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Concept development in early childhood

Utku Beyazıt, *Akdeniz University,* Turkey, *proz2proz@yahoo.com* ORCID: 0000-0002-2596-9091
Aynur Bütün Ayhan, *Ankara University,* Turkey, *a_butun@yahoo.com* ORCID: 0000-0003-3306-9672

Abstract. Concepts are defined as mental tools that enable the formation of basic cognitive structures in long-term memory and of the retention of new information in a meaningful way. Children, with the help of concepts, begin to evaluate the qualities of objects and form cognitive structures in order to adapt to the world surrounding them, starting from very early ages. The formation and the maturation of many cognitive structures occur through concept development in early childhood. However, our understanding of developmental mechanisms of conceptual development is incomplete. Within this context in this study, the concept development in early childhood is examined and suggestions were brought for parents and educators to support the concept development in children.

Keywords: Concept, concept development, early childhood

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INTRODUCTION

The early childhood period is usually described as the period from birth to eight years of age and it is claimed that it plays a critical role in a child's development (Waller, 2005). It has been identified that most of the cognitive development is completed before the age of seven. Therefore, early childhood is a remarkable period for cognitive development, as the individual experiences more rapid brain growth and learning compared with all other periods and this sets the basis for concept development (Kail & Cavanaough, 2007; Kılıç, 2010).

Cognition is described as the human's unique method of biological adaptation to a complex environment (Oakley, 2004). This process generally refers to all mental activities through which human beings acquire and process knowledge (Taylor, 2005). Cognitive development is defined as the realization of the development of active mental processes, enabling the individual to understand and learn about the world (Bee & Boyd, 2009; Senemoğlu, 2010). However, views about children's cognitive development are argued to be often limited to measures of intelligence, such as in terms of the intelligence quotient and academic achievement. It is emphasized that such cognitive measures only permit a limited understanding of how a child thinks and what a child knows and it is argued that it is based upon age (Spritz & Sandberg, 2010). Children learn the concepts that form the basis of thinking during early childhood and they subsequently categorize these concepts. Concepts learnt as a result of this categorization become meaningful and this process leads them to learning new information (Bütün Ayhan, 2009). While they acquire concepts, children acquire an understanding of the world through play; they interact with the external world, and ask questions related to their experiences. Gradually, they come to understand more about how the world functions. They begin to acquire time concepts, such as yesterday, today, tomorrow; the meaning of right and wrong; the features of nature such as light, heat, distance, living and non-living objects; the change of state from solid to liquid; they start grouping objects in terms of colour and shape, and make classifications in terms of basic criteria (Minett, 2014).

It seems plausible to argue that concept development should be examined in order to achieve a better understanding of cognitive development, as the development of cognitive abilities is predominantly reliant on the establishment of concepts. However, our understanding of developmental mechanisms of conceptual development is incomplete. Within this context in this study, the concept development in early childhood is examined.

Basic Terms and Definitions

Concepts are defined as mental tools that enable the formation of basic cognitive structures in long-term memory and of the retention of new information in a meaningful way. Concepts, as emphasized, enable individuals to think, understand the physical and social environment they live in (Lieberman, 2012; Slonchak & Pesina, 2015). The fundamental term concept is used to describe the features of people or objects, their amounts and places in a space (Uyanık Balat & Güven, 2006). These concepts can describe people or objects in terms of being beautiful, long, tall, angry or small; the location of an object within a space such as in, on, next to; time concepts such as before or after; and amounts such as little, some or a lot (Uyanık Balat, 2009).

Concepts are divided into two categories: identity concepts and classification concepts. The identity concept is a mental design of an individual, place, event, object or relationship. For example, a child's concepts regarding his/her parents, home, or school are called identity concepts. Babies, once they acquire an identity concept for something, recognize it whenever they see it and they do not have to re-learn on each occasion. The classification concept is the mental design of a group of people, places or things that have certain commonalities. For instance, concepts like book, dog, and chair are classification concepts (Gardiner & Gardiner, 2004). Concepts are also grouped into two according the ways they are learned: experiential and metaphorical concepts. Experiential concepts are related to experiences which are spatial (e.g. up-down, in-out) and structural (e.g. schemas of events). Metaphorical concepts are derived from experiential concepts are used to link ideas for a better understanding of something (e.g. "you will win if you play your cards right" or "I" am full of life") (Ülgen, 2001). The importance of information regarding various concept types in concept learning is underlined because the type of the concept determines how the concept will be taught to children. In this regard, concepts are divided into concrete and abstract concepts. Learning of concrete concepts is easier due to the clear distinction between positive and negative examples. It is stated that concept development is realized through the transition from concrete to abstract (Aral & Keskin, 2016).

