in which the information was acquired, for instance, we remember not only the weight of the package we carried yesterday but also how we lifted it and how we carried it and at what point we needed to rest, since it was too heavy. This memory enables us to reconstruct the way in which the information was acquired and later to visit the solution and perhaps even to search for additional ways to solve the problem (Shuval, 2003).

The children use spontaneously the body movement for the purpose of theoretical learning. Children jump, count, or stride, while dividing words of the

song to syllables. The movement contributes to the theoretical learning in the stage of the preparation towards the learning, creates conditions of learning through the delay in the process of the learning itself, improves the learning through the kinesthetic perception and as a tool that enables significant occurrences of learning, and constitutes an aid for perseverance and provides opportunities for independent learning (Shuval, 2003).

Movement that is subordinate to a learning task enables a long and effective stay in the task for several reasons. First, the movement conducts a dialogue between internal processes that cope with the question and external processes of the moving people. Second, the movement enables feedback that causes the continuation of the activity. Third, the movement inspires, pleasures, and keeps the children in the task. There is no need to force the movement and the physical activity to an academic topic. To enable a significant contribution, it is necessary to analyze the learned content and to examine which parts of the learned content suit the encounter with the social or physical environment. It is possible to integrate learning arithmetic – counting, comparison of groups, representation of quantities, and solving arithmetic problems.

As the movement is more involved in academic learning, there is a greater likelihood for quality learning. For the movement to help the learning, it is necessary to choose tasks in which the movement is significant for the learning itself and not to be satisfied with the movement as a side issue.

Shuval (2005) emphasizes that the academic knowledge acquired through movement has four aspects of knowledge: academic-verbal, practical, transition from practical to verbal, and transition from verbal to practical. Experience running between facilities, without banging into them, contributes to the improvement of the perception of the boundaries of space (Shuval, 2005).

Aharoni (2013) holds that mathematicians know that thinking is performed through examples. It moves from the individual to the general. A mathematician thinks in examples, the simplifications come afterwards by themselves. The rule is that it is not too simple. It is necessary to look first at the simplest examples.

Dennison (2009) determined that "movement and learning go together; one must go with the other. Movement based on learning is neglect of the brain. Happiness that we feel at the moment of learning of something new becomes ours through movement – will become ours forever."

Effective learning occurs through experience, curiosity, and play in space. The experience encourages attempting and through it we learn and develop in life.

The research study of Shuval (2005) discusses the question of whether movement may lead to the development of cognitive schema. May the body movements help in the transfer of intuitive knowledge to formal knowledge? The intuitive knowledge on the physical world is the knowledge accumulated with the observation of the phenomena in the world and with the ability to explain them, without the ability to provide a logical explanation. This knowledge is acquired through experience. The formal knowledge on the physical world is verbal knowledge, which includes facts and understanding of the processes and is acquired by others in an intentional and controlled manner. The formal knowledge develops from the intuitive knowledge, even when it is contradictory to it. The body movement can create intuitive knowledge about the components of the physical world to which it is connected since it is a part of the system of perception. The movement can help in the transition of intuitive information to verbal intuitive knowledge and in addition create a connection at the time of the acquisition of the formal knowledge, since it brings unique data and enables control through the relationship between the kinesthetic perception and the movement response.

In addition to the programs that directly connect between movement and academic learning, there are many curricula that propose 'active teaching' of individuals and groups (Kedem-Friedrich & Ben-Ari, 1996). In these educational programs, the children move as an inseparable part of the activity they perform but for the program authors and educators this variable is hidden behind concepts such as motivation, problem solving (Ben-Ari & Eliassy, 2003), and motivation and social interaction (Ben-Ari & Kedem-Friedrich, 2000). Since the verbal realization of these concepts requires skills of language and verbal communication that children have not yet mastered, most of the programs of active teaching prefer offering children outside-physical activities that help children be active through the learning time. In these programs the children are asked to choose ways of activity such as building, the drama, dancing, participation in the group play, and performance of tasks of cooperation, for instance, to have all the members of the group pass over an obstacle, in which the component of the movement is an inseparable part of the learning.

The learning activities are physical encounters with the learned environment, help with visual-movement illustration, social-movement interaction, social-verbal interaction, and stay in learning activity of movement behaviors that are not for the purposes of learning. Research studies show that a significant positive correlation was found between the variables of the learning activities and the improvement in the learning achievements in general (Shuval, 2009).

Motor experiential activity in different topics of mathematics can link between movement, mathematics, and everyday life. The engagement in mathematics through movement enables the kindergarten teacher to link between two very important domains in early childhood – mathematics and motor activity.

Shuval (2009) writes in her article on the relationship between activities of learning during movement and improvement in the learning achievements on the topic of angles. She presents the relationship between academic achievements and participation in activity of movement and level of physical fitness of children aged seven to fifteen. The research study indicates a significant positive correlation in the range of ages examined, in both sexes, but they do not provide explanations of this relationship.

Blasky (1978) examined a specific program that teaches concepts of space through movement and that illustrates these concepts for disadvantaged children in the first classes of the elementary school. Hannaford (2008) found better learning of the concepts of space among the group that learned through movement in comparison to the group that learned without movement. However, very few research studies address the acquisition and improvement of the mathematical skills through work with the body (Hannaford, 2008).

Learning activities through movement contribute to the significant learning that occurs when the learner has an opportunity to be active – to perceive what the problem is, to ask questions, to initiate solutions, and to encounter difficulties (Haggard, 2001).

Illustration is an everyday tool in teaching in general and in teaching related to science in particular. Illustration provides an example of an abstract principle and encourages discussion between the learners based on what everyone sees. During movement there are two complementary illustrations. The first is visual – the learner sees what happens to objects and what others do and these constitute an example for him, while the second is kinesthetic – the learner illustrates for himself.

A research study that examined the ability to evaluate spatial-environmental abilities found that the respondents could evaluate better their

knowledge when it is linked to movement and can be experienced in the physical environment, in contrast to being learned through a map (Hegarty, Richardson, Montello Lovelace, & Subbiah, 2002).

Research studies in the field of illustration of the skills of sport indicate the importance of visual-motor illustration, especially when the person doing the illustration is a peer known to the learners, since then the illustration increases their motivation (to imitate and to understand) (Soohoo, Takemoto, & McCullagh, 2004). It is reasonable to assume that the same mechanism of the increase of the motivation to imitate and understand also acts when the motor illustration is for other purposes of learning.

Hannaford (2008) calls for the use of the head but also the body. She maintains that true learning, the type that produces meaningful associations for the learner, is not complete until some output, a physical or personal expression of thought, is created. A considerable part of learning is related to the institutionalization of the skills that enable us to express the knowledge that we accumulated. Speaking, writing, thinking, drawing, art, playing, singing, movement in dance or in sport – the development of our knowledge strides hand in hand with the development of the skills that support and express this knowledge.

Visual perception, skills, and hand-eye coordination are required to perform the fine action required while writing. Correct mastery of the body and its limbs, such as a strong shoulder breadth, correct posture, and balance, is also necessary.

Athletic activities combine between many different types of knowledge, along with skilled coordination – knowledge on time and space and human dynamics, such as teamwork, motivation, and search for challenges. The educators must not diminish their importance. Art and athletics are not games.

They constitute ways of thinking with power and needs, with high skill for communication with the world. They deserve a larger share of the time and resources of the school than they are given till now (Hannaford, 2008).

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