Concepts describing the features of creatures are categorized as follows (Tuncer & Altunay, 2004; Vuran & Çelik, 2012):

- Concepts identifying places (location concepts): On-under, in-out, on the right-on the left, in front of-behind, first-last, etc.
- Concepts identifying opposition: Hot-cold, open-closed, clean-dirty, old-new, etc.
- Amount/Quantity concepts: Few-a lot, heavy-light, full-empty, whole-half, etc.
- Attribution concepts: Tall-short, wide-narrow, big-small, etc.
- Concepts identifying actions: Come, run, take/get, fill, empty, bring, throw, play, let go, walk, etc.
- Concepts identifying the highest level: The widest, the largest, the heaviest, etc.
- Colour concepts: Red, yellow, green, black, etc.
- Comparative concepts: Similar to large, wide, hot, but identifying a comparison with other types of size, width or warmth.
- Non-comparative concepts: Position-related concepts such as on top, next to; and concepts such as to run, to jump, vertical, horizontal, red, etc.
- Nouns: Nouns are the labels of object categories such as sweater, plane, fork, vehicle, clothes, etc. Similarly, letters and numbers are also nouns. Some nouns also include more sub-categories. For example, the concept of vehicle includes sub-categories such as boat, truck, automobile, etc.

Concepts, either concrete or abstract, enable the grouping of objects, ideas or events in an individual's surroundings; and eases our understanding of our environment. Children, with the help of concepts, begin to evaluate the qualities of objects. Concepts facilitate the process of planning and guiding events (Aral, 2011). An individual's ability to understand and form concepts is the factor that makes language and thought possible. Language is a combination of words which are actually sets of sounds that represent a concept. Similarly, concepts make up the raw material for thought as, by combining concepts appropriately, individuals are capable of

thinking and reasoning (Lieberman, 2012; Saxton, 2017). Relations between concepts form the principles related to concepts. Understanding the principles, in turn, fosters problem-solving, systematic grouping, organization of information and they are strong tools of reasoning. Concepts provide children with permanent information systems. Thus, when a child learns a concept, he/she can then also recognize the examples of that concept. In addition to such benefits provided by concepts, concepts also facilitate interpersonal communication and individuals express their desires and transmit their messages in a clearer manner by using concepts (Gelman, 1998).

The Formation of Concepts

Within cognitive psychology, there several theories that describe the process of concept development. The two major theories are suggested to be the probabilistic view and the classical view. The classical view argues that categories and concepts are represented by distinctive features. For example, birds have distinctive features, such as wings. Examples of a concept share various common features that are necessary for defining that concept. However, the probabilistic view also considers the characteristic features, not in terms of the defining features. According to this view, if any example has sufficient characterizing features, then it can still be accepted as an example of that particular concept (Levenson et al., 2011).

Apart from these theories, it is argued that Jean Piaget's theory of cognitive development has had a significant influence on understanding children's thinking and their development (Berger, 2010). Piaget (1999) realized that babies are curious and thoughtful, creating their own schema about their world. He believed that schemas are systematic patterns of actions which underlie intelligence. He viewed children as being active individuals who consequently become responsible for their own development. A schema refers to the cognitive representation of activities or things. For example, babies have innate schemas for sucking in order to ensure that they can feed and survive. As the baby grows, these schemas will become integrated with other feeding schemas. Piaget described four major periods of cognitive development, which are derived from action and are integrated with one another: The sensorimotor period (from birth to two years old), the preoperational period (between two and seven years), the concrete operational period (between seven and eleven years), and the formal operational period (between eleven and sixteen years). During the sensorimotor period (from birth to about two years), children's thinking is limited to their own actions on objects. Piaget (1971) considered the thoughts of preoperational children to be intuitive, in contrast with the logical thought of concrete operational children. In the concrete operational period, through the application of logical abilities, children can master the concepts of number, conservation, classification, and other scientific ideas. Conservation is defined as the child's understanding that when nothing has been removed or added from an object or collection of objects, the amount or quantity remains the same, despite changes in form or spatial arrangements (Piaget, 1974). The major factor in the transition from the concrete to the formal operational stage is the advent of hypothetical-deductive reasoning, in which thinking can be performed solely in terms of symbols, without the need for referents in real life. The child can think about what is possible as well as what is real. A child in the formal operational period is able to think like a scientist, can use inductive reasoning, is able to think about thinking, and can reflect on the outcome of their own thoughts (Piaget, 2005).

Starting from infancy, children establish various mental constructs in order to adapt to their surroundings. Basicly, the formation and development of mental constructs occur via concept development (Newman & Newman, 2009; Santrock, 2014). Concept development involves different processes, such as perceiving or finding similarities and differences, ordering, generalizing, giving examples of a group, and classification. Concept learning process starts with learning to differentiate. The skills for paying attention to the characteristics of objects or events, learning to differentiate and generalization develop simultaneously. It is claimed that concept development begins at birth and continues until death (Aral, 2011). Child's first concept is the feeding bottle. The concepts become more complex as the child grows (Ülgen, 2001).

Concept development is considered to consist of two different processes: concept formation and concept acquisition. Concept formation is defined as a process that is based on making generalizations. In this process, a child perceives the similar and different aspects of the stimuli and makes generalizations based on similarities. Concept formation, which is defined as a classification process, develops intensively during childhood years. Throughout this process, children perceive the functions of objects and they implement various processes on the images remaining in their minds. After being abstracted, concepts are compared and those with similar or mutual characteristics or grouped together. For example, in developing the concept of mother, the child perceives his/her mother's physical appearance, face, hair colour, voice and smell; then starts to distinguish his/her mother from other individuals. As the information, skills and experiences regarding the mother increases, the child develops an improved mother concept (M.E.B., 2007). It is suggested that concepts are formed through different methods and sources. They may be directly learned through sensorial experience of the sensory organ, from operations with other concepts which are already found in the memory or from language communication through verbalization (Slonchak & Pesina, 2015). It is emphasized that the ability to form such concepts is at the heart of the ability to make sense of the surrounding world. A newborn infant does not have the ability to group facts into conceptual categories, so he/she reacts to every new stimulus as if it was unique. If he/she encounters a dog, for example, he/she would not recognize it to be similar to dogs he/she had encountered previously, and thus would have no ground to decide whether it was dangerous or a friendly companion. In other words, this child would have no basis for knowing how to react appropriately, if every stimulus is unique (Lieberman, 2012). Concept acquisition, on the other hand, is described as the process of distinguishing and categorizing the concept within appropriate rules and measures. The concept acquisition process materializes based on the concept formation process. In regard to this process, differentiating skills are emphasized. For example, with the concept of blue, a child can differentiate whether is blue or not blue. When the skill of differentiating a certain characteristic is generalized with the other objects possessing the same characteristic, the concept is acquired (Aral, 2011).

Sloutsky (2014) argued that learning categories is the most important step in conceptual development. He claimed that infants are proficient category learners, as learning categories emerges in the early stages of life. The most critical step in acquiring concepts is suggested to be the learning of category names. Eventually, these names become part of categorization. For Beard (2006), the concept is "an idea of objects or of a class, or a relation, normally expressed by a word". According to this definition, the language that people speak both reflects and shape our conceptualization of the world (Carey, 2001). When a child learns a new word term for a dog, it must refer to that particular dog. Learning this word requires the ability to track objects and humans over time, but it would not require the ability to generalize, or to recognize how dogs are different from each other. It is argued that, in order to learn such words, children require a level of understanding of the conditions underlying different categories, such as a certain grasp of what a dog is and what it is not. For Bloom (2000), this understanding is the concept of a dog, and this concept that is associated with a word is the word's meaning. Haskill and Corts (2010) suggested that, as the child develops, the content of the language they acquire enables a wider scope for memory, which helps to organize knowledge related to objects. As the development continues, children learn new words to consider the consequences of their actions, share points of view and elaborate social situations. In this way, language is argued to provide raw materials for cognition as well as relationships and social behaviour.

On the other hand, Lewis (2010) defines the concept formation as "the acquisition of a category or a schema which refers to a subset of events or objects, such that those objects or events are viewed as similar." A schema refers to a well-defined sequence of physical or mental representations. Within this perspective, conceptual development refers to the accumulation of newly acquired concepts which together form a representation of the outer world. In other words, categories are collections of things and the concepts are the internal representations of these collections (Oakes & Rakison, 2003). According to Carey (2009, 2011) concepts are mental symbols and all mental representations determines the content of a given mental

symbol. In this sense, concepts are representations of symbols referring to the mental coding of information. The knowledge that an object or an action can represent something other than itself has been referred to as representational insight. It is argued that whereas children as young as two years can have representational insight, the ability to think about an entity in two different ways simultaneously is required before children can show representational insight (Bjorklund, 2012). It is identified that a child without representations would not be able to learn. For example, a child may drink orange juice, and likes the flavour. However, the same child drinks oil and has the opposite reaction. Such experiences provide valuable lessons about the pleasure of drinking juice and the bad taste of oil. Nevertheless, it is only possible to learn from this experience if the individual has some mental representation of the relevant objects and it is not sufficient to know that this liquid at this time is flavoursome; a child must be able to generalize it to other liquids and discriminate it from the others. Representations, and the concepts related to them, are essential for the purpose of generalization and learning (Taylor, 2005; Bjorklund & Causey, 2018).

Children learn to recognize the objects or phenomenon they see; they match the similar ones and then differentiate them from the other objects. For instance, a child points to the red blouse his/her mother wears and the red nail polish and learns to say "look, they are the same". Subsequently, the mother or other adults confirm this process by saying "yes, it is red". In other words, following the completion of the differentiating stage, children transition to the next stage where they learn the names of the objects and phenomenon. At this stage, when the child is asked "which one is red?", the child learns to point at the objects that are red. At the second stage, the child can point at the object itself or its picture when the name is said. At the third stage, the child can say the name when the object itself or its picture is shown. Through learning how to use the object or the phenomenon in appropriate ways, the objects or phenomenon are defined (Vuran & Çelik, 2012). Apart from generalization and discrimination, it is argued that the concepts are acquired through association with existing knowledge and exposure to new knowledge as well. On the other hand, it is argued that exposure and children's daily experiences influence their acquisition of biological concepts. Geerdts et al. (2015) examined how children interact with animals and how these interactions shape their development of biological concepts. They observed twenty four preschool aged children together with their pets and found that preschool age children who own pets have more adultlike and conceptual knowledge about animals.

The Development of Concepts According To Age

In the cognitive development process, it is thought that concepts start to develop during early periods and it is argued that children reason even about concepts that are abstract, not clear or distinct, and that are not easy to recognize from early ages (Sucuoğlu et al., 2008). When children acquire new cognitive skills, as they are inclined to activate these conceptually, an improvement starting from the age of four is observed in concept formation skills (Uyanık Balat, 2009). When reviewed based on developmental stages, it is seen that concept formation is particularly important in the pre-school period and continues throughout life; concept acquisition is significant in learning higher level concepts during formal education in schools (Ülgen, 2001). Some of the conceptual development characteristics according to early childhood periods are as follows.

Zero-Two Years

It is highlighted that one of the most important tasks in infancy is to develop basic concepts, not only in terms of objects and people in the world, but also in terms of the characteristics of these objects and people and their interrelations (Gardiner & Gardiner, 2004). According to Piaget (1971), infants use motor abilities and their senses to assign meaning to the world. Their learning is active; however, there is no conceptual or reflective thought. It is argued that the concepts of science are formed starting from birth. Some phenomena are perceived during the prenatal period, such as the mother´s voice. However, abstract concepts are not understood entirely in young ages because of the brain's gradual development. Until the age when they start

school, children perform experimentation and observation with objects in their environment. They explore the world around them through objects such as blocks, balls and other toys, by touching with their hands and mouth (Trnova & Trna, 2015). It is stated that infants focus on the permanent characteristics of many different objects while forming a classification regarding the objects. In the first two years, infants gradually develop an understanding of constant objects, which is also known as the object concept. This skill is the basis of the whole cognitive development process. The continuity of the object is the information indicating objects occupy a place in space and they continue to exist even outside the perception area. This development is believed to occur in all babies following a specific order. For example, when a red hoop is repeatedly shown to babies younger than four months, they become bored after a certain period, and this is a proof of their memories of the hoop. Babies between eighteen and twenty-four months seem to understand the physical characteristics of an object correctly. They search all possible hiding places and they even respond by hiding the toy themselves (Miller, 2008; San Bayhan & Artan, 2004; Parke & Gauvain, 2009).

Children usually start to acquire concepts around the age of one or two; although effective organization of the mental information is also required in order to learn the concept. Children use their reasoning skills to conduct conceptual analyses and these analyses help children to learn new concepts. If the stimuli are carefully selected, the child can group differentiating information in terms of colours and shapes (Aral, 2011). Infants are claimed to have many concepts and a large number of categories in their mental repertoire. According to Oates and Grayson (2004) infants of three-four months of age can recognize that some sets of objects can be grouped into categories, on the basis of perceptual similarities.

In the first year of life, the size and shape of objects can be perceived by infants and they can be represented in a three-dimensional space. During the second year, using objects in their external environment, children develop the ability to understand locations. They also become capable of spatial reasoning, in that they can solve problems with that information. Spatial thinking is an essential cognitive ability that contributes to mathematical thinking. It is argued that young children are able to reason about spatial distances and spatial perspectives, although their abilities considerably improve throughout the school years (Sarama & Clements, 2009). In the first year of life, infants are capable of making predictions for motion events and reason about causality. However, there is a limitation to their understanding. For example, when pre-school children imagine what will happen when a ball rolls off a table, rather than following a path, they predict the ball to fall down from the table (Jirout & Pace, 2015).

Three-six years

A significant amount of conceptual development is argued to occur after infancy. Children as young as two-three years old use words and images to represent their experiences. After three years old, they become capable of reconstructing the past and thinking about or even comparing objects that are not present. Language is suggested to be the most significant form of representational thinking that children display. Most children express their first meaningful words by the end of the first year, and at around eighteen months of age they start combining two or more words to form simple sentences (Oakley, 2004; Newman & Newman, 2009). With the acceleration of language development between the ages of two and four, children start developing symbols for unavailable objects; and can express objects and events with symbols. In this age period, children receive a number of increasing verbal inputs from a wide variety sources, such as peers, books, media, parents and other family members. Children continue to expand their knowledge, which sets the basis for acquiring new knowledge. Their processing capacity, including selective attention and memory, also undergoes significant development (Bjorklund, 2012). Hence, three-year-old children can perform measure-based classification like adults, express events and objects with symbols, and group dogs, horses and flowers. Concept development show dramatic development after four years old, as there are developments that occur as a result of more general cognitive development (Sloutsky, 2014).

Children in this stage use their symbolic abilities in everyday interactions with family members and peers. Symbolic play involves an “as if” orientation to objects, actions and peers.

Most children have imaginary friends at some point during childhood and believe in fantasy characters (Bjorklund, 2012). Most children as young as four years old are argued to distinguish what is real and what is not (Bee & Boyd, 2009). It is argued that children's representation of the reality of various objects increases dramatically between ages three and seven. In a study, which consisted of forty seven three-seven year old children, Woolley & Brown (2015) examined the conceptual development of reality/non-reality and reality/appearance. They found that children's invisibility concept is active in both their behaviour concerning real-world and reasoning, such as air and germs, and entities in their fantasies, such as imaginary friends.

Children in this period are argued to show remarkable competence in relating counting and arithmetic. For example, they can make reasonable predictions about addition and subtraction problems. It is suggested that in order to understand children's developing competence in numerical situations, their ability in situations involving larger numbers must be examined (Fuson, 1988). As young as three years of age, children can distinguish "small" and "big" and can accurately enumerate small collections arranged in a straight line. However, they do not do so in all situations. Even five-year-olds have difficulties when sequencing large disorganized collections. By five years of age, most children can count twenty to thirty objects, although their accuracy is affected by their degree of focus and effort. Without the support of concrete objects until five and a half years of age, the majority of children cannot solve larger number problems (Maier & Benz, 2012). Children gradually acquire the ability to use the numbers to count and place them in the correct order, to measure and to compare. It is argued that many children are able to repeat numbers at two or three years, but the words are often counted in the wrong order. The children learn that numbers have an order; for example, they understand that one is followed by two, and then by three before they learn the meaning of 'first', 'second', 'third'. Finally, the child understands the meaning of 'more than' and 'less than' (Minett, 2014; Bjorklund & Causey, 2017). Nonetheless, children in this period have a limited understanding of the concepts of infinity and zero. It is indicated that three year old children represent zero as the absence of objects, as touching objects is vital for young children's ability of initial counting. Hence, zero is often not encountered in the act of counting (Sarama & Clements, 2009).

Although the majority of time periods can be expressed numerically, it is believed that time cannot be acquired naturally as it is an abstract concept. It is stated that the perception of time during infancy consists of moments and events that are not linked to each other and they are immediately forgotten. As the child develops, his/her memory also develops and helps the child to form connections between events. The first step in a child regarding the development of the concept of time is that of regarding a clock. In other words, the child starts to learn the concept of time with a clock as time's concrete representation; this continues with a calendar and is completed with chronology. Between the ages of two and four, the child attempts to relate daily activities such as dinner time, when parents will come home and bedtime with the concept of time. It is pointed out that children develop the concept of time after the age of four (Eldeleklioğlu, 2008; Safran & Şimşek 2009). Similar to time, the concept of death is also an abstract concept. However, as children think in concrete terms between the ages of three and six, they have difficulty in understanding abstract concepts such as death and think of death as a temporary, reversible situation. They cannot perceive that with death, all life functions can cease. As parents go to work and come back every night, they think that dead people go on some kind of journey and that they will return after a certain period of time. They start to biologically conceptualize death around the ages of five or six (Uran Şenol, 2017).

Children between the ages of three and six can easily distinguish place related concepts, such as close-far, in a clear way. The concept of venue identifies the location of objects to each other, distance between them and their location in the available space. Children around the age of two years are able to distinguish spatial concepts such as 'below' and 'above' from changes in the entities. However, in venue concepts, due to lack of experience, they are unable to perceive that objects can have different visuals in places. Thus, they have problems when differentiating the location of objects in relation to each other, such as on the right, on the left, in front or behind (Oates & Grayson, 2004; Kol, 2010).

With the development of the ability to distinguish between objects and express the differences between them, the concept of shape shows significant development during the pre-school period. A three-year old child can recognize shapes like circle, square, triangle, and match these shapes. At the age of four, children can distinguish round and flat shapes. However, the ability to explain the differences between geometrical shapes with their reasons does not fully develop until the age of six (Maier & Benz, 2012). In a study, Clements et al. (1999) investigated preschool children's ability to distinguish members of a class of shapes from other figures. They conducted clinical interviews with ninety seven children between three and six years old, emphasizing the identification and descriptions of shapes and the reasons for these identifications. In their study, six-year-olds performed significantly better than the younger children in distinguishing geometric shapes such as circles, triangles and rectangles. They argued that, although most children were capable of recognizing the components and simple properties of familiar shapes, young children were argued to rely primarily on visual matching to distinguish shapes and had difficulty with providing descriptions.

The concept of colour is also acquired at an early age. Babies may not be able to name colours, but they can distinguish them. Babies as young as three months old can distinguish most colours and can group them into basic categories such as reds, blues and greens. It is stated that babies can particularly recognize the colour red, while they recognize the colour yellow last and other vibrant colours are recognized in between. It is also expressed that children should comprehensively learn primary colours at the age of three, and primary accent and secondary colours at the age of four (Doyran Bengisu, 2011; Okuş Tezel, 2013). Children only start using colour adjectives accurately after four-five years of age (Davidoff, 1993; Widen & Russell, 2008).

Seven-eleven years: Children continue to develop the abilities in reasoning, spatial coding and symbolizing during the elementary school years, as they develop spatial visualization abilities such as operating on mental images (Sarama & Clements, 2009). According to Piaget's theory of cognitive development, the children in this period start to think in terms of concrete operations. The term "operation" refers to the development of rules and strategies for investigating the child's world and the term "concrete" refers to the child's ability to apply these strategies to things that are present (Piaget, 2005). They now have an understanding of conservation, which refers to the understanding that changes in shape do not always change quantity. School-age children are argued to have active minds, can learn almost anything, and can understand concepts such as classification. In this period, children apply concrete logical operations to problems. This kind of thinking allows children to master such concepts as the relationship between the concepts of speed and time (Feldman, 2012).

It is argued that the development of the number concept and counting skills start during early ages and these skills are necessary for the development of mathematical thinking in later years. It is essential to construct a rich concept of numbers and counting that establishes the basis for arithmetic operations and more advanced mathematical concepts in later years (Olkun et al., 2013). It is claimed that early number knowledge has an influence on the development of arithmetic ability before school entry. A number of studies, provided proof that supporting arithmetic abilities and number knowledge through educational programmes in early ages is significantly effective in children's gaining the concepts numbers in pre-school period and retain this effect in later years. Akuysal Aydoğan and Şen (2011) implemented a concept teaching programme in a sample of 36 pre-school age children. The findings of the experimental study showed significant improvement in the arithmetic abilities of the group that was implemented the programme. In a longitudinal study Östergen and Traff (2013) examined the influence of early number knowledge on the ability of arithmetic calculation in the preschool period. In a total sample of 315 preschool-age children, they found that the knowledge of early number had a direct influence on the growth of the arithmetic ability in primary school children and early number knowledge has a significant influence on the arithmetic ability growth.

Around five-six years old, children are able to perform simple operations such as addition and subtraction of small numbers, by counting on their fingers. When they start school, most children no longer count objects on their fingers, but start to perform arithmetic

operations mentally (Fuson, 1988; Shaffer & Kipp, 2009). The understanding of inversion and associativity is argued to boost the arithmetic skills of children at school. Inversion refers to the understanding that addition and subtraction are inverse operations. If children understand inversion, then they will understand that no calculations are needed to solve the problem. Associativity refers to the understanding that as the addition and subtraction can be solved in any order, then the second part of the problem can be solved first (Robinson & Dube, 2009).
In regard to the concept of death, children from the age of seven and eight, start to perceive the three important components of death as irreversibility, ending and inevitably and the biological process of death. However, seven year old children can perceive that other people may die but have difficulty in perceiving that it may happen to them as well. They relate death with concepts of spirit, ghost, and angel between the ages of six and nine and cannot acquire a mature concept of death until the age of nine (Uran Şenol, 2017). The concept of death for children becomes abstract after the age of ten and children can understand the results of the concept of loss in a better way after this age (Dyregrov, 2000).

Supporting The Concept Development

The establishment of concepts in children is a slow and difficult process; as children gather new information, it is linked to the concepts they already have acquired or new concepts are formed. Increase in perception and experiences, as well as development of vocabulary help children to diversify concepts (Aral, 2011). For this reason, concept development is important in order to provide children with rich stimuli, and it is a part of more general developmental processes that children pass through. A child must understand the nature of the object itself and learn to perceive only certain stimuli as objects. Generally, in order to foster this process, also known as object perception, it is important to offer various stimuli to children (Bee & Boyd, 2009). Arranging the learning environment based on multi stimuli educational environment addressing the interests and needs of the child is argued to be effective in supporting the concept development. In an experimental study examining the impact of multi stimuli educational environment on concept development of children, Hayran (2010) provided evidence that enriching the education environment through linguistic, visual and auditory stimulants as well as creating learning experiences and interrelated activities that the children will have through entertainment have significant impact on children's concept development.

The socio-economic status of the parents is one of the most prominent factors that effect children's concept development, that is the socioeconomic status increases, so do children's conceptual skills (Bütün Ayhan et al., 2013). Having experiences with objects will guide the children in the process of learning new concepts; however, this does not require expensive toys and materials and everyday tools that every parents all different socio-economic status can obtain such as pans, pots, socks, spoons and pictures from magazines are also good educational tools. It is argued that such simple materials might be helpful to satisfy children's desires to create representational images form very early ages and will help them to learn about the real world (Dolya, 2010). Children learn through direct experiences and by observing other people and objects, viewing their actions, pictures, events. Therefore, they should be provided opportunities to interact with their physical and social environment. Taking the child out in the nature and/or providing opportunity for social contact would be significant facilitators of concept learning in early childhood (Didin & Köksal Akyol, 2018).

All concepts develop gradually over time and they are learned naturally while the children explore their environment as they are curious to try new plays with simple household objects and discover new ideas. Children develop their understanding in accordance with their age and developmental characteristics. They have a great deal to learn in order to acquire the knowledge and skills that are gradually acquired. Therefore, if the child shows interest in colors and sounds but in numbers, it should be noted that such variations are normal (Yielts, 1995). In young ages, infants enjoy games and activities, such as playing with sand, water and various containers, which support conceptual development and are largely unstructured activities. Infants also require as much individual attention as possible to ensure that they fully develop the directional functions of speech. It is suggested that if children are introduced to any kind of

activity too early, the probability is that they will become confused and develop a distaste for this form of learning. According to Beard (2006) it is erroneous for parents and teachers to assume that as soon as children acquire the ability to talk fluently, they have also mastered concepts which correspond with their vocabulary. Choosing the concept to work on is a crucial step, in this process. The parents or educators should pay attention to what the child has in mind at that moment and what is meaningful and enjoyable for her/him as the learning procedure should help the child to participate in day to day life and facilitate their understanding the world around them better. Promoting the ideas that help the child understand "why" by attaching play and vocabulary to all experiences might have greater significance (Spratling, 2015).

Basic concepts are important for both the start of education and later academic studies. For instance, it is stated that in order to successfully learn some mathematical skills such as adding and subtracting in the first grade, children should learn a series of concepts during the pre-school period (Sucuoğlu, 2008). These concepts, at the same time, are underlined as necessary to understand the activities in school and to subsequently adapt to them (Uyanık Balat, 2009). The pre-school period, which covers the period between the ages of three and six in particular, is acknowledged as a period of time during which children acquire many concepts and rapidly learn them (Santrock, 2014). It is also emphasized that quality academic education provided in educational institutions positively influences the cognitive development and concept acquisition skills of children, which prepares them for formal education. A previous study that aimed to compare the concept development of three-year old children, a significant difference was found between the conceptual development of children who attended a pre-school and those who did not. Children attending a pre-school were found to have improved concept development due to the support provided in the school environment (Üstün & Akman, 2003). The concept of school readiness, which refers to the child's readiness for school in terms of physical, emotional, mental and social aspects, only occurs when the child reaches a developmental level that will enable him/her to be successful in school education (Bütün Ayhan et al., 2007; Yeşil Dağlı, 2012; Gündüz & Çalışkan, 2013).

In order to foster children's level of information regarding basic concepts, various activities should be used so that they can succeed in school life and increase their readiness levels. However, it is argued that concept teaching requires different teaching and learning strategies, as they cannot be taught directly or be transferred from one person to another and requires a bottom-up, learner-centred approach (Birbili, 2015). One prominent strategy to teach basic concepts is using examples as a basic prototype of a concept followed by some other examples of the same concept; that is, for example, when teaching the concept "dog", the educator may display pictures of different types of dogs. Hence, the entire scope of that concept can be demonstrated. by presenting a range of examples. However, the child must be able to generalize the dog to other types of dog. In this process, generalization is a common strategy in teaching children concepts. If children are able to generalize new concepts, the process of learning new concepts will become more functional (Powell, 2011). In addition, different objects should be used while presenting examples of concepts. Using only one type of tool while presenting a concept can lead to incorrect learning and the children not being to generalize the newly learnt concept. The tools used for presenting the concepts should also be those that the children know and recognize. Children should be personally involved in teaching concepts such as saying "I'm old, you are young" to the child while teaching the concept of 'old/big' (Vuran & Çelik, 2012). When children are individually involved in learning, they should also be allowed to determine their own errors and inconsistencies in their own thinking, cognitive growth can be more rapid. Parents and teachers should therefore encourage children to discover the consistency of their thinking, but then allow the children to take the lead in determining the errors. For example, if the children are making mistakes in subtraction problems, a teacher should not correct the error directly but should encourage them to discover it on their own (Kail & Cavanaough, 2007).

All examples should be explained in similar terms to help children understand the concept examples in a clear and direct way. Thus, children can focus on the characteristics of a

constant example. The concepts presented should be chosen in a manner that will share the maximum amount of common characteristics. Hence, the concept will be taught with minimal examples and also the child will be able to focus on the associated characteristics of the concept (Dixon & Bangert, 200; Minett, 2014). Modeling descriptive words might be helpful to point out the common characteristics. For example, the parents or the teachers may talk to the child about everything they hear or see in the environment. The child might be given distinctive textures might be brought to the child's attention (e.g. smooth, hard, soft). Expanding the words to describe objects may also facilitate learning different concepts. For example, using the word "huge", instead of "big"; avoiding to show by gesturing or pointing and using more descriptive words such as "above", "below", "behind" would be helpful to expose the child new concepts (Loraine, 2008). As much as presenting examples of the concepts, synonyms and antonyms can be used while teaching concepts. If a concept is to be taught by using its synonyms, the child must know at least one of the meaningful expressions of the concept. For example, if the concept of boat is to be taught by using its synonym, rowboat, the student must know the meaning of rowboat. If the student does not know the meaning of the new word, the examples should be varied; positive and negative examples should be used. But it should be noted that regardless of how similar or distinctive the concepts are in meaning, each concept should be taught separately (Tuncer & Altunay, 2004).

Children might also be helped learning concepts by endorsing their interest in books. Concept books are valuable educational tools to teach children concepts. However, children primarily learn concepts by their direct contact and experiences with objects. Hence, concept books, such as about the alphabet, colors, shapes, numbers, shapes and sizes, are functional tools for reinforcing direct experiences, but not as substitutes for them. Children should be let active learners in such environment. Concept books may become a significant aspect of a rich learning environment, when they are used to stimulate their child's active experiences rather than to teach concepts (Carlson, 1996). A combination of using books and making up games would also be helpful to attract child's attention. For instance, if the concepts may not be stated directly within the text of the book, the parents or teachers may start by using an illustration and saying, for example, "Where is the bird? It' s on the table." Then, the children might be allowed to tell what is off the table. As an extension activity, the parents or the teachers may go around the room with the children and find things that are on and off something. Another play might be "I look at" by saying, "I am looking at something that is empty." For more practice, the child might be encouraged to use concepts when it is their turn. Such games might be enjoyable to use use as a group, one-on-one, or on long car journeys (Spielvogle, 2003).

In the addition to these conventional strategies and methods, despite the controversy about the advantages and the disadvantages of computers for children, in the literature there are findings suggesting that computer assisted teaching and educational softwares may be beneficial for basic educational skills and support concept development as most children get acquainted with computers starting from early years. For example, in a study Bütün Ayhan and Aral (2009) examined the effect of computer aided instruction on the concept development of the six-year old children and found that computer based instruction in teaching facilitates concept development in preschool children. Project based teaching strategies are also shown to be effective to facilitate children's learning of concepts (Aral et al., 2010).

CONCLUSION

Children form cognitive structures in order to adapt to the world surrounding them, starting from very early ages. The formation and the maturation of these cognitive structures occur through concept development. Concepts helping the child to think and understand the world around him/her and the development of concepts form the basis for cognitive development. During this process, children first recognize the concepts, and then they name the concepts. Recognition of concepts shows that the child has reached a certain level of mental maturity.

Concepts, which define the objects in the world, enable meaning for social and emotional situations and, as a result, facilitate crucial cognitive processes, which are the fundamentals of more complex developmental processes. Concepts make thinking processes more complex and enable detailed perceptive living. A child with good concept development can express his/her emotions and wishes in a more relaxed and clear manner; he/she can communicate with his/her environment more easily through concepts. Development of communicative skills is crucial for the social development of the child. The role of conceptual development is also argued to be significant in terms of academic achievements, as the mastery of basic concepts help children to adapt to and participate in activities at school. Thus, it seems plausible to argue that the early childhood period has considerable importance in terms of the concept development of children. However, our understanding of developmental mechanisms of conceptual behaviour is incomplete. It is thought that further research and examination of concept development may be beneficial in supporting children's overall development.

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